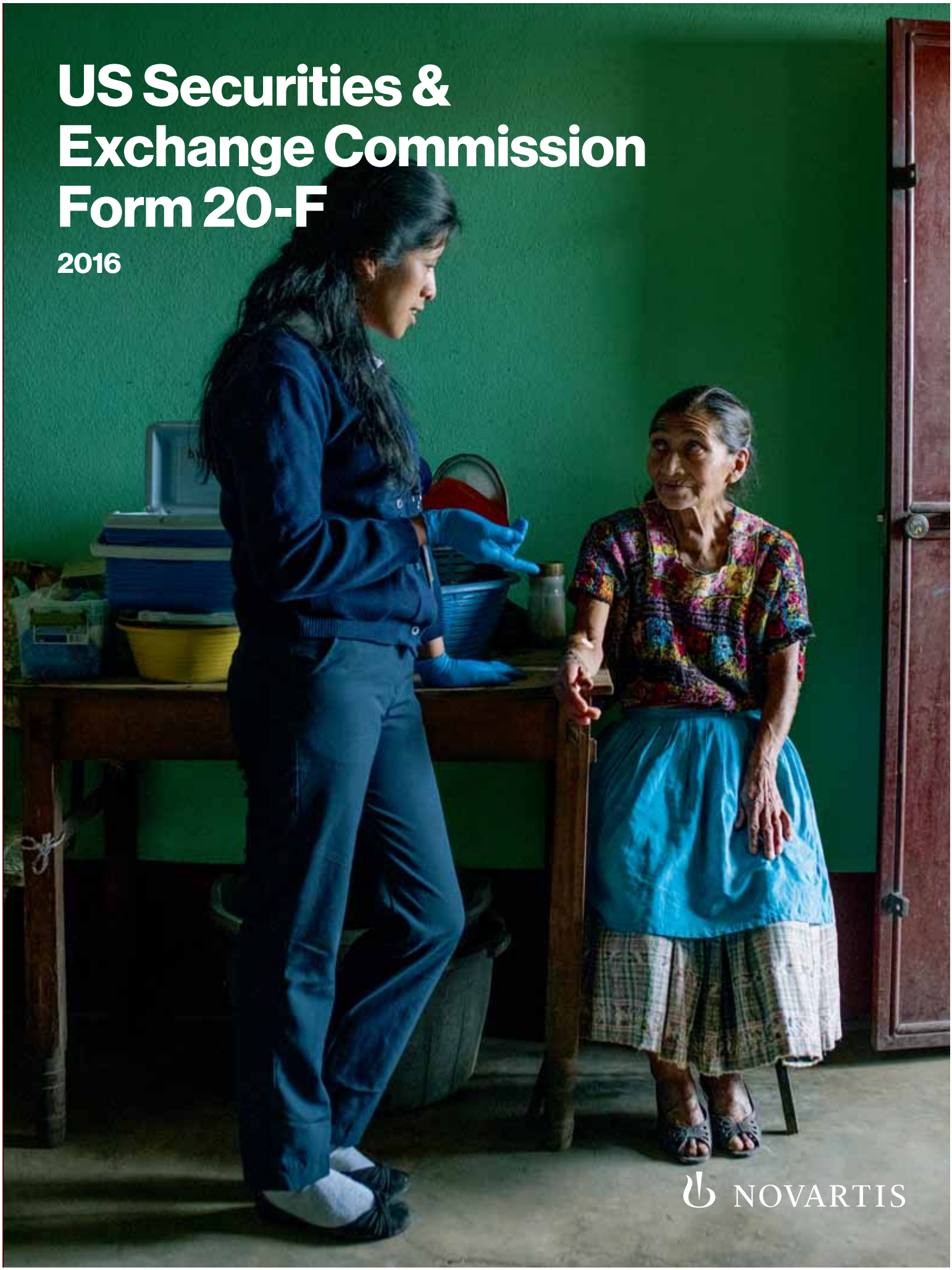
US Securities & Exchange Commission Form 20-F

2016



NOVARTIS

As filed with the Securities and Exchange Commission on January 25, 2017

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington D.C. 20549

FORM 20-F

☐ REGISTRATION STATEMENT PURSUANT TO SECTION 12(b) OR 12(g) OF THE SECURITIES EXCHANGE ACT OF 1934

OR

☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 for the fiscal year ended December 31, 2016

OR

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

OR

☐ SHELL COMPANY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

Commission file number 1-15024

NOVARTIS AG

(Exact name of Registrant as specified in its charter)

NOVARTIS Inc.

(Translation of Registrant's name into English)

Switzerland

(Jurisdiction of incorporation or organization)

Lichtstrasse 35
4056 Basel, Switzerland
(Address of principal executive offices)

Felix R. Ehrat
Group General Counsel
Novartis AG
CH-4056 Basel
Switzerland
Tel.: 011-41-61-324-1111
Fax: 011-41-61-324-7826

(Name, Telephone, E-mail and/or Facsimile number and Address of Company Contact Person)

Securities registered pursuant to Section 12(b) of the Act:

Title of class	Name of each exchange on which registered
American Depositary Shares each representing 1 share	**New York Stock Exchange**
Ordinary shares, nominal value CHF 0.50 per share*	**New York Stock Exchange***

Securities registered or to be registered pursuant to Section 12(g) of the Act:

None

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act:

None

Indicate the number of outstanding shares of each of the issuer's classes of capital or common stock as of the close of the period covered by the annual report:

2,374,059,013 shares

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes ☒ **No** ☐

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934.

Yes ☐ **No** ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes ☒ **No** ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, or a non-accelerated filer. See definition of "accelerated filer and large accelerated filer" in Rule 12b-2 of the Exchange Act (Check one):

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

☐ U.S. GAAP ☒ International Financial Reporting Standards as issued by the International Accounting Standards Board ☐ Other

If "Other" has been checked in response to the previous question indicate by check mark which financial statement item the registrant has elected to follow.

Item 17 ☐ **Item 18** ☐

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes ☐ **No** ☒

* Not for trading but only in connection with the registration of American Depositary Shares representing such ordinary shares.

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INTRODUCTION AND USE OF CERTAIN TERMS

Novartis AG and its consolidated affiliates publish consolidated financial statements expressed in US dollars. Our consolidated financial statements responsive to Item 18 of this annual report on Form 20-F (Form 20-F) are prepared in accordance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB).

Pursuant to Rule 12b-23 of the Securities Exchange Act of 1934, as amended, we incorporate information for certain items of this Form 20-F by reference to the "Excerpts from Novartis Annual Report 2016" included as Exhibit 99.1 to Form 6-K furnished to the SEC on January 25, 2017. Therefore the information in this Form 20-F should be read in conjunction with the "Excerpts from Novartis Annual Report 2016," as furnished to the SEC on Form 6-K on January 25, 2017. References to content not contained within the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, shall not be deemed to be incorporated by reference.

Unless the context requires otherwise, the words "we," "our," "us," "Novartis," "Group," "Company," and similar words or phrases in this Form 20-F refer to Novartis AG and its consolidated affiliates. However, each Group company is legally separate from all other Group companies and manages its business independently through its respective board of directors or similar supervisory body or other top local management body, if applicable. No Group company operates the business of another Group company. Each executive identified in this Form 20-F reports directly to other executives of the Group company which employs the executive, or to that Group company's board of directors.

In this Form 20-F, references to "US dollars" or "$" are to the lawful currency of the United States of America, and references to "CHF" are to Swiss francs; references to the "United States" or to "US" are to the United States of America, references to the "European Union" or to "EU" are to the European Union and its 28 member states, references to "Latin America" are to Central and South America, including the Caribbean, and references to "Australasia" are to Australia, New Zealand, Melanesia, Micronesia and Polynesia, unless the context otherwise requires; references to the "EC" are to the European Commission; references to "associates" are to employees of our affiliates; references to the "FDA" are to the US Food and Drug Administration, references to "EMA" are to the European Medicines Agency, an agency of the EU, and references to the "CHMP" are to the Committee for Medicinal Products for Human Use of the EMA; references to "ADR" or "ADRs" are to Novartis American Depositary Receipts, and references to "ADS" or "ADSs" are to Novartis American Depositary Shares; references to the "NYSE" are to the New York Stock Exchange, and references to the "SIX" are to the SIX Swiss Exchange; references to "GSK" are to GlaxoSmithKline plc, references to "Lilly" are to Eli Lilly and Company, and references to "CSL" are to CSL Limited.

All product names appearing in *italics* are trademarks owned by or licensed to Group companies. Product names identified by a "®" or a "™" are trademarks that are not owned by or licensed to Group companies.

FORWARD-LOOKING STATEMENTS

This Form 20-F contains certain "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Other written materials filed with or furnished to the US Securities and Exchange Commission (SEC) by Novartis, as well as other written and oral statements made to the public, may also contain forward-looking statements. Forward-looking statements can be identified by words such as "potential," "expected," "will," "planned," "pipeline," "outlook," or similar terms, or by express or implied discussions regarding potential new products, potential new indications for existing products, or regarding potential future revenues from any such products; potential shareholder returns or credit ratings; or regarding the potential outcome of the announced review of options being undertaken to maximize shareholder value of the Alcon Division; or regarding the potential financial or other impact on Novartis or any of our divisions of the significant reorganizations of recent years, including the creation of the Pharmaceuticals and Oncology business units to form the Innovative Medicines Division, the creation of the Global Drug Development organization and Novartis Operations (including Novartis Technical Operations and Novartis Business Services), the transfer of the Ophthalmic Pharmaceuticals products of our Alcon Division to the Innovative Medicines Division, the transfer of selected mature, non-promoted pharmaceutical products from the Innovative Medicines Division to the Sandoz Division, and the transactions

with GSK, Lilly and CSL; or regarding the potential impact of the share buyback plan; or regarding potential future sales or earnings of the Novartis Group or any of its divisions; or by discussions of strategy, plans, expectations or intentions. You should not place undue reliance on these statements.

Such forward-looking statements are based on the current beliefs and expectations of management regarding future events, and are subject to significant known and unknown risks and uncertainties. Should one or more of these risks or uncertainties materialize, or should underlying assumptions prove incorrect, actual results may vary materially from those set forth in the forward-looking statements. There can be no guarantee that any new products will be approved for sale in any market, or that any new indications will be approved for any existing products in any market, or that any approvals which are obtained will be obtained at any particular time, or that any such products will achieve any particular revenue levels. Nor can there be any guarantee that the review of options being undertaken to maximize shareholder value of the Alcon Division will reach any particular results, or at any particular time. Neither can there be any guarantee that Novartis will be able to realize any of the potential strategic benefits, synergies or opportunities as a result of the significant reorganizations of recent years, including the creation of the Pharmaceuticals and Oncology business units to form the Innovative Medicines Division, the creation of the Global Drug Development organization and Novartis Operations (including Novartis Technical Operations and Novartis Business Services), the transfer of the Ophthalmic Pharmaceuticals products of our Alcon Division to the Innovative Medicines Division, the transfer of selected mature, non-promoted pharmaceutical products from the Innovative Medicines Division to the Sandoz Division, and the transactions with GSK, Lilly and CSL. Neither can there be any guarantee that shareholders will achieve any particular level of shareholder returns. Nor can there be any guarantee that the Group, or any of its divisions, will be commercially successful in the future, or achieve any particular credit rating or financial results.

In particular, management's expectations could be affected by, among other things:

- regulatory actions or delays or government regulation generally;
- the potential that the strategic benefits, synergies or opportunities expected from the significant reorganizations of recent years, including the creation of the Pharmaceuticals and Oncology business units to form the Innovative Medicines Division, the creation of the Global Drug Development organization and Novartis Operations (including Novartis Technical Operations and Novartis Business Services), the transfer of the Ophthalmic Pharmaceuticals products of our Alcon Division to the Innovative Medicines Division, the transfer of selected mature, non-promoted pharmaceutical products from the Innovative Medicines Division to the Sandoz Division, and the transactions with GSK, Lilly and CSL may not be realized or may take longer to realize than expected;
- the inherent uncertainties involved in predicting shareholder returns or credit ratings;
- the uncertainties inherent in the research and development of new healthcare products, including clinical trial results and additional analysis of existing clinical data;
- our ability to obtain or maintain proprietary intellectual property protection, including the ultimate extent of the impact on Novartis of the loss of patent protection and exclusivity on key products which commenced in prior years and will continue this year;
- safety, quality or manufacturing issues;
- global trends toward health care cost containment, including ongoing pricing and reimbursement pressures, such as from increased publicity on pharmaceuticals pricing, including in certain large markets;
- uncertainties regarding actual or potential legal proceedings, including, among others, actual or potential product liability litigation, litigation and investigations regarding sales and marketing practices, intellectual property disputes and government investigations generally;
- general economic and industry conditions, including uncertainties regarding the effects of the persistently weak economic and financial environment in many countries;
- uncertainties regarding future global exchange rates;
- uncertainties regarding future demand for our products; and

- uncertainties regarding potential significant breaches of data security or data privacy, or disruptions of our information technology systems.

Some of these factors are discussed in more detail in this Form 20-F, including under "Item 3. Key Information—3.D. Risk Factors," "Item 4. Information on the Company," and "Item 5. Operating and Financial Review and Prospects." Should one or more of these risks or uncertainties materialize, or should underlying assumptions prove incorrect, actual results may vary materially from those described in this Form 20-F as anticipated, believed, estimated or expected. We provide the information in this Form 20-F as of the date of its filing. We do not intend, and do not assume any obligation, to update any information or forward-looking statements set out in this Form 20-F as a result of new information, future events or otherwise.

PART I

Item 1. Identity of Directors, Senior Management and Advisers

Not applicable.

Item 2. Offer Statistics and Expected Timetable

Not applicable.

Item 3. Key Information

3.A Selected Financial Data

The selected financial information set out below has been extracted from our consolidated financial statements prepared in accordance with IFRS as issued by the IASB. Our consolidated financial statements for the years ended December 31, 2016, 2015 and 2014, are included under "Novartis Group consolidated financial statements" on pages 178 to 247 of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, and in "Item 18. Financial Statements" in this Form 20 F.

All financial data should be read in conjunction with "Item 5. Operating and Financial Review and Prospects". All financial data presented in this Form 20-F are qualified in their entirety by reference to the consolidated financial statements and their notes.

	Year Ended December 31,				
	2016	**2015**	**2014**	**2013**	**2012**
	($ millions, except per share information)				
INCOME STATEMENT DATA					
Net sales to third parties from continuing operations	**48,518**	**49,414**	**52,180**	**51,869**	**51,080**
Operating income from continuing operations	**8,268**	**8,977**	**11,089**	**10,983**	**11,507**
Income from associated companies	703	266	1,918	599	549
Interest expense	(707)	(655)	(704)	(683)	(724)
Other financial income and expense	(447)	(454)	(31)	(92)	(96)
Income before taxes from continuing operations	**7,817**	**8,134**	**12,272**	**10,807**	**11,236**
Taxes	(1,119)	(1,106)	(1,545)	(1,498)	(1,706)
Net income from continuing operations	**6,698**	**7,028**	**10,727**	**9,309**	**9,530**
Net income/(loss) from discontinued operations		10,766	(447)	(17)	(147)
Group net income	**6,698**	**17,794**	**10,280**	**9,292**	**9,383**
Attributable to:					
Shareholders of Novartis AG	6,712	17,783	10,210	9,175	9,270
Non-controlling interests	(14)	11	70	117	113
Basic earnings per share ($)					
Continuing operations	2.82	2.92	4.39	3.76	3.89
Discontinued operations		4.48	(0.18)	0.00	(0.06)
Total	2.82	7.40	4.21	3.76	3.83
Diluted earnings per share ($)					
Continuing operations	2.80	2.88	4.31	3.70	3.85
Discontinued operations		4.41	(0.18)	0.00	(0.06)
Total	2.80	7.29	4.13	3.70	3.79
Cash dividends[1]	6,475	6,643	6,810	6,100	6,030
Cash dividends per share in CHF[2]	2.75	2.70	2.60	2.45	2.30

(1) Cash dividends represent cash payments in the applicable year that generally relates to earnings of the previous year.

(2) Cash dividends per share represent dividends proposed that relate to earnings of the current year. Dividends for 2012 through 2015 were approved at the respective AGMs and dividends for 2016 will be proposed to the Annual General Meeting on February 28, 2017 for approval.

	Year Ended December 31,				
	2016	2015	2014	2013	2012
			($ millions)		
BALANCE SHEET DATA					
Cash, cash equivalents and marketable securities & derivative financial instruments.	7,777	5,447	13,862	9,222	8,119
Inventories	6,255	6,226	6,093	7,267	6,744
Other current assets	10,899	11,172	10,805	13,294	13,141
Non-current assets	105,193	108,711	87,826	95,712	96,187
Assets related to discontinued operations			6,801	759	
Total assets	**130,124**	**131,556**	**125,387**	**126,254**	**124,191**
Trade accounts payable	4,873	5,668	5,419	6,148	5,593
Other current liabilities	17,336	18,040	19,136	20,170	18,458
Non-current liabilities	33,024	30,726	27,570	25,414	30,877
Liabilities related to discontinued operations			2,418	50	
Total liabilities	**55,233**	**54,434**	**54,543**	**51,782**	**54,928**
Issued share capital and reserves attributable to shareholders of Novartis AG	74,832	77,046	70,766	74,343	69,137
Non-controlling interests	59	76	78	129	126
Total equity	**74,891**	**77,122**	**70,844**	**74,472**	**69,263**
Total liabilities and equity	**130,124**	**131,556**	**125,387**	**126,254**	**124,191**
Net assets	74,891	77,122	70,844	74,472	69,263
Outstanding share capital	896	890	898	912	909
Total outstanding shares (millions)	2,374	2,374	2,399	2,426	2,421

Cash Dividends per Share

Cash dividends are translated into US dollars at the Bloomberg Market System Rate on the payment date. Because we pay dividends in Swiss francs, exchange rate fluctuations will affect the US dollar amounts received by holders of ADRs.

Year Earned	Month and Year Paid	Total Dividend per share (CHF)	Total Dividend per share ($)
2012	March 2013	2.30	2.44
2013	March 2014	2.45	2.76
2014	March 2015	2.60	2.67
2015	March 2016	2.70	2.70
2016[1]	March 2017	2.75	2.69[2]

(1) Dividend to be proposed at the Annual General Meeting on February 28, 2017 and to be distributed March 6, 2017

(2) Translated into US dollars at the December 31, 2016 rate of $0.978 to the Swiss franc. This translation is an example only, and should not be construed as a representation that the Swiss franc amount represents, or has been or could be converted into US dollars at that or any other rate.

Exchange Rates

The following table shows, for the years and dates indicated, certain information concerning the rate of exchange of US dollar per Swiss franc based on exchange rate information found on Bloomberg Market System. The exchange rate in effect on January 17, 2017, as found on Bloomberg Market System, was CHF 1.00 = $0.99.

Year ended December 31, ($ per CHF)	Period End	Average[1]	Low[2]	High[2]
2012	1.09	1.07	1.02	1.12
2013	1.12	1.08	1.05	1.12
2014	1.01	1.09	1.01	1.13
2015	1.01	1.04	0.97	1.08
2016	0.98	1.01	0.98	1.04
Month				
August 2016			1.02	1.05
September 2016			1.02	1.04
October 2016			1.01	1.03
November 2016			0.98	1.03
December 2016			0.97	0.99
January 2017 (through January 17, 2017)			0.97	0.99

(1) Represents the average of the exchange rates on the last day of each month during the year.

(2) Represents the lowest, respectively highest, of the exchange rates on the last day of each month during the year.

3.B Capitalization and Indebtedness

Not applicable.

3.C Reasons for the offer and use of proceeds

Not applicable.

3.D Risk Factors

Our businesses face significant risks and uncertainties. You should carefully consider all of the information set forth in this annual report on Form 20-F and in other documents we file with or furnish to the SEC, including the following risk factors, before deciding to invest in or to maintain an investment in any Novartis securities. Our business, as well as our financial condition or results of operations could be materially adversely affected by any of these risks, as well as other risks and uncertainties not currently known to us or not currently considered material.

Risks Facing Our Business

Our products face important patent expirations and losses of intellectual property protection.

Major products of our Innovative Medicines and Alcon Divisions, as well as certain products of our Sandoz Division, are protected by patent and other intellectual property rights, which provide us with exclusive rights to market the products, and give us an opportunity to recoup our investments in research and development. However, the strength and duration of those intellectual property rights can vary significantly from product to product and country to country. Loss of market exclusivity for one or more important products has had, and can be expected to continue to have a material adverse effect on our results of operations.

The introduction of generic competition for a patented medicine typically results in a significant and rapid reduction in net sales and net income for the patented product because generic manufacturers typically offer their unpatented versions at sharply lower prices. Such competition can occur after successful challenges to intellectual property rights or the regular expiration of the term of the patent or other intellectual property rights. Such competition can also result from the entry of generic versions of another medicine in the same therapeutic class as

one of our drugs or in another competing therapeutic class, from a Declaration of Public Interest or the compulsory licensing of our drugs by governments, or from a general weakening of intellectual property laws in certain countries around the world. In addition, generic manufacturers sometimes take an aggressive approach to challenging patents, including conducting so-called "launches at risk" of products that are still under legal challenge for patent infringement, before final resolution of legal proceedings.

We also rely in all aspects of our businesses on unpatented proprietary technology, know-how, trade secrets and other confidential information, which we seek to protect through various measures including confidentiality agreements with licensees, employees, third-party collaborators, and consultants who may have access to such information. If these agreements are breached, our contractual or other remedies may not be adequate to cover our losses.

Some of our best-selling products have begun or are about to face significant competition due to the end of market exclusivity resulting from the expiry of patent or other intellectual property protection.

- We faced generic competition in the US, Japan and some EU countries for our best-selling product *Gleevec*/*Glivec* during most of 2016. In the remaining EU countries, certain of our *Glivec* intellectual property rights expired in December 2016, and generic competition there has begun.
- Patent protection for our *Sandostatin* products has expired. Generic versions of *Sandostatin* SC are available in the US, EU and Japan. There is currently no generic competition in the US, EU or Japan for *Sandostatin LAR*, the long-acting version of *Sandostatin* which represents the majority of our *Sandostatin* sales.
- *Diovan* and *Co-Diovan*/*Diovan HCT*, which had long been our best-selling product, has generic competitors in the US, EU and Japan. In addition, the single pill combination products *Exforge* and *Exforge HCT*, which contain valsartan, the active ingredient in *Diovan*, face generic competition despite the existence of separate intellectual property covering those products. *Exforge* has generic competition in the US and Japan, and *Exforge HCT*, which is not marketed in Japan, has generic competition in the US. Generic competition for *Exforge* began in some countries in Europe in January 2017.
- Certain intellectual property protecting our major products *Afinitor* and *Gilenya* will expire in 2018, 2019 and 2020. In addition, some of the patents protecting these products are being challenged in the US, raising the possibility of an earlier entry of generic competition.

For more information on the patent status of our Innovative Medicines Division's products see "Item 4. Information on the Company—Item 4.B Business Overview—Innovative Medicines—Intellectual Property."

In 2017, we expect an impact on our net sales of about $2.5 billion as a result of the loss of intellectual property protection for our products, including *Gleevec*/*Glivec*. Because we typically have substantially reduced marketing and research and development expenses related to products that are in their final year of exclusivity, we expect that this loss of intellectual property protection also will have an impact on our 2017 operating income in an amount corresponding to a significant portion of the products' lost sales. The magnitude of the impact of generic competition could depend on a number of factors, including the time of year at which such exclusivity would be lost; the ease or difficulty of manufacturing a competitor product and obtaining regulatory approval to market it; the number of generic competitor products approved, including whether, in the US, a single competitor is granted an exclusive marketing period, and whether an authorized generic is launched; and the geographies in which generic competitor products are approved, including the strength of the market for generic pharmaceutical products in such geographies and the comparative profitability of branded pharmaceutical products in such geographies.

Clearly, with respect to major products for which the patent terms are expiring, the loss of exclusivity of these products can be expected to have a material adverse effect on our business, financial condition and results of operations. In addition, should we unexpectedly lose exclusivity on additional products as a result of patent litigation or other reasons, this could also have a material adverse effect on our business, financial condition and results of operations, both due to the loss of revenue and earnings, and the difficulties in planning for such losses.

Our financial performance depends on the commercial success of key products.

Our financial performance, including our ability to replace revenue and income lost to generic and other competition and to grow our business, depends heavily on the commercial success of certain key products, known as our Growth Products. We consider our Growth Products to be an indicator of the rejuvenation of our portfolio of products. Growth Products consist of products launched in a key market (EU, US, Japan) in 2011 or later, or products with exclusivity in key markets until at least 2020 (except Sandoz, which includes only products launched in the last 24 months). In 2016, our Growth Products contributed $17.1 billion, or 35% of our total net sales.

If these products or any of our other major products were to become subject to problems such as changes in prescription growth rates, unexpected side effects, loss of intellectual property protection, supply chain issues or other product shortages, regulatory proceedings, changes in labeling, publicity affecting doctor or patient confidence in the product, material product liability litigation, or pressure from new or existing competitive products, the adverse impact on our revenue and profit could be significant. In addition, our revenue and profit could be significantly impacted by the timing and rate of commercial acceptance of key new products.

All of our businesses are broadly faced with intense competition from new products and technological advances from competitors, including new competitors from other industries such as Alphabet and IBM that are entering the healthcare field. Physicians, patients and third-party payors may choose our competitors' products instead of ours if they perceive them to be safer, more effective, easier to administer, less expensive, more convenient, or more cost-effective.

Products that compete with ours, including products competing against our Growth Products or other major products, are launched from time to time. We cannot predict with accuracy the timing of the introduction of such competitive products or their possible effect on our sales. However, products significantly competitive to our major products *Cosentyx, Lucentis, Gilenya* and *Afinitor* have been launched. Such products, and other competitive products, could significantly affect the revenue from our products and our results of operations. In addition, the impact on our results of operations could be compounded to the extent such competition results in us making significant additional investments in marketing and sales.

Similarly, our Alcon Division, a leader in the eye care industry, has suffered declining sales and profits due in part to increased competition for its products. To counter this, we are continuing efforts to improve the division's revenues and profits. Our efforts under this plan are expected to take time to succeed. As a result, such competition and the costs of our efforts to improve Alcon's performance, as well as other factors, can be expected to affect Alcon's business, financial condition or results of operations in the near term. In addition, despite the devotion of significant resources to our efforts to improve Alcon's performance, those efforts may prove insufficient. Should our efforts fail to accomplish their goals, or fail to do so in a timely manner, it could have a material adverse impact on our business, financial condition or results of operations beyond the near term, as well. See also the discussion of Alcon's new product development efforts in "—Our research and development efforts may not succeed in bringing new products to market, or may fail to do so cost efficiently enough, or in a manner sufficient to grow our business, replace lost revenue and income and take advantage of new technologies," below, and the discussion of the impact of competition on our Sandoz Division in "—Failure to obtain marketing exclusivity periods for new generic products, or to develop biosimilars and other differentiated products, as well as intense competition from patented and generic pharmaceuticals companies, may have an adverse effect on the success of our Sandoz Division," below.

Our research and development efforts may not succeed in bringing new products to market, or may fail to do so in a cost-efficient manner, or in a manner sufficient to grow our business, replace lost revenue and income and take advantage of new technologies.

Our ability to continue to maintain and grow our business, to replace sales lost due to competition, entry of generics or other reasons, and to bring to market products and medical advances that take advantage of new, and potentially disruptive technologies depends in significant part upon the success of our research and development activities in identifying, and successfully and cost-effectively developing new products that address unmet medical needs, are accepted by patients and physicians, and are reimbursed by payors. To accomplish this, we commit substantial effort, funds and other resources to research and development, both through our own dedicated resources and through collaborations with third parties. Developing new healthcare products and bringing them to market, however, is a highly costly, lengthy and uncertain process. In spite of our significant investments, there can be no guarantee that our research and development activities will produce commercially viable new products that will enable us to replace revenue and income lost to generic and other competition and to grow our business. See also "—We may not successfully achieve our goals in strategic transactions or reorganizations," below, with regard to our recent reorganization of our pharmaceutical product development organization.

Using the products of our Innovative Medicines Division as an example, the research and development process for a new product can take up to 15 years, or even longer, from discovery to commercial product launch—and with limited available intellectual property protections, the longer it takes to develop a product, the less time there will be for us to recoup our research and development costs. New products must undergo intensive preclinical and clinical testing, and must be approved by means of highly complex, lengthy and expensive approval processes which can vary from country to country. During each stage, there is a substantial risk that we will encounter serious obstacles that will further delay us and add substantial expense, that we will develop a product with limited potential for commercial success, or that we will be forced to abandon a product in which we have invested substantial amounts of time and money. These risks may include failure of the product candidate in preclinical studies, difficulty enrolling patients in clinical trials, clinical trial holds or other delays in completing clinical trials, delays in completing formulation and other testing and work necessary to support an application for regulatory approval, adverse reactions to the product candidate or other safety concerns, insufficient clinical trial data to support the safety or efficacy of the product candidate or to differentiate our product candidate from competitors, an inability to manufacture sufficient quantities of the product candidate for development or commercialization activities in a timely and cost-effective manner, and failure to obtain, or delays in obtaining, the required regulatory approvals for the product candidate or the facilities in which it is manufactured.

In addition, following a series of widely publicized issues, health regulators have increased their focus on product safety. Governmental authorities and payors around the world have also paid increased attention to whether new products offer a significant benefit over other products in the same therapeutic class. These developments have led to requests for more clinical trial data, for the inclusion of significantly higher numbers of patients in clinical trials, and for more detailed analyses of the trials. As a result, the already lengthy and expensive process of obtaining regulatory approvals and reimbursement for pharmaceutical products has become even more challenging.

There is also the risk that we may fail to identify significant new product candidates for development or potentially disruptive new technologies, and so may fail to take advantage of a potential new wave of innovation.

For the same reason, the post-approval regulatory burden has also increased. Approved drugs are subject to various requirements such as risk evaluation and mitigation strategies (REMS), risk management plans, comparative effectiveness studies, health technology assessments, and requirements to conduct post-approval Phase IV clinical trials to gather additional safety and other data on products. These requirements have the effect of making the maintenance of regulatory approvals and of achieving reimbursement for our products increasingly expensive, and further heightening the risk of recalls, product withdrawals, loss of market share, and loss of revenue and profitability.

Our Alcon Division faces similar challenges in developing new products and bringing them to market. Alcon's Surgical and Vision Care products face medical device development and approval processes that are often similarly difficult. Alcon is taking steps to increase its innovation power and the success of its research and development efforts. But this can be expected to be costly and to require extensive efforts over time. There can be no certainty that Alcon will be successful in these efforts, in either the short- or the long-term, and if Alcon is not successful, there could be a material adverse effect on the success of the Alcon Division, and on the Group as a whole. See also the discussion of Alcon in "—Our products face important patent expirations and significant competition" above.

In addition, our Sandoz Division has made, and expects to continue to make, significant investments in the development of differentiated, "difficult-to-make" generic products, including biotechnology-based, "biologic" medicines intended for sale as bioequivalent or "biosimilar" generic versions of currently-marketed biotechnology products. While the development of such products typically is significantly less costly and complex than the development of the equivalent originator medicines, it is nonetheless often significantly more costly and complex than those for non-differentiated generic products. In addition, despite significant efforts by us and others, to date many countries do not yet have fully-developed legislative or regulatory pathways to facilitate the development of biosimilars and permit biosimilars to be sold in a manner in which the biosimilar product would be readily substitutable for the originator product. Further delays in the development and completion of such regulatory pathways, or any significant impediments that may ultimately be built into such pathways, or any other significant difficulties that may arise in the development or marketing of biosimilars or other differentiated products, could put at risk the significant investments that Sandoz has made, and will continue to make, in the development of differentiated products in general, and in its biopharmaceuticals business in particular, and could have a material

adverse effect on the long-term success of the Sandoz Division and the Group as a whole. See also "—Failure to obtain marketing exclusivity periods for new generic products, or to develop biosimilars and other differentiated products, as well as intense competition from patented and generic pharmaceuticals companies, may have an adverse effect on the success of our Sandoz Division," below.

Further, in all of our divisions, our research and development activities must be conducted in an ethical and compliant manner. Among other things, we must be concerned with patient safety, Good Clinical Practices requirements, data integrity requirements, the fair treatment of patients in developing countries, and animal welfare requirements. Should we fail to properly manage such issues, we risk injury to third parties, damage to our reputation, negative financial consequences as a result of potential claims for damages, sanctions and fines, and the potential that our investments in research and development activities could have no benefit to the Group.

If we are unable to cost-effectively maintain a flow of successful new products and new indications for existing products sufficient to maintain and grow our business, cover our substantial research and development costs and the decline in sales of older products that become subject to generic or other competition, and take advantage of technological and medical advances, then this could have a material adverse effect on our business, financial condition or results of operations. For a description of the approval processes which must be followed to market our products, see the sections headed "Regulation" included in the descriptions of our operating divisions under "Item 4. Information on the Company—Item 4.B Business Overview."

Our business is affected by pressures on pricing and reimbursement for our products.

Our businesses are operating in an ever more challenging environment, with significant pressures on the pricing of our products and on our ability to obtain and maintain satisfactory rates of reimbursement for our products by governments, insurers and other payors. The growth of overall healthcare costs as a percentage of gross domestic product in many countries means that governments and payors are under intense pressure to control healthcare spending even more tightly than in the past. These pressures are particularly strong given the persistently weak economic and financial environment in many countries and the increasing demand for healthcare resulting from the aging of the global population and associated increases in non-communicable diseases. These pressures are further compounded by consolidation among distributors, retailers, private insurers, managed care organizations and other private payors, which can increase their negotiating power. In addition, these pressures are augmented by intense publicity regarding the pricing of pharmaceuticals by our competitors, as well as government investigations and legal proceedings regarding pharmaceutical pricing practices.

As a result, even though the pharmaceutical industry's share of overall healthcare costs is comparatively low, we face numerous cost-containment measures by governments and other payors, including government-imposed industry-wide price reductions, mandatory pricing systems, reference pricing systems, payors limiting access to treatments based on cost-benefit analyses, an increase in imports of drugs from lower-cost countries to higher-cost countries, shifting of the payment burden to patients through higher co-payments, limiting physicians' ability to choose among competing medicines, mandatory substitution of generic drugs for the patented equivalent, and growing pressure on physicians to reduce the prescribing of patented prescription medicines. For more information on such price controls see "Item 4. Information on the Company—Item 4.B Business Overview—Innovative Medicines—Price Controls." See also "—Ongoing consolidation among our distributors and retailers is increasing both the purchasing leverage of key customers and the concentration of credit risk," below, with regard to the impact on pricing of the consolidation among our customers, and "—The persistently weak global economic and financial environment in many countries and increasing political and social instability may have a material adverse effect on our results," below, with regard to the impact of economic conditions on our pricing.

We expect these challenges to continue—and potentially to increase in 2017 and following years—as political pressures mount, and healthcare payors around the globe, including government-controlled health authorities, insurance companies and managed care organizations, step up initiatives to reduce the overall cost of healthcare, restrict access to higher-priced new medicines, increase the use of generics and impose overall price cuts. Such pressures could have a material adverse impact on our business, financial condition or results of operations, as well as on our reputation.

Failure to comply with law, legal proceedings and government investigations may have a significant negative effect on our results of operations.

We are obligated to comply with the laws of all of the countries around the world in which we operate and sell products with respect to an extremely wide and growing range of activities. Such legal requirements can vary from country to country and new requirements may be imposed on us from time to time as government and public expectations regarding acceptable corporate behavior change. For example, we are faced with increasing pressures, including new laws and regulations from around the world, to be more transparent with respect to how we do business, including with respect to our interactions with healthcare professionals and organizations. These laws and regulations include requirements that we disclose payments or other transfers of value made to healthcare professionals and organizations, as well as proposals that we be required to disclose the methods that we use to set the prices for our products.

To help us in our efforts to comply with the many requirements that impact us, we have a significant global ethics and compliance program in place, and we devote substantial time and resources to efforts to ensure that our business is conducted in a lawful and publicly acceptable manner. Nonetheless, despite our efforts, any actual or alleged failure to comply with law or with heightened public expectations could lead to substantial liabilities that may not be covered by insurance, or to other significant losses, and could affect our business, financial position and reputation.

In particular, in recent years, there has been a trend of increasing government investigations, legal proceedings and law enforcement activities against companies and executives operating in our industry, both in the US and in countries around the world. Increasingly, such activities can involve criminal proceedings. A number of our subsidiaries across each of our divisions are, or may in the future be subject to various investigations and legal proceedings that arise or may arise from time to time, such as proceedings regarding sales and marketing practices, pricing, corruption, trade regulation and embargo legislation, product liability, commercial disputes, employment and wrongful discharge, antitrust (including for so-called "pay for delay" patent settlements), securities, insider trading, occupational health and safety, environmental, tax, cybersecurity, data privacy and intellectual property matters, and are increasingly challenging practices previously considered to be legal.

Such proceedings are inherently unpredictable, and large judgments sometimes occur. As a consequence, we may in the future incur judgments that could involve large cash payments, including the potential repayment of amounts allegedly obtained improperly, and other penalties, including treble damages. In addition, such proceedings may affect our reputation, create a risk of potential exclusion from government reimbursement programs in the US and other countries, and may lead to civil litigation. As a result, having taken into account all relevant factors, we have in the past and may again in the future enter into major settlements of such claims despite having potentially significant defenses against them, in order limit the risks they pose to our business and reputation. Such settlements may require us to pay significant sums of money, and to enter into corporate integrity or similar agreements, which are intended to regulate company behavior for a period of years.

Any such judgments or settlements, and any accruals that we may take with respect to potential judgments or settlements, could have a material adverse impact on our business, financial condition or results of operations, as well as on our reputation.

Our businesses are and have been subject to a number of these types of cases and governmental investigations. For example, in 2013, the US government filed a civil complaint in intervention to an individual *qui tam* action against our affiliate Novartis Pharmaceuticals Corporation (NPC) in the United States District Court for the Southern District of New York (SDNY) involving several of NPC's cardiovascular medications. The complaint, as subsequently amended, asserts federal False Claims Act and common law claims with respect to speaker programs and other promotional activities for certain NPC cardiovascular medications allegedly serving as mechanisms to provide kickbacks to healthcare professionals. It seeks unspecified damages, which according to the complaint are "substantial," including treble damages and maximum civil penalties per claim, as well as disgorgement of Novartis profits from the alleged unlawful conduct. In 2013, New York State filed a civil complaint in intervention asserting similar claims. The individual relator continues to litigate the kickback claims on behalf of other states and municipalities.

See also "Note 20. Provisions and other non-current liabilities" and "Note 28. Commitments and contingencies" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on

January 25, 2017 for information on other significant legal matters also are pending against us, and see "—Our reliance on outsourcing and third parties for the performance of key business functions heightens the risks faced by our businesses" below.

Our Sandoz Division may from time to time seek approval to market a generic version of a product before the expiration of patents claimed by the marketer of the patented product. We do this in cases where we believe that the relevant patents are invalid, unenforceable, or would not be infringed by our generic product. As a result, affiliates of our Sandoz Division frequently face patent litigation, and in certain circumstances, we may elect to market a generic product even though patent infringement actions are still pending. Should we elect to proceed in this manner and conduct a "launch at risk," we could face substantial damages if the final court decision is adverse to us.

Adverse judgments or settlements in any of the significant investigations or cases against us could have a material adverse effect on our business, financial condition, results of operations and reputation.

The manufacture of our products is highly regulated and complex, and may result in a variety of issues that could lead to extended supply disruptions and significant liability.

The manufacture of our products is heavily regulated by governmental health authorities around the world, including the FDA. Whether our products are manufactured at our own dedicated manufacturing facilities or by third parties, we must ensure that all manufacturing processes comply with current Good Manufacturing Practices (cGMP) and other applicable regulations, as well as with our own high quality standards. In recent years, health authorities have substantially intensified their scrutiny of manufacturers' compliance with such requirements.

If we or our third-party suppliers fail to comply fully with these requirements and the health authorities' expectations, then we could be required to shut down our production facilities or production lines, or could be prevented from importing our products from one country to another. This could lead to product shortages, or to our being entirely unable to supply products to patients for an extended period of time. Such shortages or shut downs have led to and could continue to lead to significant losses of sales revenue and to potential third-party litigation. In addition, health authorities have in some cases imposed significant penalties for such failures to comply with cGMP. A failure to comply fully with cGMP could also lead to a delay in the approval of new products to be manufactured at the impacted site.

In order to meet increasing health authority expectations and our own high quality standards, we are devoting substantial time and resources to remediate issues, improve quality and assure consistency of product supply at our manufacturing sites around the world. Ultimately, there can be no guarantee of the outcome of these efforts. Nor can there be any guarantee that we will not again face significant manufacturing issues, or that we will successfully manage such issues when they arise.

In addition to regulatory requirements, many of our products involve technically complex manufacturing processes or require a supply of highly specialized raw materials. For some products and raw materials, we may rely on a single source of supply. Because of these complexities, we are required to plan our production activities well in advance. If we should underestimate market demand for a product, or should fail to accurately predict when the product would be approved for sale, then we may not be able to increase production sufficiently to meet demand. Alternately, if we overestimate the quantity or timing of product to be produced, then we may be required to dispose of excess product, which would result in the loss of the resources spent to produce it.

A significant portion of our portfolio are "biologic" products. Unlike traditional "small-molecule" drugs, biologic drugs or other biologic-based products cannot be manufactured synthetically, but typically must be produced from living plant or animal micro-organisms. As a result, the production of biologic-based products which meet all regulatory requirements is especially complex. Even slight deviations at any point in the production process may lead to production failures or recalls. In addition, because the production process is based on living plant or animal micro-organisms, the process could be affected by contaminants that could impact those micro-organisms. As a result, the inherent fragility of certain of our raw material supplies and production processes may cause the production of one or more of our products to be disrupted, potentially for extended periods of time.

We also manufacture and sell a number of sterile products, including oncology products, which are technically complex to manufacture, and require sophisticated environmental controls. Because the production

process for such products is so complex and sensitive, the chance of production failures and lengthy supply interruptions is increased.

In addition, because our products are intended to promote the health of patients, for some of our products, a supply disruption or other production issue could endanger our reputation and subject us to lawsuits or to allegations that the public health, or the health of individuals, has been harmed.

In sum, a disruption in the supply of certain key products—whether as a result of a failure to comply with applicable regulations or health authority expectations, the fragility of the production process, inability to obtain product or raw materials from a sole source of supply, natural or man-made disasters at one of our facilities or at a critical supplier or vendor, or our failure to accurately predict demand—could have a material adverse effect on our business, financial condition or results of operations, as well as our reputation. See also "—We may not successfully achieve our goals in strategic transactions or reorganizations," below, with regard to our recent reorganization of our product manufacturing organization, and "—Extreme weather events, earthquakes and other natural disasters could adversely affect our business," below.

Foreign exchange fluctuations may adversely affect our earnings and the value of some of our assets.

Changes in exchange rates between the US dollar, our reporting currency, and other currencies can result in significant increases or decreases in our reported sales, costs and earnings as expressed in US dollars, and in the reported value of our assets, liabilities and cash flows.

In addition to ordinary market risk, there is a risk that countries could take affirmative steps that could significantly impact the value of their currencies. Such steps could include "quantitative easing" measures and potential withdrawals by countries from common currencies. In addition, certain countries are or may experience periods of high inflation. This could lead these countries to devalue their currencies, and to set exchange controls, as, for example, Venezuela has done. Such steps taken by Venezuela have impacted our financial results. See "—The persistently weak global economic and financial environment in many countries and increasing political and social instability may have a material adverse effect on our results" above. Ongoing conditions in Venezuela and other such countries could continue to lead to further devaluations of their currencies, which could in turn result in significant additional financial losses to the Group in the future.

Despite measures undertaken to reduce, or hedge against, foreign currency exchange risks, because a significant portion of our earnings and expenditures are in currencies other than the US dollar, including expenditures in Swiss francs that are significantly higher than our revenue in Swiss francs, any such exchange rate volatility may negatively and materially impact the Group's business, results of operations and financial condition, and may impact the reported value of our net sales, earnings, assets and liabilities. In addition, the timing and extent of such volatility can be difficult to predict. Further, depending on the movements of particular foreign exchange rates, the Group may be materially adversely affected at a time when the same currency movements are benefiting some of our competitors.

For more information on the effects of currency fluctuations on our consolidated financial statements and on how we manage currency risk, see "Item 5. Operating and Financial Review and Prospects—Item 5.B Liquidity and Capital Resources—Effects of Currency Fluctuations" "Item 11. Quantitative and Qualitative Disclosures about Market Risk", and "Note 29. Financial Instruments—Additional Disclosures" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

We may not successfully achieve our goals in transactions or reorganizations.

As part of our strategy, from time to time we evaluate and pursue potential business acquisitions and divestitures to expand or complement our existing businesses, or to enable us to focus more sharply on our strategic businesses. We cannot ensure that suitable acquisition candidates will be identified. Acquisition activities can be thwarted by governmental regulation, including market concentration limitations, political interference, overtures from competitors for the targeted assets, potentially increasing prices demanded by sellers, and other issues. Once an acquisition is agreed upon with a third party, we may not be able to complete the acquisition in the expected form or within the expected time frame, or at all, due to a failure to obtain required regulatory approvals or a failure to achieve contractual or other required closing conditions. Further, after an acquisition, efforts to integrate the business may not meet expectations, or may otherwise not be successful, as a result of differences in corporate culture, difficulties in retaining key personnel, customers and suppliers, difference in

standards, controls, processes and policies, or other reasons. Acquisitions and divestments can also divert management's attention from our existing businesses, and could result in the existing businesses failing to achieve expected results, or in liabilities being incurred that were not known at the time of acquisition, or the creation of tax or accounting issues.

Similarly, we cannot ensure that suitable buyers will be identified for businesses or other assets that we might want to divest. Neither can we ensure that we will correctly select businesses or assets as candidates for divestiture, that we will be able to successfully complete any agreed upon divestments, or that any expected strategic benefits, synergies or opportunities will arise as a result of any divestiture.

In 2015, we completed a series of transactions intended to transform our portfolio of businesses. In these transactions, we acquired GSK oncology products and certain related assets; created a joint venture with GSK in consumer healthcare of which Novartis owns 36.5%; divested our vaccines business (excluding the influenza vaccines business) to GSK; divested our Animal Health business to Lilly; and divested our influenza vaccines business to CSL. In 2014, we had also divested the blood transfusion diagnostics unit to Grifols S.A. that had been part of our former Vaccines and Diagnostics Division. In agreeing to these transactions, we expected to achieve certain strategic benefits, synergies and opportunities, including certain financial results. There can be no certainty that such expected benefits will be fully realized or that they will be realized at any particular time.

In addition, as part of our strategy, from time to time we reassess the optimal organization of our business, including the allocation of products by division and the level of centralization and simplification of certain functions across the Group, to better align those products and functions with the capabilities and expertise required for competitive advantage. As an example of this, in May 2016, we announced changes to focus our former Pharmaceuticals Division by creating two business units: Novartis Pharmaceuticals and Novartis Oncology. These business units formed the Innovative Medicines Division of Novartis, reporting to the CEO of Novartis. Similarly, in January 2016 we announced a series of strategic actions intended to further focus our divisions, including focusing our Alcon Division on its Surgical and Vision Care franchises, strengthening our ophthalmic medicines business by transferring Alcon's Ophthalmic Pharmaceuticals products to our Innovative Medicines Division, and shifting selected mature pharmaceutical products from our Innovative Medicines Division into Sandoz. We also announced steps during the course of 2016 to increase Group-wide coordination of drug development, and to improve efficiency with an integrated manufacturing operation and more shared commercial and medical services at the country level. Similarly, in 2014 we created a shared services organization, Novartis Business Services (NBS). NBS consolidates a number of business support services previously spread across divisions, including Information Technology, Financial Reporting and Accounting Operations, Real Estate & Facility Services, Procurement, Payroll and Personnel Administration and the Innovative Medicines Global Business Services. We expect these actions to further strengthen our competitive position, enable us to maintain our leading position in research and development, and free resources for our growth priorities. But the expected benefits of these reorganizations may never be fully realized or may take longer to realize than expected. There can be no certainty that the numerous businesses and functions involved will be successfully integrated into the new organizations or that key personnel will be retained. Disruption from the reorganizations may make it more difficult to maintain relationships with customers, employees or suppliers, and the reorganizations may result in the Group not achieving the expected productivity and financial benefits, shortfalls in program oversight, or, potentially, sales declines and lost profits.

Both with respect to the transactions and reorganizations previously announced, and to potential future transactions and reorganizations, if we fail to timely recognize or address these risks, or to devote adequate resources to them, we may fail to achieve our strategic objectives, including our growth strategy, or otherwise may not realize the intended benefits of the acquisition, divestiture or reorganization.

Significant breaches of data security or disruptions of information technology systems and the use of Internet, social media and mobile technologies could adversely affect our business and breach the privacy rights of third parties.

Our business is heavily dependent on critical, complex and interdependent information technology systems, including Internet-based systems, to support business processes. In addition, Novartis and our employees rely on internet and social media tools and mobile technologies as a means of communications, and to gather information. We are also increasingly seeking to develop technology-based products such as mobile applications that go "beyond the pill" to improve patient welfare in a variety of ways, which could also result in us gathering information about patients and others electronically.

The size and complexity of our information technology systems, and, in some instances, their age, make them potentially vulnerable to external or internal security breaches, breakdowns, malicious intrusions, malware, misplaced or lost data, programming or human errors, or other similar events. Although we have devoted and continue to devote significant resources and management attention to the protection of our data and information technology, like many companies, we have experienced such events and expect to continue to experience them in the future. We believe that the information security breaches we have experienced to date have not resulted in significant disruptions to our operations, and will not have a significant adverse effect on our current or future results of operations. However, we may not be able to prevent future breakdowns or breaches in our systems that could have a material adverse effect on our business, financial condition, results of operation or reputation.

Any such events could negatively impact important business processes, such as the conduct of scientific research and clinical trials, the submission of the results of such efforts to health authorities in support of requests for product approvals, the functioning of our manufacturing and supply chain processes, our compliance with legal obligations and other key business activities. Such potential information technology issues could lead to the loss of important information such as trade secrets or other intellectual property and could accelerate the development or manufacturing of competing products by third parties. In addition, malfunctions in software or devices that make significant use of information technology, including our Alcon surgical equipment, could lead to a risk of harm to patients.

Our use of information technologies, including Internet, social media, mobile technologies, and technology-based medical devices, as well as other routine business operations, sometimes involve our gathering personal information (including sensitive personal information) regarding our patients, vendors, customers, employees, collaborators and others. Breaches of our systems or other failures to protect such information could expose the personal information of third parties to unauthorized persons. Any such information or other privacy breaches could give rise to significant potential liability and reputational harm. In addition, we make substantial efforts to ensure that any international transfers of personal data are done in compliance with applicable law. Any restrictions that may be placed on our ability to transfer such data could have a material adverse effect on our business, financial condition, results of operations and reputation.

In addition, we use Internet, social media and mobile tools as a means to communicate with the public about our products or about the diseases our products are intended to treat. However, such uses risk the loss of trade secrets or other intellectual property. In addition, there continue to be significant uncertainties as to the rules that apply to such communications, and as to the interpretations that health authorities will apply in this context to the rules that do exist. As a result, despite our efforts to comply with applicable rules, there is a significant risk that our use of Internet, social media and mobile technologies for such purposes may cause us to nonetheless be found in violation of them.

Our dependence upon information technology, including any breaches of data security, technology disruptions, privacy violations, or other uses of interconnected technologies could give rise to the loss of trade secrets or other intellectual property, to the public exposure of personal information, and to interruptions to our operations, and could result in enforcement actions or liability, including potential shareholders' litigation, which could require us to expend significant resources to continue to modify or enhance our protective measures and to remediate any damage. Such events could have a material adverse effect on our business, financial condition, results of operations and reputation.

Intangible assets and goodwill on our books may lead to significant impairment charges in the future.

We carry a significant amount of goodwill and other intangible assets on our consolidated balance sheet, primarily due to acquisitions, including, in particular, substantial goodwill and other intangible assets obtained as a result of our acquisitions of Alcon and the oncology assets from GSK. As a result, we may incur significant impairment charges in the future if the expected fair value of the goodwill and other intangible assets would be less than their carrying value on the Group's consolidated balance sheet at any point in time.

We regularly review our long-lived intangible and tangible assets, including identifiable intangible assets, investments in associated companies and goodwill, for impairment. Goodwill, acquired research and development, and acquired development projects not yet ready for use are subject to impairment review at least annually. Other long-lived assets are reviewed for impairment when there is an indication that an impairment may have occurred. Impairment testing under IFRS may lead to impairment charges in the future. Any significant

impairment charges could have a material adverse effect on our results of operations and financial condition. In 2016, for example, we recorded intangible asset impairment charges of $591 million. For a detailed discussion of how we determine whether an impairment has occurred, what factors could result in an impairment and the impact of impairment charges on our results of operations, see "Item 5. Operating and Financial Review and Prospects—Item 5.A Operating Results—Critical Accounting Policies and Estimates—Impairment of Goodwill, Intangible Assets and Property, Plant and Equipment" and "Note 1. Significant Accounting Policies" and "Note 11. Goodwill and Intangible Assets Movements" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

The persistently weak global economic and financial environment in many countries and increasing political and social instability may have a material adverse effect on our results.

Many of the world's largest economies and financial institutions continue to be impacted by a weak ongoing global economic and financial environment, with some continuing to face financial difficulty, liquidity problems and limited availability of credit. In addition, we continue to see weak economic growth or a slowing of economic growth rates in certain emerging growth markets, such as China, Russia, Brazil and India. It is uncertain how long these effects will last, or whether economic and financial trends will worsen or improve.

In particular, financial weakness in certain countries has increased pressures on those countries, and on payors in those countries, to force healthcare companies to decrease the prices at which we may sell them our products. See also "Item 4. Information on the Company—Item 4.B Business Overview—Innovative Medicines—Price Controls." Concerns continue that payors and customers in some countries, including Greece, Italy, Portugal, Spain, Brazil, Russia and Saudi Arabia may not be able to pay us in a timely manner.

Certain other countries are experiencing high inflation rates and have taken steps to introduce exchange controls and limit companies from distributing retained earnings or paying intercompany payables due from those countries. The most significant country in this respect is Venezuela, where we are exposed to a potential devaluation loss in the income statement with our subsidiaries in the country. The Group's subsidiaries in Venezuela are experiencing a significant reduction in approvals for remittance of US dollars outside the country at the exchange rate available for imports of specific goods and services of national priority, including medicines and medical supplies. As a result, in November 2016, the Group changed the exchange rate applied to translate the financial statements of its Venezuelan subsidiaries to the floating rate of DICOM (Systema de Divisa Complementaria) which was VEF 658 per US dollar as of November 1, 2016. A corresponding $0.3 billion revaluation loss on the outstanding intercompany balances was recognized in the fourth quarter of 2016. Due to the recorded reserves against the intercompany balances, the net outstanding intercompany payable balance of Venezuela subsidiaries reduced to an insignificant amount as per December 31, 2016.

Ongoing conditions in Venezuela and other such countries could continue to lead to further devaluations of their currencies, which could in turn result in significant additional financial losses to the Group in the future. See also "Item 5. Operating and Financial Review and Prospects—Item 5.B Liquidity and Capital Resources—Effects of Currency Fluctuations" and "—Condensed Consolidated Balance Sheets," and "Note 15. Trade Receivables" and "Note 29. Financial Instruments—Additional Disclosures" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Current economic conditions may also adversely affect the ability of our distributors, customers, suppliers and service providers to obtain the liquidity required to pay for our products, or otherwise to buy necessary inventory or raw materials, and to perform their obligations under agreements with us, which could disrupt our operations and could negatively impact our business and cash flow. Although we make efforts to monitor these third parties' financial condition and their liquidity, our ability to do so is limited, and some of them may become unable to pay their bills in a timely manner, or may even become insolvent, which could negatively impact our business and results of operations. These risks may be elevated with respect to our interactions with third parties with substantial operations in countries where current economic conditions are the most severe, particularly where such third parties are themselves exposed to payment risks from business interactions directly with fiscally-challenged government payers. See also "—Our reliance on outsourcing and third parties for the performance of key business functions heightens the risks faced by our businesses" below.

In addition, the varying effects of difficult economic times on the economies, currencies and financial markets of different countries has impacted, and may continue to unpredictably impact, our business and results

of operations including the conversion of our operating results into our reporting currency, the US dollar, as well as the value of our investments in our pension plans. See "—Foreign exchange fluctuations may adversely affect our earnings and the value of some of our assets," below, and "—If any of numerous key assumptions and estimates in calculating our pension plan obligations turn out to be different from our actual experience, we may be required to increase substantially our contributions to pension plans as well as our pension-related costs in the future," below. In addition, the financial situation may also result in a lower return on our financial investments, and a lower value on some of our assets. Alternately, inflation could accelerate, which could lead to higher interest rates, which would increase our costs of raising capital.

To the extent that the economic and financial conditions directly affect consumers, some of our businesses, including the elective surgical and contact lens businesses of our Alcon Division, may be particularly sensitive to declines in consumer spending. In addition, our Innovative Medicines and Sandoz Divisions may not be immune to declines in consumer spending, particularly given the increasing requirements in certain countries that patients pay a larger contribution toward their own healthcare costs. As a result, there is a risk that consumers may cut back on prescription drugs and medical devices to help cope with rising costs and difficult economic times.

These issues may be further impacted by unpredictable political conditions currently existing in various parts of the world, including a backlash in certain areas against free trade, the ongoing refugee crisis, anti-immigrant sentiment, social unrest and fears of terrorism. In the US, opposition to free trade agreements was a significant issue in the recent presidential election. Similarly, uncertainties remain in Europe following the UK's "Brexit" vote and the rise of populist movements in various EU countries. And significant conflicts continue in parts of the Middle East and places such as Ukraine.

Collectively, such difficult conditions can, among other things, interfere with free trade in goods, increase the costs and difficulties of international transactions and potentially disturb the international flow of goods, and thus may have a material adverse effect on our revenues, results of operations, financial condition and, if circumstances worsen, our ability to raise capital at reasonable rates.

At the same time, significant changes and volatility in the financial markets, in the consumer and business environment, in the competitive landscape and in the global political and security landscape make it increasingly difficult for us to predict our revenues and earnings into the future. As a result, any revenue or earnings guidance or outlook which we have given or might give may be overtaken by events, or may otherwise turn out to be inaccurate. Though we endeavor to give reasonable estimates of future revenues and earnings at the time we give such guidance, based on then-current knowledge and conditions, there is a significant risk that such guidance or outlook will turn out to be, or to have been, incorrect.

Similarly, increased scrutiny of corporate taxes and executive pay may lead to significant business disruptions or other adverse business conditions, and may interfere with our ability to attract and retain qualified personnel. See "—Changes in tax laws or their application could adversely affect our results of operation" and "—An inability to attract and retain qualified personnel could adversely affect our business" below.

Our indebtedness could adversely affect our operations.

As of December 31, 2016 we had $17.9 billion of non-current financial debt and $5.9 billion of current financial debt. Our current and long-term debt requires us to dedicate a portion of our cash flow to service interest and principal payments and, if interest rates rise, this amount may increase. In addition, our existing debt may limit our ability to engage in transactions or otherwise may place us at a competitive disadvantage relative to competitors that have less debt. We may also have difficulty refinancing our existing debt or incurring new debt on terms that we would consider to be commercially reasonable, if at all.

Our reliance on outsourcing key business functions to third parties heightens the risks faced by our businesses.

We invest a significant amount of effort and resources into outsourcing the performance of certain key business functions to third parties, including research and development collaborations, manufacturing operations, warehousing, distribution activities, certain finance functions, marketing activities, data management and others. Our reliance on outsourcing and third parties for certain functions, such as the research and development or manufacturing of products, may limit the potential profitability of such products. In addition, despite contractual relationships with the third parties to whom we outsource these functions, we cannot ultimately control how they perform their contracts. Nonetheless, we depend on these third parties to achieve results which may be significant

to us. If the third parties fail to meet their obligations or to comply with the law, we may lose our investment in the collaborations and fail to receive the expected benefits. In addition, should any of these third parties fail to comply with the law in the course of their performance of services for us, there is a risk that we could be held responsible for such violations of law, as well, and that our reputation may suffer. Any such failures by third parties could have a material adverse effect on our business, financial condition, results of operations or reputation.

In particular, in many countries, including many developing markets, we rely heavily on third party distributors and other agents for the marketing and distribution of our products. Many of these third parties do not have internal compliance resources comparable to those within our organization. Some of these countries are plagued by corruption. If our efforts to detect cases of potential misconduct fail, we could be held responsible for the noncompliance of these third parties with applicable laws and regulations, which may have a material adverse effect on our reputation and on our business, financial condition or results of operations.

We may not be able to realize the expected benefits of our significant investments in Emerging Growth Markets.

At a time of slowing growth in sales of healthcare products in industrialized countries, many emerging markets have in recent years experienced proportionately higher sales growth and an increasing contribution to the industry's global performance. In 2016, our Continuing Operations generated $11.9 billion, or approximately 25% (2015: 25%) of our net sales from Emerging Growth Markets—which comprise all markets other than the Established Markets of the US, Canada, Western Europe, Japan, Australia and New Zealand—as compared with $36.6 billion, or approximately 75% (2015: 75%) of our net sales, in the Established Markets. However, combined net sales in the Emerging Growth Markets grew 4% in constant currencies in 2016, compared to −1% sales growth in constant currencies in the Established Markets during the same period. As a result of this trend, we continue to take steps to increase our activities in the Emerging Growth Markets, and have been making significant investments in our businesses in those countries.

In the past two years, however, certain of these Emerging Growth Market countries, including Brazil, India, China and Russia, have experienced economic slowdowns. As a result, there can be no guarantee that our efforts to expand our sales in these countries will succeed, or that these countries will once again experience growth rates significantly in excess of the world's largest markets. In particular, some Emerging Growth Market countries may be especially vulnerable to the effects of the persistently weak global financial environment, may have very limited resources to spend on healthcare or may be susceptible to political and social instability. See "—The persistently weak global economic and financial environment in many countries and increasing political and social instability may have a material adverse effect on our results" above. Many of these countries are subject to increasing political and social pressures, including from a growing middle class seeking increased access to healthcare. Such pressures on local government may in turn result in an increased focus by the governments on our pricing, and may put at risk our intellectual property. See "—Our business is increasingly affected by pressures on pricing for our products," and "Our products face important patent expirations and significant competition" above.

These countries also may have a relatively limited number of persons with the skills and training suitable for employment at an enterprise such as ours. See "—An inability to attract and retain qualified personnel could adversely affect our business" below. In some Emerging Growth Market countries, a culture of compliance with law may not be as fully developed as in the Established Markets—China's investigations of the activities of multinational healthcare companies, for example, have been well publicized—standards of acceptable behavior may be lower than such standards in Established Markets, or we may be required to rely on third-party agents, in each case putting us at risk of liability and reputational damage. See "—Failure to comply with law, and resulting investigations and legal proceedings may have a significant negative effect on our results of operations," and "—Our reliance on outsourcing and third parties for the performance of key business functions heightens the risks faced by our businesses," above.

In addition, many of these countries have currencies that may fluctuate substantially. If these currencies devalue significantly against the US dollar and we cannot offset the devaluations with price increases, then our products may become less profitable, or may otherwise impact our reported financial results. Currency devaluation risk may also exist in countries with high inflation economies. Should these countries take steps that cause their currencies to be devalued, we may realize a significant financial loss. See "—The persistently weak global economic and financial environment in many countries and increasing political and social instability may have a material adverse effect on our results" and "—Foreign exchange fluctuations may adversely affect our

earnings and the value of some of our assets," above. Ongoing conditions in such high inflation countries could lead to further devaluations of their currencies, which could in turn result in significant additional financial losses to the Group in the future.

For all these reasons, our sales to Emerging Growth Markets carry significant risks. A failure to continue to expand our business in Emerging Growth Markets could have a material adverse effect on our business, financial condition or results of operations.

Failure to obtain marketing exclusivity periods for new generic products, or to develop biosimilars and other differentiated products, as well as intense competition from patented and generic pharmaceuticals companies, may have an adverse effect on the success of our Sandoz Division.

Our Sandoz Division achieves significant revenue opportunities when it secures and maintains exclusivity periods granted for generic products in certain markets—particularly the 180-day exclusivity period granted in the US by the Hatch-Waxman Act for first-to-file generics—and when it is able to develop biosimilars and other differentiated products with few, if any, generic competitors. Failure to obtain and maintain these market opportunities could have an adverse effect on the success of Sandoz.

In addition, the division faces intense competition both from companies that market patented pharmaceutical products, which sometimes take aggressive steps to prevent or delay the introduction of generic medicines, to limit the availability of exclusivity periods or to reduce their value, and from other generic pharmaceuticals companies, which aggressively compete for exclusivity periods and for market share of generic products that may be identical to certain of our generic products. These activities may increase the costs and risks associated with our efforts to introduce generic products, may further limit the prices at which we are able to sell these products, and may delay or entirely prevent their introduction. See also "—Failure to comply with law, legal proceedings and government investigations may have a significant negative effect on our results of operations" above, with regard to the risks of damages involved in our efforts to market generic versions of patented products.

Sandoz has also invested heavily in the development of biosimilar drugs, despite the fact that regulations concerning their approval, marketing and sale in certain countries, including in the US, are still under development or not entirely clear. If, despite ongoing efforts by us and others to encourage the development of such regulations, such regulations do not ultimately favor the development and sale of biosimilar products, then we may fail to achieve expected returns on the investments by Sandoz in the development of biosimilars. See also "—Our research and development efforts may not succeed in bringing new products to market, or may fail to do so cost-efficiently enough, or in a manner sufficient to grow our business and replace lost revenue and income" above, with regard to the risks involved in our efforts to develop differentiated generic products.

If any of numerous key assumptions and estimates in calculating our pension plan obligations turn out to be different from our actual experience, we may be required to increase substantially our contributions to pension plans as well as the amount we pay toward pension-related expenses in the future.

We sponsor pension and other post-employment benefit plans in various forms. These plans cover a significant portion of our current and former associates. While most of our plans are now defined contribution plans, certain of our associates remain under defined benefits plans. For these defined benefits plans, we are required to make significant assumptions and estimates about future events in calculating the present value of expected future plan expenses and liabilities. These include assumptions used to determine the discount rates we apply to estimated future liabilities and rates of future compensation increases. Assumptions and estimates used by Novartis may differ materially from the actual results we experience in the future, due to changing market and economic conditions (including the effects of the persistently weak global financial environment, which, to date, have resulted in extremely low or negative interest rates in many countries), higher or lower withdrawal rates, or longer or shorter life spans of participants, among other variables. For example, a decrease in the interest rate we apply in determining the present value of expected future defined benefit obligations of one-quarter of one percent would have increased our year-end defined benefit pension obligation for plans in Switzerland, US, UK, Germany and Japan, which represent about 95% of the Group total defined benefit pension obligation, by $0.8 billion. Any differences between our assumptions and estimates and our actual experience could have a material effect on our results of operations and financial condition. Further, additional employer contributions might be required if plan funding falls below the levels required by local rules. For more information on obligations under retirement and other post-employment benefit plans and underlying actuarial assumptions, see

"Item 5. Operating and Financial Review and Prospects—Item 5.A Operating Results—Critical Accounting Policies and Estimates—Retirement and other post-employment benefit plans" and "Note 25. Post-Employment Benefits for Associates" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017. See also "—The persistently weak global economic and financial environment in many countries and increasing political and social instability may have a material adverse effect on our results" above.

Changes in tax laws or their application could adversely affect our results of operations.

Our worldwide operations are taxed under laws in the jurisdictions in which we operate. However, the integrated nature of our worldwide operations can produce conflicting claims from revenue authorities as to the determination of profits to be taxed in individual countries. The majority of the jurisdictions in which we operate have double tax treaties with other foreign jurisdictions, which provide a framework for mitigating the incidence of double taxation on our revenues and capital gains. But in recent years, tax authorities around the world have increased their scrutiny of company tax filings, and have become more rigid in exercising any discretion they may have. As part of this, the Organization for Economic Co-operation and Development (OECD) has proposed a number of tax law changes under its Base Erosion and Profit Shifting (BEPS) Action Plans to address issues of transparency, coherence and substance. At the same time, the European Commission is finalizing the Anti Tax Avoidance Directive and continues to extend the application of the fiscal state aid policy and respective investigation on tax ruling practices. These tax reform initiatives on the OECD and European levels also need local country implementation, including in our home country of Switzerland, which may result in significant changes to established tax principles and could lead to an increased risk of international tax disputes.

Although we have taken steps to be in compliance with the evolving OECD and European tax initiatives, and will continue to do so, significant uncertainties remain as to the outcome of the Swiss and other countries' tax reform efforts. Such efforts, including with respect to tax base or rate, transfer pricing, intercompany dividends, cross border transactions, controlled corporations, and limitations on tax relief allowed on the interest on intercompany debt, could require us to adapt our tax structure, increase our effective tax rate and adversely affect our financial results.

Counterfeit versions of our products could harm our patients and reputation.

Our industry continues to be challenged by the vulnerability of distribution channels to illegal counterfeiting and the presence of counterfeit products in a growing number of markets and over the Internet. Counterfeit products are frequently unsafe or ineffective, and can potentially be life-threatening. To distributors and patients, counterfeit products may be visually indistinguishable from the authentic version. Reports of adverse reactions to counterfeit drugs or increased levels of counterfeiting could materially affect patient confidence in the authentic product, and harm the business of companies such as ours or lead to litigation. In addition, it is possible that adverse events caused by unsafe counterfeit products could mistakenly be attributed to the authentic product. If a product of ours was the subject of counterfeits, we could incur substantial reputational and financial harm.

Ongoing consolidation among our distributors and retailers is increasing both the purchasing leverage of key customers and the concentration of credit risk.

Increasingly, a significant portion of our global sales are made to a relatively small number of drug wholesalers, retail chains and other purchasing organizations. For example, our three most important customers globally are all in the US, and accounted for approximately 16%, 12% and 6%, respectively, of Group net sales in 2016. The largest trade receivables outstanding were for these three customers, amounting to 14%, 9% and 6%, respectively, of the Group's trade receivables at December 31, 2016. The trend has been toward further consolidation among distributors and retailers, both in the US and internationally. As a result, our customers are gaining additional purchasing leverage, which increases the pricing pressures facing our businesses. Moreover, we are exposed to a concentration of credit risk as a result of this concentration among our customers. If one or more of our major customers experienced financial difficulties, the effect on us would be substantially greater than in the past, and could include a substantial loss of sales and an inability to collect amounts owed to us. This could have a material adverse effect on our business, financial condition and results of operations.

An inability to attract and retain qualified personnel could adversely affect our business.

We highly depend upon skilled personnel in key parts of our organization, and we invest heavily in recruiting, training and retaining qualified individuals. The loss of the service of key members of our organization—including senior members of our scientific and management teams, high-quality researchers and development specialists, and skilled personnel in emerging markets—could delay or prevent the achievement of major business objectives.

Future economic growth will demand talented associates and leaders, yet the market for talent has become increasingly competitive. In particular, emerging markets are expected to continue to be a driving force in global growth, but in countries like Russia and China there is a limited pool of executives with the training and international experience needed to work successfully in a global organization like Novartis.

In addition, shifting demographic trends are expected to result in fewer students, fewer graduates and fewer people entering the workforce in the Western world in the next 10 years. Moreover, many members of younger generations around the world have changing expectations toward careers, engagement and the integration of work in their overall lifestyles.

The supply of talent for certain key functional and leadership positions is decreasing, and a talent gap is visible for some professions and geographies—engineers in Germany, for example. Recruitment is increasingly regional or global in specialized fields such as clinical development, biosciences, chemistry and information technology. In addition, the geographic mobility of talent is expected to decrease in the future, with talented individuals in developed and emerging countries anticipating ample career opportunities closer to home than in the past. This decrease in mobility may be worsened by anti-immigrant sentiments in many countries, and laws discouraging immigration.

In addition, our ability to hire qualified personnel also depends on the flexibility to reward superior performance and to pay competitive compensation. Laws and regulations on executive compensation, including legislation in our home country, Switzerland, may restrict our ability to attract, motivate and retain the required level of qualified personnel.

We face intense competition for an increasingly limited pool of qualified individuals from numerous pharmaceutical and biotechnology companies, universities, governmental entities, other research institutions, other companies seeking to enter the healthcare space, and companies in other industries. As a result, despite significant efforts on our part, we may be unable to attract and retain qualified individuals in sufficient numbers, which could have an adverse effect on our business, financial condition and results of operations.

Environmental liabilities may adversely impact our results of operations.

The environmental laws of various jurisdictions impose actual and potential obligations on us to remediate contaminated sites, in some cases over many years. While we have set aside substantial provisions for worldwide environmental liabilities, there is no guarantee that additional costs will not be incurred beyond the amounts for which we have provided in the Group consolidated financial statements. If environmental contamination caused by us adversely impact third parties, if we fail to properly manage the safety of our facilities and the environmental risks, or if we are required to further increase our provisions for environmental liabilities in the future, this could have a material adverse effect on our business, financial condition, results of operations, and on our reputation. See also "Item 4.D Property, Plants and Equipment—Environmental Matters" and "Note 20. Provisions and other non-current liabilities" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Extreme weather events, earthquakes and other natural disasters could adversely affect our business.

In recent years, extreme weather events and changing weather patterns such as storms, flooding, drought, and temperature changes, appear to have become more common. We operate in countries around the world. As a result, we are potentially exposed to varying natural disaster or extreme weather risks like hurricanes, tornadoes or floods, or other events that may result from the impact of climate change on the environment. As a result of such events, we could experience business interruptions, destruction of facilities and loss of life, all of which could have a material adverse effect on our business, financial condition and results of operations.

In addition, our corporate headquarters, the headquarters of our Innovative Medicines Division, and certain of our major Innovative Medicines Division production and research facilities are located near earthquake fault

lines in Basel, Switzerland. Other major facilities are located near major earthquake fault lines in various locations around the world. In the event of a major earthquake, we could experience business interruptions, destruction of facilities and loss of life, all of which could have a material adverse effect on our business, financial condition and results of operations. See also "—The manufacture of our products is highly regulated and complex, and may result in a variety of issues that could lead to extended supply disruptions and significant liability," above.

Risks Related To Our ADRs

The price of our ADRs and the US dollar value of any dividends may be negatively affected by fluctuations in the US dollar/Swiss franc exchange rate.

Our American Depositary Shares (ADSs) each representing one Novartis share and evidenced by American Depositary Receipts (ADRs) trade on the NYSE in US dollars. Since the shares underlying the ADRs are listed in Switzerland on the SIX Swiss Exchange (SIX) and trade in Swiss francs, the value of the ADRs may be affected by fluctuations in the US dollar/Swiss franc exchange rate. In addition, since dividends that we may declare will be denominated in Swiss francs, exchange rate fluctuations will affect the US dollar equivalent of dividends received by holders of ADRs. If the value of the Swiss franc decreases against the US dollar, the price at which our ADRs trade may—and the value of the US dollar equivalent of any dividend will—decrease accordingly.

Holders of ADRs may not be able to exercise preemptive rights attached to shares underlying ADRs.

Under Swiss law, shareholders have preemptive rights to subscribe for issuances of new shares on a *pro rata* basis. Shareholders may waive their preemptive rights in respect of any offering at a general meeting of shareholders. Preemptive rights, if not previously waived, are transferable during the subscription period relating to a particular offering of shares and may be quoted on the SIX. US holders of ADRs may not be able to exercise the preemptive rights attached to the shares underlying their ADRs unless a registration statement under the US Securities Act of 1933 is effective with respect to such rights and the related shares, or an exemption from this registration requirement is available. In deciding whether to file such a registration statement, we would evaluate the related costs and potential liabilities, as well as the benefits of enabling the exercise by ADR holders of the preemptive rights associated with the shares underlying their ADRs. We cannot guarantee that a registration statement would be filed, or, if filed, that it would be declared effective. If preemptive rights could not be exercised by an ADR holder, JPMorgan Chase Bank, N.A., as depositary, would, if possible, sell the holder's preemptive rights and distribute the net proceeds of the sale to the holder. If the depositary determines, in its discretion, that the rights could not be sold, the depositary might allow such rights to lapse. In either case, the interest of ADR holders in Novartis would be diluted and, if the depositary allowed rights to lapse, holders of ADRs would not realize any value from the preemptive rights.

Item 4. Information on the Company

4.A History and Development of Novartis

Novartis AG

Novartis AG was incorporated on February 29, 1996 under the laws of Switzerland as a stock corporation (*Aktiengesellschaft*) with an indefinite duration. On December 20, 1996, our predecessor companies, Ciba-Geigy AG and Sandoz AG, merged into this new entity, creating Novartis. We are domiciled in and governed by the laws of Switzerland. Our registered office is located at the following address:

Novartis AG
Lichtstrasse 35
CH-4056 Basel, Switzerland
Telephone: 011-41-61-324-1111
Web: www.novartis.com

Novartis is a multinational group of companies specializing in the research, development, manufacturing and marketing of a broad range of healthcare products led by innovative pharmaceuticals. Novartis AG, our Swiss holding company, owns, directly or indirectly, all of our significant operating companies. For a list of our significant operating subsidiaries, see "Note 32. Principal Group Subsidiaries and Associated Companies" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Important Corporate Developments 2014-January 2017

2017

January — Novartis announces that it is considering options for the Alcon Division. The review will explore all options, ranging from retaining all or part of the business to separation via a capital markets transaction (e.g. IPO or spin-off), in order to determine how to best maximize value for our shareholders. The review will be conducted during the course of 2017 and in a manner such that Alcon Division associates can fully focus on the unit's return to growth. The ophthalmic pharmaceutical portfolio is now fully integrated into our Innovative Medicines Division and will not be part of the review.

Novartis announces that it is initiating a share buyback of up to $5.0 billion in 2017 under existing shareholder authority.

Novartis announces that it has entered into a collaboration and option agreement with Ionis Pharmaceuticals, Inc. (Ionis), and its affiliate Akcea Therapeutics, Inc. (Akcea), to license two investigational treatments with the potential to significantly reduce cardiovascular risk in patients suffering from high levels of lipoproteins known as Lp(a) and ApoCIII. In addition, Novartis entered into a stock purchase agreement with Ionis and Akcea. This transaction is subject to customary closing conditions, including regulatory approval.

2016

December — Novartis announces that it has entered into a definitive agreement for the acquisition of Encore Vision, Inc., a privately-held company focused on the development of UNR844 (formerly EV06), an investigational, first-in-class potentially disease modifying topical treatment for presbyopia. This acquisition was completed on January 20, 2017.

Novartis announces the signing of an exclusive option, collaboration and license agreement with Conatus Pharmaceuticals Inc., for the global rights to emricasan, an investigational, first-in-class, oral, pan-caspase inhibitor for the treatment of non-alcoholic steatohepatitis (NASH) with advanced fibrosis and cirrhosis of the liver. Upon exercise of the option, Novartis will obtain an exclusive, worldwide license to develop and commercialize products containing emricasan. The exercise of the option is subject to customary closing conditions, including regulatory approval.

Novartis announces that it has entered into a definitive agreement for the acquisition of Ziarco Group Limited, a privately held company focused on the development of novel treatments in dermatology including ZPL389, a once-daily oral H_4 receptor antagonist in development for atopic dermatitis. This acquisition was completed on January 20, 2017.

November Novartis announces that it has acquired Selexys Pharmaceuticals Corporation and SEG101 (crizanlizumab, formerly SelG1) for reduction of pain crises in sickle cell disease.

September Novartis completes two euro (EUR) denominated bond offerings totaling EUR 1.75 billion.

June Novartis announces that it has entered into a collaboration and licensing agreement with Xencor for the development of bispecific antibodies for treating cancer.

Novartis announces that it will further expand its long-standing partnership with Medicines for Malaria Venture. Novartis will lead the development of antimalarial compound KAF156 with scientific and financial support from Medicines for Malaria Venture in collaboration with the Bill & Melinda Gates Foundation.

May Novartis announces changes to focus its Pharmaceuticals Division by creating two business units: Novartis Pharmaceuticals and Novartis Oncology. These business units form the Innovative Medicines Division of Novartis. The CEO of each business unit reports directly to the CEO of Novartis and both joined the Executive Committee of Novartis (ECN) effective July 1, 2016.

February Shareholders authorize the Novartis Board of Directors to execute share buybacks within the framework of a seventh share repurchase program that will allow Novartis to repurchase shares for cancellation up to a maximum of CHF 10 billion.

Novartis announces that it has entered into an agreement to acquire Transcend Medical, Inc., a privately-held, US-based company focused on developing minimally-invasive surgical devices to treat glaucoma, such as the *CyPass* Micro-Stent. This acquisition was completed on March 23, 2016.

Novartis announces that it has acquired from Pfizer the rights for the development and commercialization of PF-06438179 (biosimilar infliximab) in the European Economic Area.

January Novartis announces leadership changes effective February 1, 2016. Mike Ball has been appointed Division Head and CEO Alcon, succeeding Jeff George; Dr. Vas Narasimhan has been appointed Global Head Drug Development and Chief Medical Officer, a new position in the ECN; and André Wyss has been appointed President, Novartis Operations.

Novartis announces that it is taking a number of steps to further build on its strategy, including focusing the Alcon Division on its Surgical and Vision Care franchises and strengthening the ophthalmic medicines business by transferring Alcon's Ophthalmic Pharmaceuticals products to the Innovative Medicines Division, and by shifting selected mature, non-promoted pharmaceutical products from the Innovative Medicines Division into the Sandoz Division, which changes were operationally completed as of April 1, 2016; and by centralizing manufacturing operations across divisions within a single technical operations unit; increasing Group-wide coordination of drug development by establishing a single Global Head of Drug Development and centralizing certain common functions such as the Chief Medical Office, which changes were operationally completed as of July 1, 2016.

Novartis announces a collaboration and licensing agreement with Surface Oncology, which gives Novartis access to four pre-clinical programs in immuno-oncology.

2015

November Novartis completes a $3 billion bond offering under its US SEC Registration Statement on Form F-3.

October Novartis announces the acquisition of Admune Therapeutics LLC to broaden its portfolio of cancer immunotherapies.

September Novartis announces the appointment of Dr. James E. Bradner as President of the Novartis Institutes for BioMedical Research and a member of the ECN, effective March 1, 2016, concurrent with the retirement of Dr. Mark C. Fishman, who reached his contractual retirement age in March 2016.

Novartis announces the launch of Novartis Access, a portfolio of affordable medicines to treat chronic diseases in lower-income countries offered to governments, non-governmental organizations and other public-sector healthcare providers for $1 per treatment, per month.

Novartis announces that it has entered into a global collaboration with Amgen to commercialize and develop neuroscience treatments.

August Novartis announces an agreement to acquire all remaining rights to GSK's ofatumumab to develop treatments for multiple sclerosis and other autoimmune indications. This transaction was completed on December 21, 2015.

July	Novartis announces a swap of three mid-stage clinical assets for equity and a share of milestones and royalties on future commercial sales with Mereo BioPharma Group Limited.
June	Novartis announces that it has entered into an agreement to acquire Spinifex Pharmaceuticals, Inc., a US and Australian-based, privately held development stage company focused on developing a peripheral approach to treat neuropathic pain such as EMA401, a novel angiotensin II Type 2 receptor (AT2R) antagonist. This acquisition was completed on July 24, 2015.
March	Novartis announces entry into an alliance with Aduro Biotech focused on discovery and development of next-generation cancer immunotherapies targeting the STING signaling pathway, and the launch of a new immuno-oncology research group.
February	Novartis completes a CHF 1.375 billion bond offering listed on the SIX Swiss Exchange.
2014	
October	Novartis announces a definitive agreement with CSL of Australia to divest its influenza vaccines business for $275 million. This divestment was completed effective July 31, 2015.
	Novartis announces changes to the Novartis Executive Committee. Three members of the Executive Committee of Novartis, George Gunn, Brian MacNamara and Andrin Oswald, would leave the Company following the completion of the relevant portfolio transactions announced in April 2014.
	Novartis announces that it has entered into a collaboration with Bristol-Myers Squibb Company to evaluate three molecularly targeted compounds in combination with Bristol-Myers Squibb's investigational PD-1 immune checkpoint inhibitor, Opdivo® (nivolumab), in Phase I/II trials of patients with non-small cell lung cancer.
August	Novartis appoints a Chief Ethics, Compliance and Policy Officer reporting directly to the CEO.
July	Novartis announces that its Alcon Division has entered into an agreement with a division of Google Inc., to in-license its "smart lens" technology for all ocular medical uses.
June	Novartis announces that the FDA licensed its manufacturing facility in Holly Springs, North Carolina for the commercial production of cell-culture influenza vaccines, with the capacity to significantly increase production in the event of an influenza pandemic.
May	Novartis enters into a licensing and commercialization agreement with Ophthotech Corporation for the exclusive rights to market pegpleranib outside the US. In November 2015, Genentech entered into an agreement with Novartis to participate in certain financial rights related to the Novartis licensing and commercialization agreement with Ophthotech Corporation for pegpleranib.
April	Novartis announces a set of definitive inter-conditional agreements with GSK. Under these agreements, Novartis would acquire GSK oncology products and certain related assets, would be granted a right of first negotiation over the co-development or commercialization of GSK's current and future oncology R&D pipeline (excluding oncology vaccines) and would divest the Vaccines Division (excluding its influenza vaccines business) to GSK. The two companies would also create a joint venture in consumer healthcare, of which Novartis would own 36.5%. These transactions were completed on March 2, 2015.
	Novartis also announces a definitive agreement with Lilly to divest the Company's Animal Health Division. This divestment was completed on January 1, 2015.
	Novartis announces the creation of a shared services organization, Novartis Business Services (NBS). NBS consolidates a number of business support services previously spread across divisions, including Information Technology, Financial Reporting and Accounting Operations, Real Estate & Facility Services, Procurement, Payroll and Personnel Administration and the Pharmaceuticals Global Business Services. This reorganization was designed to improve profitability and free up resources that could be reinvested in growth and innovation, and to allow our divisions to focus more on customer-facing activities. NBS became effective on July 1, 2014.
February	Novartis announces the acquisition of CoStim Pharmaceuticals Inc., a Cambridge, Massachusetts-based, privately held biotechnology company focused on cancer immunotherapy. The acquisition brings to Novartis late discovery stage immunotherapy programs directed to several targets, including PD-1.
	Novartis appoints a Global Head, Corporate Responsibility reporting directly to the CEO.

January Novartis implements several changes to its governance structure. These include elimination of the Chairman's Committee of the Novartis AG Board of Directors; transfer of operational responsibilities that previously rested with the Chairman or the Chairman's Committee, such as approval authority for management compensation, to the CEO or the Executive Committee; and establishment of the Research and Development Committee of the Novartis AG Board of Directors to oversee Novartis research and development strategy and advise the Board on scientific trends and activities.

For information on our principal expenditures on property, plants and equipment, see "Item 4. Information on the Company—4.D Property, Plants and Equipment." For information on our significant expenditures in research and development, see the sections headed "Research and Development" included in the descriptions of our Innovative Medicines Division and Alcon Division, and the section headed "Development and Registration" included in the description of our Sandoz Division under "Item 4. Information on the Company—4.B Business Overview." For information on other principal capital expenditures and divestitures, see "Item 5. Operating and Financial Review and Prospects—Item 5.A Operating Results—Factors Affecting Comparability of Year-On-Year Results of Operations." For more information on the transactions with GSK, Lilly or CSL, see "Item 4.B Business Overview—Overview" and "Item 10.C Material Contracts."

4.B Business Overview

OVERVIEW

Novartis provides healthcare solutions that address the evolving needs of patients and societies worldwide. Our broad portfolio includes innovative pharmaceuticals and oncology medicines, generic and biosimilar medicines and eye care devices. Our mission is to discover new ways to improve and extend people's lives. Our vision is to be a trusted leader in changing the practice of medicine. Our strategy is to use science-based innovation to deliver better patient outcomes in growing areas of healthcare.

Following the completion of a series of transactions in 2014 and 2015, the Group's continuing operations comprise three global operating divisions, Innovative Medicines, Sandoz and Alcon. We also separately report the results of Corporate activities. The disclosure in this Form 20-F focuses on these continuing operations unless otherwise specified. From March 2, 2015, the date of the completion of a series of transactions with GSK, continuing operations also includes the results from the oncology assets acquired from GSK and the 36.5% interest in GSK Consumer Healthcare Holdings Ltd. for the period from March 2015 (the latter reported as an investment in associated companies). We sold on March 2, 2015, our Vaccines Division, excluding our influenza vaccines business, to GSK. Our influenza vaccines business was sold on July 31, 2105 to CSL and our Animal Health Division was sold on January 1, 2015 to Lilly. For more detail on certain of these transactions see, "Item 10.C Material Contracts."

Continuing Operations:

- Innovative Medicines (formerly named Pharmaceuticals): Innovative patent-protected prescription medicines
- Sandoz: Generic pharmaceuticals and biosimilars
- Alcon: Surgical and vision care products
- Corporate activities

Discontinued Operations:

- Vaccines and Diagnostics: Preventive human vaccines and blood-testing diagnostics
- Consumer Health: OTC (over-the-counter medicines) and Animal Health
- Corporate: certain transactional and other expenses related to the portfolio transformation

Novartis has leading positions globally in the areas of each of our three divisions. To maintain our competitive positioning across these segments of the healthcare industry, we place a strong focus on innovating to meet the evolving needs of patients around the world, working to grow our presence in new and emerging markets, and to enhance our productivity to invest for the future and increase returns to shareholders. The

financial results of our continuing Corporate activities include the costs of the Group headquarters and those of corporate coordination functions in major countries. In addition, Corporate includes other items of income and expense that are not attributable to specific segments such as certain revenues from intellectual property rights and certain expenses related to post-employment benefits, environmental remediation liabilities, charitable activities, donations and sponsorships.

The Group is organized into three divisions, Innovative Medicines, Sandoz and Alcon, as well as Corporate activities. Our divisions are supported by the following cross-divisional organizational units: Novartis Institutes for BioMedical Research, Global Drug Development and Novartis Operations, which includes Novartis Technical Operations and Novartis Business Services.

The Novartis Institutes for BioMedical Research (NIBR) is the innovation engine of Novartis, which supports our Innovative Medicines Division and also collaborates with our Sandoz Division. More than 6,000 scientists and associates at NIBR conduct research into various disease areas at sites located in the US, Switzerland, Singapore and China. For more information about NIBR, see "—Innovative Medicines—Research and Development—Research program," below.

Effective February 1, 2016, Mike Ball was appointed Division Head and CEO Alcon, and as a member of the Executive Committee of Novartis (ECN). Mike Ball succeeded Jeff George, who decided to leave Novartis.

Effective April 1, 2016, Alcon's Ophthalmic Pharmaceuticals products were transferred to our Innovative Medicines Division. At the same time, selected mature, non-promoted pharmaceutical products were shifted from our Innovative Medicines Division to Sandoz, which has proven experience in managing mature products successfully. Following these changes our Alcon Division is now focused on its Surgical and Vision Care franchises.

In January 2017, we announced that we are considering options for the Alcon Division. The review will explore all options, ranging from retaining all or part of the business to separation via a capital markets transaction (e.g. IPO or spin-off), in order to determine how to best maximize value for our shareholders. The review will be conducted during the course of 2017 and in a manner such that Alcon Division associates can fully focus on the unit's return to growth. The ophthalmic pharmaceutical portfolio is now fully integrated into our Innovative Medicines Division and will not be part of the review.

In May 2016, Novartis announced changes to focus its former Pharmaceuticals Division by creating two business units, Novartis Pharmaceuticals and Novartis Oncology, to form the Innovative Medicines Division. Effective July 1, 2016, Paul Hudson was appointed CEO, Novartis Pharmaceuticals and Bruno Strigini was appointed CEO, Novartis Oncology, both as members of the Executive Committee of Novartis. Mr. Hudson and Mr. Strigini report to Joseph Jimenez, CEO of Novartis.

In July 2016, we established the Global Drug Development (GDD) organization to oversee all drug development activities for our Innovative Medicines Division and the biosimilars portfolio of our Sandoz Division. Development of products for the Surgical and Vision Care franchises within our Alcon Division and of small molecule generics for our Sandoz Division are not included in GDD. GDD works collaboratively with NIBR, Innovative Medicines and Sandoz to execute our overall pipeline strategy and takes an enterprise approach to pipeline portfolio management. GDD incorporates centralized global functions such as Regulatory Affairs and Global Development Operations, as well as Global Development units aligned with our business franchises. GDD was created to increase Group-wide coordination of drug development and to improve resource allocation, technology implementation and process standardization with a goal of further increasing innovation. Dr. Vas Narasimhan was appointed Global Head Drug Development and Chief Medical Officer, a newly created position in the ECN and reports to the CEO of Novartis. GDD includes approximately 10,000 associates worldwide.

In 2016, André Wyss, already a member of the ECN, Head Novartis Business Services (NBS) and Country President for Switzerland, was appointed President, Novartis Operations. In his new role, he assumed responsibility for the integrated Novartis Technical Operations (NTO) organization as well as for Global Public & Government Affairs, in addition to his previous responsibilities, and he continues to report to the CEO Novartis. NTO was established effective July 1, 2016, in order to centralize management of our manufacturing operations across our Innovative Medicines and Sandoz Divisions, with a goal of further improving efficiency. Manufacturing for Alcon's Surgical and Vision Care franchises continues to be managed by our Alcon Division. NTO is expected to optimize capacity planning and adherence to quality standards, and to lower costs through simplification,

standardization and external spend optimization. Centralization is also expected to improve our ability to develop next generation technologies, implement continuous manufacturing and share best practices across divisions. NTO includes approximately 28,000 associates and 67 manufacturing sites across our Innovative Medicines and Sandoz Divisions.

NBS, our shared service organization, was also made a part of Novartis Operations in 2016. NBS delivers integrated solutions to all Novartis divisions and units worldwide. NBS seeks to drive efficiency and effectiveness across Novartis by simplifying and standardizing services across six service domains: human resources, real estate and facility services, procurement, information technology, commercial and medical support activities, and financial reporting and accounting operations. NBS has approximately 10,000 associates in more than 50 countries. NBS works to leverage the full scale of Novartis to create value across the company and to free up resources to invest in innovation and our product pipeline. NBS continues to transfer the delivery of selected services to its five Global Service Centers in Dublin, Ireland; Hyderabad, India; Kuala Lumpur, Malaysia; Mexico City, Mexico; and Prague, Czech Republic.

In 2016, Novartis continuing operations achieved net sales of $48.5 billion, while net income from continuing operations amounted to $6.7 billion. Of total net sales from continuing operations, $11.9 billion, or 25%, came from Emerging Growth Markets, and $36.6 billion, or 75%, came from Established Markets. Emerging Growth Markets comprise all markets other than the Established Markets of the US, Canada, Western Europe, Japan, Australia and New Zealand. Research & Development expenditure in 2016 amounted to $9.0 billion ($8.5 billion excluding impairment and amortization charges).

Headquartered in Basel, Switzerland, our Group companies employed 118,393 full-time equivalent associates as of December 31, 2016. Our products are sold in approximately 155 countries around the world.

Innovative Medicines Division

Innovative Medicines (formerly named the Pharmaceuticals Division) researches, develops, manufactures, distributes and sells patented prescription medicines to enhance health outcomes for patients and health-care providers. The Innovative Medicines Division is organized into two global business units: Novartis Oncology and Novartis Pharmaceuticals. Novartis Pharmaceuticals consists of the global business franchises Ophthalmology, Neuroscience, Immunology and Dermatology, Respiratory, Cardio-Metabolic and Established Medicines.

In 2016, the Innovative Medicines Division accounted for $32.6 billion, or 67%, of Group net sales, and for $7.4 billion, or 85%, of Group operating income (excluding Corporate income and expense, net).

Sandoz Division

Our Sandoz Division develops, manufactures, distributes and sells prescription medicines, as well as pharmaceutical active substances that are not protected by valid and enforceable third-party patents. Sandoz is organized globally in three franchises: Retail Generics, Anti-Infectives, and Biopharmaceuticals. In Retail Generics, Sandoz develops, manufactures and markets active ingredients and finished dosage forms of pharmaceuticals to third parties. Retail Generics includes the areas of dermatology, respiratory, oncology, ophthalmics, cardiovascular, metabolism, central nervous system, pain, gastrointestinal, and hormonal therapies, as well as finished dosage form anti-infectives sold to third parties. In Anti-Infectives, Sandoz manufactures active pharmaceutical ingredients and intermediates, mainly antibiotics, for internal use by Retail Generics and for sale to third party customers. In Biopharmaceuticals, Sandoz develops, manufactures and markets protein or other biotechnology based products, including biosimilars, and provides biotechnology manufacturing services to other companies.

In 2016, Sandoz accounted for $10.1 billion, or 21%, of Group net sales, and for $1.4 billion, or 17%, of Group operating income (excluding Corporate income and expense, net).

Alcon Division

Our Alcon Division researches, develops, manufactures, distributes and sells eye care products. Alcon is a global leader in eye care with product offerings in eye care devices and vision care. Alcon is organized into two global business franchises: Surgical and Vision Care. The Surgical franchise includes technologies and devices for cataract, retinal, glaucoma and refractive surgery, as well as intraocular lenses to treat cataracts and refractive errors, like presbyopia and astigmatism. Alcon also provides viscoelastics, surgical solutions, surgical packs, and

other disposable products for cataract and vitreoretinal surgery. The Vision Care franchise comprises daily disposable, monthly replacement, and color-enhancing contact lenses, as well as a complete line of contact lens care products including multi-purpose and hydrogen-peroxide based solutions, rewetting drops and daily protein removers.

In 2016, Alcon accounted for $5.8 billion, or 12%, of Group net sales, and for $−0.1 billion, or −2%, of Group operating income (excluding Corporate income and expense, net).

INNOVATIVE MEDICINES

Overview

Our Innovative Medicines Division is a world leader in offering innovation-driven, patent-protected medicines to patients and physicians. The Innovative Medicines Division researches, develops, manufactures, distributes and sells patented pharmaceuticals, and is composed of two business units: Novartis Oncology and Novartis Pharmaceuticals.

The Novartis Oncology business unit is responsible for the commercialization of products in the therapeutic area of oncology. In August 2016, we decided to re-integrate activities conducted by Cell and Gene Therapies, previously a separate franchise in the Innovative Medicines Division (formerly named the Pharmaceuticals Division), into the Novartis Oncology business unit.

The Novartis Pharmaceuticals business unit is organized into global business franchises responsible for the commercialization of various products in the following therapeutic areas: Ophthalmology, Neuroscience, Immunology and Dermatology, Respiratory, Cardio-Metabolic and Established Medicines.

On March 2, 2015, we completed the acquisition of the oncology products of GSK, together with certain related assets. In addition, we acquired a right of first negotiation over the co-development or commercialization of GSK's current and future oncology R&D pipeline, excluding oncology vaccines. The right of first negotiation is for a period of twelve and one half years from the acquisition closing date.

Following an internal reorganization announced on January 27, 2016, nineteen mature products were transferred from our Innovative Medicines Division to the Retail Generics franchise of our Sandoz Division, and Alcon's Ophthalmic Pharmaceuticals products were transferred to our Innovative Medicines Division. In compliance with IFRS, Novartis updated its segment financial information to reflect these transfers, both for the current and prior years, to aid comparability of year-on-year results. As a result, all comparisons of divisional results from 2016, 2015 and 2014 in this Form 20-F reflect this new divisional structure.

The Innovative Medicines Division is the largest contributor among the divisions of Novartis and reported consolidated net sales of $32.6 billion in 2016, which represented 67% of the Group's net sales.

The product portfolio of the Innovative Medicines Division includes more than 60 key marketed products, many of which are leaders in their respective therapeutic areas.

Innovative Medicines Division Products

The following table and summaries describe certain key marketed products in our Innovative Medicines Division. While we intend to sell our marketed products throughout the world, not all products and indications are currently available in every country. Compounds and new indications in development are subject to required regulatory approvals and, in certain instances, contractual limitations. These compounds and indications are in various stages of development throughout the world. It may not be possible to obtain regulatory approval for any or all of the new compounds and new indications referred to in this Form 20-F in any country or in every country. See "—Regulation" for further information on the approval process. Some of the products listed below have lost patent protection or are otherwise subject to generic competition. Others are subject to patent challenges by potential generic competitors. Please see "—Intellectual Property" for general information on intellectual property and regulatory data protection, and for further information on the status of patents and exclusivity for Innovative Medicines Division products.

Selected Marketed Products

Novartis Oncology Business Unit

Business franchise	Product	Common name	Indications (vary by country and/or formulation)	Formulation
Oncology	*Afinitor*/*Votubia* and *Afinitor Disperz*/*Votubia* dispersible tablets	everolimus	Advanced renal cell carcinoma after failure of treatment with VEGF-targeted therapy	Tablet Dispersible tablet for oral suspension
			Advanced neuroendocrine tumors of gastrointestinal, lung or pancreatic origin	
			Hormone receptor-positive advanced breast cancer in combination with an aromatase inhibitor, after prior endocrine therapy	
			Subependymal giant cell astrocytoma associated with tuberous sclerosis complex (TSC) in patients not requiring immediate surgery	
			Renal angiomyolipoma associated with TSC in patients not requiring immediate surgery	
	Arzerra	ofatumumab	Treatment of patients with chronic lymphocytic leukemia (CLL) who are refractory to fludarabine and alemtuzumab	Intravenous infusion
			In combination with an alkylator-based regimen for the treatment of patients with CLL who have not received prior therapy and are not eligible for fludarabine-based therapy	
			Maintenance/extended treatment for patients with CLL who are in complete or partial response after at least two lines of induction therapy	
			In combination with fludarabine and cyclophosphamide for the treatment of patients with relapsed CLL	
	Exjade and Jadenu	deferasirox	Chronic iron overload due to blood transfusions and non-transfusion dependent thalassemia	Dispersible tablet for oral suspension Oral film-coated tablet
	Farydak	panobinostat	Relapsed and/or refractory multiple myeloma, in combination with bortezomib and dexamethasone, after at least two prior regimens including bortezomib and an immunomodulatory agent	Capsule
	Femara	letrozole	Hormone receptor-positive early breast cancer in postmenopausal women following surgery (upfront adjuvant therapy)	Tablet
			Early breast cancer in post-menopausal women following standard tamoxifen therapy (extended adjuvant therapy)	
			Advanced breast cancer in post-menopausal women (both as first- and second-line therapies)	
	Gleevec/*Glivec*	imatinib mesylate/ imatinib	Certain forms of Ph+ chronic myeloid leukemia	Tablet Capsule
			Certain forms of KIT+ gastrointestinal stromal tumors	
			Certain forms of acute lymphoblastic leukemia	
			Dermatofibrosarcoma protuberans	
			Hypereosinophilic syndrome	
			Aggressive systemic mastocytosis	
			Myelodysplastic/myeloproliferative diseases	
	Jakavi	ruxolitinib	Disease-related splenomegaly or symptoms in adult patients with primary myelofibrosis (also known as chronic idiopathic myelofibrosis), post-polycythemia vera myelofibrosis or post-essential thrombocythemia myelofibrosis	Tablet
			Polycythemia vera in adult patients who are resistant to or intolerant of hydroxyurea	
	Odomzo[(1)]	sonidegib	Locally advanced basal cell carcinoma that has recurred following surgery or radiation therapy, or is not a candidate for surgery or radiation therapy	Capsule

(1) Subject to divestment pending closing of sale to Sun Pharma.

Business franchise	Product	Common name	Indications (vary by country and/or formulation)	Formulation
	Proleukin	aldesleukin	Metastatic renal cell carcinoma Metastatic melanoma	Powder for injection or infusion
	Promacta/*Revolade*	eltrombopag	Thrombocytopenia in adult and pediatric patients one year and older with chronic immune (idiopathic) thrombocytopenia who have had insufficient response to corticosteroids, immunoglobulins, or splenectomy Thrombocytopenia in patients with chronic hepatitis C to allow initiation and maintenance of interferon-based therapy Severe aplastic anemia in patients who have had an insufficient response to immunosuppressive therapy	Tablet Eltrombopag for oral suspension
	Sandostatin LAR and Sandostatin SC	octreotide acetate	Acromegaly Symptom control for certain forms of neuroendocrine tumors Delay of tumor progression in patients with midgut tumors	Vial Ampoule/pre-filled syringe
	Signifor and Signifor LAR	pasireotide	Cushing's disease Acromegaly	Solution for subcutaneous injection in ampoule Powder and solvent for suspension for IM injection
	Tafinlar + *Mekinist*	dabrafenib + trametinib	Patients with unresectable or metastatic melanoma with BRAF V600E or V600K mutations as detected by a validated test	Capsule (*Tafinlar*) Tablet (*Mekinist*)
	Tasigna	nilotinib	Certain forms of chronic myeloid leukemia in patients resistant or intolerant to prior treatment including *Gleevec*/*Glivec* First-line chronic myeloid leukemia	Capsule
	Tykerb	lapatinib	In combination with capacitabine for the treatment of patients with HER2+ advanced or metastatic breast cancer who have progressed on prior trastuzumab therapy In combination with an aromatase inhibitor (specifically letrozole in US) for the treatment of patients with hormone sensitive metastatic breast cancer In combination with trastuzumab for patients with HR-negative metastatic disease that has progressed on prior trastuzumab therapy(ies) plus chemotherapy In combination with paclitaxel for first line treatment of patients with HER2+ metastatic breast cancer for whom trastuzumab is not appropriate	Tablet
	Votrient	pazopanib	Advanced renal cell carcinoma Certain types of advanced soft tissue sarcoma after prior chemotherapy	Tablet
	Zometa	zoledronic acid	Skeletal-related events from bone metastases Hypercalcemia of malignancy	Vial/4mg Ready-to-use
	Zykadia	ceritinib	Anaplastic lymphoma kinase-positive metastatic non-small cell lung cancer post crizotinib	Capsule

Novartis Pharmaceuticals Business Unit

Business franchise	Product	Common name	Indications (vary by country and/or formulation)	Formulation
Ophthalmology	*Azarga*/*Azorga*	brinzolamide and timolol	Decrease of intraocular pressure in adult patients with open-angle glaucoma or ocular hypertension for whom monotherapy provides insufficient intraocular pressure reduction	Eye drops
	Duotrav	travoprost and timolol	Reduction of elevated intraocular pressure in patients with open-angle glaucoma or who have ocular hypertension	Eye drops
	Durezol	difluprednate	Treatment of inflammation and pain associated with ocular surgery	Eye drops
			Treatment of endogenous anterior uveitis	
	Lucentis	ranibizumab	Neovascular age-related macular degeneration	Intravitreal injection
			Visual impairment due to diabetic macular edema	
			Visual impairment due to macular edema secondary to central retinal vein occlusion	
			Visual impairment due to macular edema secondary to branch retinal vein occlusion	
			Visual impairment due to choroidal neovascularization secondary to pathologic myopia	
			Visual impairment due to choroidal neovascularization secondary to other pathologies	
	Pataday and Pazeo	olopatadine	Signs and symptoms of allergic conjunctivitis	Eye drops
			Ocular itching associated with allergic conjunctivitis	
	Patanol	olopatadine	Signs and symptoms of allergic conjunctivitis	Eye drops
	Simbrinza	brinzolamide and brimonidine tartrate	Decrease of elevated intraocular pressure in adult patients with open-angle glaucoma or hypertension for whom monotherapy provides insufficient intraocular pressure reduction	Eye drops
	Systane and *Systane Ultra*	polyethylene glycol 400 and propylene glycol	Temporary relief of burning and irritation due to dryness of the eye	Eye drops
	Systane Balance	propylene glycol	Temporary relief of burning and irritation due to dryness of the eye	Eye drops
	Systane Hydration	polyethylene glycol 400, propylene glycol and hyaluronic acid	Temporary relief of burning and irritation due to dryness of the eye	Eye drops
	Travatan, Travatan Z, Travatan BAK-Free, *Izba*	travoprost	Reduction of elevated intraocular pressure in patients with open-angle glaucoma or who have ocular hypertension	Eye drops
Neuroscience	*Extavia*	interferon beta-1b	Relapsing remitting and/or relapsing forms of multiple sclerosis in adult patients	Subcutaneous injection
	Gilenya	fingolimod	Relapsing forms of multiple sclerosis	Capsule
Immunology and Dermatology	*Cosentyx*	secukinumab	Active ankylosing spondylitis	Lyophilized, pre-filled syringe; Auto-injector
			Active psoriatic arthritis	
			Moderate-to-severe plaque psoriasis	
			Pustular psoriasis	
	Ilaris	canakinumab	Cryopyrin-associated periodic syndromes	Lyophilized powder for reconstitution for subcutaneous injection Solution for injection
			Tumor necrosis factor-receptor associated periodic syndrome	
			Hyperimmunoglobulin D syndrome / mevalonate kinase deficiency	
			Familial Mediterranean fever	
			Systemic juvenile idiopathic arthritis	
			Gouty arthritis	
			Adult-onset Still's disease	
	Myfortic	mycophenolic acid (as mycophenolate sodium)	Prophylaxis of organ rejection in patients receiving allogeneic renal transplants	Gastro-resistant tablet

Business franchise	Product	Common name	Indications (vary by country and/or formulation)	Formulation
	Neoral/Sandimmune	cyclosporine, USP Modified	Prevention of rejection following certain organ transplantation Non-transplantation autoimmune conditions such as severe psoriasis and severe rheumatoid arthritis	Capsule Oral solution Intravenous (*Sandimmune*)
	Simulect	basiliximab	Prevention of acute organ rejection in de novo renal transplantation	Vial for injection or infusion
	Xolair	omalizumab	Chronic spontaneous urticaria/chronic idiopathic urticaria See also, "Respiratory"	Lyophilized powder in vial and liquid formulation in pre-filled syringe
	Zortress/ Certican	everolimus	Prevention of organ rejection (heart, liver and kidney)	Tablet Dispersible tablet
Respiratory	*Onbrez Breezhaler*	indacaterol	Chronic obstructive pulmonary disease	Inhalation powder hard capsules
	Seebri Breezhaler	glycopyrronium bromide	Chronic obstructive pulmonary disease	Inhalation powder hard capsules
	Ultibro Breezhaler	indacaterol and glycopyrronium bromide	Chronic obstructive pulmonary disease	Inhalation powder hard capsules
	Xolair	omalizumab	Severe allergic asthma See also, "Immunology and Dermatology"	Lyophilized powder in vial and liquid formulation in pre-filled syringe
Cardio-Metabolic	*Entresto*	sacubitril and valsartan	Symptomatic chronic heart failure with reduced ejection fraction	Tablet
	Eucreas	vildagliptin and metformin	Type 2 diabetes	Tablet
	Galvus	vildagliptin	Type 2 diabetes	Tablet
Established Medicines	*Cibacen*	benazepril hydrochloride	Hypertension Adjunct therapy in congestive heart failure Progressive chronic renal insufficiency	Tablet
	Comtan	entacapone	Parkinson's disease patients who experience end-of-dose motor (or movement) fluctuations	Tablet
	Diovan	valsartan	Hypertension Heart failure Post-myocardial infarction	Tablet Capsule Oral solution
	Diovan HCT/ Co-Diovan	valsartan and hydrochlorothiazide	Hypertension	Tablet
	Exelon	rivastigmine	Mild-to-moderate Alzheimer's disease dementia Severe Alzheimer's disease dementia Dementia associated with Parkinson's disease	Capsule Oral solution Transdermal patch
	Exforge	valsartan and amlodipine besylate	Hypertension	Tablet
	Exforge HCT	valsartan, amlodipine besylate and hydrochlorothiazide	Hypertension	Tablet
	Focalin and Focalin XR	dexmethylphenidate HCl and dexmethylphenidate extended release	Attention deficit hyperactivity disorder	Tablet Capsule
	Lamisil	terbinafine (terbinafine hydrochloride)	Fungal infection of the skin and nails caused by dermatophyte fungi tinea capitis Fungal infections of the skin for the treatment of tinea corporis, tinea cruris, tinea pedis and yeast infections of the skin caused by the genus candida Onychomycosis of the toenail or fingernail due to dermatophytes	Tablet

Business franchise	Product	Common name	Indications (vary by country and/or formulation)	Formulation
	Lescol and Lescol XL	fluvastatin sodium	Hypercholesterolemia and mixed dyslipidemia in adults Secondary prevention of major adverse cardiac events Slowing the progression of atherosclerosis Heterozygous familial hypercholesterolemia in children and adolescents	Capsule (*Lescol)* Tablet (*Lescol* XL)
	Ritalin	methylphenidate HCl	Attention deficit hyperactivity disorder and narcolepsy	Tablet
	Ritalin LA	methylphenidate HCl modified release	Attention deficit hyperactivity disorder	Capsule
	Stalevo	carbidopa, levodopa and entacapone	Parkinson's disease patients who experience end-of-dose motor (or movement) fluctuations	Tablet
	Tegretol	carbamazepine	Epilepsy Pain associated with trigeminal neuralgia Acute mania and bipolar affective disorders Alcohol withdrawal syndrome Painful diabetic neuropathy Diabetes insipidus centralis Polyuria and polydipsia of neurohormonal origin	Tablet Chewable tablet Oral suspension Suppository
	TOBI and TOBI Podhaler	tobramycin	Pseudomonas aeruginosa infection in cystic fibrosis	Nebulizer solution (*TOBI)* Inhalation powder (*TOBI Podhaler*)
	Trileptal	oxcarbazepine	Epilepsy	Tablet Oral suspension
	Tyzeka/*Sebivo*	telbivudine	Chronic hepatitis B	Tablet Oral solution
	Voltaren/*Cataflam*	diclofenac sodium/ potassium/resinate/free acid	Inflammatory and degenerative forms of rheumatism Post traumatic and post-operative pain, inflammation and swelling Painful and/or inflammatory conditions in gynecology Other painful and/or inflammatory conditions such as renal and biliary colic, migraine attacks and as adjuvant in severe ear, nose and throat infections	Tablet Capsule Oral drops/oral suspension Ampoule for injection Suppository Gel Powder for oral solution Transdermal patch

Key Marketed Products

Novartis Oncology Business Unit

Oncology

- *Gleevec*/*Glivec* (imatinib mesylate/imatinib) is a kinase inhibitor approved as a targeted therapy for Philadelphia chromosome-positive (Ph+) chronic myeloid leukemia (CML) and to treat patients with metastatic and/or unresectable KIT (CD117) positive (KIT+) gastrointestinal stromal tumors (GIST), and as an adjuvant treatment for certain adult patients following resection of KIT+ GIST. First launched in 2001, *Gleevec*/*Glivec* is approved in more than 110 countries. *Gleevec*/*Glivec* is also approved in the US, EU and Japan to treat Ph+ acute lymphoblastic leukemia, a rapidly progressive form of leukemia. In addition, *Gleevec*/*Glivec* is approved in the US and EU to treat dermatofibrosarcoma protuberans, a rare solid tumor; hypereosinophilic syndrome; myelodysplastic/myeloproliferative diseases and other rare blood disorders. In the US, *Gleevec* is also approved for aggressive systemic mastocytosis. *Gleevec*/*Glivec* has received approvals in more than 80 countries as a post-surgery (adjuvant setting) therapy for certain adult patients with KIT+ GIST. Following approval by the FDA in 2013, the EMA approved *Gleevec*/*Glivec* in July 2013 for pediatric patients with newly diagnosed Ph+ acute lymphoblastic leukemia in combination with chemotherapy.

- *Tasigna* (nilotinib) is a signal transduction inhibitor of the BCR-ABL tyrosine kinase. Since its launch in 2007, *Tasigna* has been approved in more than 125 countries to treat patients with Ph+ CML in the chronic and/or accelerated phase who are resistant or intolerant to existing treatment, including *Gleevec*/*Glivec*. It is also approved in more than 120 markets, including the US, EU member states, Switzerland and Japan, to treat newly diagnosed patients in the chronic phase.
- *Sandostatin* SC and *Sandostatin LAR* (octreotide acetate/octreotide acetate for injectable suspension) are somatostatin analogues indicated for the treatment of patients with acromegaly, a chronic disease caused by over-secretion of pituitary growth hormone in adults. *Sandostatin* is also indicated for the treatment of patients with certain symptoms associated with carcinoid tumors and other types of gastrointestinal and pancreatic neuroendocrine tumors. Additionally, *Sandostatin LAR* is approved in more than 60 countries for treatment of patients with advanced neuroendocrine tumors of the midgut or unknown primary tumor location. *Sandostatin* was first launched in 1988 and is approved in more than 100 countries.
- *Afinitor*/*Votubia* (everolimus) is an oral inhibitor of the mTOR pathway. *Afinitor* is approved in more than 120 countries including the US, EU member states and Japan for patients with advanced renal cell carcinoma following vascular endothelial growth factor-targeted therapy (in the US, after failure of sunitinib or sorafenib). *Afinitor* is also approved in more than 110 countries, including the US, EU member states and Japan for the treatment of locally advanced, metastatic or unresectable progressive neuroendocrine tumors (NET) of pancreatic origin. *Afinitor* was approved in the US in February 2016 and the EU in June 2016 for the treatment of patients with progressive, well-differentiated, nonfunctional NET of gastrointestinal or lung origin that are unresectable, locally advanced or metastatic, and is now approved for this indication in more than 40 countries worldwide. In addition, *Afinitor* is approved in more than 110 countries for hormone receptor-positive advanced breast cancer in combination with an aromatase inhibitor, after prior endocrine therapy. Everolimus, under the trade name *Afinitor* in the US and *Votubia* in the EU, is also approved in more than 95 countries to treat patients with tuberous sclerosis complex (TSC) who have subependymal giant cell astrocytoma not requiring immediate surgery, and in more than 90 countries to treat patients with TSC who have renal angiomyolipoma not requiring immediate surgery. A dispersible tablet for oral suspension formulation is approved for patients with TSC who have SEGA in more than 40 countries including the US (under the trade name *Afinitor Disperz*), EU member states (under the trade name *Votubia*) and Japan (under the trade name *Afinitor*). Everolimus, the active ingredient in *Afinitor*, is also available under the trade names *Zortress*/*Certican* for use in transplantation in the US and EU, respectively, and is exclusively licensed to Abbott and sublicensed to Boston Scientific for use in drug-eluting stents.
- *Exjade* and *Jadenu* (deferasirox) is an oral iron chelator approved for the treatment of chronic iron overload due to blood transfusions in patients two years of age and older, as well as chronic iron overload in patients with non-transfusion dependent thalassemia in patients 10 years of age and older. Patients with chronic anemia from diseases such as thalassemia, sickle cell disease and myelodysplastic syndromes require repeated transfusions, which puts them at risk of iron overload. *Exjade,* a dispersible tablet for oral suspension, was first approved in 2005 and is now approved in more than 100 countries, including the US, EU member states and Japan. An oral film-coated tablet formulation that can be swallowed or crushed is approved in the US and Canada under the tradename *Jadenu*. It was approved by EMA in 2016 under the tradename of *Exjade*. Regulatory applications have been submitted in Switzerland and other countries. In addition to the film-coated tablet formulation, a new formulation has also been developed as granules for patients who cannot swallow tablets, using the same composition as the film-coated tablet formulation. Regulatory applications for the granules formulation have been submitted under the name *Jadenu* in the US and Japan and under the name *Exjade* in the EU.
- *Votrient* (pazopanib) is a small molecule tyrosine kinase inhibitor that targets a number of intracellular proteins to limit tumor growth and cell survival. *Votrient* is approved in the US for the treatment of patients with advanced renal cell carcinoma (aRCC), and in the EU for first-line treatment of adult patients with aRCC and for patients who have received prior cytokine therapy for advanced disease. RCC is the most common type of kidney cancer in adults, and nearly one-fifth of patients have aRCC at the time of diagnosis. *Votrient* is also indicated for the treatment of patients with advanced soft tissue sarcoma (STS) who have received prior chemotherapy (efficacy in adipocytic STS or gastrointestinal stromal tumors has not been demonstrated). STS is a type of cancer which can arise from a wide variety of soft

tissues including muscle, fat, blood vessel and nerves. *Votrient* is approved in more than 100 countries worldwide for aRCC and in more than 90 countries for advanced STS. *Votrient* was acquired from GSK.

- *Tafinlar* + *Mekinist* (dabrafenib + trametinib) is the first combination of its kind for the treatment of patients with BRAF V600 mutation positive unresectable or metastatic melanoma, as detected by a validated test, in the US, EU and several other markets. *Tafinlar* targets the serine/threonine kinase BRAF in the RAS/RAF/MEK/ERK pathway and *Mekinist* targets the threonine/tyrosine kinases MEK1 and MEK2 in the MAP kinase pathway, resulting in dual blockade of this pathway. This is the first combination of a BRAF and a MEK inhibitor to demonstrate an overall survival benefit over BRAF inhibitor monotherapy after three years in two Phase III studies in BRAF V600 mutation positive unresectable or metastatic melanoma patients. *Tafinlar* and *Mekinist* are each also approved as single agents for the treatment of patients with unresectable or metastatic melanoma in more than 60 and 40 countries worldwide, respectively. *Tafinlar* and *Mekinist* were each acquired from GSK. As part of our purchase of oncology products from GSK, we obtained the worldwide exclusive rights granted by Japan Tobacco Inc., to develop, manufacture, and commercialize trametinib.
- *Promacta*/*Revolade* (eltrombopag) is a once-daily oral thrombopoietin receptor agonist that works by stimulating bone marrow cells to produce platelets. It is the only approved once-daily oral thrombopoietin receptor agonist, and is marketed under the brand name *Promacta* in the US and *Revolade* in most countries outside the US. It is approved in more than 100 countries for the treatment of thrombocytopenia in adult patients with chronic immune (idiopathic) thrombocytopenia (ITP) who have had an inadequate response or are intolerant to other treatments. In the US and EU, *Promacta*/*Revolade* is approved for patients one year and older with chronic ITP who have had an inadequate response to other treatments. *Promacta*/*Revolade* may be considered as second-line treatment for adult non-splenectomised patients where surgery is contraindicated. *Promacta*/*Revolade* is also approved in 45 countries for the treatment of patients with severe aplastic anemia (SAA) who are refractory to other treatments (in the US for the treatment of patients with SAA who have had an insufficient response to immunosuppressive therapy and in the EU for the treatment of adults with acquired SAA who were either refractory to prior immunosuppressive therapy or heavily pretreated and are unsuitable for hematopoietic stem cell transplant). In addition, *Promacta*/*Revolade* is approved in more than 50 countries for the treatment of thrombocytopenia in patients with chronic hepatitis C to allow them to initiate and maintain interferon-based therapy. *Promacta*/*Revolade* is marketed under a collaboration agreement between Ligand Pharmaceuticals, Inc., and Novartis. *Promacta*/*Revolade* was acquired from GSK.
- *Jakavi* (ruxolitinib) is an oral inhibitor of the JAK1 and JAK2 tyrosine kinases. It is the first JAK inhibitor indicated for the treatment of disease-related splenomegaly or symptoms in adult patients with primary myelofibrosis, post-polycythemia vera myelofibrosis or post-essential thrombocythemia myelofibrosis and adult patients with polycythemia vera who are resistant to or intolerant of hydroxyurea. *Jakavi* is currently approved in more than 100 countries for patients with myelofibrosis and in more than 65 countries for patients with polycythemia vera, including EU member states and Japan. A five year follow-up of the two pivotal trials, COMFORT-I and COMFORT-II suggests an overall survival advantage for patients randomized to *Jakavi* compared to placebo or best available therapy, respectively. Novartis licensed ruxolitinib from Incyte Corporation for development and commercialization in the indications of oncology, hematology and Graft-versus-host disease outside the US. Ruxolitinib, marketed in the US as Jakafi® by Incyte Corporation, is approved by the FDA for the treatment of patients with polycythemia vera who have had an inadequate response to or are intolerant of hydroxyurea. Jakafi® is also approved by the FDA for treatment of patients with intermediate or high-risk myelofibrosis, including primary myelofibrosis, post-polycythemia vera myelofibrosis and post-essential thrombocythemia myelofibrosis.

Novartis Pharmaceuticals Business Unit

Ophthalmology

- *Lucentis* (ranibizumab) is a recombinant humanized high affinity antibody fragment that binds to vascular endothelial growth factor A (VEGF-A), a key mediator of intraocular neovascularization. *Lucentis* is an anti-VEGF therapy licensed for six ocular indications: neovascular age-related macular degeneration (nAMD), visual impairment due to diabetic macular edema (DME), visual impairment due to macular edema secondary to branch retinal vein occlusion (BRVO), visual impairment due to macular edema

secondary to central retinal vein occlusion (CRVO), visual impairment due to choroidal neovascularization secondary to pathologic myopia (myopic CNV) and visual impairment due to choroidal neovascularization (CNV) secondary to other pathologies. Approval in visual impairment due to CNV secondary to other pathologies was received in Europe in November 2016, and submissions for this indication have been filed in 22 other countries. In April 2016 the label of *Lucentis* was updated to include the treatment of RVO patients with retinal ischemia. *Lucentis* is the only anti-VEGF treatment available in a pre-filled syringe and approved for a treat and extend regimen in the first year of therapy. Since its launch, there have been more than 4.3 million patient-treatment years of exposure for *Lucentis* and more than 26.8 million injections. Novartis licensed *Lucentis* from Genentech for development and commercialization outside of the US. For further information see "Note 27. Transactions with related parties—Genentech/Roche" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

- *Travatan* (travoprost), *Travatan Z* (travoprost) and *Duotrav* (travoprost/timolol) are indicated for the reduction of elevated intraocular pressure (IOP) in patients with open-angle glaucoma or who have ocular hypertension. Single agent travoprost products (*Travatan*, *Travatan Z*, *Travatan* BAK-Free and *Izba*) are prescribed as first-line agents and are marketed in more than 140 countries, including the US, countries of the EU, Canada and China. *Duotrav* is a fixed-dose combination solution of the prostaglandin analogue travoprost with the beta-blocker timolol, and is approved as a second-line treatment in adults for the reduction of IOP in patients with open-angle glaucoma or ocular hypertension who are insufficiently responsive to topical beta-blockers or prostaglandin analogues. *Duotrav* is currently marketed in more than 140 countries, including countries of the EU, Canada and China.
- *Systane* (polyethylene glycol 400 and propylene glycol) and most other *Systane* branded products are indicated for the temporary relief of burning and irritation due to dryness of the eye. The *Systane* portfolio includes products for daily and nighttime relief, as well as products for everyday lid hygiene, and for discomfort associated with contact lens wear. *Systane Ultra* (polyethylene glycol 400 and propylene glycol) is sold in more than 80 countries, including the US, Canada and countries of the EU, Latin America and Asia. *Systane Balance* (propylene glycol) is sold in more than 60 countries. *Systane* Hydration (polyethylene glycol 400, propylene glycol and hyaluronic acid) was launched in March 2015 and is now sold in more than 35 countries across Europe, plus Canada and Australia.
- *Patanol* (olopatadine), *Pataday* (olopatadine) and *Pazeo* (olopatadine) are olopatadine hydrochloride ophthalmic solutions of different concentrations that are approved to treat the signs and symptoms of allergic conjunctivitis (*Patanol*), as well as ocular itching associated with allergic conjunctivitis (*Pataday* and *Pazeo*). Olopatadine products are marketed in more than 100 countries, including the US, countries of the EU, Canada and China.

Neuroscience

- *Gilenya* (fingolimod) is the first oral therapy approved to treat relapsing forms of multiple sclerosis (RMS) and the first in a new class of compounds called sphingosine 1-phosphate receptor modulators. In the US, *Gilenya* is indicated for relapsing forms of MS. In the EU, *Gilenya* is indicated for adult patients with high disease activity despite treatment with at least one disease modifying agent, or rapidly evolving severe relapsing-remitting MS. *Gilenya* impacts four key measures of disease activity: relapses, MRI lesions, brain shrinkage (brain volume loss) and disability progression. Its effectiveness on all of these measures has been consistently shown in multiple controlled clinical studies and in the real-world setting. As of November 2016, more than 180,000 patients have been treated in clinical trials and in a post-marketing setting, with more than 395,000 total patient-years of exposure. *Gilenya* is currently approved in more than 80 countries around the world. *Gilenya* is licensed from Mitsubishi Tanabe Pharma Corporation.

Immunology and Dermatology

- *Cosentyx* (secukinumab) is a fully human monoclonal antibody that selectively neutralizes circulating interleukin 17A (IL-17A). *Cosentyx* has been approved in over 75 markets, including the US and countries of the EU, for the treatment of moderate-to-severe plaque psoriasis. *Cosentyx* is also approved in the EU for the treatment of adults with ankylosing spondylitis who have responded inadequately to conventional therapy, such as non-steroidal anti-inflammatory drugs, and for the treatment of active psoriatic arthritis in adults when the response to disease modifying anti-rheumatic drug therapy is unsatisfactory. In January

2016, *Cosentyx* was approved in the US for the treatment of adults with active ankylosing spondylitis and for the treatment of adults with active psoriatic arthritis. *Cosentyx* is approved in more than 65 countries for the treatment of adults with ankylosing spondylitis and psoriatic arthritis, including the US, countries of the EU, Canada and Australia. *Cosentyx* is approved in Japan for the treatment of moderate-to-severe plaque psoriasis, pustular psoriasis, and both psoriasis vulgaris and psoriatic arthritis in adults who are not adequately responding to systemic therapies (except for biologics).

- *Neoral* (cyclosporine, USP Modified) is an immunosuppressant to prevent organ rejection following a kidney, liver, or heart transplant. *Neoral* is also approved for use in lung transplant in many countries outside of the US. This micro-emulsion formulation of cyclosporine is also indicated for treating selected autoimmune disorders such as psoriasis and rheumatoid arthritis. First launched in 1995, *Neoral* is marketed in approximately 100 countries.
- *Zortress*/*Certican* (everolimus) is an oral inhibitor of the mTOR pathway, indicated to prevent organ rejection following solid organ transplantation. Under the trade name *Certican*, it is approved in more than 90 countries to prevent organ rejection for renal and heart transplant patients, and in addition, in more than 70 countries worldwide to prevent organ rejection for liver transplant patients. In the US, under the trade name *Zortress*, the drug is approved for the prophylaxis of organ rejection in adult patients at low-moderate immunologic risk receiving a kidney transplant as well as for the prophylaxis of allograft rejection in adult liver transplant recipients. Everolimus is also available from Novartis in different dosage strengths and for different uses in non-transplant patient populations under the brand names *Afinitor, Afinitor Disperz* and *Votubia*. Everolimus is also exclusively licensed to Abbott and sublicensed to Boston Scientific for use in drug-eluting stents.
- *Myfortic* (enteric-coated formulation of mycophenolate sodium) is approved in more than 90 countries for the prevention of acute rejection of kidney allografts, and is indicated in combination with cyclosporine and corticosteroids. *Myfortic* was first approved in the US in 2004 and in the EU in 2003.
- *Ilaris* (canakinumab) is a human monoclonal antibody that selectively binds and neutralizes interleukin-1β (IL-1β), a pro-inflammatory cytokine. Since 2009, *Ilaris* has been approved in more than 70 countries for the treatment of children and adults suffering from cryopyrin-associated periodic syndromes, a group of rare disorders characterized by chronic recurrent fever, urticaria, occasional arthritis, deafness, and potentially life-threatening amyloidosis. In 2013, *Ilaris* was approved in the EU for the treatment of acute gouty arthritis in patients who cannot be managed with standard of care, and in the US, EU and other countries for the treatment of systemic juvenile idiopathic arthritis. In 2016, the FDA granted three simultaneous approvals for the expanded use of *Ilaris* to treat three rare and distinct types of periodic fever syndromes: tumor necrosis factor-receptor associated periodic syndrome, hyperimmunoglobulin D syndrome / mevalonate kinase deficiency and familial Mediterranean fever. *Ilaris* is the first and only FDA approved biologic treatment for these rare autoinflammatory diseases, which are also referred to as Hereditary Periodic Fevers. In December 2016, the CHMP recommended approval of the same three Periodic Fever Syndromes. In 2016, the European Commission also approved a license extension for *Ilaris* to treat patients with Adult-Onset Still's Disease.
- *Xolair* (omalizumab) is a recombinant, DNA-derived, humanized IgG1K monoclonal antibody. *Xolair* is designed to block IgE, which limits the release of mediators in the early and late phases of the allergic inflammatory cascade. *Xolair* is currently approved in the EU, Switzerland and more than 80 countries as a treatment for chronic spontaneous urticaria (CSU)/chronic idiopathic urticaria (CIU) including approvals in the EU as add-on therapy for the treatment of CSU in adult and adolescent (12 years and above) patients with inadequate response to H1 antihistamine treatment, and, in the US, for the treatment of adults and adolescents (12 years of age and above) with CIU who remain symptomatic despite H1 antihistamine treatment. See also, *Xolair* in "Respiratory" below. We co-promote *Xolair* with Genentech in the US and share a portion of operating income, but we do not record any US sales. Novartis records all sales of *Xolair* outside the US. For further information see "Note 27. Transactions with related parties—Genentech/Roche" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Respiratory

- *Xolair* (omalizumab) is approved for the treatment of moderate-to-severe, or severe, persistent allergic asthma in more than 90 countries, including the US since 2003, the EU since 2005, and Japan since 2009. *Xolair* is provided as lyophilized powder for resolution, and in addition as liquid formulation in a pre-filled syringe in most European countries. See also, *Xolair* in "Immunology and Dermatology" above. We co-promote *Xolair* with Genentech in the US and share a portion of operating income, but we do not record any US sales. Novartis records all sales of *Xolair* outside the US. For further information see "Note 27. Transactions with related parties—Genentech/Roche" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.
- *Ultibro Breezhaler* (indacaterol/glycopyrronium bromide) / *Utibron Neohaler* (indacaterol/ glycopyrrolate) is a fixed-dose combination of the long-acting beta$_2$-adrenergic agonist (LABA) indacaterol and the long-acting muscarinic antagonist (LAMA) glycopyrronium bromide. *Ultibro Breezhaler* was approved in the EU in 2013 as a once-daily maintenance bronchodilator treatment to relieve symptoms in adult patients with chronic obstructive pulmonary disease (COPD), and in Japan the MHLW approved *Ultibro* Inhalation Capsules delivered through the low resistance *Breezhaler* inhalation device, for relief of various symptoms due to airway obstruction in COPD (chronic bronchitis, emphysema). In October 2015 the combination was approved in the US under the name *Utibron Neohaler* as a twice-daily dual bronchodilator for the long-term maintenance treatment of airflow obstruction in patients with COPD, including chronic bronchitis and/or emphysema. The combination is approved in more than 90 countries and launched in more than 50 countries. The LAMA glycopyrronium bromide is approved individually as once-daily *Seebri Breezhaler* in the EU, *Seebri* (glycopyrronium) Inhalation Capsules 50 mcg administered through the *Breezhaler* device in Japan, and twice-daily *Seebri Neohaler* in the US, where the active ingredient is known as glycopyrrolate. It is now approved in more than 90 countries worldwide. Glycopyrronium bromide and certain use and formulation intellectual property were exclusively licensed to Novartis in April 2005 by Sosei and Vectura. The LABA indacaterol is approved individually as once-daily *Onbrez Breezhaler* in the EU, *Onbrez* Inhalation Capsules delivered through the *Breezhaler* inhalation device in Japan, and *Arcapta Neohaler* in the US. It is now approved in more than 100 countries worldwide. In December 2016, Sunovion Pharmaceuticals Inc., acquired the US commercialization rights for *Utibron Neohaler, Arcapta Neohaler* and *Seebri Neohaler.* Novartis will continue to market *Ultibro Breezhaler, Onbrez Breezhaler* and *Seebri Breezhaler* outside of the US.

Cardio-Metabolic

- *Galvus* (vildagliptin), an oral DPP-4 inhibitor, and *Eucreas*, a vildagliptin and metformin single-pill combination, are indicated for the treatment of type 2 diabetes. The products were first approved in 2007. *Galvus* is currently approved in more than 130 countries, including EU member states, Japan (as *Equa*) and countries in Latin America and Asia-Pacific. *Eucreas* was the first single-pill combination of a DPP-4 inhibitor and metformin approved in Europe, and also under the trade name *Galvus Met*, and is currently approved in more than 125 countries. In 2012, *Galvus* received approval in the EU for expanded use as a second-line monotherapy for type 2 diabetes patients who cannot take metformin. In 2012, the EC approved the use of *Galvus* and *Eucreas* in combination with other diabetes treatments. The first approval was for the use of vildagliptin in combination with insulin, with or without metformin, for patients with type 2 diabetes when diet, exercise and a stable dose of insulin do not result in glycemic control. The second approval was for the use of vildagliptin in triple combination with metformin and a sulphonylurea for the treatment of type 2 diabetes when diet and exercise plus dual therapy with these two agents do not provide adequate glycemic control. *Galvus* monotherapy indication was approved in China in April 2015. *Eucreas* was approved in Japan in September 2015 under the name *Equmet* as the first single-pill combination metformin/DPP-4 inhibitor approved in that country.
- *Entresto* (sacubitril/valsartan) is a first-in-class angiotensin receptor/neprilysin inhibitor indicated for the treatment of symptomatic chronic heart failure with reduced ejection fraction (HFrEF). It acts to enhance the protective neurohormonal systems of the heart (neprilysin system) while simultaneously suppressing the harmful system (the renin-angiotensin-aldosterone system, or RAAS). *Entresto* was approved and launched in the US in July 2015 as a treatment for HFrEF. It was approved in Switzerland in September 2015 and in the EU in November 2015. *Entresto* is now approved in more than 70 countries, and launched in more than 30 countries, for the treatment of HFrEF, including the US, countries of the EU, Switzerland, Canada and Australia. Both ESC HF and US HF guidelines have given a class I recommendation, the strongest class of recommendation, for the use of sacubitril/valsartan in patients with HFrEF.

Established Medicines

- *Diovan* (valsartan), together with *Diovan HCT*/*Co-Diovan* (valsartan and hydrochlorothiazide), is an angiotensin II receptor blocker (ARB). *Diovan* is the only agent in its class approved to treat all of the following: high blood pressure (including children 6 to 18 years), high-risk heart attack survivors and patients with heart failure. First launched in 1996, *Diovan* is available in more than 120 countries for treating high blood pressure, in more than 90 countries for heart failure, and in more than 70 countries for heart attack survivors. First launched in 1997, *Diovan HCT*/*Co-Diovan* is approved in more than 100 countries worldwide.
- *Exforge* (valsartan and amlodipine besylate) is a single-pill combination of the ARB *Diovan* and the calcium channel blocker amlodipine besylate. First approved for the treatment of high blood pressure in Switzerland in 2006, and in the US and EU in 2007, it is now available in more than 100 countries. *Exforge HCT* (valsartan, amlodipine besylate and hydrochlorothiazide) is a single pill combining three widely prescribed high blood pressure treatments: an ARB, a calcium channel blocker and a diuretic (hydrochlorothiazide). *Exforge HCT* was approved in the EU and the US in 2009, and is now available in more than 75 countries.
- *Voltaren*/*Cataflam* (diclofenac sodium/potassium/resinate/free acid) is a leading non-steroidal anti-inflammatory drug (NSAID) for the relief of symptoms in rheumatic diseases such as rheumatoid arthritis and osteoarthritis, and for various other inflammatory and pain conditions. *Voltaren*/*Cataflam* was first registered in 1973 and is available in more than 140 countries. This product is marketed by the Innovative Medicines Division in a wide variety of dosage forms including tablets, drops, suppositories, ampoules and topical therapy. Our Sandoz Division also markets generic versions of the product in various countries. In addition, we have licensed the *Voltaren* trademarks to our consumer healthcare joint venture with GSK to be used in the marketing of low dose oral forms and the topical forms of *Voltaren* as over-the-counter products.
- *Exelon* (rivastigmine tartrate) and *Exelon* Patch (rivastigmine transdermal system) are cholinesterase inhibitors indicated for the treatment of Alzheimer's disease (AD) dementia and Parkinson's disease (PD) dementia. They are the oral and transdermal formulations, respectively, of the cholinesterase inhibitor rivastigmine. *Exelon* capsules have been available since 1997 to treat mild to moderate AD dementia and are approved in more than 85 countries. In 2006, *Exelon* became the only cholinesterase inhibitor to be approved for mild to moderate PD dementia in addition to AD in both the US and EU. *Exelon* Patch was approved in 2007 in the US and EU and has been approved for the treatment of mild-to-moderate AD in more than 85 countries, including more than 20 countries where it is also approved for Parkinson's disease dementia. The once-daily formulation *Exelon* Patch has shown comparable efficacy and superior tolerability to the highest recommended doses of *Exelon* capsules, with significant improvement in cognition and overall functioning compared to placebo. In 2013, the FDA expanded the approved indication for *Exelon* Patch to also include the treatment of patients with severe Alzheimer's disease. In 2013, European Marketing Authorization was obtained for the higher dose in mild-to-moderate AD. The higher dose has been approved in more than 50 countries. The severe indication has now been approved in more than 10 countries.
- *Ritalin, Ritalin LA, Focalin* and *Focalin XR* (methylphenidate HCl, methylphenidate HCl extended release, dexmethylphenidate HCl and dexmethylphenidate HCl extended release) are indicated for the treatment of attention deficit hyperactivity disorder (ADHD) in children. *Ritalin LA* and *Focalin XR* are additionally indicated for ADHD in adults. *Ritalin* is also indicated for narcolepsy. *Ritalin* was first marketed during the 1950s and is available in more than 70 countries. *Ritalin LA* is available in more than 30 countries. *Focalin* comprises the active d-isomer of methylphenidate and therefore requires half the dose of *Ritalin*. *Focalin* and *Focalin XR* are available in the US.

Compounds in Development

The following table and paragraph summaries provide an overview of the key projects currently in the Confirmatory Development stage within our Innovative Medicines Division, including projects seeking to develop potential uses of new molecular entities as well as potential additional indications or new formulations for already marketed products. The year that each project entered the current phase of development disclosed below reflects

the year in which the decision to enter the phase was made. This may be different from the year in which the first patient received the first treatment in the related clinical trial. A reference to a project being in registration means that an application has been filed with a health authority for marketing approval.

Selected Development Projects

Project/Product	Common name	Mechanism of action	Potential indication/ Disease area	Business franchise	Formulation/ Route of administration	Year Project Entered Current Development Phase	Planned filing dates/Current phase
ABL001	asciminib	BCR-ABL inhibitor	Chronic myeloid leukemia, 3rd line	Oncology	Oral	2015	2020/I
ACZ885	canakinumab	Anti-interleukin-1β monoclonal antibody	Secondary prevention of cardiovascular events	Cardio-Metabolic	Subcutaneous injection	2011	2017/III
Afinitor/Votubia	everolimus	mTOR inhibitor	Tuberous sclerosis complex seizures	Oncology	Oral	EU: 2016 US: 2013	EU (registration) US 2017/III
AMG 334	erenumab	Selective CGRP receptor antagonist	Migraine	Neuroscience	Subcutaneous injection	2015	2017/III
Arzerra	ofatumumab	Anti-CD20 monoclonal antibody	Refractory non-Hodgkin's lymphoma	Oncology	Oral	2010	2018/III
BAF312	siponimod	Sphingosine-1-phosphate receptor modulator	Secondary progressive multiple sclerosis	Neuroscience	Oral	2012	2019/III[(1)]
BYL719	alpelisib	PI3Kα inhibitor	Hormone receptor-positive, HER2-negative advanced breast cancer (postmenopausal women), 2nd line (+ fulvestrant)	Oncology	Oral	2015	2019/III
BYM338	bimagrumab	Inhibitor of activin receptor Type II	Hip fracture	Neuroscience	Intravenous infusion	2013	≥2021/II
			Sarcopenia	Neuroscience	Intravenous infusion	2014	≥2021/II
CAD106	amilomotide	Beta-amyloid-protein therapy	Alzheimer's disease	Neuroscience	Intramuscular injection	2008	≥2021/ II/III
CJM112	TBD	Anti-interleukin-17 monoclonal antibody	Immune disorders	Immunology and Dermatology	Subcutaneous injection	2015	≥2021/II
CNP520	TBD	BACE inhibitor	Alzheimer's disease	Neuroscience	Oral	2015	≥2021/ I/II
Cosentyx	secukinumab	Anti-interleukin-17 monoclonal antibody	Non-radiographic axial spondyloarthritis	Immunology and Dermatology	Subcutaneous injection	2015	2018/III
			Psoriatic arthritis head-to-head study vs. adalimumab	Immunology and Dermatology	Subcutaneous injection	2016	2020/III
			Ankylosing spondylitis head-to-head study vs. adalimumab	Immunology and Dermatology	Subcutaneous injection	2016	≥2021/III
CTL019	tisagenlecleucel-T	CD19-targeted chimeric antigen receptor T-cell immunotherapy	Pediatric acute lymphoblastic leukemia	Oncology	Intravenous infusion	2012	2017/II
			Diffuse large B-cell lymphoma	Oncology	Intravenous infusion	2014	2017/II

(1) Ongoing discussions with health authorities to agree on next steps.

Project/Product	Common name	Mechanism of action	Potential indication/ Disease area	Business franchise	Formulation/ Route of administration	Year Project Entered Current Development Phase	Planned filing dates/Current phase
EMA401	TBD	Angiotensin II receptor antagonist	Neuropathic pain	Neuroscience	Oral	2011	≥2021/II
Entresto	valsartan and sacubitril (as sodium salt complex)	Angiotensin receptor/ neprilysin inhibitor	Chronic heart failure with preserved ejection fraction	Cardio-Metabolic	Oral	2013	2019/III
			Post-acute myocardial infarction	Cardio-Metabolic	Oral	2015	2020/III
FTY720	fingolimod	Sphingosine-1-phosphate receptor modulator	Pediatric multiple sclerosis	Neuroscience	Oral	2013	2017/III
Ilaris	canakinumab	Anti-interleukin-1β monoclonal antibody	Periodic fever syndromes	Immunology and Dermatology	Subcutaneous injection	2016	US (approved) EU (registration)
INC280	capmatinib	c-MET inhibitor	Non-small cell lung cancer	Oncology	Oral	2013	2018/II
			Non-small cell lung cancer EGFR mutation	Oncology	Oral	2016	≥2021/II
Jakavi	ruxolitinib	JAK1/JAK2 inhibitor	Early myelofibrosis	Oncology	Oral	2016	2020/III
			Graft-versus-host disease	Oncology	Oral	2016	2019/III
KAE609	cipargamin	PfATP4 inhibitor	Malaria	Established Medicines	Oral	2012	≥2021/II
KAF156	TBD	Imidazolopiperazines derivative	Malaria	Established Medicines	Oral	2013	≥2021/II
LAM320	clofazimine	Mycobacterial DNA binding	Multi-drug resistant tuberculosis	Established Medicines	Oral	2016	2018/III
LCI699	osilodrostat	Aldosterone synthase inhibitor	Cushing's disease	Oncology	Oral	2011	2018/III
LEE011	ribociclib	CDK4/6 inhibitor	Hormone receptor-positive, HER2-negative advanced breast cancer (postmenopausal women), 1st line (+ letrozole)	Oncology	Oral	2016	US/EU (registration)
			Hormone receptor-positive, HER2-negative advanced breast cancer (postmenopausal women), 1st/2nd line (+ fulvestrant)	Oncology	Oral	2015	2018/III
			Hormone receptor-positive, HER2-negative advanced breast cancer (premenopausal women), 1st line, (+ tamoxifen + goserelin or NSAI + goserelin)	Oncology	Oral	2014	2018/III
			Hormone receptor-positive, HER2-negative breast cancer (adjuvant)	Oncology	Oral	2016	≥2021/III
LIK066	TBD	SGLT 1/2 inhibitor	Weight loss	Cardio-Metabolic	Oral	2016	≥2021/II
LJN452	TBD	FXR agonist	Non-alcoholic steatohepatitis	Immunology and Dermatology	Oral	2015	≥2021/II
Lucentis	ranibizumab	Anti-VEGF monoclonal antibody fragment	Retinopathy of prematurity	Ophthalmology	Intravitreal injection	2014	2018/III
OMB157	ofatumumab	Anti-CD20 monoclonal antibody	Relapsing multiple sclerosis	Neuroscience	Subcutaneous injection	2016	2019/III
PIM447	TBD	Pan-PIM inhibitor	Hematologic tumors	Oncology	Oral	2015	≥2021/I
PKC412	midostaurin	Signal transduction inhibitor	Acute myeloid leukemia	Oncology	Oral	2016	US/EU (registration)
			Advanced systemic mastocytosis	Oncology	Oral	2016	US/EU (registration)
			Acute myeloid leukemia (FLT3 wild type)	Oncology	Oral	2016	≥2021/III
Promacta/ Revolade	eltrombopag	Thrombopoietin receptor agonist	Severe aplastic anemia, 1st line	Oncology	Oral	2016	2017/III

Project/Product	Common name	Mechanism of action	Potential indication/ Disease area	Business franchise	Formulation/ Route of administration	Year Project Entered Current Development Phase	Planned filing dates/Current phase
QAW039	fevipiprant	CRTH2 antagonist	Asthma	Respiratory	Oral	2010	2019/III
			Atopic dermatitis	Immunology and Dermatology	Oral	2013	≥2021/II
QBW251	TBD	CFTR potentiator	Cystic fibrosis	Respiratory	Oral	2016	≥2021/II
QGE031	ligelizumab	High affinity anti-IgE monoclonal antibody	Chronic spontaneous urticaria/ chronic idiopathic urticaria	Immunology and Dermatology	Subcutaneous injection	2015	2020/II
QMF149	indacaterol, mometasone furoate (in fixed dose combination)	Long-acting beta2-adrenergic agonist and inhaled corticosteroid	Asthma	Respiratory	Inhalation	2015	2019/III
QVM149	indacaterol, mometasone furoate, glycopyrronium bromide (in fixed dose combination)	Long-acting beta2-adrenergic agonist, long-acting muscarinic antagonist and inhaled corticosteroid	Asthma	Respiratory	Inhalation	2015	2019/III
RLX030	serelaxin	Recombinant form of human relaxin-2 hormone	Acute heart failure	Cardio-Metabolic	Intravenous infusion	2009	2017/III
RTH258	brolucizumab	Anti-VEGF single-chain antibody fragment	Neovascular age-related macular degeneration	Ophthalmology	Intravitreal injection	2014	2018/III
			Diabetic macular edema	Ophthalmology	Intravitreal injection	2016	2020/III
SEG101	crizanlizumab	P-selectin inhibitor	Sickle cell disease	Oncology	Intravenous infusion	2016	2020/III
Signifor LAR	pasireotide	Somatostatin analogue	Cushing's disease	Oncology	Long-acting release/ intramuscular injection	2016	US[(2)] /EU (registration)
Tafinlar + *Mekinist*	dabrafenib + trametinib	BRAF inhibitor + MEK inhibitor	BRAF V600+ non-small cell lung cancer	Oncology	Oral	2016	US/EU (registration)
			BRAF V600+ melanoma (adjuvant)	Oncology	Oral	2013	2018/III
			BRAF V600+ colorectal cancer	Oncology	Oral	2012	2020/ I/II
Tasigna	nilotinib	BCR-ABL inhibitor	Chronic myeloid leukemia treatment-free remission	Oncology	Oral	EU: 2016 US: 2012	EU (registration) US 2017/III
UNR844	TBD	Reduction of disulfide bonds	Presbyopia	Ophthalmology	Eye drops	2016	≥2021/II
VAY736	TBD	Anti-BAFF (B-cell activating factor) monoclonal antibody	Primary Sjoegren's syndrome	Immunology and Dermatology	Subcutaneous injection	2015	≥2021/II
ZPL389	TBD	Histamine H_4 receptor antagonist	Atopic dermatitis	Immunology and Dermatology	Oral	2016	≥2021/II
Zykadia	ceritinib	ALK inhibitor	ALK+ advanced non-small cell lung cancer (1st line, treatment naïve)	Oncology	Oral	2016	US/EU (registration)
			ALK+ advanced non-small cell lung cancer (brain metastases)	Oncology	Oral	2015	2019/II

(2) Submission pending acceptance by FDA.

Key Development Projects

- ACZ885 (canakinumab) was first approved in 2009 for cryopyrin-associated periodic syndromes as *Ilaris*. ACZ885 is currently being investigated in the fully enrolled pivotal Phase III CANTOS study to determine whether ACZ885 can reduce the risk of recurrent cardiovascular events (cardiovascular death, non-fatal myocardial infarction, non-fatal stroke) in patients with history of myocardial infarction and elevated inflammatory burden versus placebo when administered quarterly in addition to standard of care. Results from the CANTOS study are expected mid-2017.
- *Afinitor*/*Votubia* and *Afinitor Disperz* (everolimus) are oral inhibitors of the mTOR pathway. The EXIST-3 Phase III clinical trial in patients with tuberous sclerosis complex (TSC) who have refractory partial-onset seizures (uncontrollable seizures localized to a specific area of the brain) found that adjunctive therapy with everolimus significantly reduced refractory seizures associated with TSC compared to placebo in patients receiving a stable regimen of 1 - 3 anti-epileptic drugs. This data was published in The Lancet in September 2016. In December 2016, *Votubia* was recommended by the CHMP for approval as an adjunctive treatment of patients aged two years and older whose refractory partial-onset seizures, with or without secondary generalization, are associated with TSC.
- AMG 334 (erenumab) is a fully human monoclonal antibody designed to block the calcitonin gene-related peptide (CGRP) receptor, which is believed to play a critical role in mediating the incapacitating pain of migraine. In 2016, we announced positive results for a Phase II study of AMG 334 in chronic migraine prevention and for two Phase III studies of AMG 334 in episodic migraine prevention. In these studies, patients who received AMG 334 experienced fewer monthly migraine days than patients who received placebo. The safety profile of AMG 334 was comparable to placebo in the trials. AMG 334 is being co-developed by Novartis and Amgen. Novartis has commercial rights to AMG 334 outside of the US, Canada and Japan.
- *Arzerra* (ofatumumab) is a human monoclonal antibody that is designed to target the CD20 molecule found on the surface of chronic lymphocytic leukemia (CLL) cells and normal B lymphocytes. Results from the Phase III PROLONG study evaluating ofatumumab maintenance therapy versus no further treatment (observation) in patients with relapsed CLL who responded to induction treatment at relapse formed the basis for submissions made in 2015 to the EMA and FDA for this indication. In September 2015, the FDA granted Priority Review for ofatumumab as maintenance therapy in relapsed CLL, and in January 2016 the FDA approved *Arzerra* for extended treatment of patients who are in complete or partial response after at least two lines of therapy for recurrent or progressive CLL. In the EU, the CHMP did not recommend approval for *Arzerra* as maintenance treatment for patients with relapsed CLL. Results from the Phase III COMPLEMENT 2 study in 2015 showed that treatment with ofatumumab plus fludarabine and cyclophosphamide significantly improved median progression-free survival by 54% compared to treatment with fludarabine and cyclophosphamide alone in patients with relapsed CLL. Results of this study were submitted to the EMA and FDA in 2016. In May 2016, the FDA granted Priority Review for ofatumumab in combination with fludarabine and cyclophosphamide in relapsed CLL and approved this indication in August 2016. In November 2016, the CHMP issued a positive opinion for ofatumumab in combination with fludarabine and cyclophosphamide in relapsed CLL, which was followed in December 2016 by European Commission approval of the product for use in this indication. A Phase III trial is also underway to investigate ofatumumab in refractory non-Hodgkin's lymphoma. *Arzerra* is marketed under a license agreement between Genmab A/S and Novartis. Novartis is also investigating ofatumumab (disclosed as OMB157) in two Phase III studies for relapsing multiple sclerosis.
- BAF312 (siponimod) is an oral, second-generation sphingosine 1-phosphate receptor modulator in Phase III development for secondary progressive multiple sclerosis. BAF312 binds selectively to the sphingosine 1-phosphate receptor subtypes 1 and 5, and distributes effectively to the brain where it may modulate central S1P1,5 receptors to impact central nervous system inflammation and repair mechanisms. Results from the EXPAND Phase III study, evaluating the efficacy and safety of BAF312 for secondary progressive multiple sclerosis, were announced in August 2016. EXPAND met its primary endpoint and showed that treatment with BAF312 reduced the risk of three-month confirmed disability progression by 21% and six-month confirmed disability progression by 26% compared with placebo. A consistent reduction in the risk of confirmed disability progression was seen across predefined subgroups, including patients without relapses. BAF312 was generally safe and well tolerated, with a profile comparable to

other drugs in the same class. Novartis is currently in discussions with health authorities about next steps with BAF312.

- BYL719 (alpelisib) is an orally bioavailable, alpha isoform-specific PI3K inhibitor. In breast cancer cell lines harboring PIK3CA mutations, BYL719 has been shown to inhibit the PI3K/AKT/mTOR pathway and have anti-proliferative effects. In addition, cancer cell lines with PIK3CA mutations were more sensitive to alpelisib than those without the mutation across a broad range of different cancers. BYL719 is being studied in the Phase III SOLAR-1 trial in combination with fulvestrant in men and postmenopausal women with hormone receptor-positive advanced breast cancer who received prior treatment with aromatase inhibitor and a Phase II trial to determine the maximum tolerated dose in combination with fulvestrant in PIK3CA mutated estrogen receptor-positive breast cancer patients.
- *Cosentyx* (secukinumab) is a fully human monoclonal antibody that selectively neutralizes circulating IL-17A. In January 2016, *Cosentyx* was approved by the FDA for the treatment of adults with ankylosing spondylitis (AS) and for the treatment of adults with psoriatic arthritis (PsA). In October 2016, the Swiss health authority Swissmedic also approved *Cosentyx* for the treatment of AS and PsA. New results for *Cosentyx* published in the Journal of the American Academy of Dermatology from the head-to-head CLEAR study showed that *Cosentyx* remains superior to Stelara® in sustaining skin clearance (PASI 90 to PASI 100) at 52 weeks for adults with moderate-to-severe psoriasis. In addition, long-term data from the Phase III SCULPTURE study presented at a European medical meeting in October 2016 showed that *Cosentyx* delivers high and long-lasting skin clearance in patients with moderate-to-severe plaque psoriasis out to four years of treatment. Secukinumab is also in Phase III development for non-radiographic axial spondyloarthritis, and new head-to-head clinical trials have been initiated in AS and PsA to compare *Cosentyx* versus adalimumab.
- CTL019 (tisagenlecleucel-T) is an investigational therapy that utilizes chimeric antigen receptors (CARs) to use the patient's own immune system to fight certain types of cancer. CARs are engineered proteins that transform a patient's own T cells into antigen-specific cells which seek out target proteins present on a patient's cancerous tumor. When these cells are re-introduced into the patient's blood, they demonstrate the potential to bind to the cancer cells and destroy them. CTL019 targets a protein called CD19 that is associated with a number of B-cell malignancies. Data presented in December 2016 from the pivotal global Phase II ELIANA trial of CTL019 in relapsed/refractory pediatric and young adult patients with B-cell acute lymphoblastic leukemia showed that 82% of infused patients achieved complete remission or complete remission with incomplete blood count recovery at three months post CTL019 infusion. For all patients with complete remission, no minimal residual disease was detected. In addition, the estimated relapse-free rate among responders was 60% six months after infusion with CTL019. We plan to submit a BLA to the FDA on the basis of this data in early 2017. CTL019 is also being studied in a Phase II trial in diffuse large B-cell lymphoma with an FDA filing planned in 2017.
- EMA401 is a novel angiotensin II Type 2 receptor (AT_2R) antagonist in Phase II development. Targeting AT_2R is an emerging approach to neuropathic pain treatment. AT_2R antagonists block the pain signaling pathways in the peripheral nervous system. Positive results from a Phase II clinical trial of EMA401 in post-herpetic neuralgia, a painful condition that develops in some people following herpes zoster (shingles), were published in a major medical journal in February 2014. In addition, thus far, EMA401 has not been associated with central nervous system side effects such as dizziness or confusion, which are typically associated with existing therapies. Novartis expects to start two Phase II studies to assess the potential of EMA401 in peripheral neuropathic pain in 2017.
- *Entresto* (sacubitril/valsartan) is a first-in-class angiotensin receptor/neprilysin inhibitor approved and marketed for the treatment of chronic heart failure with reduced ejection fraction (HFrEF). In addition, Novartis is conducting multiple studies of *Entresto* as part of the FortiHFy clinical program. This includes two large outcome studies. The first, PARAGON-HF, a Phase III trial of *Entresto* in patients with chronic heart failure with preserved ejection fraction, has completed enrollment with results expected in 2019. Novartis has commenced recruitment in PARADISE-MI, a Phase IIIb trial for patients at high risk for heart failure after an acute myocardial infarction, with results expected in 2020.
- FTY720 (fingolimod) is a sphingosine 1-phosphate receptor modulator approved for the treatment of relapsing forms of multiple sclerosis as *Gilenya*. A Phase III study of fingolimod in pediatric multiple sclerosis was initiated in 2013. Results from the study are anticipated in 2017.

- *Jakavi* (ruxolitinib) is an oral inhibitor of the JAK 1 and JAK 2 tyrosine kinases. The Phase III study ReTHINK was initiated in the first quarter of 2016 to evaluate the efficacy and safety of *Jakavi* in early myelofibrosis patients. Novartis licensed ruxolitinib from Incyte Corporation for development and commercialization in the indications of oncology and hematology outside the US. In the second quarter of 2016 the license was amended to also include rights to research, develop and commercialize ruxolitinib in graft-versus-host disease outside the US. Ruxolitinib is marketed in the US as Jakafi® by Incyte Corporation.
- LEE011 (ribociclib) is a selective cyclin dependent kinase inhibitor that inhibits two proteins called cyclin dependent kinase 4 and 6 (CDK4/6). Results from the pivotal Phase III MONALEESA-2 study showed LEE011 plus letrozole significantly extended progression-free survival (PFS) compared to a standard of care, letrozole, as a first-line treatment in post-menopausal women with HR+/HER2− advanced breast cancer. LEE011 plus letrozole reduced the risk of disease progression or death by 44% over letrozole alone, significantly extending PFS across all patient subgroups. Results from additional analyses from the Phase III MONALEESA-2 study showed that LEE011 plus letrozole significantly prolonged PFS across various pre-planned patient subgroups with HR+/HER2− advanced or metastatic breast cancer, including post-menopausal women diagnosed de novo, those with visceral metastases (liver and/or lung involvement), and those with bone-only disease. These findings demonstrate the potential impact of LEE011 plus letrozole in the first-line setting, showing that treatment benefit was evident across relevant patient subgroups regardless of their disease burden or tumor location, including those patients with more aggressive disease. We presented this data at the San Antonio Breast Cancer Symposium in December 2016. In November 2016, Novartis announced that the FDA granted Priority Review for LEE011 as first-line treatment of postmenopausal women with HR+/HER2− advanced or metastatic breast cancer in combination with letrozole following a Breakthrough Therapy designation from the FDA in August 2016. Novartis also announced in November that the EMA has accepted for review the marketing authorization application for LEE011 plus letrozole in the same patient population. Novartis is continuing to assess LEE011 through the MONALEESA clinical trial program, which includes MONALEESA-2, MONALEESA-3 and MONALEESA-7. These trials are evaluating LEE011 in multiple endocrine therapy combinations across a broad range of patients, including men and premenopausal women. LEE011 was developed by Novartis as part of a drug discovery collaboration with Astex Pharmaceuticals.
- LIK066 is an inhibitor of the sodium-glucose co-transporter-1 (SGLT1) and sodium-glucose co-transporter-2 (SGLT2). The dual mechanism (renal and intestinal) acts to improve multiple metabolic end points including glycemic control, weight, blood pressure and lipid bio markers. We expect to initiate Phase II dose ranging studies for weight loss in the first half of 2017.
- LJN452 is a potent, non-bile acid, Farnesoid X receptor (FXR) agonist, which is being developed for the treatment of nonalcoholic steatohepatitis (NASH). LJN452 has been shown to reduce steatosis, inflammation, and fibrosis in animal models, alongside a favorable safety profile in first in-human studies. This oral treatment is designed to break the cycle of fatty build-up in the liver and harness the body's built-in mechanisms for coping with excess bile acid. Recruitment is underway for the first LJN452 clinical study in NASH patients.
- OMB157 (ofatumumab) is a fully human monoclonal antibody administered by subcutaneous injection in development for multiple sclerosis (MS). OMB157 works by binding to the CD20 molecule on the B cell surface and inducing B cell depletion. Positive Phase IIb results in MS patients were presented in 2014 and showed significant reduction in the number of new brain lesions in the first 24 weeks after ofatumumab administration. Novartis initiated a Phase III program for OMB157 in relapsing MS in August 2016. We expect to complete the Phase III program in MS in 2019. Ofatumumab is marketed by Novartis for oncology indications as intravenous infusion under the brand name *Arzerra*.
- Pegpleranib is an oligo-nucleotide aptamer that inhibits the action of platelet-derived growth factor (PDGF). The pegpleranib Phase III program originally consisted of three clinical trials to evaluate the safety and efficacy of pegpleranib in combination with anti-VEGF drugs for the treatment of neovascular age related macular degeneration (nAMD). In December 2016, Novartis announced initial topline results from two pivotal Phase III clinical studies evaluating the safety and efficacy of pegpleranib in combination with *Lucentis* (ranibizumab) for the treatment of nAMD. These studies, OPH1002 and OPH1003, sponsored by Ophthotech Corporation, did not meet the primary endpoint of superiority for the

pegpleranib and ranibizumab combination therapy, measured as best corrected visual acuity in terms of additional letter gains over ranibizumab monotherapy. In November 2015, Genentech entered into an agreement with Novartis to participate in certain financial rights related to the Novartis licensing and commercialization agreement with Ophthotech Corporation for pegpleranib. We continue to hold the license for the rights to develop and exclusively market pegpleranib outside the US.

- PKC412 (midostaurin) is an oral, multi-targeted kinase inhibitor in Phase III development for treatment of patients with FLT3-mutated acute myeloid leukemia (AML) and for advanced systemic mastocytosis (SM). In February 2016, the FDA granted PKC412 Breakthrough Therapy designation for FLT3-mutated AML, which was primarily based upon the positive results from the Phase III randomized versus placebo RATIFY clinical trial and in November 2016, the FDA granted Priority Review to the PKC412 new drug application for the treatment of newly diagnosed FLT3 mutation-positive AML and advanced SM. In the RATIFY study, patients who received PKC412 plus standard induction and consolidation chemotherapy and as monotherapy up to one year for maintenance experienced a 23% improvement in overall survival compared to those treated with standard induction/consolidation chemotherapy and placebo. The median overall survival for patients in the PKC412 treatment group was 74.7 months, versus 26.0 months for patients in the placebo group. PKC412 is the first compound to illustrate an overall survival benefit targeting FLT3 in AML. In an advanced SM pivotal Phase II study, PKC412 demonstrated an overall response rate, defined as a major or partial response, of 60% in patients. The median duration of response for all responders in the primary efficacy population was 24.1 months. These data are the basis for the worldwide regulatory filings for PKC412 for newly diagnosed, FLT3-mutated AML and for advanced SM, including the FDA and EMA.
- QAW039 (fevipiprant) is a small molecule being investigated in the reduction of frequency and duration of asthma attacks, particularly in patients with severe asthma. This compound is designed to block the activity of T-helper type-2 (Th2) cells, which are thought to contribute to the disease by releasing signals that maintain eosinophilic airway inflammation. In a Phase II study completed in August 2015, QAW039 reduced eosinophils, drivers of airway inflammation in patients with persistent moderate-to-severe asthma. Pivotal Phase III trials are underway in severe asthma.
- QVM149 (indacaterol, glycopyrronium, mometasone furoate) is a once daily fixed-dose triple combination therapy being investigated in moderate-to-severe asthma patients who are uncontrolled on a long-acting beta-agonist (LABA) combined with an inhaled corticosteroid (ICS) or who are already taking a triple combination LABA, long-acting muscarinic antagonist (LAMA) and ICS. QVM149 consists of indacaterol (a LABA), glycopyrronium (a LAMA) and mometasone furoate (an ICS) delivered via the *Breezhaler* device. QVM149 is currently in Phase III clinical trials. This Phase III program is also designed to deliver data to support regulatory filings by Novartis for QMF149, a once daily combination of indacaterol and mometasone fuorate. This Phase III program is to support registration of QVM149 and QMF149 outside the US only.
- RLX030 (serelaxin), is a novel recombinant form of the human hormone relaxin 2, and is believed to act through multiple mechanisms to reduce stress on the heart, kidneys and other organs. Results from the Phase III RELAX-AHF study showed that RLX030 improved symptoms and reduced mortality in patients with acute heart failure (AHF). Data were presented at the American Heart Association congress in 2012 and published simultaneously in The Lancet. In 2014, the FDA and CHMP decided that further data were required for marketing authorizations to be granted and a second confirmatory Phase III study, RELAX-AHF-2, is currently underway. The study's primary endpoint is a reduction in cardiovascular mortality, and top line results are expected in the first half of 2017. Based on the first study RELAX-AHF, RLX030 was approved and launched in Russia in 2014 under the trade name *Reasanz*.
- RTH258 (brolucizumab) is a novel anti-vascular endothelial growth factor (anti-VEGF) agent that is currently being tested in neovascular age-related macular degeneration (nAMD) patients. RTH258 is a single chain antibody fragment that may be longer-acting than currently approved treatments for AMD, potentially enabling patients to extend the time between treatments. We expect the results of two Phase III trials in 2017.
- SEG101 (crizanlizumab, formerly SelG1) is a humanized anti-P-selectin monoclonal antibody that is being investigated in the reduction of vaso-occlusive pain crises in patients with sickle cell disease (SCD). SCD is a hereditary blood disorder characterized by sickle-shaped red blood cells. Novartis acquired SEG101 in

2016 by exercising its right to acquire Selexys Pharmaceuticals Corporation following receipt of results of the Phase II SUSTAIN study. Results from the SUSTAIN study showed that SEG101 reduced the median annual rate of sickle cell-related pain crises compared to placebo in patients with or without hydroxyurea therapy.

- *Signifor* LAR (pasireotide) is a somatostatin analogue in development as a long-acting release formulation for patients with Cushing's disease. Applications have been submitted to the FDA and EMA for this indication.
- *Tafinlar* (dabrafenib) targets the serine/threonine kinase BRAF in the RAS/RAF/MEK/ERK pathway and *Mekinist* (trametinib) targets the threonine/tyrosine kinases MEK1 and MEK2 in the MAP kinase pathway, resulting in dual blockade of this pathway, which is the main escape mechanism for resistance. *Tafinlar + Mekinist* is the first combination of BRAF and MEK inhibitors to report three years of follow-up survival data in two Phase III studies in BRAFv600+ unresectable or metastatic patients. A Phase III study is also underway for BRAF V600 mutation positive melanoma patients in the adjuvant setting. Phase II studies are also underway to evaluate the efficacy and safety of *Tafinlar + Mekinist* in patients with BRAF V600 mutation positive non-small cell lung cancer (NSCLC). *Tafinlar* has a Breakthrough Therapy designation from the FDA for treatment of NSCLC patients with BRAF V600E mutations who have received at least one prior line of platinum-containing chemotherapy. In July 2015, the combination therapy *Tafinlar + Mekinist* also received Breakthrough Therapy designation from the FDA for NSCLC patients with BRAF V600E mutations. In November 2016, the FDA granted Priority Review to *Tafinlar + Mekinist* for the treatment of BRAF positive NSCLC, as detected by an FDA-approved test, with disease progression on or after platinum-containing chemotherapy.
- *Tasigna* (nilotinib) is a selective tyrosine-kinase inhibitor that inhibits the BCR-ABL protein produced by the Philadelphia chromosome, which is found in most people who have chronic myeloid leukemia (CML). Novartis has an ongoing global clinical trial program to evaluate the potential for Philadelphia chromosome positive (Ph+) CML patients to maintain deep molecular response after stopping nilotinib. ENESTfreedom, ENESTop, ENESTgoal, and ENESTpath are designed to evaluate the feasibility of stopping treatment, and achieving successful treatment-free remission in patients with Ph+ CML in the chronic phase and deep molecular response on nilotinib. Data from ENESTfreedom and ENESTop were presented at major US and European medical congresses in 2016. An application was filed with the EMA for the inclusion of the ENESTfreedom and ENESTop data in the Summary of Product Characteristics of *Tasigna*.
- UNR844 is a potential first-in-class topical treatment in development for presbyopia. Presbyopia is a common age-related loss of near distance vision characterized by a progressive inability to focus on objects nearby, making everyday activities, such as reading, challenging. In a phase I/II masked, placebo-controlled proof of concept study, 50 patients were treated daily for 90 days with topical UNR844 and 25 patients with placebo. UNR844 showed a statistically significant difference to placebo in distant corrected near vision at all time points measured (from day 8). At day 90, 82% of participants treated with UNR844 had 20/40 near vision (or 0.30 LogMAR) versus 48% in the placebo group. Near vision of 20/40 allows for the majority of near vision tasks in most people. UNR844 was acquired by Novartis through the acquisition of Encore Vision, Inc., in January 2017.
- VAY736 is a highly specific and potent monoclonal antibody against the B-cell activating factor receptor with enhanced antibody-dependent cell-mediated cytotoxicity against B cells. VAY736 is in Phase II development for the treatment of primary Sjoegren's syndrome, a systemic autoimmune disorder characterized by progressive lymphocytic destruction of exocrine glands and other organs resulting not only in eye and mouth dryness, but frequently complicated by severe fatigue and extraglandular organ involvement.
- ZPL389 is a once-daily oral H_4 receptor antagonist in development for atopic dermatitis, commonly known as eczema. ZPL389 is a potential first-in-class oral treatment for moderate-to-severe eczema. In a proof of concept study, ZPL389 showed a clinically and statistically significant reduction of eczema. After eight weeks of treatment, the compound reduced the Eczema Area and Severity Index (EASI) score by 50% in a study of 98 patients. In clinical studies conducted to date, ZPL389 has a favorable safety profile. ZPL389 was acquired by Novartis through the acquisition of Ziarco Group Limited in January 2017.

- *Zykadia* (ceritinib) is a potent and highly selective oral anaplastic lymphoma kinase (ALK) inhibitor that is in development for ALK positive (ALK+) cancers. Two Phase III clinical trials comparing ceritinib with chemotherapy in treatment-naïve and in previously-treated non-small cell lung cancer (NSCLC) patients have demonstrated a statistically significant and clinically meaningful benefit. Results from the Phase III ASCEND-4 study found that patients with ALK+ advanced NSCLC treated with first-line Zykadia had a median progression-free survival of 16.6 months, compared to 8.1 months in patients treated with standard first-line chemotherapy with maintenance. The study findings were presented in December 2016 at the World Conference on Lung Cancer. Results from the randomized Phase III ASCEND-5 study of *Zykadia* were presented at the European Society for Medical Oncology (ESMO) congress in October 2016. The ASCEND-5 study assessed median progression-free survival (PFS) in patients previously treated with crizotinib and one or two prior regimens of cytotoxic chemotherapy (including platinum doublet), who then received *Zykadia* or standard chemotherapy. There was a statistically significant and clinically meaningful improvement in median PFS for patients taking *Zykadia* versus chemotherapy as determined by a blinded independent review committee. In addition, updated results from the Phase II ASCEND-3 study were presented at the ESMO congress in October 2016 which demonstrated that patients with ALK+ NSCLC taking *Zykadia* as their first ALK inhibitor (post-chemotherapy) had a median PFS of 18.4 months. In December 2016, applications were submitted in the US and EU for *Zykadia* as a first-line treatment for patients with ALK+NSCLC based on the results of the ASCEND-4 trial.

Projects Added To And Subtracted From The Development Table Since 2015

Project/Product	Potential indication/ Disease area	Change	Reason
ABL001	Chronic myeloid leukemia	Now disclosed as chronic myeloid leukemia, 3rd line	
Afinitor/Votubia	Non-functioning GI and lung neuroendocrine tumors	Commercialized	
	Diffuse large B-cell lymphoma	Removed	Development discontinued
Arzerra	Chronic lymphocytic leukemia (extended treatment)	US: Commercialized EU: Removed	Approved in US Development discontinued in EU
	Chronic lymphocytic leukemia (relapse)	Commercialized	
ASB183	Solid and hematological tumors	Removed	Development discontinued
BGJ398	Solid tumors	Removed	Development discontinued
BKM120	Metastatic breast cancer, hormone receptor-positive, aromatase inhibitor resistant/mTOR naïve, 2nd line (+ fulvestrant)	Removed	Development discontinued
	Metastatic breast cancer, hormone receptor-positive, aromatase inhibitor and mTOR inhibitor resistant, 3rd line (+ fulvestrant)	Removed	Development discontinued
	Solid tumors	Removed	Development discontinued
BYL719	Solid tumors	Removed	Development discontinued
BYM338	Sporadic inclusion body myositis	Removed	Development discontinued

Project/Product	Potential indication/ Disease area	Change	Reason
Cosentyx	Psoriatic arthritis head-to-head study vs. adalimumab	Added	Entered confirmatory development
	Ankylosing spondylitis head-to-head study vs. adalimumab	Added	Entered confirmatory development
EGF816	Solid tumors	Removed	Development discontinued
Exjade film-coated tablet (FCT)	Iron overload	Commercialized	
FCR001	Renal transplant	Removed	Development discontinued
FTY720	Pediatric multiple sclerosis	Added	Pediatric indication disclosed
Gilenya	Chronic inflammatory demyelinating polyradiculoneuropathy	Removed	Development discontinued
HSC835	Stem cell transplantation	Removed	Development discontinued
INC280	Non-small cell lung cancer EGFR mutation	Added	Entered confirmatory development
Ilaris (ACZ885)	Hereditary periodic fevers	Now disclosed as periodic fever syndromes	
Jakavi	Early myelofibrosis	Added	Entered confirmatory development
	Graft-versus-host disease	Added	Extended licensing agreement with Incyte Corporation
LAM320	Multi-drug resistant tuberculosis	Added	Entered confirmatory development
LEE011	Hormone receptor-positive, HER2-negative breast cancer (adjuvant)	Added	Entered confirmatory development
	Solid tumors	Removed	Development discontinued
LIK066	Weight loss	Added	Entered confirmatory Development
LJM716	Solid tumors	Removed	Development discontinued
Lucentis	Choroidal neovascularization secondary to conditions other than age-related macular degeneration and pathologic myopia	Commercialized	
pegpleranib	Neovascular age-related macular degeneration	Removed	Development in combination with *Lucentis* discontinued

Project/Product	Potential indication/ Disease area	Change	Reason
PKC412	Aggressive systemic mastocytosis	Now disclosed as advanced systemic mastocytosis	
	Acute myeloid leukemia (FLT3 wild type)	Added	Entered confirmatory development
Promacta/Revolade	Pediatric immune thrombocytopenia	Commercialized	
	Severe aplastic anemia, 1st line	Added	Entered confirmatory development
QAX576	Allergic diseases	Removed	Development discontinued
QBW251	Cystic fibrosis	Added	Entered confirmatory Development
QGE031	Chronic spontaneous urticaria/ Inducible urticaria	Now disclosed as chronic spontaneous urticaria/ chronic idiopathic urticaria	
RTH258	Neovascular age-related macular degeneration	Added	Transferred from Alcon Division
	Diabetic macular edema	Added	Transferred from Alcon Division
SEG101	Sickle cell disease	Added	Acquired with acquisition of Selexys Pharmaceuticals Corporation
UNR844	Presbyopia	Added	Acquired with acquisition of Encore Vision, Inc.
Votrient	Renal cell carcinoma (adjuvant)	Removed	Development discontinued
ZPL389	Atopic dermatitis	Added	Acquired with acquisition of Ziarco Group Limited

Principal Markets

The Innovative Medicines Division sells products in approximately 155 countries worldwide. Net sales are generally concentrated in the US, Europe and Japan. However, sales from Emerging Growth Markets have

become increasingly important to us. The following table sets forth the aggregate 2016 net sales of the Innovative Medicines Division by region:

Innovative Medicines	2016 Net sales to third parties	
	$ millions	%
Europe	11,217	34
United States	10,897	33
Asia, Africa, Australasia	7,696	24
Canada and Latin America	2,752	9
Total	**32,562**	**100**
Of which in Established Markets*	24,416	75
Of which in Emerging Growth Markets*	8,146	25

* Emerging Growth Markets comprise all markets other than the Established Markets of the US, Canada, Western Europe, Japan, Australia and New Zealand.

Many of our Innovative Medicines Division's products are used for chronic conditions that require patients to consume the product over long periods of time, ranging from months to years. Net sales of the vast majority of our products are not subject to material changes in seasonal demand. Sales of certain ophthalmic pharmaceutical products, including those for allergies, anti-inflammation and dry eye, are subject to seasonal variation.

Production

The primary goal of our manufacturing and supply chain management program is to ensure the uninterrupted, timely and cost-effective supply of products that meet all product specifications and quality standards. The manufacture of our products is heavily regulated by governmental health authorities around the world, including the FDA and EMA. In addition to regulatory requirements, many of our products involve technically complex manufacturing processes or require a supply of highly specialized raw materials.

We manufacture our products at facilities worldwide. See also "—Item 4.D Property, Plants and Equipment." Active pharmaceutical ingredients are manufactured in our own facilities or purchased from third-party suppliers. We maintain state-of-the-art and cost-competitive processes with quality as a primary goal within our own production network. Those processes include fermentation, chemical syntheses and precipitation processes, such as sterile processing. Many biologic medicines are manufactured using recombinant DNA derived technology, by which a gene is introduced into a host cell, which then produces a human protein. This manufacturing process requires sophisticated technical expertise. We are constantly working to improve current, and to develop new, manufacturing processes.

Raw materials for the manufacturing process are either produced in-house or purchased from a number of third party suppliers. Where possible, we maintain multiple supply sources so that the business is not dependent on a single or limited number of suppliers. However, our ability to do so may at times be limited by regulatory or other requirements. We monitor market developments that could have an adverse effect on the supply of essential materials. Our suppliers of raw materials are required to comply with Novartis quality standards.

Because the manufacture of our products is complex and heavily regulated by governmental health authorities, supply is never guaranteed. If we or our third party suppliers fail to comply with applicable regulations then there could be a product recall or other shutdown or disruption of our production activities. We have experienced supply interruptions for our products in the past, and there can be no assurance that supply will not be interrupted again in the future as a result of unforeseen circumstances. We have implemented a global manufacturing strategy to maximize business continuity in case of such events or other unforeseen catastrophic events. However, there can be no guarantee that we will always be able to successfully manage such issues when they arise.

Marketing and Sales

The Innovative Medicines Division serves customers with 3,234 field force representatives in the US, and an additional 20,965 in the rest of the world, as of December 31, 2016, including supervisors and administrative personnel. These trained representatives, where permitted by law, present the therapeutic risks and benefits of our products to physicians, pharmacists, hospitals, insurance groups and managed care organizations. We continue to see increasing influence of customer groups beyond prescribers, and Novartis is responding by adapting our business practices to engage appropriately with such constituencies.

The marketplace for healthcare is also evolving with patients becoming more informed stakeholders in their healthcare decisions and looking for solutions to meet their changing needs. Where permitted by law, Novartis seeks to assist the patient, delivering innovative solutions to drive education, access, and improved patient care.

Although specific distribution patterns vary by country, Novartis generally sells its prescription drugs primarily to wholesale and retail drug distributors, hospitals, clinics, government agencies and managed healthcare providers. The growing number of so-called "specialty" drugs in our portfolio has resulted in increased engagement with specialty pharmacies. In the US, specialty pharmacies continue to grow as a distribution channel for specialty products, with an increasing number of health plans mandating use of specialty pharmacies to monitor specialty drug utilization and costs.

Novartis pursues co-promotion/co-marketing opportunities as well as licensing and distribution agreements with other companies in various markets, when legally permitted and economically attractive. In the US, certain products can be advertised by way of internet, television, newspaper and magazine advertising.

As a result of continuing changes in healthcare economics and an aging population, the US Centers for Medicare & Medicaid Services (CMS) is now the largest single payor for healthcare services in the US. In addition, both commercial and government sponsored managed care organizations continue to be one of the largest groups of payors for healthcare services in the US. In other territories, national health services are often the only significant payor for healthcare services. In an effort to control prescription drug costs, almost all managed care organizations and national health services use formularies that list specific drugs that may be reimbursed, and/or the level of reimbursement for each drug. Managed care organizations and national health services also increasingly utilize various cost-benefit analyses to determine whether or not newly-approved drugs will be added to a formulary and/or the level of reimbursement for that drug, and whether or not to continue to reimburse existing drugs. We have dedicated teams that actively seek to optimize formulary positions for our products.

Competition

The global pharmaceutical market is highly competitive, and we compete against other major international corporations which have substantial financial and other resources, as well as against smaller companies which operate regionally or nationally. Competition within the industry is intense and extends across a wide range of commercial activities, including pricing, product characteristics, customer service, sales and marketing, and research and development.

In addition, as is the case with other pharmaceutical companies selling patented pharmaceuticals, Novartis faces ever-increasing challenges from companies selling products which compete with our products, including competing patented products and generic forms of our products following the expiry of intellectual property protection. Generic companies may also gain entry to the market through successfully challenging our intellectual property rights, but we vigorously use legally permissible measures to defend those rights. See also "—Intellectual Property" below. We also face competition from over-the-counter (OTC) products that do not require a prescription from a physician. See also "—Regulation—Price Controls" below.

There is ongoing consolidation in the pharmaceutical industry. At the same time, new entrants are looking to use their expertise to establish or expand their presence in healthcare, including technology companies hoping to benefit as data and data management become increasingly important in our industry.

Research and Development

The discovery and development of a new drug is a lengthy process, usually requiring approximately 10 to 15 years from the initial research to bringing a drug to market, including approximately six to eight years from

Phase I clinical trials to market entry. At each of these steps, there is a substantial risk that a compound will not meet the requirements to progress further. In such an event, we may be required to abandon a compound in which we have made a substantial investment.

We manage our research and development expenditures across our entire portfolio in accordance with our strategic priorities. We make decisions about whether or not to proceed with development projects on a project-by-project basis. These decisions are based on the project's potential to meet a significant unmet medical need or to improve patient outcomes, the strength of the science underlying the project, and the potential of the project (subject to the risks inherent in pharmaceutical development) to generate significant positive financial results for the Company. Once a management decision has been made to proceed with the development of a particular molecule, the level of research and development investment required will be driven by many factors, including the medical indications for which it is being developed, the number of indications being pursued, whether the molecule is of a chemical or biological nature, the stage of development, and the level of evidence necessary to demonstrate clinical efficacy and safety.

We are a leader in the pharmaceuticals industry in terms of research and development, including the level of our investment. For information about research and development expenditures by our Innovative Medicines Division over the last three years, please see "Item 5. Operating and Financial Review and Prospects—5.A Operating Results—Results of Operations—2016 Compared to 2015—Innovative Medicines—Research and development of Innovative Medicines Division," and "Item 5. Operating and Financial Review and Prospects—5.A Operating Results—Results of Operations—2015 Compared to 2014—Innovative Medicines—Research and development."

Research program

Our research program is conducted by the Novartis Institutes for BioMedical Research (NIBR), which is responsible for the discovery of new medicines. We established NIBR in 2002. The principal goal of our research program is to discover new medicines for diseases with unmet medical need. To do this, we focus our work in areas where we have sufficient scientific understanding and believe we have the potential to change the practice of medicine. This requires the hiring and retention of the best talent, a focus on fundamental disease mechanisms that are relevant across different disease areas, continuous improvement in technologies for drug discovery and potential therapies, close alliances with clinical colleagues, and the establishment of appropriate external complementary alliances.

At NIBR sites in Basel, Switzerland, Cambridge, Massachusetts, and three other US locations, Singapore and China, more than 6,000 scientists, physicians and business professionals contribute to research into disease areas such as cardiovascular and metabolic diseases, neuroscience, oncology, muscle disorders, ophthalmology, autoimmune diseases, and respiratory diseases. Research platforms such as the Center for Proteomic Chemistry are headquartered at the NIBR site in Basel, Switzerland. In addition, the Novartis Institute for Tropical Diseases, the Friedrich Miescher Institute, and the Genomics Institute of the Novartis Research Foundation focus on basic genetic and genomic research as well as research into diseases of the developing world such as malaria, dengue and African sleeping sickness.

All drug candidates are taken to the clinic via "proof-of-concept" trials to enable an early assessment of the safety and efficacy of the drug while collecting basic information on pharmacokinetics and tolerability, and adhering to the guidance for early clinical testing set forth by health authorities. Following proof-of-concept, our Global Drug Development unit conducts confirmatory trials on the drug candidates.

In March 2016, Dr. Mark Fishman, President of NIBR, reached his contractual retirement age and retired. Dr. James E. Bradner, a physician-scientist from Dana Farber Cancer Institute and Harvard Medical School succeeded Dr. Fishman in that role.

In October 2016, we announced a new strategic plan for research that includes the creation of a unified early discovery research group based in Basel, Switzerland and Cambridge, Massachusetts, the creation of two centers of excellence for bio-therapeutic research in Basel, Switzerland and Cambridge, Massachusetts, the creation of an enterprise wide pharmacokinetics sciences group and growth of our respiratory diseases research group. As part of this plan, the Novartis Institute for Tropical Diseases (NITD) will move research programs and operations from Singapore to Emeryville, California, where it will be co-located with our infectious diseases research team. We also plan to complete the exit of all internal non-human primate research. These changes will result in the

closure of a biologics group in Shanghai, China and a team focused on non-human primate research in Fort Worth, Texas. We also plan to close ESBATech, a biologics group in Schlieren, Switzerland, subject to all appropriate consultation.

Development program

Effective July 1, 2016, we established a Global Drug Development (GDD) organization to oversee drug development activities for our Innovative Medicines Division. GDD works collaboratively with NIBR to execute our overall pipeline strategy and takes an enterprise approach to pipeline portfolio management. The new GDD organization includes centralized global functions such as Regulatory Affairs and Global Development Operations, and Global Development units aligned with our business franchises. GDD was created to improve resource allocation, technology implementation and process standardization to further increase innovation. GDD includes approximately 10,000 associates worldwide.

Under our Global Drug Development unit, the focus of our development program is to determine the safety and efficacy of a potential new medicine in humans.

The traditional model of development comprises three phases, which are defined as follows:

Phase I: These are the first clinical trials of a new compound, generally performed in a small number of healthy human volunteers, to assess the drug's safety profile, including the safe dosage range. These trials also determine how a drug is absorbed, distributed, metabolized and excreted, and the duration of its action.

Phase II: Clinical studies performed with patients who have the target disease, with the aim of continuing the Phase I safety assessment in a larger group, assessing the efficacy of the drug in the patient population, and determining the appropriate doses for further evaluation.

Phase III: Large-scale clinical studies with several hundred to several thousand patients, which are conducted to establish the safety and efficacy of the drug in specific indications for regulatory approval. Phase III trials may also be used to compare a new drug against a current standard of care to evaluate the overall benefit-risk relationship of the new medicine.

In each of these phases, physicians monitor volunteer patients closely to assess the potential new drug's safety and efficacy.

Though we use this traditional model as a platform, we have tailored the development process to be simpler, more flexible and efficient. We view the development process as generally consisting of Exploratory Development where "proof of concept" is established, and Confirmatory Development where this concept is confirmed in large numbers of patients. Exploratory Development consists of clinical "proof of concept" (PoC) studies, which are small clinical trials (typically 5-15 patients) that combine elements of traditional Phase I/II testing. These customized trials are designed to give early insights into issues such as safety, efficacy and toxicity for a drug in a given indication and are conducted by NIBR. Once a positive proof of concept has been established, the drug moves to the Confirmatory Development stage and becomes the responsibility of GDD. Confirmatory Development has elements of traditional Phase II/III testing and includes trials aimed at confirming the safety and efficacy of the drug in the given indication leading up to submission of a dossier to health authorities for approval. Like traditional Phase III testing, this stage can also include trials which compare the drug to the current standard of care for the disease, in order to evaluate the drug's overall risk/benefit profile.

The vast amount of data that must be collected and evaluated makes clinical testing the most time-consuming and expensive part of new drug development. The next stage in the drug development process is to seek registration for the new drug. For more information, see "—Regulation."

At each phase of clinical development, our activities are managed by our Innovation Management Board (IMB). The IMB is responsible for oversight over all major aspects of our development portfolio and oversees our drug development budget. In particular, the IMB is responsible for the endorsement of proposals to commence the first clinical trials of a development compound, and of major project phase transitions and milestones following a positive proof of concept outcome, including transitions to full development and the decision to submit a regulatory application to the health authorities. The IMB is also responsible for project discontinuations, for the endorsement of overall development strategy and the endorsement of development project priorities. The

IMB is chaired by our Global Head of Drug Development and Chief Medical Officer and has representatives from Novartis senior management, as well as experts from a variety of fields among its core members and extended membership.

Alliances and acquisitions

Our Innovative Medicines Division enters into business development agreements with other pharmaceutical and biotechnology companies and with academic institutions in order to develop new products and access new markets. We license products that complement our current product line and are appropriate to our business strategy. Therapeutic area strategies have been established to focus on alliances and acquisition activities for key disease areas and indications that are expected to be growth drivers in the future. We review products and compounds we are considering licensing using the same criteria as we use for our own internally discovered drugs.

In January 2017, we entered into a collaboration and option agreement with Ionis Pharmaceuticals, Inc. (Ionis), and its affiliate Akcea Therapeutics, Inc. (Akcea), to license two investigational treatments with the potential to significantly reduce cardiovascular risk in patients suffering from high levels of lipoproteins known as Lp(a) and ApoCIII. The two investigational antisense therapies developed by Ionis—called AKCEA-APO(a)-L_{Rx} and AKCEA-APOCIII-L_{Rx}—have the potential to lower both lipoproteins up to 90% and significantly reduce cardiovascular risk in high-risk patient populations. In addition, Novartis entered into a stock purchase agreement with Ionis and Akcea. This transaction is subject to customary closing conditions, including regulatory approval.

In December 2016, we entered into a definitive agreement for the acquisition of Encore Vision, Inc., a privately-held company focused on the development of UNR844 (formerly EV06), an investigational, first-in-class potentially disease modifying topical treatment for presbyopia. This acquisition was completed on January 20, 2017.

In December 2016, we signed an exclusive option, collaboration and license agreement with Conatus Pharmaceuticals Inc., for the global rights to emricasan, an investigational, first-in-class, oral, pan-caspase inhibitor for the treatment of non-alcoholic steatohepatitis (NASH) with advanced fibrosis and cirrhosis of the liver. Upon exercise of the option, Novartis will obtain an exclusive, worldwide license to develop and commercialize products containing emricasan. The exercise of the option is subject to customary closing conditions, including regulatory approval.

In December 2016, we entered into a definitive agreement for the acquisition of Ziarco Group Limited, a privately held company focused on the development of novel treatments in dermatology including ZPL389, a once-daily oral H_4 receptor antagonist in development for atopic dermatitis. This acquisition was completed on January 20, 2017.

In November 2016, we acquired Selexys Pharmaceuticals Corporation and SEG101 (crizanlizumab, formerly SelG1), an anti-P-selectin antibody being investigated in the reduction of vaso-occlusive pain crises in patients with sickle cell disease.

In June 2016, we announced a collaboration and licensing agreement with Xencor for the development of bispecific antibodies for treating cancer. We plan to collaborate with Xencor to co-develop their two bispecific T cell engaging antibodies targeting CD3xCD123 and CD3xCD20 for the treatment of acute myeloid leukemia and B-cell malignancies. As part of the agreement, Novartis also receives the right to develop four additional bispecific antibodies and to use other Xencor proprietary antibody engineering technology for up to ten additional biotherapeutic programs across the Novartis research and development portfolio.

In January 2016, we announced a collaboration and licensing agreement with Surface Oncology, which gives Novartis access to four pre-clinical programs in immuno-oncology. These programs target regulatory T cell populations, inhibitory cytokines, and immunosuppressive metabolites in the tumor microenvironment.

In March 2015, we entered into a collaboration with Aduro Biotech focused on the discovery and development of next generation cancer immunotherapies targeting the STING signaling pathway. STING is a signaling pathway that when activated is known to initiate broad innate and adaptive immune responses in tumors. Aduro's novel small molecule cyclic dinucleotides (CDNs) have proven to generate an immune response in preclinical models that specifically attacks tumor cells.

In January 2015, we announced collaboration and licensing agreements with Intellia Therapeutics for the discovery and development of new medicines using CRISPR genome editing technology and Caribou Biosciences for the development of drug discovery tools. CRISPR, an acronym that stands for clustered regularly interspaced short palindromic repeats, is an approach that allows scientists to easily and precisely edit the genes of targeted cells. In a short period of time it has proven to be a powerful tool for creating very specific models of disease for use in drug discovery and has potential for use as a therapeutic modality for treating disease at the genetic level by deleting, repairing or replacing the genes that cause disease.

In February 2014, we acquired CoStim Pharmaceuticals Inc., a Cambridge, Massachusetts-based, privately held biotechnology company focused on harnessing the immune system to eliminate immune-blocking signals from cancer. This acquisition enhanced our late discovery stage immunotherapy programs directed to several targets, including PD-1.

In 2012, Novartis and the University of Pennsylvania (Penn) announced an exclusive global research and development collaboration to develop and commercialize targeted chimeric antigen receptor (CAR) immunotherapies for the treatment of cancers. The research component of this collaboration focuses on accelerating the discovery and development of additional therapies using CAR immunotherapy. In September 2014, as part of its alliance with Novartis, Penn announced plans for the construction of the Center for Advanced Cellular Therapeutics (CACT) on the Perelman School of Medicine campus in Philadelphia, Pennsylvania. The CACT opened in February 2016 and is a first of its kind research and development center established specifically to develop and manufacture adoptive T cell immunotherapies under the research collaboration guided by scientists and clinicians from NIBR and Penn.

Regulation

The international pharmaceutical industry is highly regulated. Regulatory authorities around the world administer numerous laws and regulations regarding the testing, approval, manufacturing, importing, labeling and marketing of drugs, and also review the safety and efficacy of pharmaceutical products. Extensive controls exist on the non-clinical and clinical development of pharmaceutical products. These regulatory requirements, and the implementation of them by local health authorities around the globe, are a major factor in determining whether a substance can be developed into a marketable product, and the amount of time and expense associated with that development.

Health authorities, including those in the US, EU and Japan, have high standards of technical evaluation. The introduction of new pharmaceutical products generally entails a lengthy approval process. Products must be authorized or registered prior to marketing, and such authorization or registration must subsequently be maintained. In recent years, the registration process has required increased testing and documentation for the approval of new drugs, with a corresponding increase in the expense of product introduction.

To register a pharmaceutical product, a registration dossier containing evidence establishing the safety, efficacy and quality of the product must be submitted to regulatory authorities. Generally, a therapeutic product must be registered in each country in which it will be sold. In every country, the submission of an application to a regulatory authority does not guarantee that approval to market the product will be granted. Although the criteria for the registration of therapeutic drugs are similar in most countries, the formal structure of the necessary registration documents and the specific requirements, including risk tolerance, of the local health authorities can vary significantly from country to country. It is possible that a drug can be registered and marketed in one country while the registration authority in another country may, prior to registration, request additional information from the pharmaceutical company or even reject the product. It is also possible that a drug may be approved for different indications in different countries.

The registration process generally takes between six months and several years, depending on the country, the quality of the data submitted, the efficiency of the registration authority's procedures and the nature of the product. Many countries provide for accelerated processing of registration applications for innovative products of particular therapeutic interest. In recent years, efforts have been made among the US, the EU and Japan to harmonize registration requirements in order to achieve shorter development and registration times for medical products. However, the requirement in many countries to negotiate selling prices or reimbursement levels with government regulators and other payors can substantially extend the time until a product may finally be available to patients.

The following provides a summary of the regulatory processes in the principal markets served by Innovative Medicines Division affiliates:

United States

In the US, applications for drug registration are submitted to and reviewed by the FDA. The FDA regulates the testing, manufacturing, labeling and approval for marketing of pharmaceutical products intended for commercialization in the US. The FDA continues to monitor the safety of pharmaceutical products after they have been approved for sale in the US market. The pharmaceutical development and registration process is typically intensive, lengthy and rigorous. When a pharmaceutical company has gathered data which it believes sufficiently demonstrates a drug's safety, efficacy and quality, then the company may file a New Drug Application (NDA) or Biologics License Application (BLA), as applicable, for the drug. The NDA or BLA must contain all the scientific information that has been gathered about the drug and typically includes information regarding the clinical experiences of patients tested in the drug's clinical trials. A Supplemental New Drug Application (sNDA) or BLA amendment must be filed for new indications for a previously approved drug.

Once an application is submitted, the FDA assigns reviewers from its staff in biopharmaceutics, chemistry, clinical microbiology, pharmacology/toxicology, and statistics. After a complete review, these content experts then provide written evaluations of the NDA or BLA. These recommendations are consolidated and are used by senior FDA staff in its final evaluation of the NDA or BLA. Based on that final evaluation, the FDA then provides to the NDA or BLA's sponsor an approval, or a "complete response" letter if the NDA or BLA application is not approved. If not approved, the letter will state the specific deficiencies in the NDA or BLA which need to be addressed. The sponsor must then submit an adequate response to the deficiencies in order to restart the review procedure.

Once the FDA has approved an NDA, BLA, sNDA or BLA amendment, the company can make the new drug available for physicians to prescribe. The drug owner must submit periodic reports to the FDA, including any cases of adverse reactions. For some medications, the FDA requires additional post-approval studies (Phase IV) to evaluate long-term effects or to gather information on the use of the product under special conditions.

Throughout the life cycle of a product, the FDA also requires compliance with standards relating to good laboratory, clinical, manufacturing and promotional practices.

European Union

In the EU, there are three main procedures for application for authorization to market pharmaceutical products in the EU Member States, the Centralized Procedure, the Mutual Recognition Procedure and the Decentralized Procedure. It is also possible to obtain a national authorization for products intended for commercialization in a single EU member state only, or for additional indications for licensed products.

Under the Centralized Procedure, applications are made to the EMA for an authorization which is valid for the European Community. The Centralized Procedure is mandatory for all biotechnology products and for new chemical entities in cancer, neurodegenerative disorders, diabetes and AIDS, autoimmune diseases or other immune dysfunctions and optional for other new chemical entities or innovative medicinal products or in the interest of public health. When a pharmaceutical company has gathered data which it believes sufficiently demonstrates a drug's safety, efficacy and quality, then the company may submit an application to the EMA. The EMA then receives and validates the application, and appoints a Rapporteur and Co-Rapporteur to review it. The entire review cycle must be completed within 210 days, although there is a "clock stop" at day 120, to allow the company to respond to questions set forth in the Rapporteur and Co-Rapporteur's Assessment Report. When the company's complete response is received by the EMA, the clock restarts on day 121. If there are further aspects of the dossier requiring clarification, the EMA will then request an Oral Explanation on day 180, in which case the sponsor must appear before the CHMP to provide the requested additional information. On day 210, the CHMP will then take a vote to recommend the approval or non-approval of the application. The final decision under this Centralized Procedure is a European Community decision which is applicable to all Member States. This decision occurs on average 60 days after a positive CHMP recommendation.

Under the Mutual Recognition Procedure (MRP), the company first obtains a marketing authorization from a single EU member state, called the Reference Member State (RMS). In the Decentralized Procedure (DCP)

the application is done simultaneously in selected or all Member States if a medicinal product has not yet been authorized in a Member State. During the DCP, the RMS drafts an Assessment Report within 120 days. Within an additional 90 days the Concerned Member States (CMS) review the application and can issue objections or requests for additional information. On Day 90, each CMS must be assured that the product is safe and effective, and that it will cause no risks to the public health. Once an agreement has been reached, each Member State grants national marketing authorizations for the product.

After the Marketing Authorizations have been granted, the company must submit periodic safety reports to the EMA (if approval was granted under the Centralized Procedure) or to the National Health Authorities (if approval was granted under the DCP or the MRP). In addition, several pharmacovigilance measures must be implemented and monitored including Adverse Event collection, evaluation and expedited reporting and implementation, as well as update Risk Management Plans. For some medications, post approval studies (Phase IV) may be required to complement available data with additional data to evaluate long term effects (called a Post Approval Safety Study, or PASS) or to gather additional efficacy data (called a Post Approval Efficacy Study, or PAES).

European Marketing Authorizations have an initial duration of five years. After this time, the Marketing Authorization may be renewed by the competent authority on the basis of re-evaluation of the risk/benefit balance. Once renewed the Marketing Authorization is valid for an unlimited period. Any Marketing Authorization which is not followed within three years of its granting by the actual placing on the market of the corresponding medicinal product ceases to be valid.

Japan

In Japan, applications for new products are made through the Pharmaceutical and Medical Devices Agency (PMDA). Once an NDA is submitted, a review team is formed consisting of specialized officials of the PMDA, including chemistry/manufacturing, non-clinical, clinical and biostatistics. While a team evaluation is carried out, a data reliability survey and Good Clinical Practice/Good Laboratory Practice/Good Manufacturing Practice inspection are carried out by the Office of Conformity Audit and Office of GMP/GQP Inspection of the PMDA. Team evaluation results are passed to the PMDA's external experts who then report back to the PMDA. After a further team evaluation, a report is provided to the Ministry of Health, Labor and Welfare (MHLW), which makes a final determination for approval and refers this to the Council on Drugs and Foods Sanitation which then advises the MHLW on final approvability. Marketing and distribution approvals require a review to determine whether or not the product in the application is suitable as a drug to be manufactured and distributed by a person who has obtained a manufacturing and distribution business license for the type of drug concerned and confirmation that the product has been manufactured in a plant compliant with Good Manufacturing Practices.

Once the MHLW has approved the application, the company can make the new drug available for physicians to prescribe. After that, the MHLW lists its national health insurance price within 60 days (or 90 days) from the approval, and physicians can obtain reimbursement. For some medications, the MHLW requires additional post-approval studies (Phase IV) to evaluate safety, effects and/or to gather information on the use of the product under special conditions. The MHLW also requires the drug's sponsor to submit periodic safety update reports. Within three months from the specified re-examination period, which is designated at the time of the approval of the application for the new product, the company must submit a re-examination application to enable the drug's safety and efficacy to be reassessed against approved labeling by the PMDA.

Price Controls

In most of the markets where we operate, the prices of pharmaceutical products are subject to both direct and indirect price controls and to drug reimbursement programs with varying price control mechanisms. Due to increasing political pressure and governmental budget constraints, we expect these mechanisms to continue to remain robust—and to potentially even be strengthened—and to have a negative influence on the prices we are able to charge for our products.

Direct efforts to control prices

United States. In the US, as a result of the Patient Protection and Affordable Care Act (ACA), the recurring focus on deficit reduction, and public pressure on elected officials based on recent price increases

by certain pharmaceutical manufacturers, there is a significant likelihood of continued actions to control prices. Specifically, one proposal that has been repeatedly advanced would impose a government-mandated pricing formula on both patented and generic medications provided through the Medicare prescription drug benefit (Medicare Part D). In addition, the ACA mandated the creation of a new entity, the Independent Payment Advisory Board (IPAB), which has been granted unprecedented authority to implement broad actions to reduce future costs of the Medicare program. This could include required prospective prescription drug discounts or rebates, which could limit net prices for our products. The Medicare Trustees' Report from June 2016 predicted that the projected 5-year average growth in per capita Medicare program spending is likely to exceed a specified target level in 2017. If the Chief Actuary for CMS determines that the projected 5-year average growth rate exceeds the target, the IPAB would then develop savings proposals in 2018 based on a savings target set by the Chief Actuary, to be implemented in 2019. There is also a possibility that government officials will continue to search for additional ways to reduce or control prices, including state legislation mandating drug price controls, which could include limits on annual price increases or maximum price levels.

Europe. In Europe, our operations are subject to significant price and marketing regulations. Many governments are introducing healthcare reforms in a further attempt to curb increasing healthcare costs. In the EU, governments influence the price of pharmaceutical products through their control of national healthcare systems that fund a large part of the cost of such products to consumers. The downward pressure on healthcare costs in general in the EU, particularly with regard to prescription drugs, has become very intense. Increasingly strict analyses are applied when evaluating the entry of new products, and, as a result, access to innovative medicines is limited based on strict cost-benefit assessments. In addition, prices for marketed products are referenced within Member States and across Member State borders, including new EU Member States, further impacting individual EU Member State pricing.

Japan. In 2016, the National Health Insurance price calculation method for new products and the price revision rule for existing products were reviewed, and the resulting new drug tariffs became effective beginning April 2016. In addition, the MHLW implemented extraordinary price cuts in 2016 for certain products the sales of which have increased more than 100 billion Japanese Yen (one and one half times more than official forecasts). The Japanese government is currently undertaking a healthcare reform initiative with a goal of sustaining the universal coverage of the National Health Insurance program, and is addressing the efficient use of drugs, including promotion of generic use. Meanwhile, the government tentatively initiated a premium system which basically maintains the price of patented drugs for unmet medical needs in order to promote innovative new drug creation and the solution of the unapproved indication issue. The continuance of this system will be reviewed as a part of price reforms in 2018. In December 2016, the Japanese government announced basic reform principles for fundamental reforms of the drug pricing system in 2018. These include an increase in the frequency of price cuts from every other year to annually, beginning after the next regular price revision scheduled for April 2018. The government's practice of mandating additional price decreases for specific products will continue.

Rest of World. Many other countries around the world are also taking steps to control prescription drug prices. For example, in 2016, China, one of our most important emerging growth markets, organized national price negotiations for certain products directly linked to local drug reimbursement without further bidding, which will apply nationwide both in public and military hospitals, with drug price reductions of more than 50% in some cases. Drug prices in China may further decline due to a stated national policy of reducing healthcare costs, including continued strategic initiatives specifically designed to reduce drug prices. In addition, the Colombian government has taken steps to unilaterally reduce the price of *Glivec* by up to 43% through a local procedural mechanism called a Declaration of Public Interest. While the government's use of this exceptional mechanism as a tool to control the price of a prescription drug and to generally manage its healthcare budget is unprecedented, and we are contesting its appropriateness with respect to *Glivec* in Colombia, its use could become more widespread if upheld in this case, potentially leading to a more systemic impact on drug pricing.

Regulations favoring generics and biosimilars

In response to rising healthcare costs, many governments and private medical care providers, such as Health Maintenance Organizations, have instituted reimbursement schemes that favor the substitution of

generic pharmaceuticals for more expensive brand-name pharmaceuticals. In the US, generic substitution statutes have been enacted by virtually all states and permit or require the dispensing pharmacist to substitute a less expensive generic drug instead of an original patented drug. Other countries have similar laws, including numerous European countries. We expect that the pressure for generic substitution will continue to increase. In addition, the US, EU and other jurisdictions are increasingly developing laws and regulations encouraging the development of biosimilar versions of biologic drugs, which can also be expected to have an impact on pricing.

Cross-Border Sales

Price controls in one country can also have an impact in other countries as a result of cross-border sales. In the EU, products which we have sold to customers in countries with stringent price controls can in some instances legally be re-sold to customers in other EU countries with less stringent price controls at a lower price than the price at which the product is otherwise available in the importing country. In North America, products which we have sold to customers in Canada, which has relatively stringent price controls, are sometimes re-sold into the US, again at a lower price than the price at which the product is otherwise sold in the US. Such imports from Canada and other countries into the US are currently illegal. Given the increased focus on pharmaceutical prices in the US, members of the US Congress continue to explore legislation to allow the safe importation of pharmaceutical products into the US from select countries, including Canada.

We expect that pressures on pricing will continue worldwide, and will likely increase. Because of these pressures, there can be no certainty that, in every instance, we will be able to charge prices for a product that, in a particular country or in the aggregate, would enable us to earn an adequate return on our investment in that product.

Intellectual Property

We attach great importance to intellectual property including patents, trademarks, copyrights, know-how and research data in order to protect our investment in research and development, manufacturing and marketing. In general, we seek intellectual property protection under applicable laws for significant product developments in major markets. Among other things, patents may cover the products themselves, including the product's active ingredient(s) and its formulation. Patents may cover processes for manufacturing a product, including processes for manufacturing intermediate substances used in the manufacture of the product. Patents may also cover particular uses of a product, such as its use to treat a particular disease, or its dosage regimen. In addition, patents may cover assays or tests for certain diseases or biomarkers, which will improve patient outcomes when administered certain drugs, as well as assays, research tools and other techniques used to identify new drugs. The protection offered by such patents extends for varying periods depending on the grant and duration of patents in the various countries or region. The protection afforded, which may vary from country to country, depends upon the type of patent and its scope of coverage.

In addition to patent protection, various countries offer data or marketing exclusivities for a prescribed period of time. Data exclusivity may be available which would preclude a potential competitor from filing a regulatory application for a set period of time that relies on the sponsor's clinical trial data, or the regulatory authority from approving the application. The data exclusivity period can vary depending upon the type of data included in the sponsor's application. When it is available, market exclusivity, unlike data exclusivity, precludes a competitor from obtaining marketing approval for a product even if a competitor's application relies on its own data. Data exclusivity and other regulatory exclusivity periods generally run from the date a product is approved, and so their expiration dates cannot be known with certainty until the product approval date is known.

In the US and other countries, pharmaceutical products are eligible for a patent term extension for patent periods lost during product development and regulatory review. The law recognizes that product development and review by the FDA and other health authorities can take an extended period, and permits an extension of the patent term for a period related to the time taken for the conduct of clinical trials and for the health authority's review. However, the length of this extension and the patents to which it applies cannot be known in advance, but can only be determined after the product is approved.

United States

Patents

In the US, a patent issued for an application filed today will receive a term of 20 years from the application filing date, subject to potential patent term adjustments for delays in patent issuance based upon certain delays in prosecution by the United States Patent and Trademark Office (USPTO). A US pharmaceutical patent which claims a product, method of treatment using a product, or method of manufacturing a product, may also be eligible for a patent term extension based on the time the FDA took to approve the product. This type of extension may only extend the patent term for a maximum of 5 years, and may not extend the patent term beyond 14 years from regulatory approval. Only one patent may be extended for any product based on FDA delay.

In practice, however, it is not uncommon for significantly more than the 5 year maximum patent extension period to pass between the time that a patent application is filed for a product and the time that the product is approved by the FDA. As a result, it is rarely the case that, at the time a product is approved by FDA, it will have the full 20 years of remaining patent life. Rather, in our experience, it is not uncommon that, at the date of approval, a product will have from 13 to 16 years of patent life remaining, including all extensions available at that time.

Data and Market Exclusivity

In addition to patent exclusivities, the FDA may provide data or market exclusivity for a new chemical entity or an "orphan drug," each of which run in parallel to any patent protection. Regulatory data protection or exclusivity prevents a potential generic competitor from relying on clinical trial data which were generated by the sponsor when establishing the safety and efficacy of its competing product. Market exclusivity prohibits any marketing of the same drug for the same indication.

- A new small-molecule active pharmaceutical ingredient shall have 5 years of regulatory data exclusivity, during which time a competitor generally may not submit an application to the FDA based on a sponsor's clinical data.
- Orphan drug exclusivity provides 7 years of market exclusivity for drugs designated by the FDA as "orphan drugs," meaning drugs that treat rare diseases, as designated by the FDA. During this period, a potential competitor may not market the same drug for the same indication even if the competitor's application does not rely on data from the sponsor.
- A new biologic active pharmaceutical ingredient shall have 12 years of market exclusivity, during which time a competitor may not market the same drug for the same indication.
- The FDA may also request that a sponsor conduct pediatric studies, and in exchange will grant an additional 6-month period of pediatric market exclusivity, if the FDA accepts the data, the sponsor makes a timely application for approval for pediatric treatment, and the sponsor has either a patent-based or regulatory-based exclusivity period for the product which can be extended.

European Community

Patents

Patent applications in Europe may be filed in the European Patent Office (EPO) or in a particular country in Europe. The EPO system permits a single application to be granted for the EU, plus other non-EU countries, such as Switzerland and Turkey. When the EPO grants a patent, it is then validated in the countries that the patent owner designates. The term of a patent granted by the EPO or a European country office is generally 20 years from the filing date of the patent application on which the patent is based, subject to potential patent term extensions and adjustments. Pharmaceutical patents can be granted a further period of exclusivity under the Supplementary Protection Certificate (SPC) system. SPCs are designed to compensate the owner of the patent for the time it took to receive marketing authorization by the European Health Authorities. An SPC may be granted to provide, in combination with the patent, up to 15 years of exclusivity from the date of the first European marketing authorization. However, an SPC cannot last longer than 5 years. The SPC duration can additionally be extended by a further Pediatric Extension of 6 months if the product is the subject of an agreed pediatric investigation plan. The post-grant phase of patents, including the SPC system, is currently administered

on a country-by-country basis under national laws which, while differing, are intended to, but do not always, have the same effect.

In practice, as in the US, it is not uncommon for patent term extensions to not fully compensate the owner of a patent for the time it took to develop the product and receive marketing authorization by the European health authorities. Accordingly, it is not uncommon that a pharmaceutical product, at the date of approval, will have a patent lifetime of 10 to 15 years, including extensions available at that time.

Data and Market Exclusivity

In addition to patent exclusivity, the EU also provides a system of regulatory data exclusivity for authorized human medicines, which runs in parallel to any patent protection. The system for drugs being approved today is usually referred to as "8+2+1" because it provides: an initial period of 8 years of data exclusivity, during which a competitor cannot rely on the relevant data; a further period of 2 years of market exclusivity, during which the data can be used to support applications for marketing authorization, but the competitive product cannot be launched; and a possible 1-year extension of the market exclusivity period if, during the initial 8-year data exclusivity period, the sponsor registered a new therapeutic indication with "significant clinical benefit." This system applies both to national and centralized authorizations. This system has been in force since 2005, therefore some medicines remain covered by the previous system in which EU member states provided either 6 or 10 years of data exclusivity.

The EU also has an orphan drug exclusivity system for medicines similar to the US system. If a medicine is designated as an "orphan drug," then it benefits from 10 years of market exclusivity after it is authorized, during which time a similar medicine for the same indication will not receive marketing authorization. Under certain circumstances, this exclusivity can be extended with a 2-year Pediatric Extension.

Japan

Patents

In Japan, a patent can be issued for active pharmaceutical ingredients. Although methods of treatment, such as dosage and administration, are not patentable in Japan, pharmaceutical compositions for a specific dosage or administration method are patentable. Processes to make a pharmaceutical composition are also patentable. The patent term granted is generally 20 years from the filing date of the patent application on which the patent is based, subject to potential patent term extensions and adjustments. A patent term extension can be granted for up to 5 years under the Japanese Patent Act to compensate for erosion against the patent term caused by the time needed to obtain marketing authorization from the MHLW. As in the US and EU, patent term extensions in Japan may not fully compensate for the time necessary to develop a product and obtain a marketing authorization. As a result, it is not uncommon for the effective term of patent protection for an active pharmaceutical ingredient in Japan to be approximately 10 to 15 years, including available extensions.

Data and Market Exclusivity

Japan also has a regulatory data protection system called a "re-examination period" of 8 years for new chemical entities and 4-6 years for new indications and formulations and a 10 year orphan drug exclusivity system.

Third Party Patents and Challenges to Intellectual Property

Third parties can challenge our patents, patent term extensions and marketing exclusivities through various proceedings. For example, patents in the US can be challenged in the USPTO through various proceedings, including Inter Partes Review (IPR) proceedings. They may also be challenged through patent infringement litigation under the Hatch-Waxman Act. See generally, "—Sandoz—Intellectual Property" In the EU, EU patents may be challenged through oppositions in the EPO or national patents may be challenged in national courts or national patent offices. In Japan, patents may be challenged in the Japanese patent office and in national courts. The outcomes of such challenges can be difficult to predict.

In addition to directly challenging our intellectual property rights, in some circumstances a competitor may be able to market a generic version of one of our products by, for example, designing around our intellectual property or marketing the generic product for non-protected indications. Despite data exclusivity protections, a

competitor could opt to incur the costs of conducting its own clinical trials and preparing its own regulatory application, and avoid our data exclusivity protection altogether. There is a risk that some countries may seek to impose limitations on the availability of patent protection for pharmaceutical products, or on the extent to which such protections may be enforced. Also, even though we may own, co-own or in-license patents protecting our products, and conduct pre-launch freedom-to-operate analyses, a third party may nevertheless claim that one of our products infringes a third party patent for which we do not have a license.

As a result, there can be no assurance that our intellectual property will protect our products or that we will be able to avoid adverse effects from the loss of intellectual property protection or from third party patents in the future.

Intellectual Property Protection for Certain Key Marketed Products and Compounds in Development

We present below certain additional details regarding intellectual property protection for certain Innovative Medicines Division products and compounds in development. For each product and compound in development below, we identify issued, unexpired patents by general subject matter and, in parentheses, years of expiry in, if relevant, the US, EU and Japan that are owned, co-owned or exclusively in-licensed by Novartis and that relate to the product or to the method of its use as it is currently approved and marketed or, in the case of a compound in development, as it is currently filed with the FDA and/or the EMA for approval. Novartis may own or control additional patents relating to compound forms, methods of use, formulations, processes, synthesis, purification and detection. Identification of an EU patent refers to national patents in EU countries and/or to the national patents that have been derived from a patent granted by the EPO.

We identify unexpired regulatory data protection periods and, in parentheses, years of expiry for the products and compounds in development below if the relevant marketing authorizations have been authorized or granted. The term "RDP" refers to regulatory data protection, regulatory data exclusivity (which in the EU refers to the protections under "8+2+1" regulatory data exclusivity), and to data re-examination protection systems. We identify certain unexpired patent term extensions, SPCs and marketing exclusivities and, in parentheses, years of expiry if they are granted; their subject matter scope may be limited, and is not specified. We designate them as "pending" if they have been applied for but not granted and years of expiry are estimable. Such pending applications may or may not ultimately be granted. In the case of the EU, grant or authorization of a patent, patent term extension, marketing exclusivity or data protection means grant or authorization in at least one country and possibly pending in others. Marketing exclusivities and patent term extensions include orphan drug exclusivity (ODE), pediatric exclusivity (PE), patent term extension (PTE) and SPC.

For each product below, we indicate whether there is current generic competition, which in the case of products containing biologics refers to biosimilar competition, for one or more product versions in one or more approved indications in each of the major markets for which intellectual property is disclosed. We identify ongoing challenges to the disclosed intellectual property that have not been finally resolved. Challenges identified as being in administrative entities, such as national patent offices, include judicial appeals from decisions of those entities. Resolution of challenges to the disclosed intellectual property, which in the EU may involve intellectual property of one or more EU countries, may include settlement agreements under which Novartis permits or does not permit future launch of generic versions of our products before expiration of that intellectual property. We identify certain material terms of such settlement agreements where they could have a material adverse effect on our business. In other cases, such settlement agreements may contain confidentiality obligations restricting what may be disclosed.

For additional information regarding commercial arrangements with respect to these products, see "—Key Marketed Products."

Novartis Oncology Business Unit

Oncology

- *Gleevec/Glivec.* US: Patent on polymorphic compound form (2019), PE (2019); patent on GIST method of use (2021), PE (2022); patent on tablet formulation (2018). EU: Patent on polymorphic compound form (2018); patent on GIST method of use (2021); patent on tablet formulation (2023). Japan: Patent on polymorphic compound form (2019); patent on GIST method of use (2021); patent on tablet formulation (2023).

There is generic competition in the US, EU and Japan. In the US, Novartis has resolved patent litigation with certain generic manufacturers. An additional generic manufacturer has filed an ANDA challenging the US polymorphic compound form patent; the automatic 30-month stay preventing FDA approval will expire in March 2018. Novartis is taking steps in some EU countries to enforce the polymorphic compound form patent and the GIST method of use patent. The EU GIST method of use patent and polymorphic compound patent are being challenged in the patent offices and courts of several EU countries.

- *Tasigna.* US: Patent on compound (2023); patents on salt forms (2026, 2027, 2028); patent on polymorph compound form (2026). EU: Patent on compound (2023); patent on salt form (2026); patent on polymorph compound form (2026); ODE (2017). Japan: Patent on compound (2023), PTE (2024); patent on salt form (2026); patent on polymorph compound form (2026). There is currently no generic competition in the US, EU or Japan. The EU salt form patent and polymorph compound form patent are being opposed in the EPO.

- *Sandostatin* SC and *Sandostatin LAR.*

  Sandostatin SC: There is no patent protection in the US, EU or Japan. There is generic competition in the US, EU and Japan.

  Sandostatin LAR: There is no patent protection in the US, EU or Japan. There is currently no generic competition in the US, EU or Japan.

- *Afinitor*/*Votubia* and *Afinitor Disperz*/*Votubia* dispersible tablets. US: Patent on compound (2014), PTE (2019), PE (2020); patent on dispersible tablet formulation (2022), PE (2023); patent on antioxidant (2019); patent on antioxidant (2019), PE (2020); patent on TSC/SEGA use (2022), PE (2022); patent on breast cancer use (2022), PE (2022); patent on renal cell carcinoma use (2025), PE (2026); patent on pancreatic neuroendocrine tumor use (2028); RDP for NET of gastrointestinal or lung origin (2019), PE 2019; ODE for TSC/SEGA use (2017), PE (2018); ODE for pancreatic neuroendocrine tumors use (2018), PE (2018); ODE for TSC/renal angiomyolipoma (2019), PE (2019). EU: Patent on compound (2013), SPC (2018), PE (2019); patent on dispersible tablet formulation (2022); patent on antioxidant (2019); patent on breast cancer use (2022); patent on pancreatic neuroendocrine tumor use (2026); ODE (*Votubia*) (2021). Japan: Patent on compound (2013), PTE (2018); patent on dispersible tablet formulation (2022); patent on antioxidant (2019); patent on breast cancer use (2022); patent on pancreatic neuroendocrine tumor use (2026); patent on renal cell carcinoma use (2022); ODE (tuberous sclerosis) (2022); RDP (2018).

  There is currently no generic competition in the US, EU or Japan. In the US, generic manufacturers have filed ANDAs challenging several patents; the earliest automatic 30-month stay preventing FDA approval will expire in April 2018. The US compound patent is being challenged in IPR proceedings in the USPTO.

- *Exjade* and *Jadenu.*

  Exjade: US: Patent on compound (2019); patent on method of use (2017). EU: Patent on compound (2017), SPC (2021); patent on tablet formulation (2023). Japan: Patent on compound (2017), SPC (2021). There is currently no generic competition in the US, EU or Japan. In the US, Novartis has resolved patent litigation with generic manufacturers relating to *Exjade*.

  Jadenu: The compound patents in the US, EU and Japan and the US method of use patent identified for *Exjade* also protect *Jadenu*. There is currently no generic competition in the US, EU or Japan. In the US, generic manufacturers have filed ANDAs challenging the US compound patent; the earliest automatic 30-month stay preventing FDA approval will expire in May 2018.

- *Votrient.* US: Patent on compound (2021), PTE (2023), ODE (2019). EU: Patent on compound (2021), SPC (2025); RDP (2020). Japan: patent on compound (2021), PTE (2025); RDP (2020). There is currently no generic competition in the US, EU or Japan.

- *Tafinlar* and *Mekinist.*

  Tafinlar: US: Patent on compound (2030); RDP (2018); ODE (2020). EU: RDP (2023). Japan: Patent on compound (2029). There is currently no generic competition in the US, EU or Japan.

  Mekinist: US: Patent on compound (2025), pending PTE (2027); patent on method of use (2025); patent on formulation (2032); RDP (2018); ODE (2020). EU: Patent on compound and method of use (2025),

SPC (2029); RDP (2025). Japan: Patent on compound (2025); patent on method of use (2025); patent on formulation (2031). There is currently no generic competition in the US, EU or Japan.

Use of *Mekinist* with *Taflinar* or *Taflinar* with *Mekinist*: US: Patent on use of *Tafinlar* and *Mekinist* (2030); RDP (2017); ODE 2021. EU: RDP (2025). Japan: Patent on use of *Tafinlar* and *Mekinist* (2030). There is currently no generic competition in the US, EU or Japan.

- *Promacta/Revolade.* US: Patent on compound (2021), PTE (2022), PE (2023); patent on salt form (2025); patent on formulation (2027). EU: Patent on compound (2021), SPC (2025); patent on salt form (2023); patent on formulation (2027); RDP (2020). Japan: Patent on compound (2021), PTE (2025); patent on salt form (2023); patent on formulation (2027); RDP (2018). There is currently no generic competition in the US, EU or Japan. The EU formulation patent is being opposed in the EPO.
- *Jakavi.* EU: Patent on compound (2026), SPC (2027); patent on salt (2028); RDP (2023). Japan: Patent on compound (2026), PTE (2028), PTE (2030); patent on salt (2028), PTE (2028), PTE (2030); patent on compositions for medical uses (2026), PTE (2027); RDP (2022). There is currently no generic competition in the EU or Japan. The EU salt patent is being opposed in the EPO.

Novartis Pharmaceuticals Business Unit

Ophthalmology

- *Lucentis.* EU: Patent on compound (2018), SPC (2022). Japan: Patent on compound (2018), PTE (AMD indication) (2019), PTE (other indications) (2023). There is currently no generic competition in the EU or Japan.
- *Duotrav, Travatan* and *Travatan Z.*

  Duotrav. EU: Patent on methods of use (2014), SPC (2016), PE (2017); two patents on formulations (2029). Japan: Patent on methods of use (2014), PTE (2018); two patents on formulations (2029). *Duotrav* is not marketed in the US. There is currently no generic competition in the EU or Japan. In the EU, the formulation patents are being opposed in the EPO.

  Travatan. EU: Patent on method of use (2014), SPC (2016), PE (2017); two patents on formulations (2029). *Travatan* is not marketed in the US or Japan. There is generic competition in some EU countries. In the EU, the formulation patents are being opposed in the EPO.

  Travatan Z. US: Three patents on formulations (2027(2), 2029). Japan: Patent on formulation (2027). *Travatan Z* is not marketed in the EU. There is currently no generic competition in the US or Japan. In the US, Novartis has resolved patent litigation with certain generic manufacturers.
- *Systane Ultra, Systane* Original*, Systane Balance* and *Systane* Hydration.

  Systane Ultra. US: Three patents on formulation (2017, 2018, 2028). EU: Two patents on formulation (2017, 2018). Japan: Three patents on formulation (2017, 2018, 2029). There is currently no generic competition in the US, EU or Japan.

  Systane Original. US: Patent on formulation (2018). EU: Patent on formulation (2018). Japan: Patent on formulation (2018). There is currently no generic competition in the US, EU or Japan.

  Systane Balance. US: Patent on formulation (2018). EU: Two patents on formulation (2018, 2030). Japan: Two patents on formulation (2018, 2030). There is currently no generic competition in the US, EU or Japan.

  Systane Hydration. US: Two patents on formulation (2018, 2024). EU: Two patents on formulation (2018, 2024). Japan: Two patents on formulation (2018, 2024). There is currently no generic in the US, EU or Japan.
- *Patanol, Pataday* and *Pazeo.*

  Patanol. EU: Patent on method of use (2016), SPC (2017). Japan: Patent on method of use (2016), PTE (2021). There is generic competition in the US and some EU countries. There is currently no generic

competition in Japan. The Japanese method of use patent is being challenged in the Japanese Patent Office.

Pataday. US: Patent on formulation (2022), PE (2022); patent on formulation (2023), PE (2024). *Pataday* is not marketed in the EU or Japan. There is currently no generic competition in the US. In the US, Novartis has resolved patent litigation with certain generic manufacturers. In the US, an additional generic manufacturer has filed an ANDA challenging the formulation patents; the automatic 30-month stay preventing FDA approval will expire in April 2019.

Pazeo. US: Patent on formulation (2032); New Product Exclusivity, PE (2018). *Pazeo* is not marketed in the EU or Japan. There is currently no generic competition in the US. In the US, generic manufacturers have filed ANDAs challenging the formulation patent; the earliest automatic 30-month stay preventing FDA approval will expire in May 2018.

Neuroscience

- *Gilenya.* US: Patent on compound (2014), PTE (2019); patent on formulation (2026); patent on dose (2027). EU: Patent on compound (2013), SPC (2018); RDP (2021); patent on formulation (2024), SPC (2026). There is currently no generic competition in the US or EU. In the US, certain generic manufacturers have filed ANDAs challenging the US compound patent and formulation patent; the earliest automatic 30-month stays preventing FDA approval will expire in March 2018. The US formulation patent is being challenged in an IPR proceeding in the USPTO.

Immunology and Dermatology

- *Cosentyx.* US: Patent on compound (2027), pending PTE (2029); RDP (2027). EU: Patent on compound (2025), pending SPC (2030), pending PE (2030); RDP (2026). Japan: Patent on compound (2025), PTE (2029); patent on method of use (2031), PTE (2032); RDP (2022). There is currently no generic competition in the US, EU, or Japan.
- *Neoral.* There is no patent protection for *Neoral* in the US, EU or Japan. There is generic competition in the US, EU and Japan.
- *Zortress/Certican.* US: Patent on compound (2014), PTE (2019), PE (2020); patent on dispersible tablet formulation (2022), PE (2023); patent on antioxidant (2019); patent on antioxidant (2019), PE (2020); patent on methods of use (2017), PE (2018); patent on methods of use (2017), PE (2018). EU: Patent on compound (2013), SPC (2018), PE (2019); two patents on methods of use (2017); patent on dispersible tablet formulation (2022); patent on antioxidant (2019). Japan: Patent on compound (2013), PTE (2018); patent on dispersible tablet formulation (2022); patent on antioxidant (2019).

  There is currently no generic competition in the US, EU or Japan. In the US, generic manufacturers have filed ANDAs challenging several patents; the earliest automatic 30-month stay preventing FDA approval will expire in March 2017. The US compound patent is being challenged in IPR proceedings in the USPTO.
- *Myfortic.* US: Patent on formulation (2017), PTE (2018); patent on particle size (2024). EU: Patent on formulation (2017), SPC (2017); patent on formulation (2022); patent on particle size (2024). There is generic competition in the US. There is currently no generic competition in the EU. In the EU, Novartis has resolved patent litigation with certain generic manufacturers. The EU formulation patent and particle size patent are being opposed in the EPO.
- *Xolair.* US: Patent on compound (2018); patent on lyophilized formulation (2016), PTE (2017); patents on syringe formulation (2021, 2024). EU: Patent on compound (2012), SPC (2017); patents on syringe formulation (2021, 2024). Japan: Patent on compound (2012), PTE (2017); patents on syringe formulation (2021, 2024). There is currently no generic competition in the US, EU or Japan. The EU syringe formulation patent (2021) is being opposed in the EPO.

Respiratory

- *Xolair.* The information set forth in the IP paragraph for *Xolair* under the *"Immunology and Dermatology"* heading also applies to *Xolair* for respiratory indications.
- *Ultibro Breezhaler/Utibron Neohaler, Onbrez Breezhaler/Arcapta Neohaler* and *Seebri Breezhaler/Neohaler.*

  Ultibro Breezhaler/Utibron Neohaler. US: Patent on compound (2020), PTE (2025); three patents on methods of use (2021); patent on device (2025); RDP (2018). EU: Patent on compound (2020), SPC (2024); patent on device (2025); patent on method of use (2021), SPC (2026); RDP (2023). Japan: Patent on compound (2020), PTE (2025); patent on device (2025); patent on method of use (2021); RDP (2019). There is currently no generic competition in the US, EU or Japan.

  Onbrez Breezhaler/Arcapta Neohaler. US: Patent on compound (2020), PTE (2025); patent on device (2025). EU: Patent on compound (2020), SPC (2024); patent on device (2025); RDP (2019). Japan: Patent on compound (2020), PTE (2025); patent on device (2025); RDP (2019). There is currently no generic competition in the US, EU or Japan.

  Seebri Breezhaler/Neohaler. US: Patent on device (2025); three patents on uses (2021); RDP (2018). EU: Patent on formulation (2027); patent on device (2025); patent on use (2021), SPC (2026); RDP (2022). Japan: four patents on formulations (2025 (2), 2026 (2)); patent on device (2027); patent on use (2021); RDP (2020). There is currently no generic competition in the US, EU or Japan.

Cardio-Metabolic

- *Galvus* and *Eucreas*. EU: Patent on compound (2019), SPC (2022); patent on combination (2021), SPC (2022); patent on *Eucreas* formulation (2026); RDP (2017). Japan: Patent on compound (2019), PTE (2024), pending PTE (2024); patent on combination (2021); patent on *Galvus* formulation (2025), PTE (2025); patent on *Eucreas* formulation (2026), pending PTE (2028); *Galvus* RDP (2018); *Eucreas* RDP (2019). *Galvus*/*Eucreas* is not marketed in the US. There is currently no generic competition in the EU or Japan. The EU *Eucreas* formulation patent is being opposed in the EPO.
- *Entresto.* US: Patents on combination (2023); patents on complex (2026, 2027); RDP (2020). EU: Patent on combination (2023), SPC (2028); patent on complex (2026), SPC (2030); patents on formulation (2028 (2)); RDP (2025). Japan: Patent on combination (2023); patent on complex (2026); patent on formulation (2028). There is currently no generic competition in the US, EU or Japan. The EU complex patent and the EU formulation patent are being opposed in the EPO.

Established Medicines

- *Diovan* and *Co-Diovan/Diovan HCT. Diovan*: US: Patent on formulation (2017), PE (2017). There is generic competition in the US, EU and Japan. *Co-Diovan/Diovan HCT*: US: Patent on formulation (2017), PE (2017). Japan: Patent on formulation (2017). There is generic competition in the US, EU and Japan.
- *Exforge* and *Exforge HCT.*

  Exforge: US: Patent on *Exforge* combination (2019). EU: Patent on *Exforge* combination/*Exforge HCT* combination (2019), SPC (2021). There is generic competition in the US, EU and Japan. The EU *Exforge* combination/*Exforge HCT* combination patent is being challenged in the EPO and in the patent offices of some EU countries. In the EU, Novartis has resolved patent litigation with certain generic manufacturers. We are taking steps to enforce the EU *Exforge* combination/*Exforge HCT* combination patent against generic manufacturers.

  Exforge HCT: US: Patent on *Exforge HCT* combination (2023). EU: patent on *Exforge* combination/*Exforge HCT* combination (2019), SPC (2021); RDP (2019). Japan: Patent on *Exforge HCT* combination (2023). There is generic competition in the US. There is currently no generic competition in the EU. *Exforge HCT* is not currently marketed in Japan. The EU *Exforge* combination/*Exforge HCT* combination patent is being challenged in the EPO and in the patent offices of some EU countries.
- *Voltaren/Cataflam.* There is no patent protection in the US, EU or Japan. There is generic competition in the US, EU and Japan.

- *Exelon and Exelon Patch.*

  Exelon: There is no patent protection for *Exelon* capsules in the US, EU or Japan. There is generic competition in the US, EU and Japan.

  Exelon Patch: US: Patents on formulations (2019). EU: Patent on formulation (2019); patent on transdermal dosage regime (2026). Japan: Patent on formulation (2019); RDP (2019). There is generic competition in the US and in most EU countries. There is currently no generic competition in Japan. We are taking steps in several countries to enforce our EU transdermal dosage regime patent against generic competitors. In the EU, we have resolved patent litigation with certain generic manufacturers. The EU transdermal dosage regime patent is being opposed in the EPO and several national patents are being challenged in national courts. In the US, Novartis has resolved patent litigation with certain generic manufacturers. The US formulation patents are being challenged in an IPR proceeding in the USPTO.

- *Ritalin LA/Focalin XR.* US: Patent on drug-delivery formulation (2019). EU: Patent on dose (2018); patent on drug-delivery formulations (2019). Japan: Patent on dose (2018); patent on drug-delivery formulation (2019). There is generic competition in the US for *Ritalin LA* and *Focalin XR*. There is currently no generic competition in the EU or Japan. The EU formulation patent is being opposed in the EPO.

Compounds in Development

We provide the following information for non-marketed compounds in development that have been filed with the FDA and/or the EMA for registration but have not yet been approved by either agency for any indication.

- LEE011. US: Three patents on compound (2028, 2030, 2031); two patents on methods of use (2029); patent on salt (2031). EU: Patent on compound (2029); patent on methods of use (2029). Japan: Two patents on compound (2027, 2029); two patents on methods of use (2027, 2029).
- PKC412. US: Three patents on methods of use (2022, 2024, 2030). EU: Two patents on methods of use (2022, 2024); patent on formulation (2020). Japan: Two patents on methods of use (2022, 2024); patent on formulation (2020).

SANDOZ

Our Sandoz Division is a global leader in generic pharmaceuticals and biosimilars and sells products in more than 150 countries. In 2016, the Sandoz Division achieved consolidated net sales of $10.1 billion, representing 21% of the Group's total net sales. Sandoz develops, manufactures and markets finished dosage form medicines as well as intermediary products including active pharmaceutical ingredients.

Sandoz is organized globally in three franchises: Retail Generics, Anti-Infectives, and Biopharmaceuticals. In Retail Generics, Sandoz develops, manufactures and markets active ingredients and finished dosage forms of pharmaceuticals to third parties. Retail Generics includes the areas of dermatology, respiratory, oncology and ophthalmics, cardiovascular, metabolism, central nervous system, pain, gastrointestinal and hormonal therapies, as well as finished dosage form anti-infectives sold to third parties. In Anti-Infectives, Sandoz manufactures and supplies active pharmaceutical ingredients and intermediates—mainly antibiotics—for internal use by Retail Generics and for sale to third-party customers. In Biopharmaceuticals, Sandoz develops, manufactures and markets protein- or other biotechnology-based products, including biosimilars, and provides biotechnology manufacturing services to other companies.

Sandoz products reached more than 500 million patients worldwide in 2016 and Sandoz strategy is to further increase patient access by driving sustainable and profitable growth. Sandoz executes on its divisional strategy by focusing on several key priorities, including investing in key markets and therapeutic areas, increasing the performance of its small-molecule Development and Regulatory organization and maximizing opportunities in biosimilars. Sandoz focuses on products that add more value for patients, payors and healthcare professionals than standard generics.

Examples of marketed products in the Sandoz portfolio include multiple sclerosis treatment *Glatopa* (glatiramer acetate injection) 20mg/mL, respiratory inhaler therapy *AirFluSal Forspiro* (fluticasone salmeterol), and pain medication fentanyl, which is delivered using a transdermal patch.

Sandoz also has a strong and continued strategic focus on biosimilars, which it began developing in 1996 and today sells in more than 60 countries. Sandoz is the market leader in biosimilars and all three of its biosimilars continue to demonstrate strong growth in their respective categories—*Omnitrope*, a human growth hormone; *Binocrit,* an erythropoiesis-stimulating agent used to treat anemia; and filgrastim for neutropenia under the brand names *Zarzio* outside the US and *Zarxio* in the US.

The FDA approved biosimilar *Erelzi* (etanercept-szzs) to treat multiple inflammatory diseases. A confirmatory clinical safety and efficacy study demonstrated that *Erelzi* is equivalent to reference product Enbrel®. The biosimilar launch is pending litigation with Amgen, the manufacturer of Enbrel®.

Our biosimilar *Binocrit* (epoetin alfa) was approved in the EU for a new route of administration, based on data from a study in pre-dialysis and dialysis patients with anemia associated with chronic kidney disease. Filings were accepted in the EU in 2016 for our pegfilgrastim and rituximab biosimilars. We plan to make regulatory filings for adalimumab in the US and EU, rituximab in the US, and infliximab in the EU in 2017. We received a complete response letter for pegfilgrastim from the from FDA in June 2016, and plan to submit additional data for pegfilgrastim to the FDA in 2018.

According to IMS Health, Sandoz holds the global number one position in sales of biosimilars and of generic anti-infectives, ophthalmics and transplantation medicines. In addition, Sandoz holds leading global positions in key therapeutic areas such as generic injectables, dermatology, respiratory, cardiovascular, metabolism, central nervous system, pain and gastrointestinal.

In 2016, key product launches in the US included amphetamine salts extended release (Shire's Adderall XR®), linezolid solution for infusion/injection (Pfizer's Zyvox®), mometasone furoate (Merck & Co. Inc.'s Nasonex® nasal spray), and oxiconazole nitrate (*Oxistat*).

In 2016, key product launches in various European countries included imatinib mesylate (*Glivec*), *ACC* solution for injection, buprenorphine 4 and 7 day transdermal therapeutic system, matrix patch (Mundipharma's BuTrans®, Norspan®), calcipotriol bethametasone ointment (Leo Pharma's Dovobet®), fluticasone salmeterol powder dose inhaler (GSK's Seretide®) and linezolid film coated tablet (Pfizer's Zyvoxid®).

Following an internal reorganization announced on January 27, 2016, nineteen mature products were transferred from our Innovative Medicines Division (formerly named the Pharmaceuticals Division) to the Retail Generics franchise of Sandoz. In compliance with IFRS, Novartis updated its segment financial information to reflect these transfers, both for the current and prior years, to aid comparability of year-on-year results. As a result, all comparisons of divisional results from 2016, 2015 and 2014 in this Form 20-F reflect this new divisional structure.

Effective as of April 1, 2016, operational control for the Novartis Malaria Initiative was transferred from our Innovative Medicines Division to Sandoz. In addition, Sandoz has assumed operational responsibility for Novartis Access, launched in September 2015, which comprises an initial portfolio of fifteen medicines to treat chronic diseases in low and middle income countries. The portfolio, the majority of which are Sandoz medicines, addresses cardiovascular diseases, diabetes, respiratory illnesses and breast cancer, and is offered to governments, non-governmental organizations (NGOs) and other public-sector health providers for one US dollar per treatment, per month. The existing Sandoz tuberculosis business, as well as Novartis Social Business, which includes the Arogya Parivar "Healthy Families" initiative, is also operationally managed by the same unit, under the Sandoz Global Commercial Operations function.

New Products

Sandoz launched a number of important products in various countries in 2016, including:

- *ACC* solution for injection
- Amphetamine salts extended release (Shire's Adderall XR®)
- Buprenorphine 4 and 7 day transdermal therapeutic system, matrix patch (Mundipharma's BuTrans®, Norspan®)
- Calcipotriol bethametasone ointment (Leo Pharma's Dovobet®)
- Esomeprazole *MUT* (Astra Zeneca's Nexium®)

- Fluticasone salmeterol powder dose inhaler (GSK's Seretide®)
- Linezolid solution for infusion/injection (Pfizer's Zyvox®)/ Linezolid film coated tablet (Pfizer's Zyvoxid®)
- Mometasone furoate (Merck & Co. Inc.'s Nasonex® nasal spray)
- Oxiconazole nitrate (*Oxistat*)

Key Marketed Products

Sandoz markets approximately 1000 molecules in countries around the world. The following are some of the Sandoz key marketed products in each of its franchises (availability varies by market):

Retail Generics

Product	Originator Drug	Description
Amoxicillin/clavulanic acid	Augmentin®	Antibiotic
Zoledronic acid	*Aclasta*	Osteoporosis treatment
Potassium	Klor-Con®	Hypokalemia treatment
Fentanyl	various	Pain treatment
Cyclophosmamide	Endoxan®	Breast, ovarian and non-small cell cancer treatment
Levothyroxine sodium	Synthroid®; Levoxyl®	Hypothyroidism treatment

Anti-Infectives

Active Ingredients	Description
Oral and sterile penicillins	Anti-infectives
Oral and sterile cephalosporins	Anti-infectives
Clavulanic acid and mixtures with clavulanic acid	ß-lactam inhibitors
Classical and semisynthetic erythromycins	Anti-infectives

Intermediates	Description
Various cephalosporin intermediates	Anti-infectives
Erythromycin base	Anti-infectives
Various crude compounds produced by fermentation	Cyclosporine, ascomysine, rapamycine, mycophenolic acid, etc.

Biopharmaceuticals

Product	Originator Drug	Description
Binocrit and Epoetin alfa *Hexal*	Eprex®/Erypo®	Recombinant protein used for anemia
Omnitrope	Genotropin®	Recombinant human growth hormone
Zarzio, *Zarxio* and Filgrastim *Hexal*	Neupogen®	Recombinant protein used in oncology
Glatopa	Copaxone® 20 mg	Multiple sclerosis treatment

Biosimilars in Phase III Development and Registration

The following table describes Sandoz biosimilar projects that are in Phase III clinical trials (including filing preparation) and registration:

Project/product	Common name	Mechanism of action	Potential indication/ indications	Therapeutic areas	Route of administration	Current phase
GP1111	infliximab	TNF-α inhibitor	Inflammatory bowel disease, rheumatoid arthritis and plaque psoriasis (same as originator)	Immunology	Intravenous	EU: III
GP2013	rituximab	Anti-CD20 antibody	Non-Hodgkin's lymphoma, chronic lymphocytic leukemia, rheumatoid arthritis, granulomatosis with polyangiitis, and microscopic polyangiitis (same as originator)	Oncology and Immunology	Intravenous	EU: Registration US: III
GP2015	etanercept	TNF-α inhibitor	Arthritides (rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis), plaque psoriasis and others (same as originator)	Immunology	Subcutaneous	EU: Registration US: Approved
GP2017	adalimumab	TNF-α inhibitor	Arthritides (rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis), plaque psoriasis and others (same as originator)	Immunology	Subcutaneous	III
HX575	epoetin alfa	Erythropoiesis-stimulating agent	Anemia in chronic kidney disease, chemotherapy-induced anemia and others (same as originator)	Oncology and Nephrology	Subcutaneous and intravenous	US: III
LA-EP2006	pegfilgrastim	Pegylated granulocyte colony-stimulating factor	Chemotherapy-induced neutropenia and others (same as originator)	Oncology	Subcutaneous	III[(1)(2)]

(1) Withdrawal of EU filing in January 2017 with planned re-filing in 2017.

(2) Resubmission planned for 2018 to address FDA complete response letter.

Principal Markets

The two largest generics markets in the world—the US and Europe—are the principal markets for Sandoz. The following table sets forth the aggregate 2016 net sales of Sandoz by region:

Sandoz	2016 Net Sales to third parties	
	$ millions	%
Europe	4,354	43
United States	3,708	37
Asia, Africa, Australasia	1,418	14
Canada and Latin America	664	6
Total	**10,144**	**100**
Of which in Established Markets*	7,580	75
Of which in Emerging Growth Markets*	2,564	25

* Emerging Growth Markets comprise all markets other than the Established Markets of the US, Canada, Western Europe, Japan, Australia and New Zealand.

Many Sandoz products are used for chronic conditions that require patients to consume the product over long periods of time, from months to years. Sales of our anti-infective products are subject to seasonal variation. Sales of the vast majority of our other products are not subject to material changes in seasonal demand.

Production

The primary goal of our manufacturing and supply chain management program is to ensure the uninterrupted, timely and cost-effective supply of products that meet all product specifications and quality standards. The manufacture of our products is heavily regulated by governmental health authorities around the world, including the FDA and EMA. In addition to regulatory requirements, many of our products involve technically complex manufacturing processes or require a supply of highly specialized raw materials.

We manufacture our products at facilities worldwide. See also "—Item 4.D Property, Plants and Equipment." Active pharmaceutical ingredients are manufactured in our own facilities or purchased from third-party suppliers. We maintain state-of-the-art and cost-competitive processes with quality as a primary goal within our own production network. Those processes include fermentation, chemical syntheses and precipitation processes, such as sterile processing. Many biologic medicines are manufactured using recombinant DNA derived technology, by which a gene is introduced into a host cell, which then produces a human protein. This manufacturing process requires sophisticated technical expertise. We are constantly working to improve current, and to develop new, manufacturing processes.

Raw materials for the manufacturing process are either produced in-house or purchased from a number of third party suppliers. Where possible, we maintain multiple supply sources so that the business is not dependent on a single or limited number of suppliers. However, our ability to do so may at times be limited by regulatory or other requirements. We monitor market developments that could have an adverse effect on the supply of essential materials. Our suppliers of raw materials are required to comply with Novartis quality standards.

Because the manufacture of our products is complex and heavily regulated by governmental health authorities, supply is never guaranteed. If we or our third party suppliers fail to comply with applicable regulations then there could be a product recall or other shutdown or disruption of our production activities. We have experienced supply interruptions for our products in the past, and there can be no assurance that supply will not be interrupted again in the future as a result of unforeseen circumstances. We have implemented a global manufacturing strategy to maximize business continuity in case of such events or other unforeseen catastrophic events. However, there can be no guarantee that we will always be able to successfully manage such issues when they arise.

In October 2015, our Sandoz Division received a Warning Letter from the FDA with respect to our Kalwe and Turbhe, India manufacturing sites. The Warning Letter observations follow an FDA inspection at both sites in August 2014 and are related to deficiencies in current good manufacturing practice (cGMP) for finished pharmaceuticals. The Warning Letter did not contain any new issues in addition to the 483 observations issued following the August 2014 inspection. Sandoz plans to continue to collaborate with the FDA to resolve the Warning Letter observations.

In September 2015, the FDA confirmed that it closed out the May 2013 Warning Letter relating to our Sandoz Division oncology injectables manufacturing facility in Unterach, Austria. That Warning Letter contained two observations which followed an FDA inspection at the site in October 2012, and were related to historical visual inspection practices for products manufactured at the site. A follow up inspection by the FDA in 2014 resulted in no observations.

In July 2014, the FDA confirmed that it had decided to close out the Warning Letter issued in November 2011 against three Sandoz North American facilities in Broomfield, Colorado; Wilson, North Carolina; and Boucherville, Canada. The Warning Letter, which followed inspections at all three sites in the course of 2011, had raised concerns regarding these facilities' compliance with FDA cGMP regulations. The FDA observations in the Warning Letter related primarily to general documentation, validation and investigation practices. Novartis took steps in collaboration with the FDA to correct the observations in the Warning Letter with respect to all three sites.

Marketing and Sales

Sandoz sells a broad portfolio of generic pharmaceutical products, including the products of our Retail Generics franchise and biosimilars, to wholesalers, pharmacies, hospitals and other healthcare outlets. Sandoz adapts its marketing and sales approach to local decision making processes, depending on the structure of the market in each country.

In response to rising healthcare costs, many governments and private medical care providers, such as health maintenance organizations, have instituted reimbursement schemes that favor the substitution of bioequivalent generic products, such as products sold by our Retail Generics franchise, for patented pharmaceutical products. In the US, statutes have been enacted by virtually all states that permit or require pharmacists to substitute a less expensive generic product for the brand-name version of a drug that has been prescribed to a patient. Generic use is growing in Europe, but penetration rates in many EU countries (as a percentage of volume) remain well below those in the US.

Legislative or regulatory changes can have a significant impact on our business in a country. In Germany, for example, the generic market has experienced a major transition in recent years and healthcare reforms have increasingly shifted decision making from physicians to insurance funds.

Our Anti-Infectives franchise supplies active pharmaceutical ingredients and intermediates—mainly antibiotics—for internal use by Retail Generics and for sale to the pharmaceutical industry worldwide.

Our Biopharmaceuticals franchise operates in an emerging business environment, particularly in the US. Regulatory pathways for approving biosimilar products are either relatively new or still in development, and policies have not yet been fully defined or implemented for the automatic substitution and reimbursement of biosimilars in many markets, including the US (see "—Regulation"). As a result, in many of these markets, including the US, our biosimilar products are marketed as branded competitors to the originator products.

Competition

The market for generic products is characterized by increasing demand for high-quality pharmaceuticals that can be marketed at lower costs due to comparatively minimal initial research and development investments. Increasing pressure on healthcare expenditures and numerous patent and data exclusivity period expirations have created a favorable market environment for the generics industry. This positive market trend, however, brings increased competition among the companies selling generic pharmaceutical products, leading to ongoing price pressure on generic pharmaceuticals.

In addition, research-based pharmaceutical companies have responded to increased competition from generic products by licensing their patented products to generic companies (so-called "authorized generics"). By doing so, research-based pharmaceutical companies participate directly in the generic conversion process. Consequently, generic companies that were not in a position to compete on a specific product may enter the generic market using the innovator's product. In the US, the authorized generic is not subject to the US Hatch-Waxman Act rules regarding exclusivity (see "—Regulation"). The company that launches an authorized generic typically launches its product at the same time as the generic exclusivity holder. Authorized generics serve as a business opportunity for Sandoz when the product of a research-based pharmaceutical company loses patent protection and Sandoz secures a license from the research-based pharmaceutical company to launch the authorized generic of that product. However, because they are not subject to the Hatch-Waxman Act rules on exclusivity, authorized generics also reduce the value of the exclusivity for the company that invested in creating the first generic medicine to compete with the originator product. Furthermore, certain research-based companies continually seek new ways to protect their products and to decrease the impact of generic competition, thus potentially limiting the profit that the generic companies can earn on the competing generic product.

Development and Registration

Effective July 1, 2016, development of Sandoz Biopharmaceuticals products is jointly overseen by Sandoz and Novartis Global Drug Development. Development and registration activities for Retail Generics products, and certain registration activities for Biopharmaceuticals products, continue to be overseen directly by Sandoz.

Before a generic pharmaceutical may be marketed, intensive technical and clinical development work must be performed to demonstrate, in bioavailability studies, the bioequivalence of the generic product to the reference product. Nevertheless, research and development costs associated with generic pharmaceuticals generally are much lower than those of the originator pharmaceuticals, as no pre-clinical studies or clinical trials on dose finding, safety and efficacy must be performed by the generic company. As a result, pharmaceutical products for which the patent and data exclusivity period has expired can be offered for sale at prices often much lower than those of products protected by patents and data exclusivity, which must recoup substantial basic research and development costs through higher prices over the life of the product's patent and data exclusivity period.

While generic pharmaceuticals are follow-on versions of chemically synthesized molecules, "biosimilar" products contain a version of the active substance of an already approved original biological medicine. Due to the inherent variability of biologic products and their higher complexity, the development and the regulatory pathway of biosimilars differ significantly from that of generics.

Development of a biosimilar product is much more technically challenging than the development of a generic pharmaceutical. Unlike generic pharmaceuticals, development of biosimilars requires clinical studies in patients. Biosimilars are engineered to match the reference product in quality, safety and efficacy. This is achieved by systematically defining the target of the reference product and then comparing the biosimilar to the reference product at various development stages to confirm biosimilarity and to establish that there are no clinically meaningful differences between the proposed biosimilar and the reference biologic. Because the purpose of a biosimilar clinical development program is to confirm biosimilarity and not to establish efficacy and safety de novo, the clinical studies required are less than those required for an originator biologic. Therefore, the cost of development for a biosimilar is usually less than that of an originator biologic.

The Development and Registration staff employed by affiliates of the Sandoz Division are based worldwide, including facilities in Holzkirchen, Germany; Rudolstadt, Germany; Unterach, Austria; Melville, New York; Hicksville, New York; and Boucherville, Canada. In 2016, Sandoz expensed $0.8 billion (on a core basis $0.8 billion) in product development, which amounted to 8% of the division's net sales. Sandoz expensed $0.8 billion (on a core basis $0.8 billion) and $0.8 billion (on a core basis $0.8 billion) in 2015 and 2014, respectively. Core results includes impairments, amortization and certain exceptional items. For additional information, see "Item 5. Operating and Financial Review and Prospects—5.A Operating Results—Non-IFRS Measures as Defined by Novartis—Core Results."

Regulation

Generics

The Hatch-Waxman Act in the US (and similar legislation in the EU and in other countries) eliminated the requirement that manufacturers of generic pharmaceuticals repeat the extensive clinical trials required for originator products, so long as the generic version could be shown in bioavailability studies to be of identical quality and purity, and to be therapeutically equivalent to the reference product.

In the US, the decision whether a generic pharmaceutical is bioequivalent to the original patented product is made by the FDA based on an Abbreviated New Drug Application (ANDA) filed by the generic product's manufacturer. The process typically takes nearly two years from the filing of the ANDA until FDA approval. However, delays can occur if issues arise regarding the interpretation of bioequivalence study data, labeling requirements for the generic product, or qualifying the supply of active ingredients. In addition, the Hatch-Waxman Act requires a generic manufacturer to certify in certain situations that the generic product does not infringe on any current applicable patents on the product held by the innovator, or to certify that such patents are invalid or the product is non-infringing. This certification often results in a patent infringement lawsuit being brought by the patent holder against the generic company. In the event of such a lawsuit, the Hatch-Waxman Act imposes an automatic 30 month delay in the approval of the generic product in order to allow the parties to resolve the intellectual property issues. For generic applicants who are the first to file their ANDA containing a certification claiming non-infringement or patent invalidity, the Hatch-Waxman Act provides those applicants with 180 days of marketing exclusivity to recoup the expense of challenging the innovator patents. However, generic applicants must launch their products within certain time frames or risk losing the marketing exclusivity that they had gained by being a first to file applicant.

In the EU, decisions on the granting of a marketing authorization are made either by the European Commission based on a positive recommendation by the EMA under the Centralized Procedure, or by a single Member State under the national or decentralized procedure. See "—Innovative Medicines—Regulation—European Union." Companies may submit Abridged Applications for approval of a generic medicinal product based upon its "essential similarity" to a medicinal product authorized and marketed in the EU following the expiration of the product's data exclusivity period. In such cases, the generic company is able to submit its Abridged Application based on the data submitted by the medicine's innovator, without the need to conduct extensive Phase III clinical trials of its own. For all products that received a marketing authorization in the EU after late 2005, the Abridged Application can be submitted throughout the EU. However, the data submitted by the innovator in support of its application for a marketing authorization for the reference product will be protected for ten years after the first grant of marketing authorization in all Member States, and can be extended for an additional year if a further innovative indication has been authorized for that product, based on pre-clinical and clinical trials filed by the innovator that show a significant clinical benefit in comparison to the existing therapies.

Biosimilars

The regulatory pathways for approval of biosimilar products are being developed and established in many countries of the world. A regulatory framework for the approval of biosimilars has been established in the EU, Japan, Canada and US, while the WHO has issued guidance. Sandoz has successfully registered and launched the first biosimilar (or biosimilar type) product in Europe, the US, Canada, Japan, Taiwan, Australia and many countries in Latin America and Asia. Sandoz has three approved biosimilar products in more than 60 countries, and is the first company to secure approval for and launch a biosimilar under the US biosimilar pathway, which was established as part of the Biologics Price Competition and Innovation Act (BPCIA).

The approval of biosimilars in Europe follows a process similar to that followed for small molecules. However, biosimilars usually have to be approved through the centralized procedure because they are manufactured using recombinant DNA technology. As part of the approval process in the EU, biosimilars have to demonstrate comparability to the originator product in terms of safety, efficacy and quality through an extensive comparability exercise, based on strict guidelines set by the authorities. Regulators will only approve a biosimilar based on data which allows the regulators to conclude that there are no clinically meaningful differences between the reference product and the biosimilar.

Under the BPCIA, a biosimilar must be highly similar with no clinically meaningful differences compared to the reference product. Approval of a biosimilar in the US requires the submission of a BLA to the FDA, including an assessment of immunogenicity, and pharmacokinetics or pharmacodynamics. The BLA for a biosimilar can be submitted as soon as four years after the initial approval of the reference biologic, but can only be approved 12 years after the initial approval of the reference biologic. This pathway is still relatively new and some aspects remain untried, controversial and subject to ongoing litigation.

Intellectual Property

We take all reasonable steps to ensure that our products do not infringe valid intellectual property rights held by others. Nevertheless, competing companies commonly assert patent and other intellectual property rights. As a result, we can become involved in significant litigation regarding our products. If we are unsuccessful in defending these suits, we could be subject to injunctions preventing us from selling our products and to potentially substantial damages, which in some instances can be measured in terms of the competing company's profits.

Wherever possible, our products are protected by our own patents. Among other things, patents may cover the products themselves, including the product's formulation, or the processes for manufacturing a product. However, there can be no assurance that our intellectual property will protect our products or that we will be able to avoid adverse effects from the loss of intellectual property protection in the future.

ALCON

Our Alcon Division researches, develops, manufactures, distributes and sells eye care products. Alcon is a global leader in eye care with product offerings in eye care devices and vision care. Its products are sold in more than 145 countries. In 2016, the Alcon Division had consolidated net sales of $5.8 billion representing 12% of total Group net sales.

To meet the needs of patients, ophthalmologists, surgeons, optometrists, opticians and physician specialists, Alcon operates with two global business franchises: Surgical and Vision Care. Each business franchise operates with specialized sales forces and marketing support.

Following an internal reorganization announced on January 27, 2016, Alcon's Ophthalmic Pharmaceuticals products were transferred to our Innovative Medicines Division. In compliance with IFRS, Novartis updated its segment financial information to reflect these transfers, both for the current and prior years, to aid comparability of year-on-year results. As a result, all comparisons of divisional results from 2016, 2015 and 2014 in this Form 20-F reflect this new divisional structure.

In January 2017, we announced that we are considering options for the Alcon Division. The review will explore all options, ranging from retaining all or part of the business to separation via a capital markets transaction (e.g. IPO or spin-off), in order to determine how to best maximize value for our shareholders. The review will be conducted during the course of 2017 and in a manner such that Alcon Division associates can fully

focus on the unit's return to growth. The ophthalmic pharmaceutical portfolio is now fully integrated into our Innovative Medicines Division and will not be part of the review.

In April 2016, Alcon entered into a strategic alliance with PowerVision to develop an accommodating IOL that has the potential to change focus via a fluid-driven shape-changing technology.

In March 2016, Alcon acquired Transcend Medical, the developer of *CyPass* Micro-Stent, a micro invasive glaucoma surgery (MIGS) device to treat patients with glaucoma. The *CyPass* Micro-Stent was initially launched in the US in October 2016.

In February 2016, Alcon entered into an exclusive agreement in the field of ophthalmology with TrueVision to distribute *NGENUITY 3D*, a 3D visualization system which combines a high-dynamic 3D camera, advanced high-speed image optimization, polarizing surgeon glasses, and an ultra-high definition 4K OLED 3D display to create a platform for Digitally Assisted Vitreoretinal Surgery (DAVS) to help improve visualization of the delicate tissues in the back of the eye.

In October 2014, Alcon acquired WaveTec Vision. This acquisition provided Alcon with the *ORA System*, the first commercialized intra-operative guidance system for cataract surgeons implanting IOLs. Alcon has integrated the *ORA System* into its existing Cataract Refractive Suite by Alcon.

In July 2014, Alcon entered into an agreement with Verily (formerly Google Life Sciences and Google [x]) to license its "smart lens" technology with the potential to address ocular conditions.

Alcon Division Products

Surgical

Our Alcon Division's Surgical franchise is the market leader in global ophthalmic surgical product revenues, offering ophthalmic surgical equipment, instruments, disposable products and intraocular lenses for use in surgical procedures to address cataracts, vitreoretinal conditions, glaucoma and refractive errors.

Alcon's Surgical portfolio includes the Cataract Refractive Suite by Alcon, a suite of equipment to help plan and perform some of the most challenging steps of cataract surgery with automation and precision. It is comprised of the *Centurion* vision system phacoemulsification technology platform; the *LenSx* laser, a femtosecond laser for increased precision and reproducibility for the corneal incision, capsulorhexis and lens fragmentation steps of the procedure; the *Verion* image guided system, an ocular surgical planning, imaging and guidance technology; the *ORA System*, an intra-operative guidance system for IOL implantation during cataract surgery; and the *LuxOR LX3* surgical microscope for greater visualization during surgery. Alcon's Surgical portfolio also includes the *Wavelight* refractive suite portfolio for LASIK treatments and other refractive procedures, including topography-guided procedures marketed under the *Contoura* name, the *Constellation* vision system for retinal operations, and the *Infiniti* vision system to perform cataract surgeries, which is the phacoemulsification platform introduced prior to the *Centurion* vision system. Alcon also offers the *AcrySof* family of intraocular lenses (IOLs) to treat cataracts, including monofocal, toric (astigmatism-correcting), and multifocal (presbyopia-correcting) options. The *AcrySof IQ PanOptix* presbyopia-correcting IOL is a hydrophobic acrylic trifocal IOL designed to provide exceptional functional vision from near to intermediate, in addition to providing distance vision comparable to that of a monofocal lens. In addition, Alcon provides advanced viscoelastics, surgical solutions, surgical packs and other disposable products for cataract and vitreoretinal surgery.

Vision Care

Our Alcon Division's Vision Care franchise develops and markets contact lenses and lens care products. Alcon's broad portfolio of silicone hydrogel, daily disposable and color contact lenses includes our *Air Optix*, *Dailies* and *Freshlook* brands. Our *Dailies* product line includes the *Dailies Total1* lens, a first-of-its-kind water gradient contact lens, which is also offered in a multifocal option for patients with presbyopia. Our *Air Optix* monthly replacement product line features silicone hydrogel contact lenses in monofocal, astigmatism-correcting, and multifocal options, as well as *Air Optix Colors* and *Air Optix* plus *HydraGlyde* contact lenses. Our contact lens care solutions business includes the *Opti-Free* line of multi-purpose disinfecting solutions, as well as the *Clear Care* and *AOSept Plus* line of hydrogen peroxide lens care solutions.

New Products

Alcon received a number of approvals and launched a number of products in 2016, including:

- *CyPass* Micro-Stent, a micro invasive glaucoma surgery (MIGS) device, was launched in the US to treat patients with mild to moderate primary open-angle glaucoma in conjunction with cataract surgery.
- *NGENUITY 3D* Visualization System was launched in the US and EU to provide surgeons improved visualization by combining a high-dynamic 3D camera, advanced high-speed image optimization, polarizing surgeon glasses and an ultra-high definition 4K OLED 3D display to create a platform for Digitally Assisted Vitreoretinal Surgery (DAVS).
- *AcrySof IQ ReSTOR* 3.0D Toric IOL, was approved by the FDA to address presbyopia and preexisting astigmatism at the time of cataract surgery in adult patients who desire improved near, intermediate, and distance vision with an increased potential for spectacle independence.
- *Air Optix* plus *HydraGlyde,* an innovation upgrade to silicon hydrogel contact lenses featuring *HydraGlyde* Moisture Matrix technology for longer lasting lens surface wettability, was launched in the US and EU.
- *Dailies Total1* Multifocal contact lenses were launched in the US and EU to provide refractive correction with distance, intermediate and near vision for people with presbyopia.

Key Marketed Products

The following tables set forth certain key marketed products in our Alcon Division. While we intend to sell our marketed products throughout the world, not all products and indications are currently available in every country.

Surgical

Cataract	*AcrySof* family of intraocular lenses includes:
	AcrySof IQ Monofocal, *AcrySof IQ Toric, AcrySof IQ ReSTOR* Multifocal, *AcrySof IQ ReSTOR* Toric, *AcrySof IQ ReSTOR* Multifocal Toric, and *AcrySof IQ PanOptix* Multifocal IOLs
	Cataract Refractive Suite by Alcon designed to streamline the cataract surgical procedure through surgical planning and execution
	Centurion vision system for phacoemulsification and cataract removal
	Infiniti vision system for phacoemulsification and cataract removal
	LenSx laser used for specific steps in the cataract surgical procedure
	LuxOR microscope used for ophthalmic surgical procedures
	ORA System intra-operative guidance system for use with cataract surgery
	UltraSert pre-loaded delivery system for intraocular lenses
	Verion imaged-guided system for use during cataract surgery
Vitreoretinal	*Constellation* vision system for vitreoretinal operations
	Grieshaber surgical instruments
	NGENUITY 3D high-resolution visualization system for vitreoretinal surgery
	Purepoint laser system and probes
	Ultravit vitrectomy probes

Refractive	*WaveLight EX500* excimer laser for LASIK and PRK vision correction
	Allegretto Wave Eye-Q excimer laser for LASIK and PRK vision correction
	WaveLight FS200 femtosecond laser for refractive surgery
Glaucoma	*CyPass* Micro-Stent for the treatment of glaucoma during cataract surgery
	EX-PRESS glaucoma filtration device

In addition, Alcon provides advanced viscoelastic, surgical solutions, surgical packs and other disposable products for cataract and vitreoretinal surgery.

Vision Care

Contact Lenses	*Air Optix* family of silicone hydrogel contact lenses (including *Air Optix Colors* and *Air Optix* plus *HydraGlyde* lenses)
	Dailies family of daily disposable contact lenses (including *Dailies Total1* lenses)
	FreshLook family of color contact lenses
Contact Lens Care	*Clear Care* family of hydrogen peroxide lens care solution (*AOSept Plus* outside of North America)
	Opti-Free family of multi-purpose disinfecting solution

Selected Development Projects

The following tables provide an overview of certain key projects currently in development within our Alcon Division for the US and/or the EU. Alcon also has projects in development for markets outside the US and the EU, as well as less significant projects in development for markets throughout the world, including the US and EU.

Surgical

Project/Product	Description	Product Category	Planned Submission	Current Phase
A02238	Mid-tier phacoemulsification device	Cataract Equipment	US 2018 EU 2018	Advanced Advanced
AcrySof IQ PanOptix IOL	Trifocal IOL	Cataract Implant	US 2019	Advanced
AcrySof IQ PanOptix Toric IOL	Trifocal IOL for astigmatism	Cataract Implant	US 2019	Advanced
AcrySof IQ ReSTOR 2.5D Toric IOL	Multifocal IOL for astigmatism	Cataract Implant	US	Submitted
Clareon Monofocal IOL	Next-generation IOL	Cataract Implant	EU 2017 US 2019	Advanced Advanced
CyPass Micro-Stent	Micro-invasive glaucoma surgical device for implant during cataract surgery	Glaucoma Implant	EU 2017	Advanced

Vision Care

Project/Product	Description	Product Category	Planned Submission	Current Phase
A00717	Daily disposable line extension	Contact Lens	EU 2018	Advanced
			US 2018	Advanced
A01660	New daily disposable lens	Contact Lens	EU 2018	Advanced
			US 2018	Advanced

Principal Markets

The principal markets for our Alcon Division include the US, Canada and Latin America, Japan and Europe. The following table sets forth the aggregate 2016 net sales of the Alcon Division by region:

Alcon	2016 Net Sales to third parties	
	$ millions	%
Europe	1,508	26
United States	2,512	43
Asia, Africa, Australasia	1,327	23
Canada and Latin America	465	8
Total	**5,812**	**100**
Of which in Established Markets*	4,630	80
Of which in Emerging Growth Markets*	1,182	20

* Emerging Growth Markets comprise all markets other than the Established Markets of the US, Canada, Western Europe, Japan, Australia and New Zealand.

Sales of the majority of our Alcon Division products are not subject to material changes in seasonal demand.

Research and Development

In 2016, our Alcon Division expensed $0.5 billion (on a core basis $0.5 billion) in research and development, which amounted to 9% of the Division's net sales. The Alcon Division expensed $0.5 billion (on a core basis $0.5 billion) and $0.5 billion (on a core basis $0.5 billion) in research and development in 2015 and 2014, respectively. Core results includes impairments, amortization and certain exceptional items. For additional information, see "Item 5. Operating and Financial Review and Prospects—5.A Operating Results—Non-IFRS Measures as Defined by Novartis—Core Results."

Research and development activities for Alcon's Surgical franchise are focused on expanding intraocular lens capabilities to further improve surgical and refractive outcomes and on developing equipment and instrumentation for cataract, vitreoretinal, glaucoma and corneal refractive surgeries. The focus for the Vision Care franchise is on the research and development of new contact lens materials, coatings and designs to improve patient comfort, and on lens care solutions that provide the safety, disinfecting and cleaning power needed to help maintain ocular health.

Alcon continues to seek opportunities to collaborate with third parties on advanced technologies for various ocular medical uses. These include the potential to provide accommodative contact and intraocular lenses for patients living with presbyopia.

Production

The products of Alcon's Surgical business franchise are manufactured at facilities located in the United States, Belgium, Switzerland, Ireland, Germany and Israel. Alcon's Vision Care business franchise production facilities are located in the US, Germany, Singapore, Malaysia and Indonesia.

The goal of our supply chain strategy is to efficiently produce and distribute high quality products. The manufacture of our products is heavily regulated by governmental health authorities around the world, including the FDA. In addition to regulatory requirements, many of our products involve technically complex manufacturing processes or require a supply of highly specialized raw materials. For some products and raw materials, we may also rely on a single source of supply.

The manufacture of our products is complex and heavily regulated, which means that supply is never guaranteed. Like some of our competitors, our Alcon Division has faced manufacturing issues and has received Warning Letters relating to such manufacturing issues. In particular, in December 2012, Alcon received an FDA Warning Letter following an inspection at the *LenSx* laser manufacturing site in Aliso Viejo, California. Alcon responded in writing to the FDA, and in February 2013, FDA responded to Alcon acknowledging that the corrective actions described in Alcon's written response appear to address the items identified in the Warning Letter. The Warning Letter was lifted in May 2014 after all corrective actions were completed. The items noted in the Warning Letter did not affect the safety or effectiveness of the *LenSx* laser, or impact Alcon's ability to sell the product. If we or our third-party suppliers fail to comply fully with regulations then there could be a product recall or other shutdown or disruption of our production activities. We have implemented a global manufacturing strategy to maximize business continuity in case of such events or other unforeseen catastrophic events. However, there can be no guarantee that we will be able to successfully manage such issues when they arise.

Marketing and Sales

Our Alcon Division conducts sales and marketing activities around the world organized under five operating regions (Europe/Middle East/Africa, North America, Latin America/Caribbean, Asia and Russia, and Japan). The Alcon Division's global commercial capability is organized around sales and marketing organizations dedicated to the Surgical and Vision Care franchises.

Most of our global Alcon marketing efforts are supported by advertising in trade publications and by marketing and sales representatives attending regional and national medical conferences. Marketing efforts are reinforced by targeted and timely promotional materials and direct mail to eye care practitioners in the office, hospital or surgery center setting. Technical service after the sale is provided and an integrated customer relationship management system is in place in many markets. Where applicable, we also rely on direct-to-consumer marketing campaigns to promote selected products or treatment options.

While our Alcon Division markets all of its products by calling on medical professionals, direct customers and distribution methods differ across business lines. Alcon surgical products are sold directly to hospitals and ambulatory surgical centers, although Alcon sells through distributors in certain markets outside the US. In most countries, contact lenses are available only by prescription. Our contact lenses can be purchased from eye care professionals, optical chains and large retailers, subject to country regulation. Lens care products can be found in major drugstores, food, mass merchandising and optical retail chains globally, subject to country regulations.

Competition

The eye care industry is highly competitive and subject to rapid technological change and evolving industry requirements and standards. Our Alcon Division typically competes with different companies across its two franchises—Surgical and Vision Care. Companies within this industry compete on technological leadership and innovation, quality and efficacy of their products, relationships with eye care professionals and healthcare providers, breadth and depth of product offering and pricing. The presence of these factors varies across our Alcon Division's product offerings, which provides a broad line of proprietary eye care products. Our principal competitors also sometimes form strategic alliances and enter into co-marketing agreements in an effort to better compete with us.

Regulation

Most of our Surgical and Vision Care products are regulated as medical devices in the US and the EU. These jurisdictions each have risk-based classification systems that determine the type of information that must be provided to the local regulatory bodies in order to obtain the right to market a product. In the US, safety and effectiveness information for Class II and III devices must be reviewed by the FDA. There are two review procedures: a Pre-Market Approval (PMA) for Class III devices, and a Pre-Market Notification (510(k))

submission for Class II devices. Under a PMA, the manufacturer must submit to the FDA supporting evidence sufficient to prove the safety and effectiveness of the device. Under a Pre-Market Notification (510(k)) submission, the manufacturer notifies the FDA that it intends to commence marketing the product, with data that establishes the product as substantially equivalent to another Class II product already on the market.

In the EU, the CE marking is required for all medical devices sold. By affixing the CE marking, the manufacturer certifies that a product is in compliance with provisions of the EU's Medical Device Directive. Most such products are subject to a self-certification process by the manufacturer, which requires the manufacturer to confirm that the product performs to appropriate standards. This allows the manufacturer to issue a Declaration of Conformity and to notify competent authorities in the EU that the manufacturer intends to market the product. In order to comply with European regulations, our Alcon Division maintains a full Quality Assurance system and is subject to routine auditing by a certified third party (a "notified body") to ensure that this quality system is in compliance with the requirements of the EU's Medical Device Directive as well as the requirements of the ISO quality systems' standard ISO 13485.

Intellectual Property

We attach great importance to intellectual property including patents, trademarks, copyrights, know-how and research data in order to protect our investment in research and development, manufacturing and marketing. In general, we seek intellectual property protection under applicable laws for significant product developments in major markets. Among other things, patents may cover the products themselves the processes for manufacturing a product, and particular uses of a product.

The protection offered by such patents extends for varying periods depending on the legal life of patents in the various countries. The protection afforded, which may also vary from country to country, depends upon the type of patent and its scope of coverage. We monitor our competitors and typically challenge infringements of our intellectual property. We also defend challenges through litigation and administrative proceedings to the validity of our intellectual property. However, because the outcomes of intellectual property challenges can be difficult to predict, there can be no assurance that we will be able to successfully protect our intellectual property rights in all cases. If we are unsuccessful in defending such challenges, we may face loss of exclusivity and increased competition in the affected territories. See generally "—Innovative Medicines—Intellectual Property."

We take reasonable steps to ensure that our products do not infringe valid intellectual property rights held by others. Nevertheless, third parties may assert patent and other intellectual property rights against our products. As a result, we can become involved in significant intellectual property litigation regarding our products. If we are unsuccessful in defending these suits, we could be subject to injunctions preventing us from selling our products and to damages, which may be substantial.

Worldwide, all of our major products are sold under trademarks that we consider in the aggregate to be important to our business as a whole. We consider trademark protection to be particularly important in the protection of our investment in the sales and marketing of our Surgical and Vision Care franchises. The scope and duration of trademark protection varies widely throughout the world. In some countries, trademark protection continues only as long as the mark is used. Other countries require registration of trademarks and the payment of registration fees. Trademark registrations are generally for fixed, but renewable, terms.

We rely on copyright protection in various jurisdictions to protect the exclusivity of the code for the software used in our surgical equipment. The scope of copyright protection for computer software varies throughout the world, although it is generally for a fixed term which begins on the date of copyright registration.

4.C Organizational Structure

See "Item 4. Information on the Company—4.A History and Development of Novartis," and "Item 4. Information on the Company—4.B Business Overview—Overview."

4.D Property, Plants and Equipment

Our principal executive offices are located in Basel, Switzerland. Our divisions operate through a number of affiliates having offices, research facilities and production sites throughout the world.

We generally own our facilities, or have entered into long-term lease arrangements for them. Some of our principal facilities are subject to mortgages and other security interests granted to secure indebtedness to certain financial institutions.

Effective July 1, 2016, Novartis Technical Operations was formed to manage the production and supply chains of our Innovative Medicines and Sandoz Division products through a network of warehouse and distribution centers, 67 manufacturing sites, as well as through external suppliers. Our 16 Alcon Surgical and Vision Care manufacturing sites continue to be managed by the Alcon Division.

The following table sets forth our major headquarters and most significant production, research and development and administrative facilities. See also "—Item 4.B Business Overview—Innovative Medicines—Production," "—Item 4.B Business Overview—Sandoz—Production" and "—Item 4.B Business Overview—Alcon—Production" for a discussion of our manufacturing processes.

Major facilities

Location	Size of Site (in square meters)	Major Activity
Kundl and Schaftenau, Austria	480,000	Production of biotechnological products, anti-infectives, active drug substances, product development
East Hanover, New Jersey	400,000	Innovative Medicines Division US headquarters, research and development
Barleben, Germany	340,000	Production of broad range of finished dosage forms
Basel, Switzerland—St. Johann	274,000	Global Group headquarters, global Innovative Medicines Division headquarters, research and development, production of drug substances and drug intermediates
Fort Worth, Texas	262,000	Alcon Division headquarters, production, research and development for Alcon Vision Care, Surgical franchises
Changshu (Suzhou), China	230,000	Technical research, development and manufacturing of drug substances and drug intermediates
Cambridge, Massachusetts	180,000	Research and development
Shanghai, China	106,500	Research and development
Ringaskiddy, Ireland	85,000	Production of drug substances and drug intermediates
Johns Creek, Georgia	83,200	Production, research and development for Alcon Vision Care franchise
Ljubljana, Slovenia	83,000	Production of broad range of finished solid and sterile dosage forms
Grosswallstadt, Germany	82,400	Production, research and development for Alcon Vision Care franchise
Hyderabad, India	80,500	Administrative offices for Innovative Medicines, Sandoz and Alcon

Location	Size of Site (in square meters)	Major Activity
Holzkirchen, Germany	72,300	Sandoz Division headquarters, production of oral films, transdermal delivery systems, matrix patches, product development
Stein, Switzerland	64,700	Production of sterile vials, pre-filled syringes and ampoules, and of inhalation capsules, tablets and transdermals, and of active pharmaceutical ingredients
Grimsby, UK	64,000	Production of drug substances and drug intermediates
Puurs, Belgium	55,000	Production for ophthalmic medicines and Alcon Surgical franchise
Rueil-Malmaison, France	48,200	Administrative offices for Innovative Medicines and Alcon
Stryków, Poland	45,000	Production of broad range of bulk oral solid forms
Rudolfstadt, Germany	44,000	Development and production of respiratory technologies and ophthalmics
Johor, Malaysia	43,300	Production for Alcon Vision Care franchise
Irvine, California	39,700	Production, research and development for Alcon Surgical franchise
Houston, Texas	37,400	Production for Alcon Surgical franchise
Huningue, France	35,000	Production of drug substances for clinical and commercial supply
Singapore	35,000	Production for Alcon Vision Care franchise
Barbera, Spain	33,000	Production of tablets, capsules and inhalation products
Basel, Switzerland—Schweizerhalle	31,700	Production of drug substances and drug intermediates
Wehr, Germany	31,700	Production of tablets, creams and ointments
Huntington, West Virginia	27,498	Production for Alcon Surgical franchise
Tokyo, Japan	26,000	Administrative offices for Innovative Medicines, Sandoz and Alcon
Sinking Spring, Pennsylvania	21,800	Production for Alcon Surgical franchise
Batam, Indonesia	21,500	Production for Alcon Vision Care franchise
Princeton, New Jersey	14,300	Sandoz Division US headquarters

To support the objectives of Novartis Technical Operations, we have initiated the network transformation project, under which we are reviewing our Innovative Medicines and Sandoz drug manufacturing network to ensure it can appropriately meet the future needs of the Group. The network transformation project replaces and complements the previously announced review of our manufacturing footprint. Among other things, as part of

this initiative we plan to exit our Sandoz Division plant in Hicksville, New York by 2019. We expect the previously announced exit of our Sandoz Division site in Turbhe, India to be completed in 2017.

Our St. Johann site in Basel, Switzerland, is our largest research and development site as well as the headquarters for the Group and for the Innovative Medicines Division. A project was started in 2001, known as "Campus," with the aim of transforming the site into a center of knowledge, innovation and encounter with a primary emphasis on international corporate functions and research activities. At that time, changes needed to be made to the site, since it had originally been designed primarily for pharmaceuticals production, but research and development had come to account for a greater proportion of our activities there. By the end of 2016, 17 new buildings had begun operations, eight of them laboratory buildings. The current phase of the long term redevelopment of our St. Johann site is largely complete. In addition, the Novartis Board of Directors approved planning for the next phase of the campus extension in line with the overall plan for the site. A large laboratory building has been planned for the northern end of the site, but construction is currently on hold. Through December 31, 2016, the total amount paid and committed to be paid on the Campus project is equivalent to $2.1 billion. Novartis expects to have spent more than the equivalent of $2.8 billion on the Campus project through the end of 2017. We intend to fund these expenditures from internally generated resources.

In 2007, NIBR opened a start-up facility for our new R&D center in Shanghai, China (CNIBR). In 2008, we broke ground on Phase 1 of a new facility that was originally to be home to approximately 400 R&D scientists and approximately 400 other Innovative Medicines Division personnel. In 2009, we announced that we would expand the scope of the site and invest $1 billion over the next five years to increase the size of our operations in Shanghai. Based on a re-evaluation of the site conducted in 2010, Phase one was extended by two buildings to fulfill the requirements for the cross-divisional Shanghai campus to house 800 offices and 400 laboratory work places. As of December 31, 2016, two laboratory buildings, four office buildings and one restaurant building were completed. Through December 31, 2016, the total amount paid on the CNIBR Project is equivalent to $800 million.

In 2010, we announced that we would build new laboratory and office space for NIBR in Cambridge, Massachusetts on an area of land close to the existing NIBR research facilities on Massachusetts Avenue. In 2011 we finalized design plans for the new buildings, received necessary zoning changes from the City of Cambridge and began preparing the site for construction. Construction began on the site in April 2012, and as of the end of 2016, these facilities were fully operational and all associates had moved into the new buildings. Through December 31, 2016, the total amount paid on the NIBR Project is $802 million.

In 2012, Novartis announced the construction of a new state-of-the-art production facility to produce solid dosage form medicines for the Innovative Medicines Division in Stein, Switzerland. We expect our investment in this facility to exceed $600 million. The new facility is planned to replace an older facility. In addition, Novartis plans to invest in new technologies and packaging facilities for pharmaceuticals at Stein. Stein is planned to be a technological competence center for both sterile and solid dosage form drugs. Through December 31, 2016, the total amount paid and committed to be paid on this project is equivalent to $559 million.

In 2012, we announced the planned construction of a new state-of-the-art biotechnology production site in Singapore with a planned investment of over $700 million. The new facility will focus on drug substance manufacturing based on cell culture technology. Ground was broken in February 2013 and construction was completed in the third quarter of 2015 for phase one of the project. We expect phase one of this project to be operational in 2017 and phase two in 2019. It will be co-located with the pharmaceutical production site based in Tuas, Singapore. In the future, Singapore is expected to be a technological competence center for both biotechnology and pharmaceutical manufacturing at Novartis. Through December 31, 2016, the total amount paid and committed to be paid on this project is equivalent to $546 million.

A second expansion of the Johns Creek, Georgia facility was approved in the third quarter of 2014 to add nine production lines for *Dailies* and *Dailies Total1* contact lenses. The construction and equipment installation is now complete and equipment is currently undergoing validation. This project is expected to be completed in the second quarter of 2017. Through December 31, 2016, the total amount paid and committed to be paid on this project is $241 million.

The Alcon Division began an expansion of its Singapore facility in 2014 for contact lens manufacturing. The expansion is expected to add 16,000 square meters to the existing production lines. Through December 31, 2016, the total amount paid and committed to be paid on this project is equivalent to $95 million.

Environmental Matters

We integrate core values of environmental protection into our business strategy to add value to the business, manage risk and enhance our reputation.

We are subject to laws and regulations concerning the environment, safety matters, regulation of chemicals and product safety in the countries where we manufacture and sell our products or otherwise operate our business. These requirements include regulation of the handling, manufacture, transportation, use and disposal of materials, including the discharge of pollutants into the environment. In the normal course of our business, we are exposed to risks relating to possible releases of hazardous substances into the environment which could cause environmental or property damage or personal injuries, and which could require remediation of contaminated soil and groundwater, in some cases over many years, regardless of whether the contamination was caused by us, or by previous occupants of the property.

See "Item 3. Key Information—Item 3.D Risk Factors—Environmental liabilities may adversely impact our results of operations." See also "Note 20. Provisions and other non-current liabilities" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Item 4A. Unresolved Staff Comments

Not applicable.

Item 5. Operating and Financial Review and Prospects

5.A Operating Results

This operating and financial review should be read together with the Group's consolidated financial statements in this Annual Report, which have been prepared in accordance with International Financial Reporting Standards (IFRS) as published by the International Accounting Standards Board.

OVERVIEW

Novartis provides healthcare solutions that address the evolving needs of patients and societies worldwide. Our broad portfolio includes innovative pharmaceuticals and oncology medicines, generic and biosimilar medicines and eye care devices. Our mission is to discover new ways to improve and extend people's lives. Our vision is to be a trusted leader in changing the practice of medicine. Our strategy is to use science-based innovation to deliver better patient outcomes in growing areas of healthcare.

Following the completion of a series of transactions in 2014 and 2015, the Group's continuing operations comprise three global operating divisions, Innovative Medicines, Sandoz and Alcon. We also separately report the results of Corporate activities. The disclosure in this Form 20-F focuses on these continuing operations unless otherwise specified. From March 2, 2015, the date of the completion of a series of transactions with GSK, continuing operations also includes the results from the oncology assets acquired from GSK and the 36.5% interest in GSK Consumer Healthcare Holdings Ltd. for the period from March 2015 (the latter reported as an investment in associated companies). We sold on March 2, 2015, our Vaccines Division, excluding our influenza vaccines business, to GSK. Our influenza vaccines business was sold on July 31, 2105 to CSL and our Animal Health Division was sold on January 1, 2015 to Lilly. For more detail on certain of these transactions see, "Item 10.C Material Contracts."

Continuing Operations:

- Innovative Medicines (formerly named Pharmaceuticals): Innovative patent-protected prescription medicines
- Sandoz: Generic pharmaceuticals and biosimilars
- Alcon: Surgical and vision care products
- Corporate activities

Discontinued Operations:

- Vaccines and Diagnostics: Preventive human vaccines and blood-testing diagnostics
- Consumer Health: OTC (over-the-counter medicines) and Animal Health
- Corporate: certain transactional and other expenses related to the portfolio transformation

Novartis has leading positions globally in the areas of each of our three divisions. To maintain our competitive positioning across these segments of the healthcare industry, we place a strong focus on innovating to meet the evolving needs of patients around the world, working to grow our presence in new and emerging markets, and to enhance our productivity to invest for the future and increase returns to shareholders. The financial results of our continuing Corporate activities include the costs of the Group headquarters and those of corporate coordination functions in major countries. In addition, Corporate includes other items of income and expense that are not attributable to specific segments such as certain revenues from intellectual property rights and certain expenses related to post-employment benefits, environmental remediation liabilities, charitable activities, donations and sponsorships.

The Group is organized into three divisions, Innovative Medicines, Sandoz and Alcon, as well as Corporate activities. Our divisions are supported by the following cross-divisional organizational units: Novartis Institutes for BioMedical Research, Global Drug Development and Novartis Operations, which includes Novartis Technical Operations and Novartis Business Services.

The Novartis Institutes for BioMedical Research (NIBR) is the innovation engine of Novartis, which supports our Innovative Medicines Division and also collaborates with our Sandoz Division. More than 6,000 scientists and associates at NIBR conduct research into various disease areas at sites located in the US, Switzerland, Singapore and China. For more information about NIBR, see "—Innovative Medicines—Research and Development—Research program," below.

Effective February 1, 2016, Mike Ball was appointed Division Head and CEO Alcon, and as a member of the Executive Committee of Novartis (ECN). Mike Ball succeeded Jeff George, who decided to leave Novartis.

Effective April 1, 2016, Alcon's Ophthalmic Pharmaceuticals products were transferred to our Innovative Medicines Division. At the same time, selected mature, non-promoted pharmaceutical products were shifted from our Innovative Medicines Division to Sandoz, which has proven experience in managing mature products successfully. Following these changes our Alcon Division is now focused on its Surgical and Vision Care franchises.

In May 2016, Novartis announced changes to focus its former Pharmaceuticals Division by creating two business units, Novartis Pharmaceuticals and Novartis Oncology, to form the Innovative Medicines Division. Effective July 1, 2016, Paul Hudson was appointed CEO, Novartis Pharmaceuticals and Bruno Strigini was appointed CEO, Novartis Oncology, both as members of the Executive Committee of Novartis. Mr. Hudson and Mr. Strigini report to Joseph Jimenez, CEO of Novartis.

In July 2016, we established the Global Drug Development (GDD) organization to oversee all drug development activities for our Innovative Medicines Division and the biosimilars portfolio of our Sandoz Division. Development of products for the Surgical and Vision Care franchises within our Alcon Division and of small molecule generics for our Sandoz Division are not included in GDD. GDD works collaboratively with NIBR, Innovative Medicines and Sandoz to execute our overall pipeline strategy and takes an enterprise approach to pipeline portfolio management. GDD incorporates centralized global functions such as Regulatory Affairs and Global Development Operations, as well as Global Development units aligned with our business franchises. GDD was created to increase Group-wide coordination of drug development and to improve resource allocation, technology implementation and process standardization with a goal of further increasing innovation. Dr. Vas Narasimhan was appointed Global Head Drug Development and Chief Medical Officer, a newly created position in the ECN and reports to the CEO of Novartis. GDD includes approximately 10,000 associates worldwide.

In 2016, André Wyss, already a member of the ECN, Head Novartis Business Services (NBS) and Country President for Switzerland, was appointed President, Novartis Operations. In his new role, he assumed responsibility for the integrated Novartis Technical Operations (NTO) organization as well as for Global Public & Government Affairs, in addition to his previous responsibilities, and he continues to report to the CEO Novartis. NTO was established effective July 1, 2016, in order to centralize management of our manufacturing operations

across our Innovative Medicines and Sandoz Divisions, with a goal of further improving efficiency. Manufacturing for Alcon's Surgical and Vision Care franchises continues to be managed by our Alcon Division. NTO is expected to optimize capacity planning and adherence to quality standards, and to lower costs through simplification, standardization and external spend optimization. Centralization is also expected to improve our ability to develop next generation technologies, implement continuous manufacturing and share best practices across divisions. NTO includes approximately 28,000 associates and 67 manufacturing sites across our Innovative Medicines and Sandoz Divisions.

NBS, our shared service organization, was also made a part of Novartis Operations in 2016. NBS delivers integrated solutions to all Novartis divisions and units worldwide. NBS seeks to drive efficiency and effectiveness across Novartis by simplifying and standardizing services across six service domains: human resources, real estate and facility services, procurement, information technology, commercial and medical support activities, and financial reporting and accounting operations. NBS has approximately 10,000 associates in more than 50 countries. NBS works to leverage the full scale of Novartis to create value across the company and to free up resources to invest in innovation and our product pipeline. NBS continues to transfer the delivery of selected services to its five Global Service Centers in Dublin, Ireland; Hyderabad, India; Kuala Lumpur, Malaysia; Mexico City, Mexico; and Prague, Czech Republic.

In 2016, Novartis continuing operations achieved net sales of $48.5 billion, while net income from continuing operations amounted to $6.7 billion. Of total net sales from continuing operations, $11.9 billion, or 25%, came from Emerging Growth Markets, and $36.6 billion, or 75%, came from Established Markets. Emerging Growth Markets comprise all markets other than the Established Markets of the US, Canada, Western Europe, Japan, Australia and New Zealand. Research & Development expenditure in 2016 amounted to $9.0 billion ($8.5 billion excluding impairment and amortization charges).

Headquartered in Basel, Switzerland, our Group companies employed 118,393 full-time equivalent associates as of December 31, 2016. Our products are sold in approximately 155 countries around the world.

Innovative Medicines Division

Innovative Medicines (formerly named the Pharmaceuticals Division) researches, develops, manufactures, distributes and sells patented prescription medicines to enhance health outcomes for patients and health-care providers. The Innovative Medicines Division is organized into two global business units: Novartis Oncology and Novartis Pharmaceuticals. Novartis Pharmaceuticals consists of the global business franchises Ophthalmology, Neuroscience, Immunology and Dermatology, Respiratory, Cardio-Metabolic and Established Medicines.

In 2016, the Innovative Medicines Division accounted for $32.6 billion, or 67%, of Group net sales, and for $7.4 billion, or 85%, of Group operating income (excluding Corporate income and expense, net).

Sandoz Division

Our Sandoz Division develops, manufactures, distributes and sells prescription medicines, as well as pharmaceutical active substances that are not protected by valid and enforceable third-party patents. Sandoz is organized globally in three franchises: Retail Generics, Anti-Infectives, and Biopharmaceuticals. In Retail Generics, Sandoz develops, manufactures and markets active ingredients and finished dosage forms of pharmaceuticals to third parties. Retail Generics includes the areas of dermatology, respiratory, oncology, ophthalmics, cardiovascular, metabolism, central nervous system, pain, gastrointestinal, and hormonal therapies, as well as finished dosage form anti-infectives sold to third parties. In Anti-Infectives, Sandoz manufactures active pharmaceutical ingredients and intermediates, mainly antibiotics, for internal use by Retail Generics and for sale to third party customers. In Biopharmaceuticals, Sandoz develops, manufactures and markets protein or other biotechnology based products, including biosimilars, and provides biotechnology manufacturing services to other companies.

In 2016, Sandoz accounted for $10.1 billion, or 21%, of Group net sales, and for $1.4 billion, or 17%, of Group operating income (excluding Corporate income and expense, net).

Alcon Division

Our Alcon Division researches, develops, manufactures, distributes and sells eye care products. Alcon is a global leader in eye care with product offerings in eye care devices and vision care. Alcon is organized into two

global business franchises: Surgical and Vision Care. The Surgical franchise includes technologies and devices for cataract, retinal, glaucoma and refractive surgery, as well as intraocular lenses to treat cataracts and refractive errors, like presbyopia and astigmatism. Alcon also provides viscoelastics, surgical solutions, surgical packs, and other disposable products for cataract and vitreoretinal surgery. The Vision Care franchise comprises daily disposable, monthly replacement, and color-enhancing contact lenses, as well as a complete line of contact lens care products including multi-purpose and hydrogen-peroxide based solutions, rewetting drops and daily protein removers.

In 2016, Alcon accounted for $5.8 billion, or 12%, of Group net sales, and for $−0.1 billion, or −2%, of Group operating income (excluding Corporate income and expense, net).

OPPORTUNITY AND RISK SUMMARY

We believe that our strategy, which is anchored in our company's tradition of leadership in innovation, positions us well to take advantage of trends shaping the future of the industry. These trends range from advances in science and technology that are opening new frontiers for research and development (R&D), to the growing and graying of populations that are boosting demand for chronic disease treatments.

At the same time, these trends contribute to certain risks and uncertainties in our operations. Some of them are inherent to the industry, and others are specific to Novartis. Anticipating and managing these risks can influence our ability to deliver strong financial performance and meet the needs of patients, healthcare providers, payors, regulators and shareholders.

For more detail on these trends and how they impact our results, see "—Factors Affecting Results of Operations" below.

RESULTS OF OPERATIONS

In evaluating the Group's performance, we consider not only the IFRS results, but also certain non-IFRS measures, including core results and constant currency results. These measures assist us in evaluating our ongoing performance from year to year and we believe this additional information is useful to investors in understanding the performance of our business.

The Group's core results—including core operating income, core net income and core earnings per share—exclude fully the amortization and impairment charges of intangible assets, excluding software, and certain acquisition related items. The following items that exceed a threshold of $25 million are also excluded: integration and divestment related income and expenses, divestment gains and losses, restructuring charges/releases, legal related items, impairments of property, plant and equipment and financial assets, as well as income and expense items that management deems exceptional and that are or are expected to accumulate within the year to be over a $25 million threshold. For a reconciliation between IFRS results and core results see "Non-IFRS Measures as Defined by Novartis—core results," below.

We present information about our net sales and other key figures relating to operating and net income in constant currencies (cc). We calculate constant currency net sales and operating income by applying the prior-year average exchange rates to current financial data expressed in local currencies in order to estimate an elimination of the impact of foreign exchange rate movements.

The core results, constant currencies and other non-IFRS measures are explained in more detail see "Non-IFRS Measures as Defined by Novartis", and are not intended to be substitutes for the equivalent measures of financial performance prepared in accordance with IFRS. These measures may differ from similarly titled non-IFRS measures of other companies.

2016 Compared to 2015

Key figures

	Year ended Dec 31, 2016	Year ended Dec 31, 2015	Change in $	Change in constant currencies
	$ m	$ m	%	%
Net sales to third parties from continuing operations	**48,518**	**49,414**	**(2)**	**0**
Sales to discontinued operations		26	nm	nm
Net sales from continuing operations	**48,518**	**49,440**	**(2)**	**0**
Other revenues	918	947	(3)	(3)
Cost of goods sold	(17,520)	(17,404)	(1)	(2)
Gross profit from continuing operations	**31,916**	**32,983**	**(3)**	**(1)**
Marketing & Sales	(11,998)	(11,772)	(2)	(4)
Research & Development	(9,039)	(8,935)	(1)	(2)
General & Administration	(2,194)	(2,475)	11	8
Other income	1,927	2,049	(6)	(5)
Other expense	(2,344)	(2,873)	18	17
Operating income from continuing operations	**8,268**	**8,977**	**(8)**	**(3)**
Return on net sales (%)	17.0	18.2		
Income from associated companies	703	266	164	164
Interest expense	(707)	(655)	(8)	(10)
Other financial income and expense	(447)	(454)	2	58
Income before taxes from continuing operations	**7,817**	**8,134**	**(4)**	**2**
Taxes	(1,119)	(1,106)	(1)	(13)
Net income from continuing operations	**6,698**	**7,028**	**(5)**	**1**
Net income from discontinued operations		10,766	nm	nm
Net income	**6,698**	**17,794**	**(62)**	**(59)**
Attributable to:				
Shareholders of Novartis AG	*6,712*	*17,783*	*(62)*	*(59)*
Non-controlling interests	*(14)*	*11*	*nm*	*nm*
Basic earnings per share ($) from continuing operations	**2.82**	**2.92**	**(3)**	**2**
Basic earnings per share ($) from discontinued operations		4.48	nm	nm
Total basic earnings per share ($)	**2.82**	**7.40**	**(62)**	**(59)**
Free cash flow from continuing operations	**9,455**	**9,259**	**2**	
Free cash flow	**9,455**	**9,029**	**5**	

nm = not meaningful

Group overview

Novartis delivered solid results in 2016, countering much of the effects of the loss of US patent protection during the year for our pioneering leukemia drug, *Gleevec*. This underscores the strength of our pipeline and our ability in recent years to renew our product portfolio and control costs to manage through important patent expirations. *Gleevec* follows *Diovan*, which lost exclusivity in 2011 in the EU and in 2012 in the US.

Our Innovative Medicines and Sandoz Divisions performed well under challenging circumstances. We were not successful in returning Alcon to growth in 2016, although we have begun to see the first results from the growth plan implemented during the year.

Net sales for Novartis in 2016 were $48.5 billion, down 2% in reported terms, but flat measured in constant currencies (cc) to remove the impact of fluctuations in exchange rates. While volumes grew 6 percentage points,

that was offset by the negative impacts of 4 percentage points due to generic competition and 2 percentage points from lower prices.

We continued to face headwinds in 2016 from currency fluctuations, with the rising value of the dollar adversely affecting our reported sales and income. This continues a trend we have seen for several years, particularly in 2015 when currency fluctuations had a negative 10% impact on sales. To help investors assess the impact of exchange rates on our performance, we also indicate growth rates in constant currencies.

In 2016, our growth products[1] contributed $17.1 billion, or 35% of net sales. These include *Gilenya* for multiple sclerosis, up 14% (cc) to $3.1 billion; *Cosentyx* for psoriasis and two other immune-related illnesses, which reached blockbuster status with sales of $1.1 billion; *Jakavi* for blood cancer, up 45% to $581 million; and the combination cancer therapy *Tafinlar + Mekinist*, acquired from GSK during 2015 ($672 million).

Biopharmaceutical products from Sandoz also continued to be a bright spot, rising 31% (cc) to $1.0 billion.

Sales of heart failure drug *Entresto* grew steadily during the year and totaled $170 million. We continued to increase our investment in its launch, devoting additional resources during the year to educating doctors and patients about its benefits.

Operating income in 2016 was $8.3 billion (−8%, −3% cc), down mainly due to the effects of patent expirations and increased investments related to new product launches, including *Entresto* and *Cosentyx*, and the Alcon growth plan.

Net income from continuing operations was $6.7 billion, down 5% in reported terms, but up 1% in constant currencies, due to higher income from associated companies.

Basic earnings per share from continuing operations were $2.82 (−3%, +2% cc), up more than net income due to a reduction in the average number of shares outstanding.

Free cash flow from continuing operations was $9.5 billion, up 2%, reflecting lower net investment in property, plant and equipment.

For the total Group, net income amounted to $6.7 billion in 2016 compared to $17.8 billion in 2015. The prior year benefitted from the $10.8 billion net income from discontinued operations, which included $12.7 billion of exceptional pre-tax divestment gains and the operational results of the divested businesses until the respective dates of completion of the transactions. For more information on discontinued operations, see "—Factors Affecting Comparability of Year-on Year Results of Operations" below and "Note 30. Discontinued Operations" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Basic earnings per share decreased to $2.82 from $7.40 in the prior year.

Free cash flow for the total Group amounted to $9.5 billion in 2016 compared to $9.0 billion in 2015. The prior year included a negative free cash flow of approximately $0.3 billion from discontinued operations.

Productivity

Efforts to improve productivity are delivering results. Novartis Business Services (NBS), our shared services organization, continued to leverage the global scale of Novartis to streamline and consolidate our operations. For example, we reduced the number of information technology applications we use, consolidated facilities services from more than 100 suppliers to just three, and initiated the standardization of infrastructure services at selected manufacturing sites, among other steps. In addition, NBS continued to optimize its footprint through selective offshoring to five global service centers.

NBS, as well as our newly created Global Drug Development (GDD) organization and global Novartis Technical Operations (NTO) group, will continue to drive the pursuit of greater efficiency and effectiveness. We anticipate that the benefits of the new GDD and NTO organizations will yield more than $1 billion in annual cost savings by 2020.

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[1] "Growth products" are an indicator of the rejuvenation of the portfolio, and comprise products launched in a key market (EU, US, Japan) in 2011 or later, or products with exclusivity in key markets until at least 2020 (except Sandoz, which includes only products launched in the last 24 months). They include the acquisition effect of the GSK oncology assets.

Net Sales by Segment

The following table provides an overview of net sales to third parties by segment:

	Year ended Dec 31, 2016	Year ended Dec 31, 2015	Change in $	Change in constant currencies
	$ m	$ m	%	%
Innovative Medicines[1],[2]	**32,562**	**33,345**	**(2)**	**0**
Sandoz[2]	**10,144**	**10,070**	**1**	**2**
Alcon[2]	**5,812**	**5,999**	**(3)**	**(2)**
Net sales to third parties from continuing operations	**48,518**	**49,414**	**(2)**	**0**

(1) Formerly named the Pharmaceuticals Division

(2) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

Innovative Medicines

Innovative Medicines Division sales were $32.6 billion, down 2% in reported terms, but in line with the prior year in constant currencies (cc). A 7% increase in volume was offset by the impact of generic competition (−6 percentage points) and price declines (−1 percentage point).

Sales performance varied by geography. Sales in Europe were $11.2 billion, up 7% in constant currencies, and reached $8.1 billion in emerging growth markets, up 6% (cc). In the US, sales declined 8% (cc) to $10.9 billion, mainly due to generic competition for *Gleevec* following loss of patent protection there in February. And in Japan, sales declined 10% (cc), due to generic competition and divestments.

Growth products contributed $14.8 billion, up 24% in constant currencies. These products—which include *Gilenya*, *Cosentyx*, *Entresto*, *Tasigna*, *Jakavi*, and the combination of *Tafinlar* + *Mekinist*—represented 45% of net sales, compared to 37% in 2015.

Novartis Pharmaceuticals Business Unit

Ophthalmology

Sales in Ophthalmology were $5.5 billion (−8%, −6% cc), primarily reflecting declines in *Lucentis* (−11%, −8% cc), which continues to see increasing competitive pressure in Japan and some European countries.

Neuroscience

Neuroscience sales were $3.7 billion (+1%, +2% cc), with increases for *Gilenya* (+12%, +14% cc) being offset by lower sales of *Exelon* and *Exelon* Patch (−39%, −39% cc), due to generic competition for *Exelon* Patch in the US and EU.

Immunology and Dermatology

Sales in Immunology and Dermatology reached $3.0 billion (+41%, +44% cc). Sales of *Cosentyx* continued to accelerate, reaching $1.1 billion, versus $261 million in 2015. Gains for *Ilaris* (+20%, +22% cc) also helped offset declines in other products due to generic competition.

Respiratory

Respiratory sales were $1.5 billion (+11%, +15% cc). Our portfolio of drugs for chronic obstructive pulmonary disease (COPD)—including *Onbrez Breezhaler*/*Arcapta Neohaler*, *Seebri Breezhaler* and *Ultibro Breezhaler*—achieved sales of $655 million (+14%, +16% cc). Sales of *Xolair,* the first biologic drug approved for moderate-to-severe allergic asthma, reached $835 million (+11%, +15% cc), including as a treatment for chronic hives.

Cardio-Metabolic

Sales for the franchise were $1.4 billion (+19%, +20% cc). *Entresto*—which has been launched in more than 30 countries and benefited from a strong endorsement in updated clinical practice guidelines in the US and EU—continued to grow steadily and sales reached $170 million, up from $21 million in 2015. *Galvus* sales were $1.2 billion (+5%, +6% cc).

Established Medicines

Established medicines such as *Diovan* ($1.1 billion, −13% cc) and *Exforge* ($926 million, −8% cc) continued to see declines due to generic competition.

Novartis Oncology business unit

Oncology sales were $12.8 billion (−4%, −2% cc), nearly even with the prior year, despite declining sales of *Gleevec*/*Glivec* (−29%, −28% cc) due to generic competition in the US. That decline was largely offset by growth in other products. Products showing growth included the combination therapy *Tafinlar* + *Mekinist* ($672 million); *Votrient* ($729 million); *Promacta*/*Revolade* ($635 million); and *Jakavi*, up 45% (cc) to $581 million.

TOP 20 INNOVATIVE MEDICINES DIVISION[1] PRODUCT NET SALES—2016

Brands	Business Franchise	Indication	US $ m	US % change in constant currencies	Rest of world $ m	Rest of world % change in constant currencies	Total $ m	Total % change in $	Total % change in constant currencies
Gleevec*/*Glivec	Oncology	Chronic myeloid leukemia and GIST	1,214	(52)	2,109	1	**3,323**	**(29)**	**(28)**
Gilenya	Neuroscience	Relapsing multiple sclerosis	1,683	12	1,426	15	**3,109**	**12**	**14**
Lucentis	Ophthalmology	Age-related macular degeneration			1,835	(8)	**1,835**	**(11)**	**(8)**
Tasigna	Oncology	Chronic myeloid leukemia	722	9	1,017	10	**1,739**	**7**	**10**
Sandostatin	Oncology	Carcinoid tumors and Acromegaly	853	4	793	3	**1,646**	**1**	**3**
Afinitor*/*Votubia	Oncology	Breast cancer / TSC	775	(13)	741	6	**1,516**	**(6)**	**(5)**
Galvus	Cardio-Metabolic	Diabetes			1,193	6	**1,193**	**5**	**6**
Cosentyx	Immunology and Dermatology	Psoriasis, ankylosing spondylitis and psoriatic arthritis	765	nm	363	nm	**1,128**	**nm**	**nm**
Diovan*/*Co-Diovan	Established Medicines	Hypertension	147	(42)	926	(6)	**1,073**	**(16)**	**(13)**
Exjade*/*Jadenu	Oncology	Chronic iron overload	447	22	509	(6)	**956**	**4**	**6**
Exforge	Established Medicines	Hypertension	10	(85)	916	(3)	**926**	**(12)**	**(8)**
***Xolair*[2]**	Respiratory	Asthma			835	15	**835**	**11**	**15**
Votrient	Oncology	Renal cell carcinoma	357	nm	372	nm	**729**	**nm**	**nm**
Tafinlar*/*Mekinist	Oncology	Melanoma	298	nm	374	nm	**672**	**nm**	**nm**
Promacta*/*Revolade	Oncology	Immune thrombocytopenic purpura	310	nm	325	nm	**635**	**nm**	**nm**
Travoprost Group	Ophthalmology	Reduction of elevated intraocular pressure	211	6	408	(5)	**619**	**(2)**	**(1)**
Jakavi	Oncology	Myelofibrosis			581	45	**581**	**42**	**45**
Voltaren*/*Cataflam	Established Medicines	Inflammation/pain			525	1	**525**	**(6)**	**1**
Neoral*/*Sandimmun(e)	Immunology and Dermatology	Transplantation	41	(13)	474	(9)	**515**	**(10)**	**(9)**
***Exelon*/*Exelon* Patch**	Neuroscience	Alzheimer's disease	90	(74)	354	(8)	**444**	**(39)**	**(39)**
Top 20 products total			**7,923**	**(8)**	**16,076**	**7**	**23,999**	**0**	**2**
Rest of portfolio			2,974	(7)	5,589	(4)	**8,563**	**(8)**	**(5)**
Total Division sales			**10,897**	**(8)**	**21,665**	**4**	**32,562**	**(2)**	**0**

[1] Formerly named the Pharmaceuticals Division.

[2] Net sales reflect *Xolair* sales for all indications (e.g. including *Xolair* SAA and *Xolair* CSU, which is managed by the Immunology and Dermatology).

nm = not meaningful

Gleevec/*Glivec* ($3.3 billion, −28% cc) is a kinase inhibitor approved as a targeted therapy for Philadelphia chromosome-positive (Ph+) chronic myeloid leukemia (CML) and to treat patients with metastatic and/or unresectable KIT (CD117) positive (KIT+) gastrointestinal stromal tumors (GIST), as an adjuvant treatment for certain adult patients following resection of KIT+ GIST. First launched in 2001, *Gleevec*/*Glivec* is approved in more than 110 countries. *Gleevec*/*Glivec* is also approved in the US, EU and Japan to treat Ph+ acute lymphoblastic leukemia, a rapidly progressive form of leukemia. In addition, *Gleevec*/*Glivec* is approved in the US and EU to treat dermatofibrosarcoma protuberans, a rare solid tumor; hypereosinophilic syndrome; myelodysplastic/myeloproliferative diseases and other rare blood disorders. In the US, *Gleevec* is also approved for aggressive systemic mastocytosis. *Gleevec*/*Glivec* has received approvals in more than 80 countries as a post-surgery (adjuvant setting) therapy for certain adult patients with KIT+ GIST. Following approval by the

FDA in 2013, the EMA approved *Gleevec*/*Glivec* in July 2013 for pediatric patients with newly diagnosed Ph+ acute lymphoblastic leukemia in combination with chemotherapy.

Gilenya ($3.1 billion, +14% cc) is the first oral therapy approved to treat relapsing forms of multiple sclerosis (RMS) and the first in a new class of compounds called sphingosine 1-phosphate receptor modulators. In the US, *Gilenya* is indicated for relapsing forms of MS. In the EU, *Gilenya* is indicated for adult patients with high disease activity despite treatment with at least one disease modifying agent, or rapidly evolving severe relapsing-remitting MS. *Gilenya* impacts four key measures of disease activity: relapses, MRI lesions, brain shrinkage (brain volume loss) and disability progression. Its effectiveness on all of these measures has been consistently shown in multiple controlled clinical studies and in the real-world setting. As of November 2016, more than 180,000 patients have been treated in clinical trials and in a post-marketing setting, with more than 395,000 total patient-years of exposure. *Gilenya* is currently approved in more than 80 countries around the world. *Gilenya* is licensed from Mitsubishi Tanabe Pharma Corporation.

Lucentis ($1.8 billion, −8% cc) is a recombinant humanized high affinity antibody fragment that binds to vascular endothelial growth factor A (VEGF-A), a key mediator of intraocular neovascularization. Approved in 2006 as the first anti-VEGF for ocular use Lucentis revolutionized the therapy for patients with neovascular age related macular degeneration (nAMD). Today Lucentis is licensed for six ocular indications: nAMD, visual impairment due to diabetic macular edema (DME), visual impairment due to macular edema secondary to branch retinal vein occlusion (BRVO), visual impairment due to macular edema secondary to central retinal vein occlusion (CRVO), visual impairment due to choroidal neovascularization secondary to pathologic myopia (myopic CNV) and visual impairment due to choroidal neovascularization secondary to other pathologies. Approval of the sixth indication was received in Europe in November 2016, and submissions have been filed in 22 other countries, including Switzerland, Australia, Indonesia and Brazil. Lucentis is the only treatment available for a wide range of CNV conditions confirming it in diseases of the retina. The label of *Lucentis* was updated in September 2014 allowing flexible treatment (including a treat and extent regimen) already in the first year of therapy. In April 2016 the label of *Lucentis* was further updated to include the treatment of RVO patients with retinal ischemia. In November 2016, the EMA approved *Lucentis* to treat patients with visual impairment due to choroidal neovascularization (CNV) associated with causes other than neovascular age-related macular degeneration or myopic CNV. *Lucentis* is the only anti-VEGF treatment available in a pre-filled syringe and approved for a treat and extend regimen in the first year of therapy. Since its launch in 2007, there have been more than 4.3 million patient-treatment years of exposure for *Lucentis* and more than 26.8 million injections. Novartis licensed *Lucentis* from Genentech for development and commercialization outside of the US.

Tasigna ($1.7 billion, +10% cc) is a signal transduction inhibitor of the BCR-ABL tyrosine kinase. Since its launch in 2007, *Tasigna* has been approved in more than 125 countries to treat patients with Ph+ CML in the chronic and/or accelerated phase who are resistant or intolerant to existing treatment, including *Gleevec*/*Glivec*. It is also approved in more than 120 markets, including the US, EU member states, Switzerland and Japan, to treat newly diagnosed patients in the chronic phase.

Sandostatin ($1.6 billion, +3% cc) is a somatostatin analogue indicated for the treatment of patients with acromegaly, a chronic disease caused by over-secretion of pituitary growth hormone in adults. *Sandostatin* is also indicated for the treatment of patients with certain symptoms associated with carcinoid tumors and other types of gastrointestinal and pancreatic neuroendocrine tumors. Additionally, *Sandostatin LAR* is approved in more than 60 countries for treatment of patients with advanced neuroendocrine tumors of the midgut or unknown primary tumor location. *Sandostatin* was first launched in 1988 and is approved in more than 100 countries.

Afinitor/*Votubia* ($1.5 billion, −5% cc) is an oral inhibitor of the mTOR pathway. *Afinitor* is approved in more than 120 countries including the US, EU member states and Japan for patients with advanced renal cell carcinoma following vascular endothelial growth factor-targeted therapy (in the US, after failure of sunitinib or sorafenib). *Afinitor* is also approved in more than 110 countries, including the US, EU member states and Japan for the treatment of locally advanced, metastatic or unresectable progressive neuroendocrine tumors (NET) of pancreatic origin. *Afinitor* was approved in the US in February and the EU in June for the treatment of patients with progressive, well-differentiated, nonfunctional NET of gastrointestinal or lung origin that are unresectable, locally advanced or metastatic, and is approved for this indication in more than 40 countries worldwide. In addition, *Afinitor* is approved in more than 110 countries for hormone receptor-positive advanced breast cancer in combination with an aromatase inhibitor, after prior endocrine therapy. Everolimus, under the trade name *Afinitor* in the US and *Votubia* in the EU, is also approved in more than 95 countries to treat patients with

tuberous sclerosis complex (TSC) who have subependymal giant cell astrocytoma not requiring immediate surgery, and in more than 90 countries to treat patients with TSC who have renal angiomyolipoma not requiring immediate surgery. A dispersible tablet for oral suspension formulation is approved for patients with TSC who have SEGA in more than 40 countries including the US (under the trade name *Afinitor Disperz*), EU member states (under the trade name *Votubia*) and Japan (under the trade name *Afinitor*). Everolimus, the active ingredient in *Afinitor*, is also available under the trade names *Zortress*/*Certican* for use in transplantation in the US and EU, respectively, and is exclusively licensed to Abbott and sublicensed to Boston Scientific for use in drug-eluting stents.

Galvus Group ($1.2 billion, +6% cc), includes *Galvus*, an oral treatment for type 2 diabetes, and *Eucreas*, a single-pill combination of vildagliptin (the active ingredient in *Galvus*) and metformin. The products were first approved in 2007. *Galvus* is currently approved in more than 130 countries, including EU member states, Japan (as *Equa*) and countries in Latin America and Asia-Pacific. *Eucreas* was the first single-pill combination of a DPP-4 inhibitor and metformin approved in Europe, and also under the trade name *Galvus Met*, and is currently approved in more than 125 countries. In 2012, *Galvus* received EU approval for expanded use as a second-line monotherapy for type 2 diabetes patients who cannot take metformin. In 2012, the EC approved the use of *Galvus* and *Eucreas* in combination with other diabetes treatments. The first approval was for the use of vildagliptin in combination with insulin, with or without metformin, for patients with type 2 diabetes when diet, exercise and a stable dose of insulin do not result in glycemic control. The second approval was for the use of vildagliptin in triple combination with metformin and a sulphonylurea for the treatment of type 2 diabetes when diet and exercise plus dual therapy with these two agents do not provide adequate glycemic control. *Galvus* monotherapy indication was approved in China in April 2015. *Eucreas* was approved in Japan in September 2015 under the name *Equmet* as the first single-pill combination metformin/DPP-4 inhibitor approved in that country.

Cosentyx ($1.1 billion) is a fully human monoclonal antibody that selectively neutralizes circulating interleukin 17A (IL-17A). *Cosentyx* has been approved in over 75 markets, including the US and countries of the EU, for the treatment of moderate-to-severe plaque psoriasis. *Cosentyx* is also approved in the EU for the treatment of adults with ankylosing spondylitis who have responded inadequately to conventional therapy, such as non-steroidal anti-inflammatory drugs, and for the treatment of active psoriatic arthritis in adults when the response to disease modifying anti-rheumatic drug therapy is unsatisfactory. In January 2016, *Cosentyx* was approved in the US for the treatment of adults with active ankylosing spondylitis and for the treatment of adults with active psoriatic arthritis. *Cosentyx* is approved in more than 65 countries for the treatment of adults with ankylosing spondylitis and psoriatic arthritis, including the US, countries of the EU, Canada and Australia. *Cosentyx* is approved in Japan for the treatment of moderate-to-severe plaque psoriasis, pustular psoriasis, and both psoriasis vulgaris and psoriatic arthritis in adults who are not adequately responding to systemic therapies (except for biologics).

Diovan Group ($1.1 billion, −13% cc), consisting of *Diovan* monotherapy and the combination product *Co-Diovan*/*Diovan* HCT, is an angiotensin II receptor blocker (ARB). *Diovan* is the only agent in its class approved to treat all of the following: high blood pressure (including children 6 to 18 years), high-risk heart attack survivors and patients with heart failure. First launched in 1996, *Diovan* is available in more than 120 countries for treating high blood pressure, in more than 90 countries for heart failure, and in more than 70 countries for heart attack survivors. First launched in 1997, *Diovan HCT*/*Co-Diovan* is approved in more than 100 countries worldwide.

Exjade/*Jadenu* ($956 million, +6% cc), is an oral iron chelator approved for the treatment of chronic iron overload due to blood transfusions in patients two years of age and older, as well as chronic iron overload in patients with non-transfusion dependent thalassemia in patients 10 years of age and older. Patients with chronic anemia from diseases such as thalassemia, sickle cell disease and myelodysplastic syndromes require repeated transfusions, which puts them at risk of iron overload. *Exjade,* a dispersible tablet for oral suspension, was first approved in 2005 and is now approved in more than 100 countries, including the US, EU member states and Japan. An oral film-coated tablet formulation that can be swallowed or crushed is approved in the US and Canada under the tradename *Jadenu*. It was approved by EMA in 2016 under the tradename of *Exjade*. Regulatory applications have been submitted in Switzerland and other countries. In addition to the film-coated tablet formulation, a new formulation has also been developed as granules for patients who cannot swallow tablets, using the same composition as the film-coated tablet formulations. Regulatory applications for granules formulation have been submitted under the name *Jadenu* in the US and Japan and under the name *Exjade* in the EU.

Exforge Group ($926 million, −8% cc) includes two medicines approved for the treatment of hypertension: *Exforge*, a single-pill combination of the angiotensin receptor blocker (ARB) valsartan and the calcium channel blocker amlodipine besylate; and *Exforge* HCT, a single pill combining an ARB (valsartan), calcium channel blocker (amlodipine) and a diuretic (hydrochlorothiazide) three widely prescribed blood pressure treatments. First approved for the treatment of high blood pressure in Switzerland in 2006, and in the US and EU in 2007, *Exforge* is now available in more than 100 countries. *Exforge HCT* was approved in the EU and the US in 2009, and is now available in more than 75 countries.

Xolair ($835 million, +15% cc) is a recombinant, DNA-derived, humanized IgG1K monoclonal antibody. *Xolair* is designed to block IgE, which limits the release of mediators in the early and late phases of the allergic inflammatory cascade. *Xolair* is approved for the treatment of moderate-to-severe, or severe, persistent allergic asthma in more than 90 countries, including the US since 2003, the EU since 2005, and Japan since 2009. *Xolair* is provided as lyophilized powder for resolution, and in addition as liquid formulation in a pre-filled syringe in most European countries. *Xolair* is currently approved in the EU, Switzerland and more than 80 countries as a treatment for chronic spontaneous urticaria (CSU)/chronic idiopathic urticaria (CIU) including approvals in the EU as add-on therapy for the treatment of CSU in adult and adolescent (12 years and above) patients with inadequate response to H1 antihistamine treatment, and, in the US, for the treatment of adults and adolescents (12 years of age and above) with CIU who remain symptomatic despite H1 antihistamine treatment. We co-promote *Xolair* with Genentech in the US and share a portion of operating income, but we do not record any US sales. Novartis records all sales of *Xolair* outside the US.

Votrient ($729 million) is a small molecule tyrosine kinase inhibitor that targets a number of intracellular proteins to limit tumor growth and cell survival. *Votrient* is approved in the US for the treatment of patients with advanced renal cell carcinoma (aRCC), and in the EU for first-line treatment of adult patients with aRCC and for patients who have received prior cytokine therapy for advanced disease. RCC is the most common type of kidney cancer in adults, and nearly one-fifth of patients have aRCC at the time of diagnosis. *Votrient* is also indicated for the treatment of patients with advanced soft tissue sarcoma (STS) who have received prior chemotherapy (efficacy in adipocytic STS or gastrointestinal stromal tumors has not been demonstrated). STS is a type of cancer which can arise from a wide variety of soft tissues including muscle, fat, blood vessel and nerves. *Votrient* is approved in more than 100 countries worldwide for aRCC and in more than 90 countries for aSTS. *Votrient* was acquired from GSK.

Tafinlar + *Mekinist* ($672 million) is the first combination of its kind for the treatment of patients with BRAF V600 mutation positive unresectable or metastatic melanoma, as detected by a validated test, in the US, EU and several other markets. *Tafinlar* targets the serine/threonine kinase BRAF in the RAS/RAF/MEK/ERK pathway and *Mekinist* targets the threonine/tyrosine kinases MEK1 and MEK2 in the MAP kinase pathway, resulting in dual blockade of this pathway. This is the first combination of a BRAF and a MEK inhibitor to demonstrate an overall survival benefit over BRAF inhibitor monotherapy after three years in two Phase III studies in BRAF V600 mutation positive unresectable or metastatic melanoma patients. *Tafinlar* and *Mekinist* are each also approved as single agents for the treatment of patients with unresectable or metastatic melanoma in more than 60 and 40 countries worldwide, respectively. *Tafinlar* and *Mekinist* were each acquired from GSK. As part of our purchase of oncology products from GSK, we obtained the worldwide exclusive rights granted by Japan Tobacco Inc., to develop, manufacture, and commercialize trametinib.

Promacta/*Revolade* ($635 million) is a once-daily oral thrombopoietin receptor agonist that works by stimulating bone marrow cells to produce platelets. It is the only approved once-daily oral thrombopoietin receptor agonist, and is marketed under the brand name *Promacta* in the US and *Revolade* in most countries outside the US. It is approved in more than 100 countries for the treatment of thrombocytopenia in adult patients with chronic immune (idiopathic) thrombocytopenia (ITP) who have had an inadequate response or are intolerant to other treatments. In the US and EU, *Promacta*/*Revolade* is approved for patients one year and older with chronic ITP who have had an inadequate response to other treatments. *Promacta*/*Revolade* may be considered as second line treatment for adult non-splenectomised patients where surgery is contraindicated. *Promacta*/*Revolade* is also approved in 45 countries for the treatment of patients with severe aplastic anemia (SAA) who are refractory to other treatments (in the US for the treatment of patients with SAA who have had an insufficient response to immunosuppressive therapy and in the EU for the treatment of adults with acquired SAA who were either refractory to prior immunosuppressive therapy or heavily pretreated and are unsuitable for hematopoietic stem cell transplant). In addition, *Promacta*/*Revolade* is approved in more than 50 countries for the treatment of thrombocytopenia in patients with chronic hepatitis C to allow them to initiate and maintain

interferon-based therapy. *Promacta*/*Revolade* is marketed under a collaboration agreement between Ligand Pharmaceuticals, Inc., and Novartis. *Promacta*/*Revolade* was acquired from GSK.

Travoprost Group ($619 million, −1% cc), including *Travatan*, *Travatan Z*, and *Duotrav*, are indicated for the reduction of elevated intraocular pressure (IOP) in patients with open-angle glaucoma or who have ocular hypertension. Single agent travoprost products (*Travatan*, *Travatan Z*, *Travatan* BAK-Free and *Izba*) are prescribed as first-line agents and are marketed in more than 140 countries, including the US, countries of the EU, Canada and China. *Duotrav* is a fixed-dose combination solution of the prostaglandin analogue travoprost with the beta-blocker timolol, and is approved as a second-line treatment in adults for the reduction of IOP in patients with open-angle glaucoma or ocular hypertension who are insufficiently responsive to topical beta-blockers or prostaglandin analogues. *Duotrav* is currently marketed in more than 140 countries, including countries of the EU, Canada and China.

Jakavi ($581 million, +45% cc) is an oral inhibitor of the JAK1 and JAK2 tyrosine kinases. It is the first JAK inhibitor indicated for the treatment of disease-related splenomegaly or symptoms in adult patients with primary myelofibrosis, post-polycythemia vera myelofibrosis or post-essential thrombocythemia myelofibrosis and adult patients with polycythemia vera who are resistant to or intolerant of hydroxyurea. *Jakavi* is currently approved in more than 100 countries for patients with myelofibrosis and in more than 65 countries for patients with polycythemia vera, including EU member states and Japan. A five year follow-up of the two pivotal trials, COMFORT-I and COMFORT-II suggests an overall survival advantage for patients randomized to *Jakavi* compared to placebo or best available therapy, respectively. Novartis licensed ruxolitinib from Incyte Corporation for development and commercialization in the indications of oncology, hematology and Graft-versus-host disease outside the US. Ruxolitinib, marketed in the US as Jakafi® by Incyte Corporation, is approved by the FDA for the treatment of patients with polycythemia vera who have had an inadequate response to or are intolerant of hydroxyurea. Jakafi® is also approved by the FDA for treatment of patients with intermediate or high-risk myelofibrosis, including primary myelofibrosis, post-polycythemia vera myelofibrosis and post-essential thrombocythemia myelofibrosis.

Voltaren/*Cataflam* ($525 million, 1% cc) is a leading non-steroidal anti-inflammatory drug (NSAID) for the relief of symptoms in rheumatic diseases such as rheumatoid arthritis and osteoarthritis, and for various other inflammatory and pain conditions. *Voltaren*/*Cataflam* was first registered in 1973 and is available in more than 140 countries. This product is marketed by the Innovative Medicines Division in a wide variety of dosage forms including tablets, drops, suppositories, ampoules and topical therapy. Our Sandoz Division also markets generic versions of the product in various countries. In addition, we have licensed the *Voltaren* trademarks to our consumer healthcare joint venture with GSK to be used in the marketing of low dose oral forms and the topical forms of *Voltaren* as over-the-counter products.

Neoral/*Sandimmun* ($515 million, −9% cc) is an immunosuppressant to prevent organ rejection following a kidney, liver, or heart transplant. *Neoral* is also approved for use in lung transplant in many countries outside of the US. This micro-emulsion formulation of cyclosporine is also indicated for treating selected autoimmune disorders such as psoriasis and rheumatoid arthritis. First launched in 1995, *Neoral* is marketed in approximately 100 countries.

Exelon/*Exelon* Patch ($444 million, −39% cc) are cholinesterase inhibitors indicated for the treatment of Alzheimer's disease (AD) dementia and Parkinson's disease (PD) dementia. They are the oral and transdermal formulations, respectively, of the cholinesterase inhibitor rivastigmine. *Exelon* capsules have been available since 1997 to treat mild to moderate AD dementia and are approved in more than 85 countries. In 2006, *Exelon* became the only cholinesterase inhibitor to be approved for mild to moderate PD dementia in addition to AD in both the US and EU. *Exelon* Patch was approved in 2007 in the US and EU and has been approved for the treatment of mild-to-moderate AD in more than 85 countries, including more than 20 countries where it is also approved for Parkinson's disease dementia. The once-daily formulation *Exelon* Patch has shown comparable efficacy and superior tolerability to the highest recommended doses of *Exelon* capsules, with significant improvement in cognition and overall functioning compared to placebo. In 2013, the FDA expanded the approved indication for *Exelon* Patch to also include the treatment of patients with severe Alzheimer's disease. In 2013, European Marketing Authorization was obtained for the higher dose in mild-to-moderate AD. The higher dose has been approved in more than 50 countries. The severe indication has now been approved in more than 10 countries.

Sandoz

Sandoz net sales in 2016 were $10.1 billion (+1%, +2% in constant currencies, or cc), with strong performance particularly in biopharmaceuticals (+31% cc). An 8 percentage-point increase in volume more than offset the negative 6 percentage-point effect of price erosion. Sales rose in Central and Eastern Europe (+7% cc), Western Europe (+3% cc), the US (+1% cc), Latin America (+11% cc), and the Middle East and Africa (+6% cc). Sales in Asia Pacific were comparable to the prior year (cc).

	Year ended Dec 31, 2016	Year ended Dec 31, 2015[1]	Change in $	Constant currencies change
	$ m	$ m	%	%
Retail Generics	8,623	8,718	(1)	1
Biopharmaceuticals	1,002	772	30	31
Anti-Infectives (Partner label/API)	519	580	(11)	(10)
Total	**10,144**	**10,070**	**1**	**2**

(1) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

Retail Generics

Sandoz markets active ingredients, intermediates and finished dosage forms of pharmaceuticals. The Retail Generics franchise includes products in the therapeutic areas of dermatology, respiratory, oncology, transplantation and ophthalmics, plus finished dosage forms of anti-infectives sold under the Sandoz name. Franchise sales reached $8.6 billion (+1% cc).

Biopharmaceuticals

Sandoz markets protein- and other biotechnology-based products called biosimilars, as well as *Glatopa,* which treats a relapsing form of multiple sclerosis. Global sales of biopharmaceuticals grew 31% (cc) to $1.0 billion, benefiting from the US launches in 2015 of *Glatopa* and *Zarxio*, and the continued strong growth of other products already on the market.

Anti-Infectives

Sandoz sells pharmaceutical ingredients and intermediates (mainly antibiotics) under the Sandoz name and to third-party customers. Anti-infectives sold to third parties for sale under their own name were $519 million, down 10% (cc), because some low-margin products were discontinued and also due to a weak flu season in the first quarter of 2016. Total Anti-Infectives sales were $1.4 billion, down 2% (cc), and included sales of finished dosage forms sold under the Sandoz name of $860 million, up 4% (cc).

Alcon

Alcon implemented a growth plan in 2016 with emphasis on three areas: accelerating innovation and sales, strengthening customer relationships, and improving operations. Alcon launched new products during the year, including the *CyPass* Micro-Stent to treat glaucoma, the *NGENUITY* 3D Visualization System for retinal surgery, and a multifocal version of its innovative *Dailies Total1* contact lenses. Increased advertising and promotion for contact lenses helped return that segment to growth after several weak quarters.

Alcon net sales in 2016 were $5.8 billion (−3%, −2% in constant currencies, or cc).

	Year ended Dec 31, 2016	Year ended Dec 31, 2015[1]	Change in $	Constant currencies change
	$ m	$ m	%	%
Surgical				
Cataract products	2,695	2,853	(6)	(3)
of which IOLs	*986*	*1,099*	*(10)*	*(7)*
Vitreoretinal products	616	594	4	4
Refractive/other	207	251	(18)	(16)
Total	**3,518**	**3,698**	**(5)**	**(3)**
Vision Care				
Contact lenses	1,762	1,743	1	2
Contact lens care	532	558	(5)	(5)
Total	**2,294**	**2,301**	**0**	**0**
Total net sales	**5,812**	**5,999**	**(3)**	**(2)**

(1) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

Surgical

Surgical sales declined 3% (cc) to $3.5 billion, mainly due to weaker performance of intraocular lenses, which faced competitive pressures, and slowing equipment sales (primarily *LenSx* for cataract surgery and *Wavelight* for refractive surgery, which have reached high penetration in their market segments). Those factors were partially offset by continued solid growth in sales of cataract disposable surgical supplies (4% cc). The Surgical business is making progress, improving service and supply levels in 2016 and laying the foundation for a return to growth.

Vision Care

Vision Care sales were flat in constant currencies at $2.3 billion. Growth in contact lenses offset a decline in contact lens care products. Increased advertising and promotion behind key brands helped return the contact lens segment to growth after several weak quarters. *Dailies Total1*, the first and only water-gradient lens, was the key driver.

Operating Income from continuing operations

The following table provides an overview of operating income by segment:

	Year ended Dec 31, 2016	% of net sales	Year ended Dec 31, 2015	% of net sales	Change in $	Change in constant currencies
	$ m		$ m		%	%
Innovative Medicines[1],[2]	**7,426**	**22.8**	**7,815**	**23.4**	**(5)**	**0**
Sandoz[2]	**1,445**	**14.2**	**1,300**	**12.9**	**11**	**14**
Alcon[2]	**(132)**	**(2.3)**	**281**	**4.7**	**nm**	**nm**
Corporate	(471)		(419)		(12)	(25)
Operating income from continuing operations	**8,268**	**17.0**	**8,977**	**18.2**	**(8)**	**(3)**

nm = not meaningful

(1) Formerly named the Pharmaceuticals Division

(2) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

Operating income was $8.3 billion (−8%, −3% cc), a decrease from $9.0 billion in 2015 mainly due to the loss of exclusivity on *Gleevec*, as investments related to new product launches and the Alcon growth plan were partially offset by resource allocation and productivity programs. The negative currency impact of 5% was due to the strong US dollar on average versus the British pound and major emerging market currencies, partially offset by the strengthening of the Japanese yen. Operating income margin in constant currencies decreased 0.7 percentage points; currency had a negative impact of 0.5 percentage points resulting in a decrease of 1.2 percentage points to 17.0% of net sales.

Core Operating Income key figures[1]

	Year ended Dec 31, 2016	Year ended Dec 31, 2015	Change in $	Change in constant currencies
	$ m	$ m	%	%
Core gross profit from continuing operations	**35,806**	**36,900**	**(3)**	**(1)**
Marketing & Sales	(11,991)	(11,729)	(2)	(4)
Research & Development	(8,402)	(8,738)	4	3
General & Administration	(2,120)	(2,389)	11	8
Other income	753	823	(9)	(7)
Other expense	(1,059)	(1,077)	2	(1)
Core operating income from continuing operations	**12,987**	**13,790**	**(6)**	**(2)**
As % of net sales	*26.8*	*27.9*		

(1) An explanation of non-IFRS measures and reconciliation tables see "Non-IFRS Measures as Defined by Novartis".

The adjustments made to operating income to arrive at core operating income from continuing operations amounted to $4.7 billion (2015: $4.8 billion) broadly in line with the prior year.

Excluding these items, core operating income from continuing operations decreased 6% (−2% cc) to $13.0 billion. Core operating income margin in constant currencies decreased 0.7 percentage points mainly due to the loss of exclusivity on *Gleevec*, as investments related to new product launches and the Alcon growth plan were partially offset by resource allocation and productivity programs. Currency had a negative impact of 0.4 percentage points, resulting in a margin of 26.8% of net sales, compared to 27.9% in 2015.

The following table provides an overview of core operating income by segment:

	Year ended Dec 31, 2016	% of net sales	Year ended Dec 31, 2015	% of net sales	Change in $	Change in constant currencies
	$ m		$ m		%	%
Innovative Medicines[1,2]	**10,354**	**31.8**	**10,862**	**32.6**	**(5)**	**(1)**
Sandoz[2]	**2,071**	**20.4**	**2,045**	**20.3**	**1**	**4**
Alcon[2]	**850**	**14.6**	**1,235**	**20.6**	**(31)**	**(27)**
Corporate	(288)		(352)		18	4
Core operating income from continuing operations	**12,987**	**26.8**	**13,790**	**27.9**	**(6)**	**(2)**

(1) Formerly named the Pharmaceuticals Division

(2) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

Innovative Medicines

Operating income was $7.4 billion (−5%, 0% cc).

Core operating income, which excludes certain items, was $10.4 billion (−5%, −1% cc). Core operating income margin decreased 0.2 percentage points, mainly due to launch investments for *Entresto* and *Cosentyx*, but partially offset by productivity improvements. Fluctuations in exchange rates had a further negative impact of 0.6 percentage points, resulting in a net decrease of 0.8 percentage points to 31.8% of net sales.

Research and development of Innovative Medicines Division

The following table provides an overview of the reported and core research and development expense of the Innovative Medicines Division:

	Year ended Dec 31, 2016	Year ended Dec 31, 2015[1]	Change in $	Change in constant currencies
	$ m	$ m	%	%
Research and Exploratory Development	(2,645)	(2,739)	3	2
Confirmatory Development	(5,064)	(4,946)	(2)	(4)
Total Innovative Medicines Division Research and Development expense	**(7,709)**	**(7,685)**	**0**	**(2)**
As % of Innovative Medicines net sales to third parties	*23.7*	*23.0*		
Core Research and Exploratory Development[2]	(2,543)	(2,663)	5	3
Core Confirmatory Development[2]	(4,569)	(4,839)	6	4
Total Core Innovative Medicines Division Research and Development expense	**(7,112)**	**(7,502)**	**5**	**4**
As % of Innovative Medicines net sales to third parties	*21.8*	*22.5*		

[1] Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

[2] Core excludes impairments, amortization and certain other items.

Innovative Medicines Division Research and Exploratory Development expense amounted to $2.6 billion in 2016, a decrease of 3% (+2% cc) compared to 2015 as a result of continued productivity efforts. Confirmatory Development expense increased by 2% (−4% cc) to $5.1 billion compared to $4.9 billion in 2015, mainly driven by the impairment of intangible assets.

Core Research and Exploratory Development expense in the Innovative Medicines Division as percent of sales decreased by 0.8 percentage points in constant currencies as a result of continued productivity efforts and synergies from acquired Oncology assets. This decrease was partially offset by negative currency movements of 0.1 percentage points, resulting in a net decrease of 0.7 percentage points to 21.8% of net sales.

Sandoz

Operating income reached $1.4 billion, up 11% (+14% cc).

Core operating income, which excludes certain exceptional items, was $2.1 billion (+1%, +4% cc). Core operating income margin in constant currencies increased 0.2 percentage points. However, that gain was partly offset by the negative 0.1 percentage-point impact of exchange rates, yielding a result of 20.4% of net sales.

Sandoz continued to build its portfolio of biopharmaceuticals, which now represents a $1 billion-plus business, with roughly half of that coming from the US. In 2016, our biosimilar Erelzi (etanercept-szzs) was approved in the US to treat the same inflammatory diseases as the reference product, Amgen's Enbrel®, with its launch pending litigation. In addition, our biosimilar *Binocrit* (epoetin alfa) was approved in the EU for a new route of administration. We are currently evaluating options for an epoetin alfa filing in the US. Filings were accepted in the EU for our pegfilgrastim and rituximab biosimilars.

Alcon

Operating loss was $132 million, compared to an income of $281 million the year before.

Core operating income, which excludes certain items, was $850 million (−31%, −27% cc), mainly due to increased investment in research and development, as well as higher spending on sales and marketing—both activities that were part of the Alcon growth plan. Core operating income margin in constant currencies decreased by 5.3 percentage points, and exchange rates added another 0.7 percentage points of negative impact, yielding a net decrease of 6 percentage points to 14.6% of net sales.

Corporate Income and Expense, Net

Corporate income and expense, which includes the cost of Group management and central services, amounted to a net expense of $471 million (−12%, −25% cc) in 2016 compared to a net expense of $419 million in the prior year. The increase was mainly due to lower royalty and other income as well as costs related to the execution of the initiatives announced on January 27, 2016, to further focus the divisions, centralize manufacturing and integrate drug development functions. These factors more than offset the reduction in General & Administration expenses in 2016.

Non-Operating Income and Expense

The following table provides an overview of non-operating income and expense:

	Year ended Dec 31, 2016	Year ended Dec 31, 2015	Change in $	Change in constant currencies
	$ m	$ m	%	%
Operating income from continuing operations	**8,268**	**8,977**	**(8)**	**(3)**
Income from associated companies	703	266	164	164
Interest expense	(707)	(655)	(8)	(10)
Other financial income and expense	(447)	(454)	2	58
Income before taxes from continuing operations	**7,817**	**8,134**	**(4)**	**2**
Taxes	(1,119)	(1,106)	(1)	(13)
Net income from continuing operations	**6,698**	**7,028**	**(5)**	**1**
Net income from discontinued operations		10,766	nm	nm
Net income	**6,698**	**17,794**	**(62)**	**(59)**
Basic EPS ($) from continuing operations	**2.82**	**2.92**	**(3)**	**2**
Basic EPS ($) from discontinued operations		4.48	nm	nm
Total basic EPS ($)	**2.82**	**7.40**	**(62)**	**(59)**

nm = not meaningful

Income from associated companies

Income from associated companies increased to $703 million, compared to $266 million in the prior year.

The increase was mainly due to income recognized from our investment in GSK Consumer Healthcare Holdings Ltd. of $234 million compared to a loss of $79 million recognized in the prior year, in which the income from operations was more than offset by integration charges and an additional expense from the final purchase price allocation for the investment in GSK. The 2016 income contribution from GSK Consumer Healthcare Holdings Ltd. includes a negative adjustment recorded in the second quarter upon the issuance of 2015 actual results.

In addition, in 2016, we recognized an income of $464 million from our investment in Roche, which reflected our estimated share of income for 2016 of $532 million partly offset by the adjustment for 2015 actual results. The higher contribution from Roche in 2016 was mainly due to a smaller adjustment recognized upon publication of

2015 actual results by Roche compared to the adjustment recorded in the prior year upon publication of the 2014 actual results.

Interest Expense and other financial income and expense

Interest expense from continuing operations increased to $707 million from $655 million in the prior year due to higher outstanding debt.

Other financial income and expense amounted to an expense of $447 million compared to $454 million in the prior-year, mainly on account of an exceptional charge of $305 million (2015: $410 million) related to Venezuela due to foreign exchange losses on intra-group payables as well as higher currency losses recognized in 2016.

Taxes

The tax rate from continuing operations increased to 14.3% from 13.6% in the prior year, mainly as a result of a change in profit mix to jurisdictions with higher tax rates.

Net Income

Net income from continuing operations was $6.7 billion (—5%, +1% cc) with the increase of 1% in constant currencies compared to the decline in operating income due to higher income from associated companies, mainly from the investment in GSK Consumer Healthcare Holdings Ltd. The current year includes $0.3 billion (2015: $0.4 billion) exceptional charges related to Venezuela. For more information see "—Effects of Currency Fluctuations".

EPS

Basic earnings per share from continuing operations was $2.82 per share (−3%, +2% cc), up more than net income due to a reduction in the average number of shares outstanding.

The following table provides an overview of core non-operating income and expense:

Core Non-Operating Income and Expense

	Year ended Dec 31, 2016	Year ended Dec 31, 2015	Change in $	Change in constant currencies
	$ m	$ m	%	%
Core operating income from continuing operations	**12,987**	**13,790**	**(6)**	**(2)**
Income from associated companies	1,134	981	16	16
Interest expense	(707)	(655)	(8)	(10)
Other financial income and expense	(99)	(24)	nm	nm
Core income before taxes from continuing operations	**13,315**	**14,092**	**(6)**	**(2)**
Taxes	(2,001)	(2,051)	2	(2)
Core net income from continuing operations	**11,314**	**12,041**	**(6)**	**(3)**
Core net loss from discontinued operations		(256)	nm	nm
Core net income	**11,314**	**11,785**	**(4)**	**(1)**
Core basic EPS ($) from continuing operations	**4.75**	**5.01**	**(5)**	**(2)**
Core basic EPS ($) from discontinued operations		(0.11)	nm	nm
Core basic EPS ($)	**4.75**	**4.90**	**(3)**	**0**

nm = not meaningful

Core Income from associated companies

Core income from associated companies increased to $1.1 billion from $981 million in the prior-year period. The increase was due to a higher contribution from GSK Consumer Healthcare Holdings Ltd., which accounted for $369 million in 2016 compared to $213 million in prior-year period.

Core Interest Expense and other financial income and expense

Core other financial income and expense, which excludes the exceptional charges of $0.3 billion (2015: $0.4 billion) related to Venezuela amounted to a net expense of $99 million, compared to $24 million in 2015.

Core Taxes

The core tax rate from continuing operations (core tax as a percentage of core pre-tax income) increased to 15.0% from 14.6% in the prior year. This increase is mainly a result of a change in core profit mix to jurisdictions with higher tax rates.

Core Net Income

Core net income from continuing operations was $11.3 billion (−6%, −3% cc) and decreased 3% in constant currencies, broadly in line with core operating income.

Core EPS

Core basic EPS from continuing operations was $4.75 (−5%, −2% cc), down less than core net income due to a reduction in the number of shares outstanding.

Discontinued Operations

	Year ended Dec 31, 2015
	$ m
Net sales to third parties from discontinued operations	**601**
Operating income from discontinued operations	**12,477**
Net income from discontinued operations	**10,766**
Attributable to:	
Shareholders of Novartis AG	*10,758*
Non-controlling interests	*8*
Basic earnings per share ($) from discontinued operations	**4.48**
Free cash flow from discontinued operations	**(230)**

As all transactions of the portfolio transformation were completed during 2015, there are no results from discontinued operations reported in the 2016 consolidated income statement. In 2015, results for discontinued operations include the operational results from the Vaccines influenza business, prior to its divestment to CSL Limited on July 31, 2015, as well as results from the Vaccines non-influenza business and OTC until March 2, 2015. Operational results from the Animal Health business, which was divested on January 1, 2015 include only the divestment gain.

Discontinued operations in 2015 also include the exceptional pre-tax gains of $12.7 billion from the divestment of Animal Health ($4.6 billion), and the transactions with GSK ($2.8 billion for the Vaccines non-influenza business and $5.9 billion arising from the contribution of Novartis OTC into the GSK Consumer Healthcare joint venture). In addition, the GSK transactions resulted in $0.6 billion of additional transaction-related costs that were expensed.

Net income from discontinued operations in the prior year amounted to $10.8 billion. For more information on discontinued operations please see "Factors Affecting Comparability of Year-on Year Results of Operations" below and "Note 30. Discontinued Operations" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Total Group

For the total Group, net income amounted to $6.7 billion compared to $17.8 billion in 2015. The decrease was mainly due to the exceptional divestment gains included in the net income from the discontinued operations of the prior year.

Basic earnings per share decreased to $2.82 from $7.40 in the prior year.

2015 Compared to 2014

Group overview

On January 27, 2016, Novartis announced plans to further focus our divisions, integrating businesses that share therapeutic areas to better leverage our development and marketing capabilities. These plans included the transfer of the Ophthalmic Pharmaceuticals franchise from the Alcon Division to the Innovative Medicines Division (formerly named the Pharmaceuticals Division), and the transfer of selected mature products from the Innovative Medicines Division to the Sandoz Division. Operationally, these transfers were completed as of April 1, 2016. The centralization of manufacturing and the integration of some drug development functions, also announced on January 27, 2016, were operationally completed as of July 1, 2016.

In compliance with International Financial Reporting Standards (IFRS), Novartis updated its 2015 and 2014 segment financials to reflect these transfers, to aid comparability of year-on year results. As a result, all comparisons of divisional results from 2015 to 2014 reflect the new divisional structure.

In 2015, Novartis completed a series of portfolio transformation transactions, including the acquisition of oncology assets from GlaxoSmithKline plc (GSK) and a 36.5% interest in GSK Consumer Healthcare Holdings Ltd., and the divestment of its Vaccines and Animal Health businesses. To reflect these transactions, Novartis reported the Group's financial results in for all years presented as "continuing operations" and "discontinued operations." In addition, on January 9, 2014, Novartis completed the divestment to Grifols S.A. of our former blood transfusion diagnostics unit, which had been included in our former Vaccines and Diagnostics Division. The divestment gain and results of this divested business were also accounted for as discontinued operations and not included in our results from continuing operations. All comparisons from 2015 to 2014 are versus continuing operations, unless otherwise noted. See "—Factors Affecting Comparability Of Year-On-Year Results Of Operations".

Key figures

	Year ended Dec 31, 2015	Year ended Dec 31, 2014	Change in $	Change in constant currencies
	$ m	$ m	%	%
Net sales to third parties from continuing operations	**49,414**	**52,180**	**(5)**	**5**
Sales to discontinued operations	26	239	(89)	(88)
Net sales from continuing operations	**49,440**	**52,419**	**(6)**	**4**
Other revenues	947	1,215	(22)	(22)
Cost of goods sold	(17,404)	(17,345)	0	(8)
Gross profit from continuing operations	**32,983**	**36,289**	**(9)**	**2**
Marketing & Sales	(11,772)	(12,377)	5	(5)
Research & Development	(8,935)	(9,086)	2	(3)
General & Administration	(2,475)	(2,616)	5	(1)
Other income	2,049	1,391	47	55
Other expense	(2,873)	(2,512)	(14)	(24)
Operating income from continuing operations	**8,977**	**11,089**	**(19)**	**(2)**
Return on net sales (%)	18.2	21.3		
Income from associated companies	266	1,918	(86)	(86)
Interest expense	(655)	(704)	7	2
Other financial income and expense	(454)	(31)	nm	nm
Income before taxes from continuing operations	**8,134**	**12,272**	**(34)**	**(17)**
Taxes	(1,106)	(1,545)	28	10
Net income from continuing operations	**7,028**	**10,727**	**(34)**	**(18)**
Net income from discontinued operations	10,766	(447)	nm	nm
Net income	**17,794**	**10,280**	**73**	**91**
Attributable to:				
Shareholders of Novartis AG	*17,783*	*10,210*	*74*	*92*
Non-controlling interests	*11*	*70*	*(84)*	*(84)*
Basic earnings per share ($) from continuing operations	**2.92**	**4.39**	**(33)**	**(17)**
Basic earnings per share ($) from discontinued operations	4.48	(0.18)	nm	nm
Total basic earnings per share ($)	**7.40**	**4.21**	**76**	**94**
Free cash flow from continuing operations	**9,259**	**10,934**	**(15)**	
Free cash flow	**9,029**	**10,762**	**(16)**	

nm = not meaningful

Novartis delivered solid financial performance in 2015, driven by our continued success with growth products and expansion in emerging growth markets, which helped offset the effects of generic competition of approximately $2.2 billion. As a result, we achieved net sales to third parties from continuing operations of $49.4 billion (−5%, +5% cc). Growth in constant currencies has been more than offset by negative currency impacts driven by the strengthening of the US dollar versus the euro, Japanese yen and major emerging market currencies.

Operating income decreased by 2% in constant currencies to $9.0 billion (−19%, −2% cc), mainly due to the amortization of the new oncology assets in Innovative Medicines. In addition, an exceptional expense of $400 million for a settlement of the specialty pharmacies case in the Southern District of New York was recorded in 2015, whereas the prior-year benefitted from a one-time commercial settlement gain of $302 million and $248 million gain from selling a Novartis Venture Fund investment. Operating income margin was 18.2 percent of net sales.

Net income from continuing operations was $7.0 billion, declining more than operating income (−34%, −18% cc) mainly due to higher financial expense driven by $0.4 billion exceptional charges related to Venezuela and lower income from associated companies, which included in the prior year a gain of $0.8 billion from the sale of the shares of Idenix Pharmaceuticals, Inc., US (Idenix) to Merck & Co., US, and a gain of $0.4 billion from the divestment of the shareholding in LTS Lohmann Therapie-Systeme AG, Germany (LTS).

Basic earnings per share from continuing operations decreased 33% (−17% cc) to $2.92, declining less than net income from continuing operations due to the lower number of average outstanding shares.

Free Cash Flow from continuing operations decreased 15% to $9.3 billion, primarily due to negative currency impact on operations.

Net income from discontinued operations amounted to $10.8 billion in 2015, which included $12.7 billion of pre-tax divestment gains and the operational results of the divested businesses until the respective dates of completion of the transactions, compared to a net loss of $447 million in 2014. For more information on discontinued operations see "—Factors Affecting Comparability of Year-On-Year Results of Operations", below and "Note 30. Discontinued Operations" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

For the total Group, net income amounted to $17.8 billion in 2015 compared to $10.3 billion in 2014, impacted by the exceptional divestment gains included in net income from the discontinued operations. Basic earnings per share increased to $7.40 from $4.21 in the prior year and free cash flow for the total Group amounted to $9.0 billion.

Growth

Across our divisions, our portfolio of growth products continued to support performance in 2015. Sales of growth products increased 17% to $16.6 billion, or 34% of net sales, demonstrating our ability to renew our product portfolio and helping offset the impact of patent expirations. In our Innovative Medicines Division, sales of growth products increased 31% (cc) and accounted for 43% of net sales, up from 35% in 2014.

Innovative Medicines growth products in 2015 included *Gilenya* ($2.8 billion, +21% cc), our oral therapy for multiple sclerosis; *Tasigna* ($1.6 billion, +16% cc), a treatment for chronic myeloid leukemia; and *Afinitor* ($1.6 billion, +10% cc), a treatment for several types of cancer.

In the Sandoz Division, sales of biopharmaceuticals, including biosimilar follow-on versions of complex biologic drugs, rose 39% (cc) to $772 million globally.

Although overall Alcon performance lagged in 2015, some products continued to do well. Alcon saw continued growth in sales of its innovative *Dailies Total1* contact lenses and of disposable cataract and vitreoretinal surgical supplies.

Efforts to expand in emerging growth markets[2] such as those in Asia, Africa and Latin America continued to deliver results, although growth moderated as overall economic activity slowed in China, Brazil, India and elsewhere. Net sales in emerging markets rose 7% (cc) to $12.4 billion, led by Turkey, up 14% (cc), and Brazil, up 12% (cc).

Productivity

Last year Novartis continued to find synergies across divisions in our ongoing effort to improve productivity. Total productivity gains reached $3.2 billion in 2015, 6% of net sales. Novartis Business Services (NBS), the cross-divisional services organization that ramped up last year, played a key role in achieving this result. NBS continues to scale up the offshoring of services to global service centers, while outsourcing selected services to third parties.

The biggest savings came from our procurement efforts, through which we saved more than $1.7 billion on goods and services, or about 8% of the spending managed by Novartis procurement organizations.

An ongoing effort begun in 2010 to optimize our global manufacturing network continues to yield results. In 2015, we announced plans to exit Sandoz manufacturing sites in Frankfurt and Gerlingen, Germany, as well as in Turbhe, India. We also closed a Innovative Medicines Division facility in Resende, Brazil, divested an Alcon site in Kaysersberg, France, as well as a pharmaceutical site in Taboão da Serra, Brazil, and announced the downsizing of a Innovative Medicines Division site in Ringaskiddy, Ireland. To date, 25 sites in our continuing operations have been or are being restructured or divested. These steps help us balance production capacity and further increase efficiency.

[2] Growth products are products launched in 2010 or later, or products with exclusively until at least 2019 in key markets (EU, US, Japan), except Sandoz (launched in the last 24 months). Emerging growth markets are all markets except the US, Canada, Western Europe, Japan, Australia and New Zealand.

Net Sales by Segment

The following table provides an overview of net sales to third parties by segment:

	Year ended Dec 31, 2015	Year ended Dec 31, 2014	Change in $	Change in constant currencies
	$ m	$ m	%	%
Innovative Medicines[1],[2]	33,345	34,828	(4)	6
Sandoz[2]	10,070	10,736	(6)	5
Alcon[2]	5,999	6,616	(9)	(1)
Net sales to third parties from continuing operations	**49,414**	**52,180**	**(5)**	**5**

(1) Formerly named the Pharmaceuticals Division

(2) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

Innovative Medicines

Innovative Medicines delivered net sales of $33.3 billion (−4%, +6% in constant currencies, or cc) as increased volumes, including from the oncology portfolio acquired from GlaxoSmithKline (GSK) in 2015, countered the impact of greater generic competition, which reduced sales by 6 percentage points.

Growth products generated $14.4 billion of division net sales, growing 31% (cc) compared to last year. These products—which include *Gilenya*, *Tasigna*, *Ultibro*, the combination of *Tafinlar* + *Mekinist*, *Jakavi, Revolade* and *Cosentyx*—contributed 43% of division net sales, compared to 35% in 2014.

Sales in emerging growth markets increased 8% (cc) to $8.4 billion.

Highlights in 2015 included regulatory approval in the US and EU for *Entresto* (formerly LCZ696) for chronic heart failure; *Farydak* for multiple myeloma; and *Tafinlar* + *Mekinist*, the first combination therapy for metastatic melanoma. *Cosentyx,* which was successfully launched in the US and EU in 2015 to treat psoriasis, also received approval in Europe to treat psoriatic arthritis and ankylosing spondylitis.

Oncology

Oncology sales rose 14% (+23% cc) to $13.3 billion, boosted by the newly acquired portfolio from GSK and continued growth in our existing products. By brand, growth drivers included *Afinitor*, up 10% (cc) to $1.6 billion; *Tasigna*, up 16% (cc) to $1.6 billion; and *Jakavi*, up 71% (cc) to $410 million.

Ophthalmology

Sales in Ophthalmology were $5.9 billion (−12%, −2% cc), driven mainly by lower sales of *Lucentis*, which faced increased competitive pressure in Japan and some European markets.

Neuroscience

Neuroscience sales were $3.6 billion (−2%, +6% cc), with *Gilenya* rising 12% (+21% cc) to $2.8 billion and more than offsetting declines in *Exelon*/*Exelon* Patch due to generic competition.

Immunology and Dermatology

Sales in Immunology and Dermatology were $2.1 billion (0%, +11% cc). *Cosentyx* made a strong start after launching in February, reaching sales of $261 million. Additionally, *Zortress*/*Certican* rose 2% (+17% cc) to $335 million, and *Ilaris* increased 19% (+30% cc), helping offset declines in other products primarily stemming from generic competition.

Respiratory

Respiratory sales were $1.4 billion (+5%, +23% cc). We had sales of $576 million (+19%, +40% cc) for our portfolio of drugs for chronic obstructive pulmonary disease (COPD), including *Onbrez Breezhaler*/*Arcapta Neohaler*, *Seebri Breezhaler* and *Ultibro Breezhaler.* Sales of *Xolair* reached $755 million (−3%, +14% cc), including as a treatment for chronic hives.

Cardio-Metabolic

Cardio-Metabolic sales were $1.2 billion (−6%, +9% cc). *Entresto* was launched in the US in the third quarter and full-year sales reached $21 million. *Galvus* sales were $1.1 billion (−7%, +8% cc).

Established Medicines

Established Medicines sales were $5.8 billion (−28%, −19% cc). Established medicines such as *Diovan* ($1.3 billion, −40% cc) and *Exforge* ($1.0 billion, −15% cc) continued to see declines as a result of generic competition.

TOP 20 INNOVATIVE MEDICINES[1] PRODUCT NET SALES—2015

			US		Rest of world		Total		
Brands	**Business Franchise**	**Indication**	**$ m**	**% change in constant currencies**	**$ m**	**% change in constant currencies**	**$ m**	**% change in $**	**% change in constant currencies**
Gleevec*/*Glivec	Oncology	Chronic myeloid leukemia and GIST	2,533	17	2,125	(5)	**4,658**	**(2)**	**5**
Gilenya	Neuroscience	Relapsing multiple sclerosis	1,497	26	1,279	17	**2,776**	**12**	**21**
Lucentis	Ophthalmology	Age-related macular degeneration			2,060	(2)	**2,060**	**(16)**	**(2)**
Tasigna	Oncology	Chronic myeloid leukemia	661	22	971	12	**1,632**	**7**	**16**
Sandostatin	Oncology	Carcinoid tumors and Acromegaly	823	10	807	5	**1,630**	**(1)**	**7**
Afinitor*/*Votubia	Oncology	Breast cancer / TSC	892	11	715	9	**1,607**	**2**	**10**
Diovan*/*Co-Diovan	Established Medicines	Hypertension	254	(74)	1,030	(17)	**1,284**	**(45)**	**(40)**
Galvus	Cardio-Metabolic	Diabetes			1,140	8	**1,140**	**(7)**	**8**
Exforge	Established Medicines	Hypertension	67	(76)	980	1	**1,047**	**(25)**	**(15)**
Exjade	Oncology	Chronic iron overload	365	19	552	3	**917**	**(1)**	**8**
***Xolair*[2]**	Respiratory	Asthma			755	14	**755**	**(3)**	**14**
***Exelon*/*Exelon* Patch**	Neuroscience	Alzheimer's disease	340	(30)	388	(13)	**728**	**(28)**	**(21)**
Travoprost Group	Ophthalmology	Reduction of elevated intraocular pressure	199	(8)	432	(2)	**631**	**(14)**	**(4)**
Neoral*/*Sandimmun(e)	Immunology and Dermatology	Transplantation	47	(15)	523	(5)	**570**	**(17)**	**(6)**
Votrient	Oncology	Renal cell carcinoma	287	nm	278	nm	**565**	**nm**	**nm**
Voltaren (excl. other divisions)	Established Medicines	Inflammation/pain			558	0	**558**	**(12)**	**0**
Topical Olopatadine Group	Ophthalmology	Allergic Conjunctivitis	317	(10)	140	(2)	**457**	**(11)**	**(8)**
Tafinlar*/*Mekinist	Oncology	Melanoma	267	nm	186	nm	**453**	**nm**	**nm**
Myfortic	Immunology and Dermatology	Transplantation	109	(27)	332	0	**441**	**(19)**	**(8)**
Jakavi	Oncology	Myelofibrosis			410	71	**410**	**47**	**71**
Top 20 products total			**8,658**	**5**	**15,661**	**5**	**24,319**	**(5)**	**5**
Rest of portfolio			3,192	6	5,834	8	**9,026**	**(3)**	**7**
Total Division sales			**11,850**	**5**	**21,495**	**6**	**33,345**	**(4)**	**6**

(1) Formerly named the Pharmaceutical Division.

(2) Net sales reflect Xolair sales for all indications (e.g. including Xolair SAA and Xolair CSU, which are managed by the Immunology and Dermatology franchise).

nm = not meaningful

Gleevec/*Glivec* ($4.7 billion, +5% cc) is a treatment for adult patients with metastatic and/or unresectable KIT+ gastrointestinal stromal tumors (GIST), as an adjuvant treatment for certain adult patients following resection of KIT+ GIST, and as a targeted therapy for Philadelphia chromosome-positive chronic myeloid leukemia (Ph+ CML). Sales growth were driven mainly by the US, and more than compensated for the loss of patent exclusivity in some markets. In the US, Novartis Pharmaceuticals Corporation has settled its litigation with a subsidiary of Sun Pharmaceutical Industries Ltd. relating to Novartis patents covering the use of certain polymorphic forms of *Gleevec*/*Glivec*, which expire in 2019 (including pediatric exclusivity). The basic compound patent for *Gleevec*/*Glivec* expired in the US on July 4, 2015. As a result of the settlement, Novartis will permit Sun's subsidiary to market a generic version of *Gleevec*/*Glivec* in the US commencing on February 1, 2016.

Gilenya ($2.8 billion, +21% cc), the first once-daily oral therapy to treat relapsing forms of multiple sclerosis (RMS), continued to outgrow the market, achieving double-digit growth in 2015 in recognition of strong trends towards oral treatments with higher efficacy. Growth was also fueled by an increasing acceptance of the role of high-efficacy treatments when used earlier in the course of the disease. *Gilenya* continues to see volume growth through new patient initiations in both the US and non-US markets. In the US, *Gilenya* is indicated for relapsing forms of MS. In the EU, *Gilenya* is indicated for adult patients with high disease activity despite treatment with at least one disease modifying agent, or rapidly evolving severe relapsing remitting MS. In an expanding oral market with multiple options, *Gilenya* is the only oral disease-modifying therapy (DMT) to impact the course of RMS with high efficacy across four key measures of disease activity: relapses, MRI lesions, brain shrinkage (brain volume loss) and disability progression. *Gilenya* has an overall positive benefit-risk profile with over ten years of safety experience. As of November 30, 2015, *Gilenya* has been used to treat approximately 134,000 patients in clinical trials and in a post-marketing setting, with a total patient exposure of approximately 289,000 patient years. *Gilenya* is currently approved in over 80 countries around the world. *Gilenya* is licensed from Mitsubishi Tanabe Pharma.

Lucentis ($2.1 billion, −2% cc) sales were impacted by increased competition in Japan and in some European markets, which offset growth opportunities in Emerging Markets. *Lucentis* maintained a strong ex-US market position across indications but was impacted by competitive pressures in the neovascular age-related macular degeneration (nAMD) and diabetic macular edema (DME) indications, partially offset by continued growth in macular edema secondary to central and branch retinal vein occlusion (CRVO and BRVO), and choroidal neovascularization secondary to pathologic myopia (mCNV) indications. *Lucentis* is an anti-VEGF therapy licensed in many countries for the treatment of the following five ocular indications: nAMD, DME, CRVO, BRVO, and mCNV. *Lucentis* is approved in more than 100 countries to treat patients with the first four conditions, and in more than 80 countries for mCNV. In 2015, *Lucentis* obtained reimbursement for DME and RVO in Australia. It is the only anti-VEGF treatment delivered in a pre-filled syringe and approved for a treat & extend regimen across all indications in Europe. Since its launch in 2006, there have been more than 3.7 million patient-treatment years of exposure for *Lucentis* with more than 22 million injections. *Lucentis* is an anti-VEGF therapy specifically designed for the eye, minimizing systemic exposure, that has demonstrated significant efficacy with individualized dosing in its five licensed indications and has a well-established safety profile supported by extensive clinical studies and real-world experience. *Lucentis* is licensed from Genentech, and Novartis holds the rights to commercialize the product outside the US. Genentech holds the rights to commercialize *Lucentis* in the US.

Tasigna ($1.6 billion, +16% cc) performance was driven by strong growth in the US and other markets. *Tasigna* is currently approved as a first-line therapy for newly diagnosed patients with Philadelphia chromosome-positive (Ph+) chronic myeloid leukemia (CML) in the chronic phase in more than 85 countries globally, including the US, EU, Japan and Switzerland, with additional submissions pending worldwide. *Tasigna* (nilotinib) is also approved in more than 110 countries as a second-line treatment for patients with Ph+ CML in chronic and/or accelerated phase who are resistant or intolerant to existing treatment, such as *Gleevec*/*Glivec*.

Sandostatin ($1.6 billion, +7% cc) continued to benefit from the increasing use of *Sandostatin LAR* (long acting release) in key markets and from the launch of the enhanced presentation (now approved in 69 countries) which includes a diluent, safety needle and vial adapter. *Sandostatin* is a somatostatin analogue used to treat patients with acromegaly as well as neuroendocrine tumors (NET). In NET, it is used for both the treatment of patients with symptoms of carcinoid syndrome and those with advanced NET of the midgut or unknown primary tumor location (currently approved in more than 60 countries).

Afinitor/*Votubia* ($1.6 billion, +10% cc) performance was driven by strong growth in the US, Japan and other markets. *Afinitor* is an oral inhibitor of the mTOR pathway approved in combination with exemestane for the treatment of patients with HR+/HER2− advanced breast cancer after failure with a non-steroidal aromatase inhibitor (NSAI), for advanced renal cell carcinoma (RCC) following vascular endothelial growth factor-targeted therapy (after failure of sunitinib and sorafenib in the US) and for the treatment of advanced pancreatic neuroendocrine tumors (NET). *Afinitor* is also approved for treatment of patients with subependymal giant cell astrocytoma (SEGA) and renal angiomyolipoma associated with tuberous sclerosis complex (TSC), including as a dispersible tablet formulation in the US and EU for SEGA. Everolimus is also in Phase III development for patients with nonfunctional gastrointestinal and lung NET, HER2+ breast cancer, diffuse large B-cell lymphoma and TSC-related seizures. Everolimus, the active ingredient in *Afinitor*/*Votubia*, is available under the trade names *Zortress*/*Certican* for use in other non-oncology indications and is exclusively licensed to Abbott and sublicensed to Boston Scientific for use in drug-eluting stents.

Diovan Group ($1.3 billion, −40% cc), consisting of *Diovan* monotherapy and the combination product *Co-Diovan*/*Diovan* HCT, continues to retain a blockbuster status despite generic competition in most markets, including the US (following July 7, 2014 *Diovan* monotherapy generic entry), many EU countries and Japan (generic entry in June 2014). Sales continued to grow in Emerging Growth Markets, including China and selected countries in Latin America, Asia Pacific and Africa, partially compensating for loss of exclusivity in the US and the EU.

Galvus Group ($1.1 billion, +8% cc), includes *Galvus*, an oral treatment for type 2 diabetes, and *Eucreas*, a single-pill combination of vildagliptin (the active ingredient in *Galvus*) and metformin. *Galvus* delivered solid growth with major milestones including approval of the *Galvus* monotherapy indication in China in April 2015. In September 2015, the Japanese HA PMDA approved *Eucreas* (*EquMet*), the first single-pill combination of a DPP4 inhibitor and metformin approved in this market. The focus for *Galvus* remains on patients whose diabetes remains uncontrolled on metformin, earlier treatment intensification as well as on an expansion of usage in key segments such as elderly and renal-impaired patients. *Galvus* Group is currently approved in more than 125 countries.

Exforge Group ($1.0 billion, −15% cc) includes two medicines approved for the treatment of hypertension: *Exforge*, a single-pill combination of the angiotensin receptor blocker (ARB) valsartan and the calcium channel blocker amlodipine besylate; and *Exforge HCT*, a single pill combining an ARB (valsartan), calcium channel blocker (amlodipine) and a diuretic (hydrochlorothiazide) three widely prescribed blood pressure treatments. *Exforge* lost exclusivity in October 2014 and *Exforge HCT* in November 2014 in the US. Outside the US, *Exforge HCT* is growing across all regions, showing significantly high growth in emerging markets. *Exforge* continues to grow with double-digit growth in China and a number of emerging markets. *Exforge* is now available in more than 100 countries and *Exforge HCT* is available in over 77 countries.

Exjade ($917 million, +8% cc), a once-daily dispersible tablet for chronic transfusional iron overload saw sales increases in the US and Asia augmented by the March 2015 approval in the US of *Jadenu*, an oral tablet formulation that can be swallowed or crushed, and was approved by the FDA in 2015. Regulatory applications for *Jadenu* have been submitted in the EU, Canada, Switzerland, and many other countries. *Exjade,* first approved in 2005 and now approved in more than 100 countries, is also approved for the treatment of chronic iron overload in patients with non-transfusion-dependent thalassemia in more than 70 countries, with additional regulatory reviews underway. *Jadenu* is also approved for the treatment of chronic iron overload in patients with non-transfusion-dependent thalassemia in the US.

Xolair ($755 million, +14% cc), a biologic drug for appropriate patients with severe persistent allergic asthma in Europe and moderate-to-severe persistent allergic asthma in the US, is currently approved in more than 90 countries. Its sales continued to grow strongly in Canada, Europe and Latin America. *Xolair* is also approved in the EU, Switzerland and over 40 other countries as a treatment for chronic spontaneous urticaria (CSU), also known as chronic idiopathic urticaria (CIU), for which it is approved in the US and now Canada and Australia. Novartis co-promotes *Xolair* with Genentech in the US and shares a portion of the operating income, but does not book US sales.

Exelon/*Exelon* Patch ($728 million, −21% cc) sales declined due to generic competition for *Exelon* Patch in the EU and now in the US. *Exelon* Patch is approved for the treatment of mild-to-moderate Alzheimer's disease dementia (AD) in more than 90 countries, including more than 20 countries where it is also approved for

Parkinson's disease dementia. *Exelon* Patch is also indicated for the treatment of patients with severe AD in 14 countries, including the US.

Travoprost Group ($631 million, −4% cc), including *Travatan*, *Travatan Z* and *DuoTrav*, is indicated for the reduction of elevated intraocular pressure (IOP) in patients with open-angle glaucoma or who have ocular hypertension. Sales declined mainly due to increased generic competition for *Travatan Z*. Single agent travoprost products (*Travatan*, *TravatanZ*, *Travatan BAK-Free* and *Izba*) are prescribed as first-line agents and are marketed in more than 140 countries, including the US, EU countries, Canada and China. *DuoTrav* is a fixed-dose combination solution of the prostaglandin analogue travoprost with the beta-blocker timolol, and is approved as a second-line treatment in adults for the reduction of IOP in patients with open-angle glaucoma or ocular hypertension who are insufficiently responsive to topical beta-blockers or prostaglandin analogues

Neoral/*Sandimmun* ($570 million, −6% cc), a micro-emulsion formulation of cyclosporine, is an immunosuppressant to prevent organ rejection following a kidney, liver or heart transplant. *Neoral* is also approved for use in lung transplant in many countries outside of the US. Additionally, it is indicated for treating selected autoimmune disorders such as psoriasis and rheumatoid arthritis. First launched in 1995, *Neoral* is marketed in approximately 100 countries. Although sales are declining due to generic competition and mandatory price reductions, most notably in Europe and Japan, the decrease is not as rapid as has been the case in other therapeutic areas, due to the special characteristics of the solid organ transplant market.

Votrient ($565 million) is a small molecule tyrosine kinase inhibitor that targets a number of intracellular proteins to limit tumor growth and cell survival. Acquired from GSK in 2015, *Votrient* is approved in the US for the treatment of patients with advanced renal cell carcinoma (aRCC), and in the EU for first-line treatment of adult patients with aRCC and for patients who have received prior cytokine therapy for advanced disease. RCC is the most common type of kidney cancer in adults, and nearly one-fifth of patients have aRCC at the time of diagnosis. *Votrient* is also indicated for patients with advanced soft tissue sarcoma (STS) who have received prior chemotherapy. The efficacy of *Votrient* for the treatment of patients with adipocytic STS or gastrointestinal stromal tumors has not been demonstrated. STS is a type of cancer which can arise from a wide variety of soft tissues including muscle, fat, blood vessel and nerves. *Votrient* is approved in 99 countries worldwide for aRCC and in 87 countries for aSTS.

Voltaren/*Cataflam* ($558 million, 0% cc), is a leading non-steroidal anti-inflammatory drug (NSAID) for the relief of symptoms in rheumatic diseases such as rheumatoid arthritis and osteoarthritis, and for various other inflammatory and pain conditions. *Voltaren*/*Cataflam* was first registered in 1973 and is available in more than 140 countries. This product, which is subject to generic competition, is marketed by the Innovative Medicines Division in a wide variety of dosage forms, including tablets, drops, suppositories, ampoules and topical therapy. In addition, in various countries, our Sandoz Division markets generic versions of the product and our Alcon Division markets *Voltaren* for ophthalmic indications.

Topical Olopatadine Group ($457 million, −8% cc) includes *Patanol*, *Pataday* and *Pazeo*, which are olopatadine hydrochloride ophthalmic solutions of different concentrations that are approved to treat the signs and symptoms of allergic conjunctivitis (*Patanol*), as well as ocular itching associated with allergic conjunctivitis (*Pataday* and *Pazeo*). The sales decline for the Topical Olopatadine Group was driven by lower sales for *Patanol* and *Pataday*. Olopatadine products are marketed in more than 100 countries, including the US, EU countries, Canada and China.

Tafinlar + *Mekinist* ($453 million) achieved strong growth in sales. Acquired from GSK in 2015, this combination is the first of its kind for the treatment of patients with BRAF V600 mutation-positive unresectable or metastatic melanoma, as detected by a validated test, in the US, EU, Canada and several other markets. In August, the combination of *Tafinlar* + *Mekinist* was approved in Europe for the treatment of adult patients with unresectable or metastatic melanoma with a BRAF V600 mutation and in November, this combination received regular approval in the US based on the completion of two Phase III confirmatory trials. The combination was previously approved in the US under accelerated approval. *Tafinlar* targets the serine/threonine kinase BRAF in the RAS/RAF/MEK/ERK pathway and *Mekinist* targets the threonine/tyrosine kinases MEK1 and MEK2 in the MAP kinase pathway, resulting in dual blockade of this pathway, improving the clinical efficacy of the treatment. This is the first combination of BRAF/MEK inhibitors to achieve a median overall survival of more than two years in two Phase III studies in BRAF V600 mutation positive unresectable or metastatic melanoma patients. *Tafinlar* + *Mekinist* are also approved as single agents for the treatment of patients with unresectable or

metastatic melanoma in more than 45 and 30 countries worldwide, respectively. In addition, *Tafinlar* also has Breakthrough Therapy designation from the FDA for treatment of non-small cell lung cancer (NSCLC) patients with BRAF V600E mutations who have received at least one prior line of platinum-containing chemotherapy. In July, the combination therapy *Tafinlar* + *Mekinist* also received Breakthrough Therapy designation from the FDA for NSCLC patients with BRAF V600E mutations.

Myfortic ($441 million, −8% cc), a transplantation medicine, is available in more than 90 countries to prevent organ rejection in adult kidney transplant patients. Although it has experienced declining sales after the expected launch of generic competition in the US in early 2014, the decrease is not as rapid as has been the case in other therapeutic areas, due to the special characteristics of the solid organ transplant market. *Myfortic* continued to grow in some geographies where generic competition has not yet begun. Marketing authorizations for generic competitors have been granted in European countries.

Jakavi ($410 million, +71% cc) performance was driven by strong volume growth across multiple markets. *Jakavi* is an oral inhibitor of the JAK 1 and JAK 2 tyrosine kinases. It is the first JAK inhibitor indicated for the treatment of disease-related splenomegaly or symptoms in adult patients with primary myelofibrosis (also known as chronic idiopathic myelofibrosis), post-polycythemia vera myelofibrosis or post-essential thromboycythemia myelofibrosis. *Jakavi* is currently approved in more than 95 countries, including EU member states, Japan and Canada. In March 2015, the EC approved *Jakavi* for the treatment of adult patients with polycythemia vera (PV) who are resistant to or intolerant of hydroxyurea. *Jakavi* is the first targeted treatment approved by the EC for these patients. More than 45 countries have approved *Jakavi* in the PV indication, including Switzerland, Canada and Japan, and regulatory applications have been submitted in other countries. Novartis licensed ruxolitinib from Incyte Corporation for development and commercialization outside the US.

Sandoz

In 2015, Sandoz had net sales of $10.1 billion (−6%, +5% in constant currencies, or cc, from the prior year).

Sandoz continued to strengthen its global leadership position in biopharmaceuticals, which include medicines that are difficult to develop and manufacture. In June, Sandoz launched *Glatopa*—the first generic competitor to Copaxone® 20 mg—in the US. And in September in the US, Sandoz also launched *Zarxio,* which is the first biosimilar approved by the US Food and Drug Administration (FDA) under new regulations.

	Year ended Dec 31, 2015[1]	Year ended Dec 31, 2014[1]	Change in $	Constant currencies change
	$ m	$ m	%	%
Retail Generics	8,718	9,583	(9)	2
Biopharmaceuticals	772	618	25	39
Anti-Infectives (Partner label/API)	580	535	8	18
Total	**10,070**	**10,736**	**(6)**	**5**

[1] Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

Retail Generics

In Retail Generics, Sandoz develops, manufactures and markets active ingredients and finished dosage forms of pharmaceuticals. The Retail Generics franchise includes products in the therapeutic areas of dermatology, respiratory, oncology, transplantation and ophthalmics, as well as finished dosage forms of anti-infective products sold under the Sandoz name. Retail *Generics* sales worldwide were $8.7 billion (−9%, +2% cc). New product launches included US-authorized generics of our Innovative Medicines Division's *Exelon Patch* and *Exforge*, as well as bivalirudin, an injectable anticoagulant.

Biopharmaceuticals

In Biopharmaceuticals, Sandoz develops, manufactures and markets protein- and biotechnology-based products known as biosimilars, as well as *Glatopa*. Sandoz also provides biotechnology manufacturing services to other companies. Sales of biopharmaceuticals rose 25% (+39% cc) to $772 million. Sandoz further strengthened

its leadership in biosimilars in 2015 with the US approval of *Zarxio* (filgrastim), used to fight infection in cancer patients receiving chemotherapy.

Sandoz is the global market leader in biosimilars with three products that continue to see strong growth in their respective categories: *Omnitrope*, a human growth hormone; *Binocrit,* an erythropoiesis-stimulating agent; and filgrastim under the brand names *Zarzio* outside the US and *Zarxio* in the US. We continued in 2015 to build our portfolio of biosimilars. The FDA and European Medicines Agency confirmed acceptance of our applications for etanercept, a proposed biosimilar to Amgen's Enbrel®, which treats autoimmune diseases such as rheumatoid arthritis and psoriasis. The FDA also accepted our applications for pegfilgrastim, a proposed biosimilar to Amgen's Neulasta®, used to reduce the chance of infection in cancer patients receiving chemotherapy. Sandoz has five biosimilars in Phase III development or registration preparation.

Anti-Infectives

Sandoz manufactures pharmaceutical ingredients and intermediates—mainly antibiotics—for sale under the Sandoz name and to third-party customers. Total Anti-Infectives sales were $1.4 billion, up 9% (cc) driven by a strong flu season and restored production capacity after 2014 quality upgrades. Sales of finished dosage forms sold under the Sandoz name reached $860 million. Anti-Infectives sold to third parties for sale under their own name reached $580 million.

Alcon

Alcon net sales in 2015 were $6.0 billion (−9%, −1% in constant currencies, or cc). Regionally, sales decreased in Japan and rose in Latin America and the Caribbean. In Europe, the Middle East and Africa, sales were flat (0% cc), with strong sales of recently launched contact lenses, including *Dailies Total1* and *Air Optix Colors*, offset by declines in surgical equipment.

Sales in North America declined 1%, mainly due to a slowdown in contact lens care and surgical equipment sales. In Asia and Russia, sales declined 8% (cc), driven by a significant market slowdown, with weak performance in China, India and Southeast Asia.

To accelerate growth, we are taking concerted action on two fronts. For the Surgical and Vision Care businesses, we have identified key actions as part of a growth plan. They include steps to optimize innovation in intraocular lenses (IOLs) for cataract surgery, prioritizing and investing in the development of promising new products, and improving the effectiveness of our sales force.

	Year ended Dec 31, 2015[1]	Year ended Dec 31, 2014[1]	Change in $	Constant currencies change
	$ m	$ m	%	%
Surgical				
Cataract products	2,853	3,174	(10)	(2)
of which IOLs	*1,099*	*1,264*	*(13)*	*(4)*
Vitreoretinal products	594	615	(3)	6
Refractive/other	251	284	(12)	(5)
Total	**3,698**	**4,073**	**(9)**	**(1)**
Vision Care				
Contact lenses	1,743	1,897	(8)	1
Contact lens care	558	646	(14)	(8)
Total	**2,301**	**2,543**	**(10)**	**(2)**
Total net sales	**5,999**	**6,616**	**(9)**	**(1)**

(1) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

Surgical

Surgical franchise sales were $3.7 billion (−9%, −1% cc). Solid sales of cataract and vitreoretinal disposable surgical supplies were offset by competitive pressure on IOL sales, as well as a slowdown in equipment purchases in the US and emerging markets, particularly Asia. Launches in 2015 of our *UltraSert* pre-loaded and *PanOptix* trifocal IOLs in Europe, as well as regulatory approval of *UltraSert* pre-loaded IOLs in the US, provide an opportunity to renew growth in this segment.

Vision Care

Vision Care sales were $2.3 billion (−10%, −2% cc). Contact lens sales reached $1.7 billion (−8%, +1% cc), with strong sales of innovative lenses, particularly *Dailies Total1* and *Air Optix Colors,* offset by declines in older products. Sales of contact lens solutions were $0.6 billion (−14%, −8% cc), affected by ongoing market shifts to daily disposable lenses, as well as competitive pressure in the US.

Operating Income from Continuing Operations

Operating income from continuing operations was $9.0 billion (−19%, −2% cc), mainly due to amortization of the new oncology assets in Innovative Medicines. The current year includes an exceptional expense of $400 million for a settlement of the specialty pharmacies case in the Southern District of New York, whereas the prior-year benefitted from a one-time commercial settlement gain of $302 million and $248 million gain from selling a Novartis Venture Fund investment. The negative currency impact of 17 percentage points was mainly due to the strong $ versus the euro, Japanese yen and emerging market currencies. Operating income margin in constant currencies decreased 1.4 percentage points; currency had a negative impact of 1.7 percentage points resulting in a net decrease of 3.1 percentage points to 18.2 percent of net sales.

The following table provides an overview of operating income by segment:

	Year ended Dec 31, 2015	% of net sales	Year ended Dec 31, 2014	% of net sales	Change in $	Change in constant currencies
	$ m		$ m		%	%
Innovative Medicines[1],[2]	**7,815**	**23.4**	**8,826**	**25.3**	**(11)**	**6**
Sandoz[2]	**1,300**	**12.9**	**1,570**	**14.6**	**(17)**	**(7)**
Alcon[2]	**281**	**4.7**	**760**	**11.5**	**(63)**	**(33)**
Corporate	(419)		(67)		nm	nm
Operating income from continuing operations	**8,977**	**18.2**	**11,089**	**21.3**	**(19)**	**(2)**

nm = not meaningful

(1) Formerly named the Pharmaceuticals Division

(2) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

Core Operating Income key figures[1]

	Year ended Dec 31, 2015	Year ended Dec 31, 2014	Change in $	Change in constant currencies
	$ m	$ m	%	%
Core gross profit from continuing operations	**36,900**	**38,821**	**(5)**	**5**
Marketing & Sales	(11,729)	(12,355)	5	(5)
Research & Development	(8,738)	(8,723)	0	(6)
General & Administration	(2,389)	(2,552)	6	0
Other income	823	563	46	59
Other expense	(1,077)	(1,281)	16	7
Core operating income from continuing operations	**13,790**	**14,473**	**(5)**	**10**
As % of net sales	*27.9*	*27.7*		

[1] For an explanation of non-IFRS measures and reconciliation tables, see "—Non-IFRS Measures as Defined by Novartis".

The adjustments made to operating income to arrive at core operating income from continuing operations amounted to $4.8 billion (2014: $3.4 billion). The increase was mainly driven by higher amortization of the new oncology assets in Innovative Medicines, higher legal settlement expense and higher acquisition-related expense, whereas 2014 included a commercial settlement gain of $302 million, partially offset by the provision of $204 million for the US healthcare reform fee.

Excluding these items, core operating income from continuing operations decreased 5% (+10% cc) to $13.8 billion. Core operating income margin in constant currencies increased 1.3 percentage points mainly due to higher sales and productivity initiatives; currency had a negative impact of 1.1 percentage points, resulting in a margin of 27.9% of net sales, compared to 27.7% in 2014.

The following table provides an overview of core operating income by segment:

	Year ended Dec 31, 2015	% of net sales	Year ended Dec 31, 2014	% of net sales	Change in $	Change in constant currencies
	$ m		$ m		%	%
Innovative Medicines[1],[2]	**10,862**	**32.6**	**11,075**	**31.8**	**(2)**	**13**
Sandoz[2]	**2,045**	**20.3**	**2,101**	**19.6**	**(3)**	**9**
Alcon[2]	**1,235**	**20.6**	**1,720**	**26.0**	**(28)**	**(15)**
Corporate	(352)		(423)		17	11
Core operating income from continuing operations	**13,790**	**27.9**	**14,473**	**27.7**	**(5)**	**10**

[1] Formerly named the Pharmaceuticals Division

[2] Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

Innovative Medicines

Operating income was $7.8 billion (−11%, +6% cc) and included the effects of the acquisition of GSK's oncology portfolio, among other exceptional items.

Core operating income, which excludes certain exceptional items, was $10.9 billion (−2%, +13% cc), helped by our ongoing efforts to improve productivity and control costs. Core operating income margin improved by 2.1 percentage points in constant currencies. However, that was offset by 1.3 percentage points of negative impact from currency exchange rates, yielding a core margin of 32.6% of net sales.

Research and development

The following table provides an overview on the reported and core Research and Development expense of the Innovative Medicines Division:

	Year ended Dec 31, 2015[1]	Year ended Dec 31, 2014[1]	Change in $	Change in constant currencies
	$ m	$ m	%	%
Research and Exploratory Development	(2,739)	(2,894)	5	3
Confirmatory Development	(4,946)	(4,893)	(1)	(6)
Total Innovative Medicines Division Research and Development expense	**(7,685)**	**(7,787)**	**1**	**(3)**
as % of Innovative Medicines net sales to third parties	*23.0*	*22.4*		
Core Research and Exploratory Development	(2,663)	(2,812)	5	3
Core Confirmatory Development	(4,839)	(4,620)	(5)	(10)
Total Core Innovative Medicines Division Research and Development expense	**(7,502)**	**(7,432)**	**(1)**	**(5)**
as % of Innovative Medicines net sales to third parties	*22.5*	*21.3*		

[1] Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

[2] Core excludes impairments, amortization and certain other items.

Innovative Medicines Division Research and Exploratory Development expenditure amounted to $2.7 billion in 2015, a decrease of 5% (+3% cc) compared to 2014. Confirmatory Development expenditures increased by 1% (−6% cc) to $4.9 billion, mainly driven by additional development expense for the newly acquired Oncology assets. Core R&D expense in the Innovative Medicines Division as percent of sales was flat in constant currencies, and currency had a negative impact of 1.2 percentage points mainly from the sales base, as the Core R&D expenses are primarily denominated in US dollars and Swiss francs, which resulted in a net increase of 1.2 percentage points to 22.5% of net sales.

Sandoz

Operating income was $1.3 billion (−17%, −7% cc).

Core operating income, which excludes certain exceptional items, decreased 3% (+9% cc) to $2.0 billion. Core operating income margin increased 0.8 percentage points in constant currencies and currency exchange rates had a negative impact of 0.1 percentage points, yielding a core margin of 20.3% of net sales.

Alcon

Operating income was $0.3 billion (−63%, −33% cc).

Core operating income, which excludes certain items, was $1.2 billion (−28%, −15% cc), impacted by lower sales, investments in product development, and increased provisions for bad debt in Asia. Core operating income margin declined 3.5 percentage points in constant currencies and currency exchange rates had a negative impact of 1.9 percentage points, yielding a core margin of 20.6% of net sales.

Corporate Income and Expense, Net

Corporate income and expense amounted to a net expense of $419 million in 2015 compared to a net expense of $67 million in the prior year. The increased expense was mainly due to the $302 million commercial settlement gain and a $248 million gain from selling Novartis Venture Fund investments recorded in 2014,

partially offset by the gain on the sale of real estate in Switzerland of $54 million, lower share-based compensation accruals and lower provisions in the captive insurance companies in 2015.

Non-Operating Income and Expense

The following table provides an overview of non-operating income and expense:

	Year ended Dec 31, 2015	Year ended Dec 31, 2014	Change in $	Change in constant currencies
	$ m	$ m	%	%
Operating income from continuing operations	**8,977**	**11,089**	**(19)**	**(2)**
Income from associated companies	266	1,918	(86)	(86)
Interest expense	(655)	(704)	7	2
Other financial income and expense	(454)	(31)	nm	nm
Income before taxes from continuing operations	**8,134**	**12,272**	**(34)**	**(17)**
Taxes	(1,106)	(1,545)	28	10
Net income from continuing operations	**7,028**	**10,727**	**(34)**	**(18)**
Net income from discontinued operations	10,766	(447)	nm	nm
Net income	**17,794**	**10,280**	**73**	**91**
Basic EPS ($) from continuing operations	**2.92**	**4.39**	**(33)**	**(17)**
Basic EPS ($) from discontinued operations	4.48	(0.18)	nm	nm
Total basic EPS ($)	**7.40**	**4.21**	**76**	**94**

The following table provides an overview of core non-operating income and expense:

	Year ended Dec 31, 2015	Year ended Dec 31, 2014	Change in $	Change in constant currencies
	$ m	$ m	%	%
Core operating income from continuing operations	**13,790**	**14,473**	**(5)**	**10**
Income from associated companies	981	943	4	4
Interest expense	(655)	(704)	7	2
Other financial income and expense	(24)	(31)	23	nm
Core income before taxes from continuing operations	**14,092**	**14,681**	**(4)**	**10**
Taxes	(2,051)	(2,028)	(1)	(16)
Core net income from continuing operations	**12,041**	**12,653**	**(5)**	**9**
Core net loss from discontinued operations	(256)	102	nm	nm
Core net income	**11,785**	**12,755**	**(8)**	**6**
Core basic EPS ($) from continuing operations	**5.01**	**5.19**	**(3)**	**10**
Core basic EPS ($) from discontinued operations	(0.11)	0.04	nm	nm
Core basic EPS ($)	**4.90**	**5.23**	**(6)**	**7**

nm = not meaningful

Income from associated companies

Income from associated companies from continuing operations amounted to $266 million in 2015, compared to $1.9 billion in 2014. The prior-year benefited from a pre-tax gain of $0.8 billion recognized on the sale of the shares of Idenix to Merck, a gain of $0.4 billion from the divestment of the shareholding in LTS and from the gain of $64 million recorded on the Novartis Venture Funds investments.

In addition, the estimated income from Roche Holding AG declined from $599 million in the prior-year period to $343 million in 2014, due to an adjustment of $157 million recognized in the first quarter of 2015 when Roche published full year results, as well as a lower estimated income contribution from Roche for 2015 due to an announced restructuring.

The estimated share in net results from the GSK Consumer Healthcare joint venture amounted to a loss of $17 million, as income from operations was more than offset by integration charges. This estimate will be adjusted based on actual results in the first quarter of 2016. In addition, in 2015, we finalized the purchase price allocation for the investment in the GSK Consumer Healthcare joint venture which is accounted for as associated company and recognized amortization of purchase price adjustments of $62 million, resulting in a total estimated loss of $79 million for our share in the net results from the GSK Consumer Healthcare joint venture for the year.

Core income from associated companies increased to $981 million compared to $943 million in 2014. Our estimated share in core results from the consumer healthcare joint venture with GSK, which amounted to $213 million in 2015, was offset by decreases in our estimated share of core results from Roche (from $856 million to $766 million) and prior-year income from associated companies of the Novartis Venture Fund.

Interest Expense and other financial income and expense

Interest expense from continuing operations decreased by 7% (+2% cc) to $655 million from $704 million in the prior year.

Other financial income and expense amounted to an expense of $454 million compared to $31 million in the prior-year period mainly on account of the exceptional charges of $410 million related to Venezuela due to foreign exchange losses of $211 million and monetary losses from hyperinflation accounting of $72 million and a loss of $127 million on the sale of PDVSA bonds received to settle a portion of intra-group payables.

Core other financial income and expense, which exclude the exceptional charges of $410 million related to Venezuela, amounted to a net expense of $24 million, compared to $31 million in 2014.

Taxes

The tax rate for continuing operations (taxes as percentage of pre-tax income) in 2015 increased to 13.6% from 12.6% in the prior year, as a result of a change in profit mix from lower to higher tax jurisdictions.

The core tax rate from continuing operations (core tax as a percentage of core pre-tax income) increased to 14.6% from 13.8% in 2014, mainly as a result of a change in profit mix from lower to higher tax jurisdictions.

Net Income

Net income from continuing operations of $7.0 billion was down 34% (−18% cc) declining more than operating income mainly due to the exceptional charges related to Venezuela in the current year and the prior-year gains of $0.8 billion from the sale of Idenix shares and $0.4 billion from the sale of LTS shares.

Core net income from continuing operations of $12.0 billion was down 5% (+9% cc), in line with core operating income.

EPS

Basic earnings per share (EPS) from continuing operations was $2.92 per share, down 33% (−17% cc), declining less than net income from continuing operations due to the lower number of outstanding shares.

Core basic EPS from continuing operations was $5.01 (−3%, +10% cc), growing ahead of core net income due to lower average outstanding shares and lower minority interests.

Discontinued Operations

	Year ended Dec 31, 2015	Year ended Dec 31, 2014
	$ m	$ m
Net sales to third parties from discontinued operations	**601**	**5,816**
Operating income from discontinued operations	**12,477**	**(353)**
Net income from discontinued operations	**10,766**	**(447)**
Attributable to:		
Shareholders of Novartis AG	*10,758*	*(444)*
Non-controlling interests	*8*	*(3)*
Basic earnings per share ($) from discontinued operations	**4.48**	**(0.18)**
Free cash flow from discontinued operations	**(230)**	**(172)**

Operational results for discontinued operations in 2015 include the results from the Vaccines influenza business, prior to its divestment to CSL Limited on July 31, 2015, as well as results from the Vaccines non-influenza business and OTC until March 2, 2015. Operational results from the Animal Health business, which was divested on January 1, 2015 include only the divestment gain. The prior year included the results of all divested units during the full year.

Discontinued operations also include the exceptional pre-tax gains of $12.7 billion from the divestment of Animal Health ($4.6 billion) and the transactions with GSK ($2.8 billion for the Vaccines non-influenza business and $5.9 billion arising from the contribution of Novartis OTC into the GSK Consumer Healthcare joint venture). In addition, the GSK transactions resulted in $0.6 billion of additional transaction-related costs that were expensed.

Net sales to third parties of the discontinued operations in 2015 amounted to $0.6 billion compared to $5.8 billion in 2014.

Operating income from discontinued operations in 2015 amounted to an income of $12.5 billion which was mainly driven by the exceptional pre-tax gains from the portfolio transformation. Excluding the divestment gains, the remaining operating loss from discontinued operations was $0.2 billion, representing the operating performance of the Vaccines influenza business up to July 31, 2015 as well as the Vaccines non-influenza business and OTC until their respective divestment dates, and is net of the partial reversal of $0.1 billion of the impairment of the assets of Vaccines influenza business recorded in 2014.

The prior year operating loss of $353 million included an exceptional impairment charge of $1.1 billion for the Vaccines influenza business which was partially offset by an exceptional pre-tax gain of $0.9 billion from the divestment of our blood transfusion diagnostics unit.

Net income from discontinued operations amounted to $10.8 billion in 2015 compared to a net loss $447 million in 2014. For more information on discontinued operations see "—Factors Affecting Comparability of Year-On-Year Results of Operations", below and "Note 30. Discontinued Operations" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Total Group

For the total Group, net income amounted to $17.8 billion compared to $10.3 billion in 2014, impacted by the exceptional divestment gains included in the net income from the discontinued operations. Basic earnings per share increased to $7.40 from $4.21.

FACTORS AFFECTING COMPARABILITY OF YEAR-ON-YEAR RESULTS OF OPERATIONS

The comparability of the year-on-year results of our operations for the total Group can be significantly affected by acquisitions and divestments. The transactions of significance during 2016 and 2015 are mentioned below.

Significant transactions in 2016

Alcon—Acquisition of TRANSCEND MEDICAL, INC.

On February 17, 2016, Alcon entered into an agreement to acquire Transcend Medical, Inc. (Transcend), a privately-held, US-based company focused on developing minimally-invasive surgical devices to treat glaucoma. The transaction closed on March 23, 2016, and the fair value of the total purchase consideration was $332 million. Results of operations since the date of acquisition were not material.

Innovative Medicines—Acquisition of SELEXYS PHARMACEUTICALS CORPORATION

On November 18, 2016, Novartis acquired Selexys Pharmaceuticals Corporation (Selexys), a privately-held, US-based company specializing in development of therapeutics in certain hematologic and inflammatory disorders, following receipt of results of the SUSTAIN study. The fair value of the total purchase consideration for acquiring the 81% stake Novartis did not already own amounted to $268 million. Results of operations since the date of acquisition were not material.

Significant transactions in 2015

PORTFOLIO TRANSFORMATION TRANSACTION

In 2015, Novartis completed a series of portfolio transformation transactions as follows:

Transaction with Eli Lilly and Company

On January 1, 2015, Novartis closed its transaction with Eli Lilly and Company, USA (Lilly) announced in April 2014, to divest its Animal Health business for $5.4 billion in cash. This resulted in a pre-tax gain of $4.6 billion, which is recorded in operating income from discontinued operations.

Transactions with GlaxoSmithKline plc

On March 2, 2015, Novartis closed its transactions with GlaxoSmithKline plc, Great Britain (GSK) announced in April 2014, with the following consequences:

Innovative Medicines—Acquisition of GSK oncology products

Novartis acquired GSK's oncology products and certain related assets for an aggregate cash consideration of $16.0 billion. In 2015, from the date of acquisition the business generated net sales of $1.8 billion. Management estimates that sales for the entire year 2015 would have amounted to $2.1 billion had the oncology products been acquired at the beginning of the 2015 reporting period. The 2015 net results from operations on a reported basis since the acquisition date were not material, mainly due to amortization of intangible assets.

Vaccines—Divestment

Novartis divested its Vaccines business (excluding its Vaccines influenza business) to GSK for up to $7.1 billion plus royalties. The $7.1 billion consists of $5.25 billion paid at closing and up to $1.8 billion in future milestone payments. The fair value of the contingent future milestones and royalties as at the acquisition date is $1.0 billion, resulting in a fair value of consideration received of $6.25 billion. Included in this amount is a $450 million milestone payment received in late March 2015. The sale of this business resulted in a pre-tax gain of $2.8 billion, which is recorded in operating income from discontinued operations.

Consumer Health—Combination of Novartis OTC with GSK Consumer Healthcare

Novartis and GSK agreed to create a combined consumer healthcare business through the combination of Novartis OTC and GSK Consumer Healthcare businesses. On March 2, 2015, a new entity, GlaxoSmithKline Consumer Healthcare Holdings Ltd. (GSK Consumer Healthcare) was formed via the contribution of business from both Novartis and GSK. Novartis has a 36.5% interest in the newly created entity. Based on estimates of fair value exchanged, an investment in associated company of $7.6 billion was recorded. The resulting pre-tax gain, net of transaction related costs, of $5.9 billion is recorded in operating income from discontinued operations. The

investment is accounted for using the equity method of accounting using estimated results for the last quarter of the year.

Additional GSK related costs

The GSK transaction resulted in $0.6 billion of additional transaction-related costs that were expensed, thereof $0.3 billion paid in 2015.

Transaction with CSL

On October 26, 2014, Novartis entered into an agreement with CSL to sell its Vaccines influenza business to CSL for $275 million. The transaction with CSL was completed on July 31, 2015, resulting in a partial reversal of the impairment recorded in 2014 in the amount of $0.1 billion, which is included in operating income from discontinued operations.

Other significant transactions in 2015

Innovative Medicines—Acquisition of SPINIFEX PHARMACEUTICALS, INC.

On June 29, 2015, the Innovative Medicines Division acquired Spinifex Pharmaceuticals, Inc. (Spinifex), a US and Australia based, privately held development stage company, focused on developing a peripheral approach to treat neuropathic pain. The transaction closed on July 24, 2015, and the fair value of the total purchase consideration was $312 million. The 2015 results of operations since the date of acquisition were not material.

Innovative Medicines—Acquisition of ADMUNE THERAPEUTICS LLC

On October 16, 2015, the Innovative Medicines Division acquired Admune Therapeutics LLC (Admune), a US-based, privately held company, broadening the Novartis pipeline of cancer immunotherapies. The fair value of the total purchase consideration amounted to $258 million. The 2015 results of operations since the date of acquisition were not material.

For further details on significant transactions in 2016 and 2015, see "Note 2. Significant Transactions" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Classification as continuing operations and discontinued operations

Following the April 22, 2014 announcement of the portfolio transformation transactions with Lilly and GSK, as described above, Novartis reported the Group's financial statements for the current and prior years as "continuing operations" and "discontinued operations".

Continuing operations comprise the businesses of the Innovative Medicines, Sandoz and Alcon Divisions as well as the continuing Corporate activities. Continuing operations also include the results from oncology assets acquired from GSK and the estimated results from the 36.5% interest in GSK Consumer Healthcare Holdings Ltd. for the period from March 2, 2015 (the latter reported as part of income from associated companies).

Discontinued operations included in 2015 the operational results from the Vaccines influenza business, prior to its divestment to CSL Limited on July 31, 2015, as well as results from the Vaccines non-influenza business and OTC business until March 2, 2015. Operational results from the Animal Health business, which was divested on January 1, 2015, include only the divestment gain.

Discontinued operations in 2015 also included the exceptional pre-tax gain of $12.7 billion from the divestment of Animal Health ($4.6 billion) and from the transactions with GSK ($2.8 billion from the Vaccines non-influenza business and $5.9 billion arising from the contribution of Novartis OTC into GSK Consumer Healthcare Holdings Ltd.). In addition the GSK transactions resulted in $0.6 billion of additional transaction-related costs, which were expensed and reported in Corporate discontinued operations.

Excluded from discontinued operations are certain intellectual property rights and related other revenues of the Vaccines Division, which are retained by Novartis and are now reported under Corporate activities.

As required by IFRS, results of the discontinued operations excluded any further depreciation and amortization related to discontinued operations from the date of the portfolio transformation announcement of April 22, 2014.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

Our significant accounting policies are set out in "Note 1. Significant Accounting Policies" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, which are prepared in accordance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB).

Given the uncertainties inherent in our business activities, we must make certain estimates and assumptions that require difficult, subjective and complex judgments. Because of uncertainties inherent in such judgments, actual outcomes and results may differ from our assumptions and estimates, which could materially affect the Group's consolidated financial statements. Application of the following accounting policies requires certain assumptions and estimates that have the potential for the most significant impact on our consolidated financial statements.

Deductions from Revenues

As is typical in the pharmaceutical industry, our gross sales are subject to various deductions which are primarily composed of rebates and discounts to retail customers, government agencies, wholesalers, health insurance companies and managed healthcare organizations. These deductions represent estimates of the related obligations, requiring the use of judgement when estimating the effect of these sales deductions on gross sales for a reporting period. These adjustments are deducted from gross sales to arrive at net sales.

The following summarizes the nature of some of these deductions and how the deduction is estimated. After recording these, net sales represent our best estimate of the cash that we expect to ultimately collect. The US market has the most complex arrangements related to revenue deductions.

United States specific healthcare plans and program rebates

The United States Medicaid Drug Rebate Program is administered by State governments using State and Federal funds to provide assistance to certain vulnerable and needy individuals and families. Calculating the rebates to be paid related to this program involves interpreting relevant regulations, which are subject to challenge or change in interpretative guidance by government authorities. Provisions for estimating Medicaid rebates are calculated using a combination of historical experience, product and population growth, product pricing and the mix of contracts and specific terms in the individual State agreements.

The United States Federal Medicare Program, which funds healthcare benefits to individuals age 65 or older and certain disabilities, provides prescription drug benefits under Part D section of the program. This benefit is provided and administrated through private prescription drug plans. Provisions for estimating Medicare Part D rebates are calculated based on the terms of individual plan agreements, product sales and population growth, product pricing and the mix of contracts.

We offer rebates to key managed healthcare and private plans in an effort to sustain and increase sales of our products. These programs provide a rebate after the plans have demonstrated they have met all terms and conditions set forth in their contract with us. These rebates are estimated based on the terms of individual agreements, historical experience, product pricing, and projected product growth rates.

These provisions are adjusted based on established processes and experiences from filing data with individual states and plans. There is often a time lag of several months between us recording the revenue deductions and our final accounting for them.

Non-United States specific healthcare plans and program rebates

In certain countries other than the US, we provide rebates to governments and other entities. These rebates are often mandated by laws or government regulations.

In several countries, especially in Europe and Australia, we enter into innovative pay-for-performance arrangements with certain healthcare providers. Under these agreements, we may be required to make refunds to the healthcare providers or to provide additional medicines free of charge if anticipated treatment outcomes do not meet predefined targets. Potential refunds and the delivery of additional medicines at no cost are estimated and recorded as a deduction of revenue at the time the related revenues are recorded. Estimates are based on

historical experience and clinical data. In cases where historical experience and clinical data are not sufficient for a reliable estimation of the outcome, revenue recognition would be deferred until such history would be available. In addition, we offer global patient assistance programs.

There is often a time lag of several months between us recording the revenue deductions and our final accounting for them.

Non-healthcare plans and program rebates, returns and other deductions

We offer rebates to purchasing organizations and other direct and indirect customers to sustain and increase market share for our products. Since rebates are contractually agreed upon, the related provisions are estimated based on the terms of the individual agreements, historical experience, and projected product growth rates.

Charge-backs occur where our subsidiaries have arrangements with indirect customers to sell products at prices that are lower than the price charged to wholesalers. A charge-back represents the difference between the invoice price to the wholesaler and the indirect customer's contract price. We account for vendor charge-backs by reducing revenue for the estimate of charge-backs attributable to a sale transaction. Provisions for estimated charge-backs are calculated using a combination of factors such as historical experience, product growth rates, payments, product pricing, level of inventory in the distribution channel, the terms of individual agreements and our estimate of the claims processing time lag.

When we sell a product providing a customer the right to return it, we record a provision for estimated sales returns based on our sales return policy and historical return rates. Other factors considered include actual product recalls, expected marketplace changes, the remaining shelf life of the product, and the expected entry of generic products. In 2016, sales returns amounted to approximately 1% of gross product sales. If sufficient experience is not available, sales are only recorded based on evidence of product consumption or when the right of return has expired.

We enter into distribution service agreements with major wholesalers, which provide a financial disincentive for the wholesalers to purchase product quantities in excess of current customer demand. Where possible, we adjust shipping patterns for our products to maintain wholesalers' inventory levels consistent with underlying patient demand.

We offer cash discounts to customers to encourage prompt payment. Cash discounts are estimated and accrued at the time of invoicing and are deducted from revenue.

Following a decrease in the price of a product, we generally grant customers a "shelf stock adjustment" for their existing inventory for the relevant product. Provisions for shelf stock adjustments, which are primarily relevant within the Sandoz Division, are determined at the time of the price decline or at the point of sale, if the impact of a price decline on the products sold can be reasonably estimated based on the customer's inventory levels of the relevant product.

Other sales discounts, such as consumer coupons and co-pay discount cards, are offered in some markets. The estimated amounts of these discounts are recorded at the time of sale, or when the coupons are issued, and are estimated utilizing historical experience and the specific terms for each program. If a discount for a probable future transaction is offered as part of a sales transaction then an appropriate portion of revenue is deferred to cover this estimated obligation.

We adjust provisions for revenue deductions periodically to reflect actual experience. To evaluate the adequacy of provision balances, we use internal and external estimates of the inventory in transit, the level of inventory in the distribution and retail channels actual claims data received and the time lag for processing rebate claims. External data sources include reports from wholesalers and third-party market data purchased by Novartis.

The following table shows the worldwide extent of our revenue deductions provisions and related payment experiences for the Innovative Medicines, Sandoz and Alcon Divisions:

PROVISIONS FOR DEDUCTIONS FROM REVENUE

	Revenue deductions provisions at January 1	Effect of currency translation and business combinations	Payments/ utilizations	Income statement charge		Change in provisions offset against gross trade receivables	Revenue deductions provisions at December 31
				Adjustments of prior years	Current year		
	$ m	$ m	$ m	$ m	$ m	$ m	$ m
2016							
US-specific healthcare plans and program rebates	1,165		(3,203)	7	3,492		1,461
Non-US-specific healthcare plans and program rebates	1,024	(31)	(1,844)	(26)	1,883	14	1,020
Non-healthcare plans and program-related rebates, returns and other deductions	1,601	(19)	(11,142)	(117)	11,383	(4)	1,702
Total continuing operations 2016	**3,790**	**(50)**	**(16,189)**	**(136)**	**16,758**	**10**	**4,183**
2015							
US-specific healthcare plans and program rebates	1,097		(2,823)	(90)	2,981		1,165
Non-US-specific healthcare plans and program rebates	1,015	(109)	(1,716)	(3)	1,846	(9)	1,024
Non-healthcare plans and program-related rebates, returns and other deductions	1,421	(69)	(10,679)	(124)	10,993	59	1,601
Total continuing operations 2015	**3,533**	**(178)**	**(15,218)**	**(217)**	**15,820**	**50**	**3,790**
2014							
US-specific healthcare plans and program rebates	1,376		(3,118)	(186)	3,025		1,097
Non-US-specific healthcare plans and program rebates	1,145	(124)	(1,743)	(19)	1,787	(31)	1,015
Non-healthcare plans and program-related rebates, returns and other deductions	1,427	(83)	(9,046)	(52)	9,564	(389)	1,421
Total continuing operations 2014	**3,948**	**(207)**	**(13,907)**	**(257)**	**14,376**	**(420)**	**3,533**

The table below shows the gross to net sales reconciliation for our Innovative Medicines Division:

GROSS TO NET SALES RECONCILIATION

	Income statement charge			
	Charged through revenue deduction provisions	Charged directly without being recorded in revenue deduction provisions	Total	In % of gross sales
	$ m	$ m	$ m	
2016				
Innovative Medicines gross sales subject to deductions			**42,630**	**100.0**
US-specific healthcare plans and program rebates	(3,051)		(3,051)	(7.2)
Non-US-specific healthcare plans and program rebates	(1,352)	(885)	(2,237)	(5.2)
Non-healthcare plans and program-related rebates, returns and other deductions	(2,736)	(2,044)	(4,780)	(11.2)
Total Innovative Medicines gross to net sales adjustments	**(7,139)**	**(2,929)**	**(10,068)**	**(23.6)**
Innovative Medicines net sales 2016			**32,562**	**76.4**
2015[1]				
Innovative Medicines gross sales subject to deductions			**42,460**	**100.0**
US-specific healthcare plans and program rebates	(2,533)		(2,533)	(6.0)
Non-US-specific healthcare plans and program rebates	(1,238)	(762)	(2,000)	(4.7)
Non-healthcare plans and program-related rebates, returns and other deductions	(2,831)	(1,751)	(4,582)	(10.8)
Total Innovative Medicines gross to net sales adjustments	**(6,602)**	**(2,513)**	**(9,115)**	**(21.5)**
Innovative Medicines net sales 2015			**33,345**	**78.5**
2014[1]				
Innovative Medicines gross sales subject to deductions			**43,768**	**100.0**
US-specific healthcare plans and program rebates	(2,524)		(2,524)	(5.8)
Non-US-specific healthcare plans and program rebates	(1,293)	(830)	(2,123)	(4.8)
Non-healthcare plans and program-related rebates, returns and other deductions	(2,395)	(1,898)	(4,293)	(9.8)
Total Innovative Medicines gross to net sales adjustments	**(6,212)**	**(2,728)**	**(8,940)**	**(20.4)**
Innovative Medicines net sales 2014			**34,828**	**79.6**

(1) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016.

Surgical Equipment Revenue

Surgical equipment is often sold together with other products and services under a single contract. The total consideration is allocated to the separate elements based on their relative fair values. Revenue is recognized once the recognition criteria have been met for each element of the contract.

For surgical equipment, in addition to cash and instalment sales, revenue is recognized under finance and operating lease arrangements. Arrangements in which Novartis transfers substantially all the risks and rewards incidental to ownership to the customer are treated as finance lease arrangements. Revenue from finance lease arrangements is recognized at amounts equal to the fair values of the equipment, which approximate the present values of the minimum lease payments under the arrangements. As interest rates embedded in lease arrangements are approximately market rates, revenue under finance lease arrangements is comparable to revenue for outright sales. Finance income for arrangements in excess of twelve months is deferred and subsequently recognized based on a pattern that approximates the use of the effective interest method and

recorded in "Other income". Operating lease revenue for equipment rentals is recognized on a straight-line basis over the lease term.

Impairment of Goodwill, Intangible Assets and Property, Plant and Equipment

We review long-lived intangible assets and property, plant and equipment for impairment whenever events or changes in circumstance indicate that the asset's balance sheet carrying amount may not be recoverable. Goodwill, the Alcon brand-name and other currently not amortized intangible assets are reviewed for impairment at least annually.

An asset is generally considered impaired when its balance sheet carrying amount exceeds its estimated recoverable amount, which is defined as the higher of its fair value less costs of disposal and its value in use. Usually, Novartis adopts the fair value less costs of disposal method for its impairment evaluation. In most cases no directly observable market inputs are available to measure the fair value less costs of disposal. Therefore, an estimate of fair value less costs of disposal is derived indirectly and is based on net present value techniques utilizing post-tax cash flows and discount rates. In the limited cases where the value in use method is applied, net present value techniques are utilized using pre-tax cash flows and discount rates.

Fair value reflects estimates of assumptions that market participants would be expected to use when pricing the asset and for this purpose management considers the range of economic conditions that are expected to exist over the remaining useful life of the asset. The estimates used in calculating net present values are highly sensitive, and depend on assumptions specific to the nature of the Group's activities with regard to:

– amount and timing of projected future cash flows;

– future tax rates;

– behavior of competitors (launch of competing products, marketing initiatives, etc.); and

– appropriate discount rate.

Due to the above factors and those further described in "Note 1. Significant Accounting Policies" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, actual cash flows and values could vary significantly from forecasted future cash flows and related values derived using discounting techniques.

The recoverable amount of the grouping of cash generating units to which goodwill and indefinite life intangible assets are allocated is based on fair value less costs of disposal. The valuations are derived from applying discounted future cash flows based on key assumptions, including the terminal growth rate and discount rate. For additional information see "Note 11. Goodwill and Intangible Assets" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

In 2016, intangible asset impairment charges for continuing operations of $591 million were recognized, of which $522 million were recorded in the Innovative Medicines Division and $65 million in the Sandoz Division and $4 million in the Alcon Division.

In 2015, intangible asset impairment charges of continuing operations amounted to $206 million ($178 million in the Innovative Medicines Division and $27 million in the Sandoz Division and $1 million in the Alcon Division).

In 2016, there was no reversal of prior year impairment charges (2015: $40 million).

Goodwill and other intangible assets represent a significant part of our consolidated balance sheet, primarily due to acquisitions. Although no significant additional impairments are currently anticipated, impairment evaluation could lead to material impairment charges in the future. For more information, see "Note 11. Goodwill and Intangible Assets" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Additionally, net impairment charges for property, plant and equipment from continuing operations during 2016 amounted to $102 million (2015: $80 million).

Trade Receivables

Trade receivables are initially recognized at their invoiced amounts including any related sales taxes less adjustments for estimated revenue deductions such as rebates, charge backs and cash discounts.

Provisions for doubtful trade receivables are established once there is an indication that it is likely that a loss will be incurred. These provisions represent the difference between the trade receivable's carrying amount in the consolidated balance sheet and the estimated net collectible amount. Significant financial difficulties of a customer, such as probability of bankruptcy, financial reorganization, default or delinquency in payments are considered indicators that recovery of the trade receivable is doubtful. Trade receivable balances include sales to drug wholesalers, retailers, private health systems, government agencies, managed care providers, pharmacy benefit managers and government-supported healthcare systems. Novartis continues to monitor sovereign debt issues and economic conditions in Greece, Italy, Portugal, Spain and other countries, and evaluates trade receivables in these countries for potential collection risks. Substantially all of the trade receivables overdue from such countries are due directly from local governments or from government-funded entities. Deteriorating credit and economic conditions and other factors in these countries have resulted in, and may continue to result in an increase in the average length of time that it takes to collect these trade receivables and may require Novartis to re-evaluate the collectability of these trade receivables in future periods.

Contingent Consideration

In a business combination or divestment of a business, it is necessary to recognize contingent future payments to previous or from new owners representing contractually defined potential amounts as a liability or asset. Usually for Novartis these are linked to milestone or royalty payments related to certain assets and are recognized as a financial liability or asset at their fair value which is then re-measured at each subsequent reporting date. These estimations typically depend on factors such as technical milestones or market performance and are adjusted for the probability of their likelihood of payment and if material, appropriately discounted to reflect the impact of time. Changes in the fair value of contingent consideration liabilities are recognized in the consolidated income statement in "Cost of goods sold" for currently marketed products and in "Research & Development" for In-Process Research and Development (IPR&D). Changes in contingent consideration assets are recognized in "Other revenue", "Other income" or "Other expense", depending on its nature. The effect of unwinding the discount over time is recognized in "Interest expense" in the consolidated income statement. Novartis does not recognize contingent consideration associated with asset purchases outside of a business combination that are conditional upon future events which are within its control until such time as there is an unconditional obligation. If the contingent consideration is outside the control of Novartis, a liability is recognized once it becomes probable that the contingent consideration will become due. In both cases, if appropriate, a corresponding asset is recorded.

Impairment of Associated Companies Accounted for at Equity

Novartis considers investments in associated companies for impairment evaluation whenever indicators are noted for example when there is a quoted share price indicating a fair value less than the per-share balance sheet carrying value for the investment.

"Marketable securities" are financial assets recorded in Corporate and consisting principally of quoted equity and quoted debt securities as well as fund investments which are principally traded in liquid markets. Marketable securities that are held for long-term strategic purposes and typically recorded in the Divisions are classified as non-current financial assets. They include equity securities and fund investments.

Retirement and Other Post-Employment Benefit Plans

We sponsor pension and other post-employment benefit plans in various forms that cover a significant portion of our current and former associates. For post-employment plans with defined benefit obligations, we are required to make significant assumptions and estimates about future events in calculating the expense and the present value of the liability related to these plans. These include assumptions about the interest rates we apply to estimate future defined benefit obligations and net periodic pension expense as well as rates of future pension increases. In addition, our actuarial consultants provide our management with historical statistical information such as withdrawal and mortality rates in connection with these estimates.

Assumptions and estimates used by the Group may differ materially from the actual results we experience due to changing market and economic conditions, higher or lower withdrawal rates, and longer or shorter life spans of participants among other factors. For example, in 2016, a decrease in the interest rate we apply in determining the present value of the defined benefit obligations of one quarter of one percent would have increased our year-end defined benefit pension obligation for plans in Switzerland, US, UK, Germany and Japan, which represent 95% of the Group total defined benefit pension obligation, by approximately $0.8 billion. Similarly, if the 2016 interest rate had been one quarter of one percentage point lower than actually assumed, net periodic pension cost for pension plans in these countries, which represent about 92% of the Group's total net periodic pension cost for pension plans, would have increased by approximately $27 million. Depending on events, such differences could have a material effect on our total equity. For more information on obligations under retirement and other post-employment benefit plans and underlying actuarial assumptions, see "Note 25. Post-Employment Benefits for Associates" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Provisions and Contingencies

A number of Group companies are involved in various government investigations and legal proceedings (intellectual property, sales and marketing practices, product liability, commercial, employment and wrongful discharge, environmental claims, etc.) arising out of the normal conduct of their businesses. For more information, see "Note 20. Provisions and other non-current Liabilities" and "Note 28 Commitments and Contigencies" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

We record provisions for legal proceedings when it is probable that a liability has been incurred and the amount can be reliably estimated. These provisions are adjusted periodically as assessments change or additional information becomes available. For significant product liability cases the provision is actuarially determined based on factors such as past experience, amount and number of claims reported, and estimates of claims incurred but not yet reported.

Provisions are recorded for environmental remediation costs when expenditure on remedial work is probable and the cost can be reliably estimated. Remediation costs are provided for under "Non-current liabilities" in the Group's consolidated balance sheet.

Provisions relating to estimated future expenditure for liabilities do not usually reflect any insurance or other claims or recoveries, since these are only recognized as assets when the amount is reasonably estimable and collection is virtually certain.

Research & Development

Internal Research & Development costs are fully charged to the consolidated income statement in the period in which they are incurred. We consider that regulatory and other uncertainties inherent in the development of new products preclude the capitalization of internal development expenses as an intangible asset usually until marketing approval from the regulatory authority is obtained in a relevant major market, such as for the US, the EU, Switzerland or Japan.

Healthcare Contributions

In many countries our subsidiaries are required to make contributions to the countries' healthcare costs as part of programs other than the ones mentioned above under deductions from revenues. The amounts to be paid depend on various criteria such as the subsidiary's market share or sales volume compared to certain targets. Considerable judgment is required in estimating these contributions as not all data is available when the estimates need to be made.

The largest of these healthcare contributions relates to the US Healthcare Reform fee, which was introduced in 2011. This fee is an annual levy to be paid by US pharmaceutical companies, including various Novartis subsidiaries, based on each company's qualifying sales as a percentage of the prior year's government-funded program sales. This pharmaceutical fee levy is recognized in "Other expense".

On July 25, 2014, the US Department of the Treasury and the US Internal Revenue Service issued final guidance on this pharmaceutical fee levy which stipulated that instead of a liability being estimated and recognized immediately with the first qualifying sale in the following fee year, as had been industry practice, the levy is owed in the year in which the sales occur.

As a result of this final guidance, in 2014, "Other expense" includes the recurring non-tax deductible annual expense of approximately $200 million for the 2014 pharmaceutical fee levy, as well as the non-tax deductible expense of $204 million for the 2013 pharmaceutical fee levy. $204 million of this charge has been considered as an additional exceptional charge in 2014 since it results from the change in timing of recognition of the pharmaceutical fee levy as required by the final guidance.

In addition, effective 2013, the US government also implemented a medical device sales tax which is levied on the Alcon Division's US sales of products which are considered surgical devices under the law. This medical device tax is initially included in the cost of inventory as, for Alcon, the tax is usually levied on intercompany sales. It is expensed as cost of goods sold when the inventory is sold to third parties.

Taxes

We prepare and file our tax returns based on an interpretation of tax laws and regulations, and record estimates based on these judgments and interpretations. Our tax returns are subject to examination by the competent taxing authorities, which may result in an assessment being made requiring payments of additional tax, interest or penalties. Since Novartis uses its intellectual property globally to deliver goods and services, the transfer prices within the Group as well as arrangements between subsidiaries to finance research & development and other activities may be challenged by the national tax authorities in any of the jurisdictions in which Novartis operates. Therefore, inherent uncertainties exist in our estimates of our tax positions, but we believe that our estimated amounts for current and deferred tax assets or liabilities, including any amounts related to any uncertain tax positions, are appropriate based on currently known facts and circumstances.

New Accounting Pronouncements

See "Note 1. Significant Accounting Policies" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Internal Control over Financial Reporting

The Group's management has assessed the effectiveness of internal control over financial reporting. The Group's independent statutory auditor also issued an opinion on the effectiveness of internal control over financial reporting. Both the Group's management and its external auditors concluded that the Group maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016.

FACTORS AFFECTING RESULTS OF OPERATIONS

Transformational changes Fueling Demand

Golden age for medical research

Innovation in medical science is accelerating, driven by new therapeutic approaches. The number of new treatments underscores this trend. For instance, the average annual number of new drug molecules approved by the US Food and Drug Administration from 2012 through 2016 increased 46% compared to the prior five years.

Researchers are developing exciting new ways to treat diseases. Examples include gene editing and gene therapies, as well as RNA-based treatments that can intervene in how cells create specific proteins. Oncology is a particularly fast-evolving field and includes advances such as cell therapies to attack cancer cells, and vaccines that help people ward off the development of cancer in the first place.

The sophisticated new treatment approaches emerging from this golden age of medical research offer society and patients new hope for tackling the many diseases that still lack effective treatments.

Digital technology is also playing an increasingly important role in healthcare. Remote monitoring of patients, advanced data analytics, and other digital applications are changing the way clinical trials are conducted, as well as the way patients are treated. Technology is also being used to augment the effectiveness of traditional medicines.

This opens new possibilities for healthcare companies to further improve health outcomes for patients. It is also attracting technology companies to the healthcare industry. Their special skills make them potential partners for science-based companies like Novartis, which have skills they lack, such as deep clinical and regulatory expertise.

Growing and graying populations

The world's population continues to grow, with an additional 1 billion people expected to join the human race by 2030, bringing the total number of inhabitants to about 8.5 billion, predicts the United Nations. Most of this population growth is expected to be in the developing world, where there continues to be tremendous unmet medical need. The world's population also continues to age rapidly, with the number of people aged 60 or older expected to increase by more than 500 million by 2030, to 1.4 billion people.

At the same time, millions of people are migrating from rural areas to cities, sparking changes in lifestyle and diet that over time can affect their health. More than half the world's population now lives in cities and towns, and this number is expected to grow to about 5 billion people by 2030.

These trends are fueling a global increase in chronic diseases such as diabetes and heart disease that may require patients to follow years or even decades of treatment. Cancer and cardiovascular diseases will cause half of all deaths worldwide by 2025, predicts the World Health Organization.

Rising pressure on healthcare costs

These factors are contributing to higher demand for healthcare worldwide and putting healthcare systems under increasing cost pressure. Healthcare costs globally have risen at a rate of about 10% annually in recent years, according to Aon Hewitt, well above the general inflation rate. In many countries, overall spending on healthcare continues to grow as a proportion of total economic activity. The US spends the most, at 17% of all the goods and services produced in the country, according to the Organization for Economic Cooperation and Development.

Responding to the world's rising healthcare needs represents a significant opportunity for healthcare companies such as Novartis in the coming years and decades. However, healthcare companies also have an important role to play in ensuring healthcare systems are sustainable over the long haul.

The pressure on healthcare systems already has governments and health insurers looking for ways to slow the rise in spending, while still providing quality care for as many people as possible. In some cases, they are employing tough tactics, from limiting access to treatment and slowing the uptake of innovative new medicines, to shifting more of the cost to individual patients.

This trend means healthcare companies increasingly find themselves squeezed by conflicting demands to provide cost-effective treatments, while at the same time continuing to use the latest technology to pursue breakthrough medicines and devices. Rising costs have also helped fuel a heated public debate about the pharmaceutical industry's pricing practices and have prompted a heightened level of scrutiny.

Indeed, the possibility of political or regulatory action on drug prices has become a greater risk for the entire industry, including Novartis. Such action could take a variety of forms, from restrictions on price increases and mandates to provide broad access to treatments, to changes in intellectual property laws. For more on the risks Novartis faces and the steps we are taking to address them, please see "—Approach to Risk Management" below. One response to rising costs that is gaining momentum with governments, insurers and healthcare companies is to shift healthcare systems toward a focus on producing better health outcomes, rather than simply paying for pills and healthcare services.

For instance, the European Commission has sanctioned a value-based tendering approach for medical devices that allows companies to include measures of health outcomes in their price calculations. Elsewhere, the US Centers for Medicare & Medicaid Services is a year ahead of schedule in reaching its target of converting 50% of spending to quality-based payments that take into account both health outcomes and cost-effectiveness.

Novartis has also advocated a value-based approach as a way of improving efficiency in healthcare, and has agreed to be reimbursed for certain products based partly on health outcomes.

Taken together, the evolving trends we see in society and the healthcare industry reinforce our conviction that our strategy of focusing on innovation and improved health outcomes for patients is the correct one to steer us through a shifting healthcare landscape. Our attention remains on executing our strategy as effectively as possible.

Increasingly Challenging Business Environment

Loss of exclusivity for patented products

Pharmaceutical companies routinely face generic competition when their products lose patent or other intellectual property protection, and Novartis is no exception. Major products of our Innovative Medicines and Alcon Divisions, as well as certain products of our Sandoz Division, are protected by patent or other intellectual property rights—allowing us to exclusively market those products. The loss of exclusivity has had, and will continue to have, an adverse effect on our results. In 2016, the impact of generic competition on our net sales amounted to $2.4 billion.

Some of our best-selling products have started to, or are expected to, face considerable competition due to the expiration of patent or other intellectual property protection. For example, we faced generic competition for *Gleevec*/*Glivec* in the US, Japan and certain EU countries for most of 2016. In the remaining EU countries, certain of our *Glivec* intellectual property rights expired in December 2016, and generic competition there has begun. Looking forward, certain intellectual property protecting *Afinitor* and *Gilenya* will expire in 2018, 2019 and 2020. In addition, some of the patents protecting these products are being challenged in the US, raising the possibility of an earlier entry of generic competition.

To counter the impact of patent expirations, we continuously invest in R&D to rejuvenate our portfolio. For example, in 2016, we invested 18.6% of total net sales in R&D. One measure of the output of our efforts is the performance of our growth products—products launched in a key market (EU, US, Japan) in 2011 or later, or products with exclusivity in key markets until at least 2020 (except Sandoz, which includes only products launched in the last 24 months). These products accounted for 35% of total net sales in 2016, up 20% ($) from the previous year.

Ability to deliver new products

Our ability to maintain and grow our business—and to replace revenue and income lost to generic and other competition—depends in part on the success of our R&D activities in identifying and developing new treatments that address unmet medical needs, are accepted by patients and physicians, and are reimbursed by payors.

Developing new healthcare products and bringing them to market is a costly, lengthy and uncertain process. R&D for a new product in our Innovative Medicines Division can take 15 years or more, from discovery to commercial launch. With time limits on intellectual property protections, the longer it takes to develop a product, the less time we may have to recoup our costs. During each stage of development, there is a significant risk that we will encounter obstacles. They may cause a delay or add substantial expense, limit the potential for commercial success, or force us to abandon a product in which we have invested substantial amounts of time and money.

In addition, as healthcare costs continue to rise, governments and payors around the world are increasingly focused on health outcomes, rewarding new products that represent truly breakthrough innovation versus those that offer an incremental benefit over other products in the same therapeutic class. This has led to requests for more clinical trial data, for the inclusion of more patients in clinical trials, and for more detailed analyses of the trials. As a result, the already lengthy and expensive process of obtaining regulatory approvals and reimbursement for pharmaceutical products has become even more challenging.

Our Sandoz Division faces similar challenges, particularly in the development of biosimilars. While Sandoz was a pioneer in introducing biosimilars to the European market in 2006, and was the first company to win approval for a biosimilar under the new regulatory pathway in the US in 2015, many countries still lack fully developed regulatory frameworks for the development and approval of biosimilars. Further delays in establishing regulatory frameworks, or any other difficulties that may arise in the development or marketing of biosimilars, could put at risk the significant investments that Sandoz has made, and will continue to make, in this area.

Our Alcon Division faces medical device development and approval processes that are often similarly difficult. As part of its growth plan, Alcon is taking steps to accelerate innovation. It has started to see the results

of its efforts, with the approval and launch in 2016 of two new intraocular lenses, *PanOptix* and *UltraSert*, as well as a multifocal version of *Dailies Total1*. But there is no certainty that Alcon will continue to be successful in these efforts, and if it is not, there could be a material adverse effect on the success of the Alcon Division, and on the Group as a whole.

In spite of our significant investments, there can be no guarantee that our R&D activities will produce commercially viable new products that will enable us to grow our business and replace revenue and income lost to competition.

Commercial success of key growth products

Our ability to grow depends not only on our pipeline delivery, but also on our commercial success, particularly with respect to our growth products, which we consider to be an indicator of our ability to renew our portfolio. The commercial success of these products could be impacted at any time by a number of factors, including new competitors, changes in doctors' prescribing habits, pricing pressure, manufacturing issues, or loss of intellectual property protection. In addition, our revenue could be significantly impacted by the timing and rate of commercial acceptance of key new products.

All of our businesses face intense competition from new products and scientific advances from competitors. Physicians, patients and payors may choose competitor products instead of ours if they perceive them to be better in terms of efficacy, safety, cost or convenience. In our Oncology business, for example, *Afinitor* saw sales decline in 2016 due to new treatment options in advanced breast cancer and renal cell carcinoma in the US. Sales increases for *Afinitor* in other indications, such as neuroendocrine tumors of gastrointestinal or lung origin, were unable to compensate.

Our Alcon Division also faced significant competitive pressure in 2016. Alcon is implementing a growth plan to counteract this pressure, including steps such as accelerating innovation and increasing investments in new product launches. While we are starting to see signs of progress, such as contact lens market share gains in certain European countries where we started investing in direct-to-consumer advertising, there is no certainty that our actions and investments will be sufficient to offset competition and return the division to growth. Should our efforts fail to accomplish their goals, or fail to do so in a timely manner, it could have a material adverse impact on our business, financial condition, or results of operations beyond the near term, as well.

Pricing and reimbursement

Around the world, governments and payors continue to struggle with rising healthcare costs as aging populations contribute to increased prevalence of chronic diseases. There have also been examples, particularly in the US, of significant controversies about prices for pharmaceuticals that some members of the public have considered excessive. These factors have intensified the pressures we face regarding the prices we charge for our drugs, and on our ability to establish satisfactory rates of reimbursement for our products by governments, insurers and other payors.

We expect scrutiny to continue in 2017 and following years as governments and insurers around the world strive to reduce healthcare costs through steps such as restricting access to higher priced new medicines, increasing coinsurance or copays owed by patients for medicines, increasing the use of generics, and imposing price cuts. In this environment, we believe it is more important than ever to demonstrate the value that true innovation brings to the healthcare system.

To manage these pressures, we are investing in real-world data and analytics to provide additional evidence of the health benefits of our products, exploring new technologies and patient management services, and partnering with payors to develop and scale outcomes-based commercial models. For example, we are working with customers on flexible pricing approaches where we are fully compensated only if a drug succeeds in meeting certain performance targets.

Business practices

In recent years, there has been a trend of increasing government investigations and litigation against companies operating in our industry, including in the US and other countries. We are obligated to comply with the laws of all countries in which we operate, as well as any new requirements that may be imposed upon us. But

beyond legal requirements, we strive to meet evolving public expectations for ethical behavior. We have a significant global compliance program in place, and devote substantial time and resources to ensure that our business is conducted in a legal and publicly acceptable manner. Despite our efforts, any failure to comply with the law could lead to substantial liabilities that may not be covered by insurance and could affect our business and reputation.

Governments and regulatory authorities worldwide are also increasingly challenging practices previously considered to be legal and compliant. For example, sponsoring doctors to attend medical conferences has long been used by pharmaceutical companies to help raise awareness of the latest advances in medicine. One of our goals in 2016 was to find better and more inclusive ways to reach a broader cross-section of this community. We have therefore started to employ technology to supplement face-to-face meetings and bring the experience of international congresses to the local level.

Responding to these challenges and new regulations is costly. Investigations and litigation may affect our reputation, create a risk of potential exclusion from government reimbursement programs in the US and other countries, potentially large damage payments and agreements intended to regulate company behavior. This is why we continued to strengthen the Integrity & Compliance (I&C) function in 2016. The function now has 375 employees, 175 of whom were added in the last three years.

We also introduced a new Chief Ethics and Compliance Officer, reporting directly to the CEO, in 2016. The new Chief Ethics and Compliance Officer is also Head of Litigation, reporting to the Group General Counsel of Novartis. By bringing the I&C and Legal functions closer together, we can evaluate facts that are at issue in lawsuits to determine if additional compliance actions or policies are warranted. We expect this will help us constantly improve our compliance activities.

Supply continuity

The production of pharmaceutical products and medical devices can be highly complex, and any manufacturing issue compromising supply or quality could have serious consequences for the health of patients. For this reason, there are strict regulatory requirements surrounding our manufacturing processes, which introduce a greater chance for disruptions and liabilities. For example, government authorities monitor our manufacturing facilities, and if they fail to meet requirements, there is a risk that they could be shut down. Disturbances in our supply chain could lead to product shortages, lost revenue and litigation.

Beyond regulatory requirements, many of our products involve technically sophisticated manufacturing processes or require specialized raw materials. For example, biologic products—produced from living plant or animal micro-organisms—comprise a significant portion of our product portfolio. For biologic products, slight deviations in the production process could lead to production failures or recalls. Our portfolio also includes a number of sterile products, such as oncology treatments, which are technically complex to manufacture and require strict environmental controls. There is a greater chance of production failures and supply interruptions for such products.

Given the complexity of our manufacturing processes, we have worked for several years to adopt a single high-quality standard across the company. We believe these efforts are having an impact. The results of inspections by regulatory agencies in 2016 were consistent with the year before. Out of a total of 206 inspections, all but four (98%) were without major findings. Novartis took a further step in 2016 in our ongoing commitment to improvement, realigning our quality organization into a single, enterprise-wide group under one leader.

Foreign exchange fluctuations

Changes in exchange rates between the US dollar, our reporting currency, and other currencies can have a significant effect on our reported sales, costs and earnings, as well as on the reported value of our assets, liabilities and cash flows.

For example, because our expenditures in Swiss francs are significantly higher than our revenue in Swiss francs, volatility in the value of the Swiss franc can have a significant impact on our reported results, and the timing and extent of such volatility can be difficult to predict.

There is also a risk that certain countries could take steps that could significantly impact the value of their currencies, such as withdrawing from trade agreements or common currencies. In addition, countries may

experience periods of high inflation. This could lead them to devalue their currencies or set exchange controls, as Venezuela has done. Ongoing conditions in Venezuela and other such countries could lead to further devaluations, which could result in significant additional financial losses to the Group in the future.

To mitigate the risk posed by foreign exchange fluctuations, we engage in hedging transactions where management deems appropriate, after taking into account the natural hedging afforded by our global business activity.

Intangible assets and goodwill

We carry a significant amount of goodwill and other intangible assets on our consolidated balance sheet, primarily due to acquisitions. As a result, we may incur significant impairment charges if the fair value of intangible assets and groupings of cash generating units containing goodwill would be less than their carrying value on the Group's consolidated balance sheet at any point in time.

We regularly review our long-lived intangible and tangible assets for impairment. In 2016, for example, we recorded intangible asset impairment charges of $591 million. Impairment testing may lead to additional impairment charges in the future. Any significant impairment charges could have a material adverse effect on our results of operations and financial condition.

Tax

Our worldwide operations are taxed under laws in the jurisdictions in which we operate. However, the integrated nature of our worldwide operations can produce conflicting claims from revenue authorities as to the determination of profits to be taxed in individual countries. The majority of the jurisdictions in which we operate have double tax treaties with other foreign jurisdictions, which provide a framework for mitigating the incidence of double taxation on our revenues and capital gains.

But in recent years, tax authorities around the world have increased their scrutiny of companies tax filings and have become more rigid in exercising any discretion they may have. As part of this, the Organization for Economic Co-operation and Development (OECD) has proposed a number of tax law changes under its Base Erosion and Profit Shifting (BEPS) Action Plans to address issues of transparency, coherence and substance.

At the same time, the European Commission is finalizing the Anti Tax Avoidance Directive and continues to expand the application of the fiscal state aid policy and the respective investigation on tax ruling practices. These tax reform initiatives on the OECD and European levels also need local country implementation, including in our home country of Switzerland, which may result in significant changes to established tax principles and could lead to an increased risk of international tax disputes.

Although we have taken steps to be in compliance with the evolving OECD and European tax initiatives, and will continue to do so, significant uncertainties remain as to the outcome of the Swiss and other countries' tax reform efforts. Such efforts, including with respect to tax base or rate, transfer pricing, intercompany dividends, cross border transactions, controlled corporations, and limitations on tax relief allowed on the interest on intercompany debt, could require us to adapt our tax structure, increase our effective tax rate and adversely affect our financial results.

IT security, data integrity & data privacy

Our business is heavily dependent on critical, complex and interdependent information technology (IT) systems, including Internet-based systems, to support business processes.

The size and complexity of our IT systems, and—in some instances—their age, make them potentially vulnerable to external and internal security breaches, breakdowns, malicious intrusions, malware, misplaced and lost data, programming and human errors, and other similar events. Although we have devoted and continue to devote significant resources and management attention to the protection of our data and information technology, like many companies, we have experienced such events and expect to continue to experience them in the future. We believe that the data security breaches we have experienced to date have not resulted in significant disruptions to our operations, and will not have a significant adverse effect on our current or future results of operations. However, we may not be able to prevent breakdowns or breaches in our systems that could have a material adverse effect on our business, financial condition, results of operation, or reputation.

In addition, our use of information technologies, including the Internet, social media, mobile technologies, and technology-based medical devices—as well as other routine business operations—sometimes involves gathering personal information (including sensitive personal information) regarding our patients, vendors, customers, employees, collaborators and others. Breaches of our systems or other failures to protect such information could expose the personal information of third parties to unauthorized persons. Such information breaches could result in significant potential liability and reputational harm.

Approach to Risk Management

The Risk Committee of the Board ensures the Group has implemented an appropriate and effective risk management system and process. It reviews with management and internal audit the identification, prioritization and management of the risks, the accountabilities and roles of the functions involved with risk management, the risk portfolio and the related actions implemented by management. The Risk Committee informs the Board of Directors on a periodic basis.

The Group Risk Office coordinates and aligns the risk management processes, and reports to the Risk Committee on a regular basis on risk assessment and risk management. Organizational and process measures have been designed to identify and mitigate risks at an early stage. Organizationally, the responsibility for risk assessment and management is allocated to the divisions, organizational units, and functions, with specialized Corporate functions, such as Group Finance, Group Legal, Group Quality Assurance, Corporate Health, Safety and Environment, Business Continuity Management, Integrity and Compliance and the Business Practices Office, providing support and controlling the effectiveness of the risk management in these respective areas.

Financial risk management is described in more detail in "Note 29. Financial Instruments—Additional Disclosures" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

NON-IFRS MEASURES AS DEFINED BY NOVARTIS

Novartis uses certain non-IFRS metrics when measuring performance, especially when measuring current year results against prior periods, including core results, constant currencies, free cash flow and net debt.

Despite the use of these measures by management in setting goals and measuring the Group's performance, these are non-IFRS measures that have no standardized meaning prescribed by IFRS. As a result, such measures have limits in their usefulness to investors.

Because of their non-standardized definitions, the non-IFRS measures (unlike IFRS measures) may not be comparable to the calculation of similar measures of other companies. These non-IFRS measures are presented solely to permit investors to more fully understand how the Group's management assesses underlying performance. These non-IFRS measures are not, and should not be viewed as, a substitute for IFRS measures.

As an internal measure of Group performance, these non-IFRS measures have limitations, and the Group's performance management process is not solely restricted to these metrics.

Core Results

The Group's core results—including core operating income, core net income and core earnings per share—exclude fully the amortization and impairment charges of intangible assets, excluding software, and certain acquisition related items. The following items that exceed a threshold of $25 million are also excluded: integration and divestment related income and expenses, divestment gains and losses, restructuring charges/releases, legal related items, impairments of property, plant and equipment and financial assets, as well as income and expense items that management deems exceptional and that are or are expected to accumulate within the year to be over a $25 million threshold.

Novartis believes that investor understanding of the Group's performance is enhanced by disclosing core measures of performance because, as they exclude items that can vary significantly from year to year, the core measures enable better comparison of business performance across years. For this same reason, Novartis uses these core measures in addition to IFRS and other measures as important factors in assessing the Group's performance.

The following are examples of how these core measures are utilized:

– In addition to monthly reports containing financial information prepared under IFRS, senior management receives a monthly analysis incorporating these core measures.

– Annual budgets are prepared for both IFRS and core measures.

A limitation of the core measures is that they provide a view of the Group's operations without including all events during a period, such as the effects of an acquisition, divestments, or amortization/impairment of purchased intangible assets and restructurings.

Constant Currencies

Changes in the relative values of non-US currencies to the US dollar can affect the Group's financial results and financial position. To provide additional information that may be useful to investors, including changes in sales volume, we present information about our net sales and various values relating to operating and net income that are adjusted for such foreign currency effects.

Constant currency calculations have the goal of eliminating two exchange rate effects so that an estimate can be made of underlying changes in the consolidated income statement excluding the impact of fluctuations in exchange rates:

– The impact of translating the income statements of consolidated entities from their non-US dollar functional currencies to $; and

– The impact of exchange rate movements on the major transactions of consolidated entities performed in currencies other than their functional currency.

We calculate constant currency measures by translating the current year's foreign currency values for sales and other income statement items into $, using the average exchange rates from the prior year and comparing them to the prior year values in $.

We use these constant currency measures in evaluating the Group's performance, as they may assist us in evaluating our ongoing performance from year to year. However, in performing our evaluation, we also consider equivalent measures of performance that are not affected by changes in the relative value of currencies.

Growth Rate Calculation

For ease of understanding, Novartis uses a sign convention for its growth rates such that a reduction in operating expenses or losses compared to the prior year is shown as a positive growth.

Free Cash Flow

Novartis defines free cash flow as cash flow from operating activities and cash flow associated with the purchase or sale of property, plant and equipment, and intangible, other non-current and financial assets, excluding marketable securities. Cash flows in connection with the acquisition or divestment of subsidiaries, associated companies and non-controlling interests in subsidiaries are not taken into account to determine free cash flow.

Free cash flow is presented as additional information because Novartis considers it to be a useful indicator of the Group's ability to operate without reliance on additional borrowing or use of existing cash. Free cash flow is a measure of the net cash generated that is available for debt repayment, investment in strategic opportunities and for returning to shareholders. Free cash flow is not intended to be a substitute measure for cash flow from operating activities as determined under IFRS.

Net Debt

Novartis defines net debt as current and non-current financial debt less cash and cash equivalents, current investments and derivative financial instruments. Net debt is presented as additional information because management believes it is a useful supplemental indicator of the Group's ability to pay dividends, to meet financial commitments and to invest in new strategic opportunities, including strengthening its balance sheet.

Novartis Cash Value Added

The Novartis Cash Value Added (NCVA) is a metric that is based on what the company assesses to be its cash flow return less a capital charge on gross operating assets. NCVA is used as the primary internal financial measure for determining payouts under the new Long-Term Performance Plan (LTPP) introduced in 2014. More information on NCVA is presented as part of the Compensation Report, see "Item 6.B Compensation".

Additional Information

EBITDA

Novartis defines earnings before interest, tax, depreciation and amortization (EBITDA) as operating income from continuing operations excluding depreciation of property, plant and equipment (including any related impairment charges) and amortization of intangible assets (including any related impairment charges).

	2016	2015	Change
	$ m	$ m	$ m
Operating income from continuing operations	**8,268**	**8,977**	**(709)**
Depreciation of property, plant & equipment	1,489	1,470	19
Amortization of intangible assets	3,861	3,755	106
Impairments of property, plant & equipment, and intangible assets	693	246	447
EBITDA from continuing operations	**14,311**	**14,448**	**(137)**

Enterprise value

Enterprise value represents the total amount that shareholders and debt holders have invested in Novartis, less the Group's liquidity.

	Dec 31, 2016	Dec 31, 2015	Change
	$ m	$ m	$ m
Market capitalization	172,048	208,321	(36,273)
Non-controlling interests	59	76	(17)
Financial debts and derivatives	23,802	21,931	1,871
Liquidity	(7,777)	(5,447)	(2,330)
Enterprise value	**188,132**	**224,881**	**(36,749)**
Enterprise value/EBITDA	**13**	**16**	

2016 AND 2015 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS

	Innovative Medicines[1]		Sandoz		Alcon		Corporate		Total Group	
	2016	2015[2] restated	2016	2015[2] restated	2016	2015[2] restated	2016	2015	2016	2015
	$ m	$ m	$ m	$ m	$ m	$ m	$ m	$ m	$ m	$ m
IFRS operating income from continuing operations	**7,426**	**7,815**	**1,445**	**1,300**	**(132)**	**281**	**(471)**	**(419)**	**8,268**	**8,977**
Amortization of intangible assets	**2,440**	**2,367**	**460**	**447**	**901**	**895**			**3,801**	**3,709**
Impairments										
Intangible assets	522	138	65	27	4	1			591	166
Property, plant & equipment related to the Group-wide rationalization of manufacturing sites	1	6	(7)	83					(6)	89
Other property, plant & equipment	76	(45)	8	14		1		21	84	(9)
Financial assets	18	32					99	91	117	123
Total impairment charges	**617**	**131**	**66**	**124**	**4**	**2**	**99**	**112**	**786**	**369**
Acquisition or divestment related items										
—Income	(68)	(22)		(1)			(229)	(260)	(297)	(283)
—Expense	41	214		1			223	250	264	465
Total acquisition or divestment related items, net	**(27)**	**192**		**0**			**(6)**	**(10)**	**(33)**	**182**
Other items										
Divestment gains	(608)	(626)	(6)				(48)	(54)	(662)	(680)
Restructuring items										
—Income	(41)	(30)	(23)		(4)	(4)	(5)	(5)	(73)	(39)
—Expense	418	422	123	121	33	29	65	57	639	629
Legal-related items										
—Income	(99)								(99)	
—Expense	205	578		40		4		(30)	205	592
Additional income	(61)	(119)		(2)	(13)	(5)	(22)	(68)	(96)	(194)
Additional expense	84	132	6	15	61	33	100	65	251	245
Total other items	**(102)**	**357**	**100**	**174**	**77**	**57**	**90**	**(35)**	**165**	**553**
Total adjustments	**2,928**	**3,047**	**626**	**745**	**982**	**954**	**183**	**67**	**4,719**	**4,813**
Core operating income from continuing operations	**10,354**	**10,862**	**2,071**	**2,045**	**850**	**1,235**	**(288)**	**(352)**	**12,987**	**13,790**
As % of net sales	**31.8%**	**32.6%**	**20.4%**	**20.3%**	**14.6%**	**20.6%**			**26.8%**	**27.9%**
Income from associated companies			6	2			697	264	703	266
Core adjustments to income from associated companies, net of tax							431	715	431	715
Interest expense									(707)	(655)
Other financial income and expense[3]									(99)	(24)
Taxes (adjusted for above items)									(2,001)	(2,051)
Core net income from continuing operations									**11,314**	**12,041**
Core net loss from discontinued operations[4]										(256)
Core net income									**11,314**	**11,785**
Core net income attributable to shareholders									11,307	11,774
Core basic EPS from continuing operations ($)[5]									**4.75**	**5.01**
Core basic EPS from discontinued operations ($)[5]										(0.11)
Total core basic EPS ($)[5]									**4.75**	**4.90**

(1) Formerly named the Pharmaceuticals Division

(2) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016.

(3) Adjusted for charges of $0.3 billion related mainly to Venezuela subsidiaries (2015: $0.4 billion)

(4) For details on 2015 discontinued operations reconciliation from IFRS to core net income, please refer to "—2015 and 2014 Reconciliation of IFRS Results to Core Results—Discontinued Operations".

(5) Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

2015 AND 2014 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS

	Innovative Medicines[1]		Sandoz		Alcon		Corporate		Total Group	
	2015[2] restated	2014[2] restated	2015[2] restated	2014[2] restated	2015[2] restated	2014[2] restated	2015	2014	2015	2014
	$ m	$ m	$ m	$ m	$ m	$ m	$ m	$ m	$ m	$ m
IFRS operating income from continuing operations	**7,815**	**8,826**	**1,300**	**1,570**	**281**	**760**	**(419)**	**(67)**	**8,977**	**11,089**
Amortization of intangible assets	**2,367**	**1,401**	**447**	**448**	**895**	**891**		**3**	**3,709**	**2,743**
Impairments										
Intangible assets	138	238	27	39	1				166	277
Property, plant & equipment related to the Group-wide rationalization of manufacturing sites	6	23	83						89	23
Other property, plant & equipment	(45)	(8)	14	7	1	(1)	21	23	(9)	21
Financial assets	32	20		1			91	91	123	112
Total impairment charges	**131**	**273**	**124**	**47**	**2**	**(1)**	**112**	**114**	**369**	**433**
Acquisition or divestment related items										
—Income	(22)		(1)				(260)		(283)	
—Expense	214	33	1				250		465	33
Total acquisition or divestment related items, net	**192**	**33**	**0**				**(10)**		**182**	**33**
Other items										
Divestment gains	(626)	(237)					(54)	(294)	(680)	(531)
Restructuring items										
—Income	(30)	(59)		(3)	(4)	(21)	(5)		(39)	(83)
—Expense	422	664	121	21	29	63	57	1	629	749
Legal-related items										
—Income										
—Expense	578	125	40		4		(30)	30	592	155
Additional income	(119)	(158)	(2)		(5)	(29)	(68)	(315)	(194)	(502)
Additional expense	132	207	15	18	33	57	65	105	245	387
Total other items	**357**	**542**	**174**	**36**	**57**	**70**	**(35)**	**(473)**	**553**	**175**
Total adjustments	**3,047**	**2,249**	**745**	**531**	**954**	**960**	**67**	**(356)**	**4,813**	**3,384**
Core operating income from continuing operations	**10,862**	**11,075**	**2,045**	**2,101**	**1,235**	**1,720**	**(352)**	**(423)**	**13,790**	**14,473**
As % of net sales	**32.6%**	**31.8%**	**20.3%**	**19.6%**	**20.6%**	**26.0%**			**27.9%**	**27.7%**
Income from associated companies		812	2	4			264	1,102	266	1,918
Core adjustments to income from associated companies, net of tax		(812)					715	(163)	715	(975)
Interest expense									(655)	(704)
Other financial income and expense[3]									(24)	(31)
Taxes (adjusted for above items)									(2,051)	(2,028)
Core net income from continuing operations									**12,041**	**12,653**
Core net income from discontinued operations[4]									(256)	102
Core net income									**11,785**	**12,755**
Core net income attributable to shareholders									11,774	12,685
Core basic EPS from continuing operations ($)[5]									**5.01**	**5.19**
Core basic EPS from discontinued operations ($)[5]									(0.11)	0.04
Total core basic EPS ($)[5]									**4.90**	**5.23**

(1) Formerly named the Pharmaceuticals Division.

(2) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016.

(3) Adjusted in 2015 for charges of $0.4 billion related mainly to Venezuela subsidiaries.

(4) For details on discontinued operations reconciliation from IFRS to core net income, please refer to "—2015 and 2014 Reconciliation of IFRS Results to Core Results—Discontinued Operations".

(5) Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

2016, 2015 AND 2014 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS—GROUP

2016	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment related items, including restructuring and integration charges[3]	Other items[4]	Core results
	$ m	$ m	$ m	$ m	$ m	$ m
Gross profit from continuing operations	**31,916**	**3,758**	**96**		**36**	**35,806**
Operating income from continuing operations	**8,268**	**3,801**	**786**	**(33)**	**165**	**12,987**
Income before taxes from continuing operations	**7,817**	**4,097**	**786**	**(33)**	**648**	**13,315**
Taxes from continuing operations[5]	(1,119)					(2,001)
Net income from continuing operations	**6,698**					**11,314**
Net income	**6,698**					**11,314**
Basic EPS from continuing operations ($)[6]	**2.82**					**4.75**
Total basic EPS ($)[6]	**2.82**					**4.75**
The following are adjustments to arrive at Core Gross Profit from continuing operations						
Other revenues	918				(50)	868
Cost of goods sold	(17,520)	3,758	96		86	(13,580)
The following are adjustments to arrive at Core Operating Income from continuing operations						
Marketing & Sales	(11,998)				7	(11,991)
Research & Development	(9,039)	43	495		99	(8,402)
General & Administration	(2,194)				74	(2,120)
Other income	1,927		(10)	(297)	(867)	753
Other expense	(2,344)		205	264	816	(1,059)
The following are adjustments to arrive at Core Income before taxes from continuing operations						
Income from associated companies	703	296			135	1,134
Other financial income and expense	(447)				348	(99)

(1) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms; Income from associated companies includes $296 million for the Novartis share of the estimated Roche core items.

(2) Impairments: Cost of goods sold and Research & Development include impairment charges related to intangible assets; Other income includes impairment reversals of property, plant and equipment; Other expense includes impairment charges related to property, plant and equipment, and financial assets.

(3) Acquisition or divestment related items, including restructuring and integration charges: Other income and Other expense include transitional service-fee income and expenses and other items related to the portfolio transformation; Other income also includes a gain from the revaluation of a previously held financial investment in a newly acquired company.

(4) Other items: Other revenues include an early release of deferred income associated with a collaboration agreement; Cost of goods sold, Other income and Other expense include net restructuring and other charges related to the Group-wide rationalization of manufacturing sites; Research & Development, Marketing & Sales, Other income and Other expense include other restructuring income and charges; Cost of goods sold and Research & Development include adjustments of contingent considerations; General & Administration, Other income and Other expense include items related to setup costs for Novartis Business Services; Other income and Other expense also include legal settlements and changes in provisions; Other income also includes gains from product divestments, other income related to the portfolio transformation and a gain related to the sale of real estate; Other expense also includes a charge as a result of a pension plan amendment, a charge for an indirect tax settlement and other costs; Income from associated companies includes $135 million for the Novartis share of the estimated GSK Consumer Healthcare Holdings Ltd. core items; Other financial income and expense relates mainly to devaluation losses in Venezuela.

(5) Taxes on the adjustments between IFRS and core results take into account, for each individual item included in the adjustment, the tax rate that will finally be applicable to the item based on the jurisdiction where the adjustment will finally have a tax impact. Generally, this results in amortization and impairment of intangible assets and acquisition-related restructuring and integration items having a full tax impact. There is usually a tax impact on other items, although this is not always the case for items arising from legal settlements in certain jurisdictions. Adjustments related to income from associated companies are recorded net of any related tax effect. Due to these factors and the differing effective tax rates in the various jurisdictions, the tax on the total adjustments for continuing operations of $5.5 billion to arrive at the core results before tax amounts to $882 million. The average tax rate on the adjustments for continuing operations is 16.0% since the estimated full-year tax charge has been applied to the pre-tax income of the period.

(6) Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

2015	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment related items, including restructuring and integration charges[3]	Other items[4]	Core results
	$ m	$ m	$ m	$ m	$ m	$ m
Gross profit from continuing operations	**32,983**	**3,666**	**126**		**125**	**36,900**
Operating income from continuing operations	**8,977**	**3,709**	**369**	**182**	**553**	**13,790**
Income before taxes from continuing operations	**8,134**	**4,132**	**369**	**182**	**1,275**	**14,092**
Taxes from continuing operations[5]	(1,106)					(2,051)
Net income from continuing operations	**7,028**					**12,041**
Net income/loss from discontinued operations[6]	10,766					(256)
Net income	**17,794**					**11,785**
EPS from continuing operations ($)[7]	**2.92**					**5.01**
EPS from discontinued operations ($)[7]	4.48					(0.11)
EPS ($)[7]	**7.40**					**4.90**
The following are adjustments to arrive at Core Gross Profit from continuing operations						
Other revenues	947				(28)	919
Cost of goods sold	(17,404)	3,666	126		153	(13,459)
The following are adjustments to arrive at Core Operating Income from continuing operations						
Marketing & Sales	(11,772)				43	(11,729)
Research & Development	(8,935)	43	40		114	(8,738)
General & Administration	(2,475)				86	(2,389)
Other income	2,049		(56)	(283)	(887)	823
Other expense	(2,873)		259	465	1,072	(1,077)
The following are adjustments to arrive at Core Income before taxes from continuing operations						
Income from associated companies	266	423			292	981
Other financial income and expense	(454)				430	(24)

(1) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms; Income from associated companies includes $423 million for the Novartis share of the estimated Roche core items.

(2) Impairments: Cost of goods sold, Research & Development and Other expense consist principally of net impairment charges or reversals related to intangible assets, property, plant and equipment, and financial assets; Other income includes a reversal of an impairment related to property, plant and equipment.

(3) Acquisition or divestment related items, including restructuring and integration charges: Other income and Other expense include items related to the portfolio transformation.

(4) Other items: Other revenues and Other income include additional gains from product divestments; Cost of goods sold and Other expense include charges for the Group-wide rationalization of manufacturing sites; Cost of goods sold also includes an inventory write-off; Marketing & Sales, Research & Development and Other expense include other restructuring charges; Research & Development also includes expenses related to product acquisitions; General & Administration includes charges for transforming IT and finance processes and expenses related to setup costs for Novartis Business Services; Other income also includes a gain of $110 million from a Swiss pension plan amendment and items related to portfolio transformation; Other expense also includes legal settlement provisions; Income from associated companies includes $292 million for the Novartis share of the estimated OTC joint venture core items; Other financial income and expense relates mainly to devaluation losses in Venezuela.

(5) Taxes on the adjustments between IFRS and core results take into account, for each individual item included in the adjustment, the tax rate that will finally be applicable to the item based on the jurisdiction where the adjustment will finally have a tax impact. Generally, this results in amortization and impairment of intangible assets and acquisition-related restructuring and integration items having a full tax impact. There is usually a tax impact on other items, although this is not always the case for items arising from legal settlements in certain jurisdictions. Adjustments related to income from associated companies are recorded net of any related tax effect. Due to these factors and the differing effective tax rates in the various jurisdictions, the tax on the total adjustments for continuing operations of $6.0 billion to arrive at the core results before tax amounts to $945 million. The average tax rate on the adjustments for continuing operations is 15.9%.

(6) For details on discontinued operations reconciliation from IFRS to core net income, please refer to "—2015 and 2014 Reconciliation of IFRS Results to Core Results—Discontinued Operations".

(7) Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

2014	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment related items, including restructuring and integration charges[3]	Other items[4]	Core results
	$ m	$ m	$ m	$ m	$ m	$ m
Gross profit from continuing operations	**36,289**	**2,692**	**(21)**		**(139)**	**38,821**
Operating income from continuing operations	**11,089**	**2,743**	**433**	**33**	**175**	**14,473**
Income before taxes from continuing operations	**12,272**	**3,000**	**434**	**33**	**(1,058)**	**14,681**
Taxes from continuing operations[5]	(1,545)					(2,028)
Net income from continuing operations	**10,727**					**12,653**
Net loss/income from discontinued operations[6]	(447)					102
Net income	**10,280**					**12,755**
EPS from continuing operations ($)[7]	**4.39**					**5.19**
EPS from discontinued operations ($)[7]	(0.18)					0.04
EPS ($)[7]	**4.21**					**5.23**
The following are adjustments to arrive at Core Gross Profit from continuing operations						
Other revenues	1,215				(302)	913
Cost of goods sold	(17,345)	2,692	(21)		163	(14,511)
The following are adjustments to arrive at Core Operating Income from continuing operations						
Marketing & Sales	(12,377)				22	(12,355)
Research & Development	(9,086)	48	298		17	(8,723)
General & Administration	(2,616)				64	(2,552)
Other income	1,391		(15)		(813)	563
Other expense	(2,512)	3	171	33	1,024	(1,281)
The following are adjustments to arrive at Core Income before taxes from continuing operations						
Income from associated companies	1,918	257	1		(1,233)	943

(1) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms; Other expense includes amortization of intangible assets; Income from associated companies includes $257 million for the Novartis share of the estimated Roche core items.

(2) Impairments: Cost of goods sold, Research & Development, Other income and Other expense consist principally of net impairment charges or reversals related to intangible assets, property, plant and equipment and financial assets.

(3) Acquisition or divestment related items, including restructuring and integration charges: Other expense includes costs related to the portfolio transformation.

(4) Other items: Other revenues includes an amount for a commercial settlement; Cost of goods sold includes charges for the Group-wide rationalization of manufacturing sites; Marketing & Sales, Research & Development and General & Administration include charges for transforming IT and finance processes; Other income includes product related divestment gains and gains in the Novartis Venture Fund, an insurance recovery net of a deferred amount, a partial reversal of a legal expense provision, a reduction in restructuring provisions, and the impact from a post-retirement medical plan amendment; Other expense includes restructuring provision charges, charges for transforming IT and finance processes, an expense related to *Lucentis* in Italy, the expense of $204 million related to the advancement of the timing of recording the US Healthcare Fee liability as a result of final regulations; Income from associated companies includes gains from the divestment of Idenix and LTS Lohmann Therapie-Systeme AG shareholdings.

(5) Taxes on the adjustments between IFRS and core results of continuing operations take into account, for each individual item included in the adjustment, the tax rate that will finally be applicable to the item based on the jurisdiction where the adjustment will finally have a tax impact. Generally, this results in amortization and impairment of intangible assets and acquisition-related restructuring and integration items having a full tax impact. There is usually a tax impact on other items although this is not always the case for items arising from legal settlements in certain jurisdictions. Adjustments related to income from associated companies are recorded net of any related tax effect. Due to these factors and the differing effective tax rates in the various jurisdictions, the tax on the total adjustments of $2.4 billion to arrive at the core results before tax amounts to $483 million. This results in the average tax rate on the adjustments being 20.0%.

(6) For details on discontinued operations reconciliation from IFRS to core net income, please refer to "—2015 and 2014 Reconciliation of IFRS Results to Core Results—Discontinued Operations".

(7) Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

2016, 2015 AND 2014 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS—INNOVATIVE MEDICINES (FORMERLY NAMED THE PHARMACEUTICALS DIVISION)

2016	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment related items, including restructuring and integration charges[3]	Other items[4]	Core results
	$ m	$ m	$ m	$ m	$ m	$ m
Gross profit	**24,670**	**2,409**	**41**		**(11)**	**27,109**
Operating income	**7,426**	**2,440**	**617**	**(27)**	**(102)**	**10,354**
The following are adjustments to arrive at Core Gross Profit						
Other revenues	815				(50)	765
Cost of goods sold	(9,331)	2,409	41		39	(6,842)
The following are adjustments to arrive at Core Operating Income						
Marketing & Sales	(8,435)				7	(8,428)
Research & Development	(7,709)	31	481		85	(7,112)
Other income	1,091			(68)	(759)	264
Other expense	(1,213)		95	41	576	(501)

(1) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms.

(2) Impairments: Cost of goods sold and Research & Development include impairment charges related to intangible assets; Other expense includes impairment charges related to property, plant and equipment, and financial assets.

(3) Acquisition or divestment related items, including restructuring and integration charges: Other income and Other expense include transitional service-fee income and expenses and other items related to the portfolio transformation; Other income also includes a gain from the revaluation of a previously held financial investment in a newly acquired company.

(4) Other items: Other revenues include an early release of deferred income associated with a collaboration agreement; Cost of goods sold, Other income and Other expense include net restructuring and other charges related to the Group-wide rationalization of manufacturing sites; Research & Development, Marketing & Sales, Other income and Other expense include other restructuring income and charges; Research & Development also includes an expense due to an adjustment of a contingent consideration; Other income and Other expense also include legal settlements and changes in provisions; Other income also includes gains from product divestments; Other expense also includes a charge as a result of a pension plan amendment.

2015	IFRS restated results[1]	Amortization of intangible assets[2]	Impairments[3]	Acquisition or divestment related items, including restructuring and integration charges[4]	Other items[5]	Core restated results[1]
	$ m	$ m	$ m	$ m	$ m	$ m
Gross profit	**25,451**	**2,335**	**99**		**90**	**27,975**
Operating income	**7,815**	**2,367**	**131**	**192**	**357**	**10,862**
The following are adjustments to arrive at Core Gross Profit						
Other revenues	792				(28)	764
Cost of goods sold	(9,204)	2,335	99		118	(6,652)
The following are adjustments to arrive at Core Operating Income						
Marketing & Sales	(8,430)				43	(8,387)
Research & Development	(7,685)	32	39		112	(7,502)
Other income	1,149		(56)	(22)	(747)	324
Other expense	(1,639)		49	214	859	(517)

(1) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016.

(2) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms.

(3) Impairments: Cost of goods sold includes impairment charges, as well as reversals of impairment charges related to intangible assets; Research & Development includes impairment charges for in process projects and termination of collaboration and license agreements; Other income includes a reversal of intangible asset impairments; Other expense includes impairment charges related to property, plant and equipment and financial assets.

(4) Acquisition or divestment related items, including restructuring and integration charges: Other income and Other expense include income and costs related to the portfolio transformation.

(5) Other items: Other revenues and Other income include additional gains from product divestments; Cost of goods sold and Other expense include net restructuring charges related to the Group-wide rationalization of manufacturing sites; Cost of goods sold also includes an inventory write-off; Marketing & Sales, Research & Development and Other expense include other restructuring charges; Research & Development also includes expenses related to product acquisitions; Other income also includes a gain from a Swiss pension plan amendment; Other expense also includes legal settlement provisions.

2014	IFRS restated results[1]	Amortization of intangible assets[2]	Impairments[3]	Acquisition or divestment related items, including restructuring and integration charges[4]	Other items[5]	Core restated results[1]
	$ m	$ m	$ m	$ m	$ m	$ m
Gross profit	**27,433**	**1,359**	**(58)**		**127**	**28,861**
Operating income	**8,826**	**1,401**	**273**	**33**	**542**	**11,075**
The following are adjustments to arrive at Core Gross Profit						
Cost of goods sold	(8,724)	1,359	(58)		127	(7,296)
The following are adjustments to arrive at Core Operating Income						
Marketing & Sales	(8,809)				8	(8,801)
Research & Development	(7,787)	42	296		17	(7,432)
General & Administration	(1,114)				1	(1,113)
Other income	737		(13)		(454)	270
Other expense	(1,634)		48	33	843	(710)

(1) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016.

(2) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms.

(3) Impairments: Cost of good sold includes partial reversal of previously impaired production assets, partly offset by the impairment of intangible assets related to a marketed product; Research & Development includes impairment charges for in process projects and termination of collaboration and license agreements; Other income relates to impairment reversals of property, plant and equipment; Other expense includes impairment charges related to property, plant and equipment and financial assets.

(4) Acquisition or divestment related items, including restructuring and integration charges: Other expense includes costs related to the portfolio transformation.

(5) Other items: Cost of goods sold, Research & Development and Marketing & Sales include net restructuring charges related to the Group-wide rationalization of manufacturing sites; Marketing & Sales also includes charges for transforming IT and finance processes; Research & Development also includes a net increase of contingent consideration liabilities related to acquisitions; Other income includes an insurance recovery from Corporate related to exchange risks, gains related to the rationalization of manufacturing sites, the impact from a post-retirement medical plan amendment, as well as additional gains from divestments announced in prior periods; Other expense include restructuring charges, an expense related to *Lucentis* in Italy and an expense of $186 million related to the advancement of the timing of recording the US Healthcare Fee liability as a result of final regulations.

2016, 2015 AND 2014 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS—SANDOZ

2016	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Other items[3]	Core results
	$ m	$ m	$ m	$ m	$ m
Gross profit	**4,314**	**460**	**55**	**60**	**4,889**
Operating income	**1,445**	**460**	**66**	**100**	**2,071**
The following are adjustments to arrive at Core Gross Profit					
Cost of goods sold	(5,971)	460	55	60	(5,396)
The following are adjustments to arrive at Core Operating Income					
Research & Development	(814)		10		(804)
Other income	185		(10)	(29)	146
Other expense	(259)		11	69	(179)

(1) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets.

(2) Impairments: Cost of goods sold and Research & Development include impairment charges related to intangible assets; Other income includes impairment reversals of property, plant and equipment; Other expense includes impairment charges related to property, plant and equipment.

(3) Other items: Cost of goods sold, Other income and Other expense include net restructuring and other charges related to the Group-wide rationalization of manufacturing sites; Cost of goods sold, Other income and Other expense also include other restructuring income and charges; Other income also includes gains from product divestments; Other expense also includes other costs.

2015	IFRS restated results[1]	Amortization of intangible assets[2]	Impairments[3]	Acquisition or divestment related items, including restructuring and integration charges[4]	Other items[5]	Core restated results[1]
	$ m	$ m	$ m	$ m	$ m	$ m
Gross profit	**4,379**	**446**	**27**		**33**	**4,885**
Operating income	**1,300**	**447**	**124**		**174**	**2,045**
The following are adjustments to arrive at Core Gross Profit						
Cost of goods sold	(5,844)	446	27		33	(5,338)
The following are adjustments to arrive at Core Operating Income						
Research & Development	(782)	1				(781)
Other income	109			(1)	(4)	104
Other expense	(381)		97	1	145	(138)

(1) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016.

(2) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets.

(3) Impairments: Cost of goods sold includes impairments of intangible assets; Other expense includes impairment charges related to property, plant and equipment.

(4) Acquisition or divestment related items, including restructuring and integration charges: Other income and Other expense include items related to the portfolio transformation.

(5) Other items: Cost of goods sold includes marketable intangible assets not capitalized; Cost of goods sold and Other expense include net restructuring charges related to the Group-wide rationalization of manufacturing sites; Other income includes a gain from a Swiss pension plan amendment; Other expense also includes a legal settlement.

2014	IFRS restated results[1]	Amortization of intangible assets[2]	Impairments[3]	Other items[4]	Core restated results[1]
	$ m	$ m	$ m	$ m	$ m
Gross profit	**4,742**	**446**	**37**	**10**	**5,235**
Operating income	**1,570**	**448**	**47**	**36**	**2,101**
The following are adjustments to arrive at Core Gross Profit					
Cost of goods sold	(6,293)	446	37	10	(5,800)
The following are adjustments to arrive at Core Operating Income					
Research & Development	(833)	2	2		(829)
Other income	97		(1)	(3)	93
Other expense	(189)		9	29	(151)

(1) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016.

(2) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms.

(3) Impairments: Cost of goods sold and Research & Development include charges related to impairment of intangible assets; Other income includes a reversal of impairment charges related to property, plant and equipment; Other expense includes impairment charges related to property, plant and equipment and financial assets.

(4) Other items: Cost of goods sold and Other expense include net restructuring charges; Other income includes the reversal of restructuring charges; Other expense also includes an expense of $18 million related to the advancement of the timing of recording the US Healthcare Fee liability as a result of final regulations.

2016, 2015 AND 2014 RECONCILIATION OF IFRS RESULTS TO CORE RESULTS—ALCON

2016	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Other items[3]	Core results
	$ m	$ m	$ m	$ m	$ m
Gross profit	**2,724**	**889**		**(13)**	**3,600**
Operating loss/income	**(132)**	**901**	**4**	**77**	**850**
The following are adjustments to arrive at Core Gross Profit					
Cost of goods sold	(3,092)	889		(13)	(2,216)
The following are adjustments to arrive at Core Operating Income					
Research & Development	(516)	12	4	14	(486)
Other income	48			(4)	44
Other expense	(96)		–	80	(16)

(1) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms;

(2) Impairments: Research & Development includes impairment charges related to intangible assets.

(3) Other items: Cost of goods sold includes an income due to an adjustment of a contingent consideration; Research & Development, Other income and Other expense include restructuring income and charges; Research & Development also includes an expense due to an adjustment of a contingent consideration; Other expense also includes a charge for an indirect tax settlement.

2015	IFRS restated results[1]	Amortization of intangible assets[2]	Impairments[3]	Other items[4]	Core restated results[1]
	$ m	$ m	$ m	$ m	$ m
Gross profit	**2,877**	**885**		**2**	**3,764**
Operating income	**281**	**895**	**2**	**57**	**1,235**
The following are adjustments to arrive at Core Gross Profit					
Cost of goods sold	(3,145)	885		2	(2,258)
The following are adjustments to arrive at Core Operating Income					
Research & Development	(468)	10	1	2	(455)
General & Administration	(450)			32	(418)
Other income	54			(9)	45
Other expense	(69)		1	30	(38)

(1) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016.

(2) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms.

(3) Impairments: Research & Development includes impairment charges related to intangible assets; Other expense includes impairment charges related to property, plant and equipment.

(4) Other items: Cost of goods sold includes net restructuring charges related to the Group-wide rationalization of manufacturing sites; Research & Development includes non capitalized costs for the US; General & Administration includes charges for transforming IT and finance processes; Other income includes a gain from a Swiss pension plan amendment and a partial reversal of restructuring charges; Other expense includes other restructuring charges and a legal settlement.

2014	IFRS restated results[1]	Amortization of intangible assets[2]	Impairments[3]	Other items[4]	Core restated results[1]
	$ m	$ m	$ m	$ m	$ m
Gross profit	**3,444**	**887**		**26**	**4,357**
Operating income	**760**	**891**	**(1)**	**70**	**1,720**
The following are adjustments to arrive at Core Gross Profit					
Cost of goods sold	(3,204)	887		26	(2,291)
The following are adjustments to arrive at Core Operating Income					
Marketing & Sales	(1,697)			14	(1,683)
Research & Development	(466)	4			(462)
General & Administration	(508)			45	(463)
Other income	76		(1)	(49)	26
Other expense	(89)			34	(55)

(1) Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016.

(2) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms.

(3) Impairments: Other income includes a reversal of impairment charges related to property, plant and equipment.

(4) Other items: Cost of goods sold and Other expense include net restructuring charges related to the Group-wide rationalization of manufacturing sites; Marketing & Sales and General & Administration include charges for transforming IT and finance processes; Other income includes the reversal of restructuring charges related to the Group-wide rationalization of manufacturing sites, as well as the impact from a post-retirement medical plan amendment.

2016, 2015 AND 2014 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS—CORPORATE

2016	IFRS results	Impairments[1]	Acquisition or divestment related items, including restructuring and integration charges[2]	Other items[3]	Core results
	$ m	$ m	$ m	$ m	$ m
Gross profit	**208**				**208**
Operating loss	**(471)**	**99**	**(6)**	**90**	**(288)**
The following are adjustments to arrive at Core Operating Loss					
General & Administration	(506)			74	(432)
Other income	603		(229)	(75)	299
Other expense	(776)	99	223	91	(363)

(1) Impairments: Other expense includes impairment charges related to financial assets.

(2) Acquisition or divestment related items, including restructuring and integration charges: Other income and Other expense include transitional service-fee income and expenses and other items related to the portfolio transformation.

(3) Other items: General & Administration, Other income and Other expense include items related to setup costs for Novartis Business Services; Other income also includes an income related to the portfolio transformation and a gain related to the sale of real estate; Other expense also includes other restructuring charges and other costs.

2015	IFRS results	Impairments[1]	Acquisition or divestment related items, including restructuring and integration charges[2]	Other items[3]	Core results
	$ m	$ m	$ m	$ m	$ m
Gross profit	**276**				**276**
Operating loss	**(419)**	**112**	**(10)**	**(35)**	**(352)**
The following are adjustments to arrive at Core Operating Loss					
General & Administration	(648)			54	(594)
Other income	737		(260)	(127)	350
Other expense	(784)	112	250	38	(384)

(1) Impairments: Other expense includes impairment charges related to property, plant and equipment and financial assets.

(2) Acquisition or divestment related items, including restructuring and integration charges: Other income and Other expense include items related to the portfolio transformation.

(3) Other items: General & Administration and Other expense include expenses related to setup costs for Novartis Business Services; Other income includes a gain from a Swiss pension plan amendment, a reversal of a provision and items related to portfolio transformation; Other expense also includes a credit for a legal settlement charged to the divisions.

2014	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Other items[3]	Core results
	$ m	$ m	$ m	$ m	$ m
Gross profit	**670**			**(302)**	**368**
Operating loss	**(67)**	**3**	**114**	**(473)**	**(423)**
The following are adjustments to arrive at Core Gross Profit					
Other revenues	540			(302)	238
The following are adjustments to arrive at Core Operating Loss					
General & Administration	(618)			18	(600)
Other income	481			(307)	174
Other expense	(600)	3	114	118	(365)

(1) Amortization of intangible assets: Other expense includes amortization of intangible assets.

(2) Impairments: Other expense includes impairment charges related to property, plant and equipment and financial assets.

(3) Other items: Other revenues includes an amount for a commercial settlement; General & Administration includes expenses related to setup costs for Novartis Business Services; Other income includes an insurance recovery transferred to Innovative Medicines net of a deferred amount and gains in the Novartis Venture Fund; Other expense includes charges for transforming IT and finance processes, as well as a provision for a legal settlement.

2015 AND 2014 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS—GROUP DISCONTINUED OPERATIONS

2015	IFRS results	Impairments[1]	Acquisition or divestment related items, including restructuring and integration charges[2]	Other items[3]	Core results
	$ m	$ m	$ m	$ m	$ m
Gross profit	**267**			**6**	**273**
Operating income/loss	**12,477**	**(83)**	**(12,627)**	**8**	**(225)**
Income/loss before taxes	**12,479**	**(83)**	**(12,627)**	**8**	**(223)**
Taxes[4]	(1,713)				(33)
Net income/loss	**10,766**				**(256)**
EPS ($)[5]	**4.48**				**(0.11)**
The following are adjustments to arrive at Core Gross Profit					
Cost of goods sold	(376)			6	(370)
The following are adjustments to arrive at Core Operating Income					
Other income	13,420		(13,310)	(1)	109
Other expense	(727)	(83)	683	3	(124)

(1) Impairments: Other expense includes the partial reversal of the influenza Vaccines business impairment charge recorded in 2014.

(2) Acquisition or divestment related items, including restructuring and integration charges: Other income includes gains from the divestment of Animal Health ($4.6 billion) and from the transactions with GSK ($2.8 billion for the non-influenza Vaccines business and $5.9 billion resulting from the contribution of the former Novartis OTC Division into the GSK consumer healthcare joint venture in exchange for 36.5% interest in this newly created entity); Other expense includes additional transaction related expenses of $0.6 billion and other portfolio transformation related costs.

(3) Other items: Cost of goods sold, Other income and Other expense include restructuring charges.

(4) Taxes on the adjustments between IFRS and core results take into account, for each individual item included in the adjustment, the tax rate that will finally be applicable to the item based on the jurisdiction where the adjustment will finally have a tax impact. There is usually a tax impact on other items although this is not always the case for items arising from legal settlements in certain jurisdictions. Due to these factors and the differing effective tax rates in the various jurisdictions, the tax on the total adjustments of $12.7 billion to arrive at the core results before tax amounts to $1.7 billion. The average tax rate on the adjustments is 13.2%.

(5) Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

2014	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment related items, including restructuring and integration charges[3]	Other items[4]	Core results
	$ m	$ m	$ m	$ m	$ m	$ m
Gross profit	**2,886**	**65**	**302**		**19**	**3,272**
Operating loss/income	**(353)**	**73**	**1,141**	**(680)**	**(38)**	**143**
Loss/income before taxes	**(351)**	**73**	**1,141**	**(680)**	**(38)**	**145**
Taxes[5]	(96)					(43)
Net loss/income	**(447)**					**102**
EPS ($)[6]	**(0.18)**					**0.04**
The following are adjustments to arrive at Core Gross Profit						
Cost of goods sold	(3,073)	65	302		19	(2,687)
The following are adjustments to arrive at Core Operating Loss						
Research & Development	(857)	8				(849)
Other income	1,007		(1)	(876)	(89)	41
Other expense	(1,146)		840	196	32	(78)

(1) Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets up to the portfolio transformation annoucement date; Research & Development includes the recurring amortization of acquired rights for technology platforms up to the portfolio transformation announcement date.

(2) Impairments: Cost of goods sold and Other expense include the $1.1 billion impairment charge as a result of the sale of the influenza vaccines business; Other income includes a reduction of an impairment charge for property, plant and equipment; Other expense relates to an additional impairment charge in Corporate, for an in-process project which is divestment as a result of the portfolio transformation transactions.

(3) Acquisition or divestment related items, including restructuring and integration charges: Other income includes the gain on the disposal of the blood transfusion diagnostics unit on January 9, 2014; Other expense includes professional service fees related to the portfolio transformation divestment activities.

(4) Other items: Cost of goods sold and Other expense include restructuring charges related to the Group-wide rationalization of manufacturing sites; Other income includes the gain on the sale of a divested product, which was sold as a result of the portfolio transformation transaction, the reversal of restructuring charges related to the Group-wide rationalization of manufacturing sites, the partial reversal of a legal expense provision, and the impact from a post-retirement medical plan amendment; Other expense also includes the write-off of a receivable as a result of the portfolio transformation transactions.

(5) Taxes on the adjustments between IFRS and core results take into account, for each individual item included in the adjustment, the tax rate that will finally be applicable to the item based on the jurisdiction where the adjustment will finally have a tax impact. There is usually a tax impact on other items although this is not always the case for items arising from legal settlements in certain jurisdictions. Due to these factors and the differing effective tax rates in the various jurisdictions, the tax on the total adjustments of $496 million to arrive at the core results before tax amounts to $53 million. The average tax rate on the adjustments is 10.7%.

(6) Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

5.B Liquidity and Capital Resources

The following tables summarize the Group's cash flow and net debt.

	2016	2015	2014
	$ m	$ m	$ m
Cash flows from operating activities from continuing operations	11,475	12,085	13,898
Cash flows used in investing activities from continuing operations	(2,693)	(19,666)	(8)
Cash flows used in/from operating and investing activities from discontinued operations	(748)	8,694	888
Cash flows used in financing activities	(5,314)	(9,176)	(8,147)
Effect of exchange rate changes on cash and cash equivalents	(387)	(286)	(295)
Net change in cash and cash equivalents	**2,333**	**(8,349)**	**6,336**
Change in marketable securities, commodities, time deposits and derivative financial instruments	(3)	(66)	(1,696)
Change in current and non-current financial debts and derivative financial instruments	(1,871)	(1,520)	(2,393)
Change in net debt	**459**	**(9,935)**	**2,247**
Net debt at January 1	(16,484)	(6,549)	(8,796)
Net debt at December 31	**(16,025)**	**(16,484)**	**(6,549)**

CASH FLOW

Financial year 2016

Cash flows from operating activities from continuing operations amounted to $11.5 billion, compared to $12.1 billion in 2015. The decrease of $0.6 billion was driven by lower operating income adjusted for non-cash items, lower hedging results and higher payments out of provisions, partially offset by dividends received from GSK Consumer Healthcare Holdings Ltd., lower cash outflows for taxes paid and net current assets and other operating cash flow items.

Cash flows used in investing activities from continuing operations amounted to $2.7 billion in 2016. This amount includes cash outflows of $1.9 billion for the purchase of property, plant and equipment, $1.4 billion for intangible, financial and other non-current assets, and $0.8 billion for acquisitions and divestments of businesses, net (including the Transcend Medical, Inc. and Selexys Pharmaceuticals Corporation acquisitions). This was offset by cash inflows of $1.3 billion of proceeds from the sale of non-current assets and $0.1 billion net proceeds from sales of marketable securities and commodities. In 2015, cash flows used in investing activities from continuing operations amounted to $19.7 billion, primarily due to the acquisition of the GSK oncology assets for $16.0 billion.

Cash flows used in investing activities from discontinued operations amounted to $0.7 billion in 2016 due to portfolio transformation transactions payments, including capital gains taxes. In 2015, the cash flows from investing activities from discontinued operations of $8.9 billion were mainly driven by net proceeds from the portfolio transformation divestments.

The cash flows used in financing activities amounted to $5.3 billion, compared to $9.2 billion in 2015. The 2016 amount includes cash outflows of $6.5 billion for the dividend payment and $0.9 billion for treasury share transactions, net. The net inflow from current and non-current financial debts of $2.1 billion was due to the increase in short-term borrowings of $1.8 billion and the issuance of two euro denominated bonds for total proceeds of $1.9 billion, partially offset by the repayment at maturity of a euro denominated bond of $1.7 billion.

The 2015 amount included mainly a cash outflow of $6.6 billion for the dividend payment and $4.5 billion for treasury share transactions, net, partially offset by a net inflow from financial debts of $2.0 billion.

Financial year 2015

Cash flow from operating activities of continuing operations decreased to $12.1 billion from $13.9 billion in 2014.

The decrease was primarily due to the negative currency impact on operations. The prior year also included higher proceeds from commercial settlements.

The cash outflow for investing activities of continuing operations amounted to $19.7 billion in 2015. This was primarily due to the outflow of $16.5 billion for acquisitions of businesses, mainly the oncology business from GSK for $16.0 billion, the net outflow of $2.8 billion for the purchase of property, plant and equipment, intangible and other non-current assets and the net outflow of $0.3 billion from the change in marketable securities.

In 2014, cash flow from investing activities of continuing operations was a small net outflow of $8 million. This was primarily due to net outflows of $0.3 billion from the acquisition of businesses, $3.0 billion mainly from purchase of property, plant and equipment, offset by $1.4 billion of proceeds from the sale of investments in associated companies, particularly LTS Lohmann Therapie-Systeme AG and Idenix Pharmaceuticals, Inc. and $1.9 billion proceeds from the net sale of other marketable securities, including maturing long-term deposits.

The cash flows used in financing activities amounted to $9.2 billion, compared to $8.1 billion in 2014. The 2015 amount includes a cash outflow of $6.6 billion for the dividend payment and $4.5 billion for treasury share transactions, net. The net inflow from the increase in current and non-current financial debt of $2.0 billion was mainly due to the issuance of three Swiss franc denominated bonds for a total amount of $1.5 billion in the first half of 2015, the issuance of two US dollar denominated bonds totaling $3.0 billion in the fourth quarter 2015 and the increase in commercial paper outstanding of $0.4 billion, partially offset by the repayment at maturity of a US dollar denominated bond of $2.0 billion and a Swiss franc denominated bond of $0.9 billion. In 2014, the cash outflows included $6.8 billion for the dividend payment and $4.5 billion for treasury share transactions, net. These outflows were partially offset by increase in the current and non-current financial debt of $3.3 billion.

The net cash inflows from discontinued operations of $8.7 billion in 2015 were mainly driven by the net proceeds of $8.9 billion from the divestments in connection with the portfolio transformation transactions. In 2014, the net cash inflow of $0.9 billion consisted mainly of proceeds from the divestment of the blood transfusion diagnostics unit to Grifols S.A.

Financial year 2014

Cash flow from operating activities of continuing operations increased to $13.9 billion from $12.6 billion in 2013, an increase of $1.3 billion. This was primarily due to higher operating income adjusted for non-cash items, despite negative currency effects and increased hedging gains, partially offset by payments for legal settlements and restructuring.

The cash flow used in investing activities from continuing operations were almost balanced compared to an outflow of $3.2 billion in 2013. In 2014, there were proceeds from the sale of investments in associated companies included, in particular LTS Lohmann Therapie-Systeme AG and Idenix Pharmaceuticals, Inc. of $0.6 billion and $0.8 billion respectively and of $1.9 billion from the net sale of other marketable securities including maturing long-term deposits. These inflows were offset by outflows of $2.6 billion for property, plant and equipment and a net amount of $0.7 billion for acquisition of businesses mainly the acquisition of WaveTec ($0.4 billion) and other non-current assets, primarily intangible assets. The prior year outflow for investing activities of $3.2 billion was primarily related to investments in property, plant and equipment of $2.9 billion and a net outflow of $0.3 billion for the acquisition of businesses and other non-current assets, mainly intangible assets.

In 2014, cash inflows from investing activities of discontinued operations amounted to $ 0.9 billion, mainly on account of the net proceeds from the divestment of the blood transfusion diagnostics unit to Grifols S.A.

The Group total cash flows used in financing activities amounted to $8.1 billion, compared to $8.8 billion, in 2013. The 2014 amount includes the dividend payment of $6.8 billion, net treasury share transactions of $4.5 billion and a net increase in financial debt of $3.3 billion, principally due to the issuance of four bonds totaling $5.5 billion reduced by the repayment at maturity of a bond of $2.0 billion. In 2013, the dividend payment amounted to $6.1 billion, net treasury share transactions were $1.2 billion and financial debt decreased by a net amount of $1.3 billion.

GROUP NET DEBT

Net debt constitutes a non-IFRS financial measure, which means that it should not be interpreted as a measure determined under International Financial Reporting Standards (IFRS). Net debt/liquidity is presented as additional information as it is a useful indicator of the Group's ability to meet financial commitments and to invest in new strategic opportunities, including strengthening its balance sheet.

Group net debt consists of:

	2016	2015	Change
	$ m	$ m	$ m
Current financial debts and derivative financial instruments	(5,905)	(5,604)	(301)
Non-current financial debts	(17,897)	(16,327)	(1,570)
Total financial debt	**(23,802)**	**(21,931)**	**(1,871)**
Less liquidity			
Cash and cash equivalents	7,007	4,674	2,333
Marketable securities, commodities, time deposits and derivative financial instruments	770	773	(3)
Total liquidity	**7,777**	**5,447**	**2,330**
Net debt at December 31	**(16,025)**	**(16,484)**	**459**

Financial year 2016

Total non-current and current financial debt, including derivatives, amounted to $23.8 billion at December 31, 2016, compared to $21.9 billion at December 31, 2015.

Non-current financial debt increased by $1.6 billion to $17.9 billion at December 31, 2016, mainly due to the issuance of two euro denominated bonds for a total amount of $2.0 billion.

Current financial debt increased by $0.3 billion to $5.9 billion at December 31, 2016, from $5.6 billion at December 31, 2015, mainly due to higher short-term borrowings partially offset by a repayment at maturity of a euro denominated bond of $1.7 billion. Overall current financial debt consists of the current portion of non-current debt of $0.2 billion and other short-term borrowings (including derivatives and commercial paper) of $5.7 billion. Group net debt decreased to $16.0 billion at the end of 2016 from $16.5 billion at the end of 2015.

Novartis has two US commercial paper programs under which it can issue up to $9.0 billion in the aggregate of unsecured commercial paper notes. Novartis also has a Japanese commercial paper program under which it can issue up to JPY 150 billion (approximately $1.3 billion) of unsecured commercial paper notes. Commercial paper notes totaling $3.2 billion under these three programs were outstanding as per December 31, 2016. Novartis further has a committed credit facility of $6.0 billion, entered into on September 23, 2015. This credit facility is provided by a syndicate of banks and is intended to be used as a backstop for the US commercial paper programs. It matures in September 2020 and was undrawn as per December 31, 2016.

The long-term credit rating for the company continues to be double-A (Moody's Aa3; Standard & Poor's AA−; Fitch AA).

Financial year 2015

Total financial debt, including derivatives, amounted to $21.9 billion at December 31, 2015 compared to $20.4 billion at December 31, 2014.

Non-current financial debt increased by $2.5 billion to $16.3 billion at December 31, 2015, from $13.8 billion at December 31, 2014. The increase was mainly due to the issuance of three Swiss franc denominated bonds for a total amount of $1.5 billion and the issuance of two US dollar denominated bonds for a total of $3.0 billion, partially offset by the reclassification to current financial debt of a euro denominated bond of $1.6 billion.

Current financial debt decreased by $1.0 billion to $5.6 billion at December 31, 2015, from $6.6 billion at December 31, 2014. The decrease was mainly due to repayment at maturity of a US dollar denominated bond of $2.0 billion and a Swiss franc denominated bond of $0.9 billion, partially offset by the reclassification from non-current financial debt of the $1.6 billion euro denominated bond mentioned above.

Overall current financial debt consists of the current portion of non-current debt of $1.7 billion and other short-term borrowings (including derivatives and commercial paper) of $3.9 billion. Group net debt increased to $16.5 billion at the end of 2015 compared to $6.5 billion at the end of 2014.

Novartis has two US commercial paper programs under which it can issue up to $9 billion in the aggregate of unsecured commercial paper notes. Novartis also has a Japanese commercial paper program under which it can issue up to JPY 150 billion (approximately $1.25 billion) of unsecured commercial paper notes. Commercial paper notes totaling $1.1 billion under these three programs were outstanding as per December 31, 2015. Novartis further has a committed credit facility of $6 billion, entered into on September 23, 2015. This credit facility is provided by a syndicate of banks and is intended to be used as a backstop for the US commercial paper programs. It matures in September 2020 and was undrawn as per December 31, 2015.

The long-term credit rating for the company continues to be double-A (Moody's Aa3; Standard & Poor's AA−; Fitch AA).

An overview of the movements in our current financial debt and related interest rates is set forth below:

	December 31	Average interest rate at year end	Average balance during the year	Average interest rate during the year	Maximum balance during the year
	$ m	%	$ m	%	$ m
2016					
Interest-bearing accounts of associates payable on demand	1,601	0.50	1,694	0.50	1,763
Bank and other financial debt	836	8.56	1,066	6.71	1,369
Commercial paper	3,174	0.68	4,788	0.45	6,989
Current portion of non-current financial debt	178	na	881	na	1,719
Fair value of derivative financial instruments	116	na	93	na	192
Total current financial debt	**5,905**		**8,522**		**12,032**
2015					
Interest-bearing accounts of associates payable on demand	1,645	0.62	1,720	0.59	1,803
Bank and other financial debt	1,185	5.98	1,280	5.54	2,785
Commercial paper	1,085	0.62	3,545	0.19	5,686
Current portion of non-current financial debt	1,659	na	1,916	na	3,044
Fair value of derivative financial instruments	30	na	79	na	188
Total current financial debt	**5,604**		**8,540**		**13,506**

na = not applicable or available

Interest bearing accounts of associates payable on demand relate to employee deposits in CHF from the compensation of associates employed by Swiss entities (December 31, 2016 interest rate: 0.5%). Other bank and financial debt refer to usual lending and overdraft facilities.

The maturity schedule of our net debt is as follows:

	2016					
	Due within one month	Due later than one month but less than three months	Due later than three months but less than one year	Due later than one year but less than five years	Due after five years	Total
	$ m	$ m	$ m	$ m	$ m	$ m
Current assets						
Marketable securities and time deposits	32	126	110	124	53	445
Commodities					94	94
Derivative financial instruments and accrued interest	38	102	91			231
Cash and cash equivalents	5,907	1,100				7,007
Total current financial assets	**5,977**	**1,328**	**201**	**124**	**147**	**7,777**
Non-current liabilities						
Financial debt				(5,141)	(12,756)	(17,897)
Financial debt—undiscounted				*(5,155)*	*(12,901)*	*(18,056)*
Total non-current financial debt				**(5,141)**	**(12,756)**	**(17,897)**
Current liabilities						
Financial debt	(5,099)	(250)	(440)			(5,789)
Financial debt—undiscounted	*(5,099)*	*(250)*	*(440)*			*(5,789)*
Derivative financial instruments	(15)	(72)	(29)			(116)
Total current financial debt	**(5,114)**	**(322)**	**(469)**			**(5,905)**
Net debt	**863**	**1,006**	**(268)**	**(5,017)**	**(12,609)**	**(16,025)**

	2015					
	Due within one month	Due later than one month but less than three months	Due later than three months but less than one year	Due later than one year but less than five years	Due after five years	Total
	$ m	$ m	$ m	$ m	$ m	$ m
Current assets						
Marketable securities and time deposits	22	11	200	247	62	542
Commodities					86	86
Derivative financial instruments and accrued interest	40	67	38			145
Cash and cash equivalents	4,674					4,674
Total current financial assets	**4,736**	**78**	**238**	**247**	**148**	**5,447**
Non-current liabilities						
Financial debt				(4,664)	(11,663)	(16,327)
Financial debt—undiscounted				*(4,676)*	*(11,797)*	*(16,473)*
Total non-current financial debt				**(4,664)**	**(11,663)**	**(16,327)**
Current liabilities						
Financial debt	(3,258)	(289)	(2,027)			(5,574)
Financial debt—undiscounted	*(3,258)*	*(289)*	*(2,028)*			*(5,575)*
Derivative financial instruments	(8)	(20)	(2)			(30)
Total current financial debt	**(3,266)**	**(309)**	**(2,029)**			**(5,604)**
Net debt	**1,470**	**(231)**	**(1,791)**	**(4,417)**	**(11,515)**	**(16,484)**

The following table provides a breakdown of liquidity and financial debt by currency as of December 31:

LIQUIDITY AND FINANCIAL DEBT BY CURRENCY

	Liquidity in % 2016[1]	Liquidity in % 2015[1]	Financial debt in % 2016[2]	Financial debt in % 2015[2]
$	77	50	66	64
EUR	9	16	13	14
CHF	5	13	13	14
JPY		1	5	5
Other	9	20	3	3
	100	100	100	100

(1) Liquidity includes cash and cash equivalents, marketable securities, commodities and time deposits.

(2) Financial debt includes non-current and current financial debt.

EFFECTS OF CURRENCY FLUCTUATIONS

We transact our business in many currencies other than the US dollar, our reporting currency.

The following provides an overview of net sales and operating expenses for our continuing operations based on IFRS values for 2016, 2015 and 2014 for currencies most important to the Group:

	2016		2015		2014	
Currency	Net sales	Operating expenses	Net sales	Operating expenses	Net sales	Operating expenses
	%	%	%	%	%	%
US dollar ($)	38	43	40	42	36	39
Euro (EUR)	26	23	24	23	26	25
Swiss franc (CHF)	2	15	2	13	2	13
Japanese yen (JPY)	7	5	6	4	7	5
Chinese yuan (CNY)	4	3	4	3	3	3
British pound (GBP)	3	2	3	3	3	2
Canadian dollar (CAD)	3	1	3	1	3	1
Brazilian real (BRL)	2	1	2	2	2	2
Australian dollar (AUD)	2	1	2	1	2	1
Russian ruble (RUB)	1	1	1	1	2	1
Other currencies	12	5	13	7	14	8

Operating expenses in the above table include cost of goods sold, Marketing & Sales, Research & Development, General & Administration, Other income and Other expense.

We prepare our consolidated financial statements in US dollars. As a result, fluctuations in the exchange rates between the US dollar and other currencies can have a significant effect on both the Group's results of operations as well as on the reported value of our assets, liabilities and cash flows. This in turn may significantly affect reported earnings (both positively and negatively) and the comparability of period-to-period results of operations.

For purposes of our consolidated balance sheets, we translate assets and liabilities denominated in other currencies into US dollars at the prevailing market exchange rates as of the relevant balance sheet date. For purposes of the Group's consolidated income and cash flow statements, revenue, expense and cash flow items in local currencies are translated into US dollars at average exchange rates prevailing during the relevant period. As a result, even if the amounts or values of these items remain unchanged in the respective local currency, changes

in exchange rates have an impact on the amounts or values of these items in our consolidated financial statements.

Because our expenditures in Swiss francs are significantly higher than our revenues in Swiss francs, volatility in the value of the Swiss franc can have a significant impact on the reported value of our earnings, assets and liabilities, and the timing and extent of such volatility can be difficult to predict. In addition, there is a risk that certain countries could take steps that could significantly impact the value of their currencies.

There is also a risk that certain countries could devalue their currency. If this occurs, then it could impact the effective prices we would be able to charge for our products and also have an adverse impact on both our consolidated income statement and balance sheet. The Group is exposed to a potential adverse devaluation risk on its intercompany funding and total investment in certain subsidiaries operating in countries with exchange controls.

The most significant country in this respect is Venezuela, where the Group has incurred significant foreign exchange losses in 2016 and 2015.

Subsidiaries whose functional currencies have experienced a cumulative inflation rate of more than 100% over the past three years apply the rules of IAS 29 "Financial Reporting in Hyperinflationary Economies." Gains and losses incurred upon adjusting the carrying amounts of non-monetary assets and liabilities for inflation are recognized in the income statement. The subsidiaries in Venezuela restate non-monetary items in the balance sheet in line with the requirements of IAS 29.

The Group's subsidiaries in Venezuela are experiencing a significant reduction in approvals for remittance of US dollars outside the country at the exchange rate available for imports of specific goods and services of national priority, including medicines and medical supplies. As a result, in November 2016, the Group changed the exchange rate applied to translate the financial statements of its Venezuelan subsidiaries from VEF 11 per $ to the floating rate of DICOM (Sistema de Divisa Complementaria) which was VEF 658 per $ as of November 1, 2016. A corresponding $0.3 billion revaluation loss on the outstanding intercompany balances was recognized in the fourth quarter of 2016. Due to reserves against the intercompany balances, the net outstanding intercompany payable balance of Venezuela subsidiaries was reduced to an insignificant amount as at December 31, 2016.

The Group has an equivalent of approximately $2 million of cash in Venezuela in local currency (VEF), which is subject to loss of purchase power due to high inflation in the country.

The Group manages its global currency exposure by engaging in hedging transactions where management deems appropriate, after taking into account the natural hedging afforded by our global business activity. For 2016, we entered into various contracts that change in value with movements in foreign exchange rates to preserve the value of assets, commitments and expected transactions. We use forward contracts and foreign currency options to hedge. For more information on how these transactions affect our consolidated financial statements and on how foreign exchange rate exposure is managed, see "Note 1. Significant Accounting Policies", "Note 5. Interest Expense and other Financial Income and Expense", "Note 16. Marketable Securities, Commodities, Time Deposits, Derivative Financial Instruments and Cash and Cash Equivalents" and "Note 29. Financial Instruments—Additional Disclosures" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

The following table sets forth the foreign exchange rates of the US dollar against key currencies used for foreign currency translation when preparing the Group's consolidated financial statements:

$ per unit	Average for year 2016	Average for year 2015	Change in %	Year-end 2016	Year-end 2015	Change in %
AUD	0.744	0.753	(1)	0.722	0.731	(1)
BRL	0.288	0.305	(6)	0.307	0.253	21
CAD	0.755	0.784	(4)	0.741	0.721	3
CHF	1.015	1.040	(2)	0.978	1.011	(3)
CNY	0.151	0.159	(5)	0.144	0.154	(6)
EUR	1.107	1.110	0	1.051	1.093	(4)
GBP	1.355	1.529	(11)	1.227	1.483	(17)
JPY (100)	0.922	0.826	12	0.854	0.831	3
RUB (100)	1.498	1.649	(9)	1.648	1.362	21

$ per unit	Average for year 2015	Average for year 2014	Change in %	Year-end 2015	Year-end 2014	Change in %
AUD	0.753	0.903	(17)	0.731	0.819	(11)
BRL	0.305	0.426	(28)	0.253	0.376	(33)
CAD	0.784	0.906	(13)	0.721	0.861	(16)
CHF	1.040	1.094	(5)	1.011	1.010	0
CNY	0.159	0.162	(2)	0.154	0.161	(4)
EUR	1.110	1.329	(16)	1.093	1.215	(10)
GBP	1.529	1.648	(7)	1.483	1.556	(5)
JPY (100)	0.826	0.947	(13)	0.831	0.836	(1)
RUB (100)	1.649	2.649	(38)	1.362	1.722	(21)

The following table provides a summary of the currency impact on key Group figures due to their conversion into $, the Group's reporting currency, of the financial data from entities reporting in non-US dollars. Constant currency (cc) calculations apply the exchange rates of the prior year to the current year financial data for entities reporting in non-US dollars.

CURRENCY IMPACT ON KEY FIGURES

	Change in constant currencies % 2016	Change in $ % 2016	Percentage point currency impact 2016	Change in constant currencies % 2015	Change in $ % 2015	Percentage point currency impact 2015
Net sales from continuing operations	0	(2)	(2)	5	(5)	(10)
Operating income from continuing operations	(3)	(8)	(5)	(2)	(19)	(17)
Net income from continuing operations	1	(5)	(6)	(18)	(34)	(16)
Core operating income from continuing operations	(2)	(6)	(4)	10	(5)	(15)
Core net income from continuing operations	(3)	(6)	(3)	9	(5)	(14)

For additional information on the effects of currency fluctuations, see "Note 29. Financial Instruments—Additional Disclosures" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

FREE CASH FLOW

Novartis defines free cash flow as cash flow from operating activities and cash flow associated with the purchase or sale of property, plant and equipment, intangible, other non-current and financial assets, excluding marketable securities. Cash flows in connection with the acquisition or divestment of subsidiaries, associated companies and non-controlling interests in subsidiaries are not taken into account to determine free cash flow. For further information about the free cash flow measure, which is a non-IFRS measure, see "Item 5. Operating and Financial Review and Prospects—5.A Operating Results—Non-IFRS Measures as Defined by Novartis" above. The following is a summary of the free cash flow:

	2016	2015	2014
	$ m	$ m	$ m
Operating income from continuing operations	**8,268**	**8,977**	**11,089**
Reversal of non-cash items			
Depreciation, amortization and impairments	6,175	5,575	4,751
Change in provisions and other non-current liabilities	956	1,642	1,490
Other	(264)	(96)	122
Operating income adjusted for non-cash items	**15,135**	**16,098**	**17,452**
Interest and other financial receipts	942	1,180	1,067
Interest and other financial payments	(878)	(669)	(692)
Taxes paid	(2,111)	(2,454)	(2,179)
Payments out of provisions and other net cash movements in non-current liabilities	(1,536)	(1,207)	(1,125)
Change in inventory and trade receivables less trade payables	(1,051)	(617)	(731)
Change in other net current assets and other operating cash flow items	974	(246)	106
Cash flows from operating activities from continuing operations	**11,475**	**12,085**	**13,898**
Purchase of property, plant & equipment	(1,862)	(2,367)	(2,624)
Proceeds from sales of property, plant & equipment	161	237	60
Purchase of intangible assets	(1,017)	(1,138)	(780)
Proceeds from sales of intangible assets	847	621	246
Purchase of financial assets	(247)	(264)	(239)
Proceeds from sales of financial assets	247	166	431
Purchase of other non-current assets	(149)	(82)	(60)
Proceeds from sales of other non-current assets		1	2
Free cash flow from continuing operations	**9,455**	**9,259**	**10,934**
Free cash flow from discontinued operations		(230)	(172)
Free cash flow	**9,455**	**9,029**	**10,762**

Financial year 2016

In 2016, free cash flow from continuing operations amounted to $9.5 billion (+2% $) compared to $9.3 billion in 2015. The increase of $0.2 billion was mainly driven by lower net investments in property, plant and equipment.

Free cash flow for the total Group amounted to $9.5 billion in 2016 compared to $9.0 billion in 2015. The prior year included a negative free cash flow of approximately $0.3 billion from discontinued operations.

Financial year 2015

In 2015, free cash flow from continuing operations decreased by 15% to $9.3 billion compared to $10.9 billion in 2014. This decrease was primarily due to the negative currency impact on operations. The prior year also included higher proceeds from Novartis Venture Fund divestments and commercial settlements. Total free cash flow including the continuing and discontinued operations was $9.0 billion in 2015 compared to $10.8 billion in 2014.

Financial year 2014

The free cash flow from continuing operations increased by $1.4 billion to $10.9 billion. This was primarily due to higher cash flows from operating activities, which mainly benefited from higher operating income adjusted for non-cash items, despite negative currency effects and increased hedging gains, partially offset by higher investments in intangible assets.

In 2014, free cash flow of the total Group increased by $0.8 billion to $10.8 billion compared to $9.9 billion in 2013.

CONDENSED CONSOLIDATED BALANCE SHEETS

	Dec 31, 2016	Dec 31, 2015	Change
	$ m	$ m	$ m
Assets			
Property, plant & equipment	15,641	15,982	(341)
Goodwill	30,980	31,174	(194)
Intangible assets other than goodwill	31,340	34,217	(2,877)
Financial and other non-current assets	27,232	27,338	(106)
Total non-current assets	**105,193**	**108,711**	**(3,518)**
Inventories	6,255	6,226	29
Trade receivables	8,202	8,180	22
Other current assets	2,697	2,992	(295)
Cash, marketable securities, commodities, time deposits and derivative financial instruments	7,777	5,447	2,330
Total current assets	**24,931**	**22,845**	**2,086**
Total assets	**130,124**	**131,556**	**(1,432)**
Equity and liabilities			
Total equity	**74,891**	**77,122**	**(2,231)**
Financial debts	17,897	16,327	1,570
Other non-current liabilities	15,127	14,399	728
Total non-current liabilities	**33,024**	**30,726**	**2,298**
Trade payables	4,873	5,668	(795)
Financial debts and derivatives	5,905	5,604	301
Other current liabilities	11,431	12,436	(1,005)
Total current liabilities	**22,209**	**23,708**	**(1,499)**
Total liabilities	**55,233**	**54,434**	**799**
Total equity and liabilities	**130,124**	**131,556**	**(1,432)**

Total non-current assets of $105.2 billion at December 31, 2016 decreased by $3.5 billion compared to December 31, 2015.

Intangible assets other than goodwill decreased by $2.9 billion, mainly due to amortization and impairment charges totaling $4.5 billion, and unfavorable currency translation adjustments of $0.5 billion, partially offset by the impact of business combinations and additions totaling $2.1 billion. Property, plant and equipment decreased by 0.3 billion, mainly due to depreciation of $1.5 billion and unfavorable currency translation adjustments of $0.5 billion, partially offset by additions of $1.8 billion.

Goodwill decreased by $0.2 billion to $31.0 billion, mainly on account of currency translation adjustments.

Financial and other non-current assets decreased by $0.1 billion to $27.2 billion. This includes: investments in associated companies, which decreased by $1.0 billion to $14.3 billion, mainly on account of currency translation

adjustments; deferred tax assets, which increased by $1.1 billion to $10.0 billion, mainly on intangible assets, inventories and pension obligations, and financial assets and other non-current assets which decreased by $0.2 billion to $2.9 billion.

Total current assets increased by $2.1 billion to $24.9 billion at December 31, 2016, mainly due to an increase in cash and cash equivalents, marketable securities, commodities and derivatives of $2.3 billion, partially offset by a decrease in other current assets of $0.3 billon. Inventories and trade receivables were broadly in line with the prior year.

Based on our current incurred loss provisioning approach, we consider that our doubtful debt provisions are adequate. However, we intend to continue to monitor the level of trade receivables in Greece, Italy, Portugal, Spain, Brazil, Russia and Saudi Arabia. Should there be a substantial deterioration in our economic exposure with respect to those countries, we may increase our level of provisions by moving to an expected loss provisioning approach or may change the terms of trade on which we operate.

The majority of the outstanding trade receivables from these closely monitored countries are due directly from local governments or from government-funded entities except for Russia, which are due from private entities. The gross trade receivables from these countries at December 31, 2016 amount to $1.5 billion (2015: $1.6 billion), of which $82 million are past due for more than one year (2015: $80 million) and for which provisions of $62 million have been recorded (2015: $56 million). At December 31, 2016, amounts past due for more than one year are not significant in any of these countries.

The following table provides an overview of our aging analysis of our trade receivables as of December 31, 2016 and 2015:

	2016	2015
	$ m	$ m
Not overdue	7,386	7,318
Past due for not more than one month	262	265
Past due for more than one month but less than three months	223	255
Past due for more than three months but less than six months	185	193
Past due for more than six months but less than one year	145	156
Past due for more than one year	163	135
Provisions for doubtful trade receivables	(162)	(142)
Total trade receivables, net	**8,202**	**8,180**

There is also a risk that certain countries could devalue their currency. Currency exposures are described in more detail, see "—Effects of Currency Fluctuations" above.

Trade payables and other current liabilities decreased by $1.8 billion to $16.3 billion, compared to $18.1 billion at December 31, 2015, due to a decrease in other current liabilities of $1.0 billion and a decrease in trade payables of $0.8 billion.

Current income tax liabilities decreased by $0.1 billion to $1.6 billion. While there is some uncertainty about the final taxes to be assessed in our major countries, we believe that our estimated amounts for current income tax liabilities, including any amounts related to any uncertain tax positions, are appropriate based on currently known facts and circumstances.

In our key countries, Switzerland and the US, assessments have been agreed by the tax authorities up to 2014 in Switzerland and in the US up to 2012, with the exception of one open US position related to the 2007 and one for the 2010 tax filings.

Other non-current liabilities amounted to $15.1 billion at December 31, 2016, compared to $14.4 billion at December 31, 2015. The increase of $0.7 billion was primarily due to an increase in the pension liability of $0.5 billion, mainly resulting from a decrease in the actuarial discount rates used to calculate the present value of the benefit obligation and an increase in deferred tax liability of $0.3 billion.

Other non-current liabilities include deferred tax liabilities of $6.7 billion, provisions and other non-current liabilities of $8.5 billion.

Novartis believes that its total provisions are adequate based upon currently available information. However, given the inherent difficulties in estimating liabilities in this area, Novartis may incur additional costs beyond the amounts provided. Management believes that such additional amounts, if any, would not be material to the Group's financial condition but could be material to the results of operations or cash flows in a given period.

The Group's equity decreased by $2.2 billion to $74.9 billion at December 31, 2016, compared to $77.1 billion at December 31, 2015. The decrease was mainly on account of unfavorable currency translation differences of $2.4 billion and net actuarial losses from defined benefit plans of $0.5 billion, partially offset by the Novartis share of other comprehensive income recognized by associated companies of $0.7 billion. The $6.5 billion dividend payment was offset by the net income of $6.7 billion.

The Group's liquidity amounted to $7.8 billion at December 31, 2016 compared to $5.4 billion at December 31, 2015, and net debt decreased to $16.0 billion at December 31, 2016 compared to $16.5 billion at December 31, 2015. The debt/equity ratio increased to 0.32:1 at December 31, 2016 compared to 0.28:1 at December 31, 2015.

SUMMARY OF EQUITY MOVEMENTS ATTRIBUTABLE TO NOVARTIS AG SHAREHOLDERS

	Number of outstanding shares (in millions)			Issued share capital and reserves attributable to Novartis AG shareholders		
	2016	2015	Change	2016	2015	Change
				$ m	$ m	$ m
Balance at beginning of year	**2,373.9**	**2,398.6**	**(24.7)**	**77,046**	**70,766**	**6,280**
Shares acquired to be held in Group Treasury		(9.6)	9.6		(897)	897
Shares acquired to be canceled	(10.3)	(49.9)	39.6	(784)	(4,805)	4,021
Other share purchases	(2.6)	(4.1)	1.5	(208)	(417)	209
Exercise of options and employee transactions	4.1	27.0	(22.9)	214	1,592	(1,378)
Equity-based compensation	9.0	11.9	(2.9)	664	815	(151)
Decrease of treasury share repurchase obligation under a share buyback trading plan					658	(658)
Dividends				(6,475)	(6,643)	168
Net income of the year attributable to shareholders of Novartis AG				6,712	17,783	(11,071)
Impact of change in ownership of consolidated entities				(7)		(7)
Other comprehensive income attributable to shareholders of Novartis AG				(2,330)	(1,806)	(524)
Balance at end of year	**2,374.1**	**2,373.9**	**0.2**	**74,832**	**77,046**	**(2,214)**

During 2016, 13.1 million treasury shares were delivered as a result of options being exercised and physical share deliveries related to equity-based participation plans (2015: 38.9 million shares). Novartis repurchased 10.3 million shares on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback approved at the Annual General Meeting (AGM) in 2016, to offset the dilutive impact from equity-based participation plans (2015: 49.9 million shares under the $5 billion share buyback announced in November 2013, which was completed in November 2015). In addition, 2.6 million shares were acquired from employees, which were previously granted to them under the respective programs (2015: 4.1 million). No shares were repurchased on the SIX Swiss Exchange first trading line in 2016 (2015: 9.6 million). With these transactions, the total number of shares outstanding was increased by 0.2 million shares in 2016 (2015: reduction of 24.7 million shares).

Treasury shares

At December 31, 2016, our holding of treasury shares amounted to 253.1 million shares or approximately 10% of the total number of issued shares. Approximately 135 million treasury shares are held in entities that limit their availability for use.

At December 31, 2015, our holding of treasury shares amounted to 303.1 million shares or approximately 11% of the total number of issued shares. Approximately 137 million treasury shares are held in entities that limit their availability for use.

At December 31, 2014, our holding of treasury shares amounted to 307.6 million shares or approximately 11% of the total number of issued shares. Approximately 153 million treasury shares are held in entities that limit their availability for use.

Bonds

In September 2016, two EUR bonds totaling EUR 1.75 billion were issued; a 7-year bond of EUR 1.25 billion with a coupon of 0.125% and a 12-year bond of EUR 0.5 billion with a coupon of 0.625%.

In June 2016, a EUR bond of EUR 1.5 billion with a coupon of 4.25% was repaid at maturity.

In February 2015, three Swiss franc bonds totaling CHF 1.375 billion were issued; a 10-year bond of CHF 0.5 billion with a coupon of 0.25%, a 14-year bond of CHF 0.55 billion with a coupon of 0.625% and a 20-year bond of CHF 0.325 billion with a coupon of 1.050%.

In November 2015, two US Dollar bonds totaling $3.0 billion were issued: a 10-year bond of $1.75 billion with a coupon of 3.0% and a 30-year bond of $1.25 billion with a coupon of 4.0%.

In April 2015, a 2.9% US Dollar bond of $2.0 billion was repaid at maturity. In June 2015, a 3.625% CHF bond of 0.8 billion was repaid at maturity.

In February 2014, two US Dollar bonds totaling $4.0 billion were issued; a 10-year bond of $2.15 billion with a coupon of 3.4% and a 30-year bond of $1.85 billion with a coupon of 4.4%. Further, a 4.125% US Dollar bond of $2.0 billion was repaid at maturity.

In October 2014, two EUR bonds totaling EUR1.2 billion were issued; a 7-year bond of EUR 0.6 billion with a coupon of 0.75% and a 12-year bond of EUR 0.6 billion with a coupon of 1.625%.

Liquidity/Short-term Funding

We continuously track our liquidity position and asset/liability profile. This involves modeling cash flow maturity profiles based on both historical experiences and contractual expectations to project our liquidity requirements. We seek to preserve prudent liquidity and funding capabilities.

We are not aware of significant demands to change our level of liquidity needed to support our normal business activities. We make use of various borrowing facilities provided by several financial institutions. We also successfully issued various bonds in previous years (including 2015 and 2016) and raised funds through our commercial paper programs. In addition, reverse repurchasing agreements are contracted and Novartis has entered into credit support agreements with various banks for derivative transactions. For details of the maturity profile of debt, currency and interest rate structure, see "Note 29. Financial Instruments—Additional Disclosures" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

5.C Research & Development, Patents and Licenses

Our R&D spending for continuing operations totaled $9.0 billion, $8.9 billion and $9.1 billion ($8.5 billion, $8.9 billion and $8.7 billion excluding impairments and amortization charges) for the years 2016, 2015 and 2014, respectively. Each of our divisions has its own R&D and patents policies. Our divisions have numerous products in various stages of development. For further information on these policies and these products in development, see "Item 4. Information on the Company—4.B Business Overview."

As described in the "Risk Factors" section and elsewhere in this Form 20-F, our drug development efforts are subject to the risks and uncertainties inherent in any new drug development program. Due to the risks and uncertainties involved in progressing through pre-clinical development and clinical trials, and the time and cost involved in obtaining regulatory approvals, among other factors, we cannot reasonably estimate the timing, completion dates, and costs, or range of costs, of our drug development program, or of the development of any particular development compound, see "Item 3. Key Information—3.D Risk Factors." In addition, for a description of the research and development process for the development of new drugs and our other products, and the regulatory process for their approval, see "Item 4. Information on the Company—4.B Business Overview."

5.D Trend Information

Please see "—5.A Operating Results—Factors Affecting Results of Operations" and "Item 4. Information on the Company—4.B Business Overview" for trend information.

5.E Off-Balance Sheet Arrangements

We have no unconsolidated special purpose financing or partnership entities or other off-balance sheet arrangements that have or are reasonably likely to have a current or future effect on our financial condition, changes in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources, that is material to investors, see also "Note 28. Commitments and Contingencies" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017 and matters described in "Item 5.F Aggregate Contractual Obligations".

5.F Tabular Disclosure of Contractual Obligations

The following table summarizes the Group's contractual obligations and other commercial commitments, as well as the effect these obligations and commitments are expected to have on the Group's liquidity and cash flow in future periods:

	Payments due by period				
	Total	**Less than 1 year**	**2–3 years**	**4–5 years**	**After 5 years**
	$ m	**$ m**	**$ m**	**$ m**	**$ m**
Non-current financial debt, including current portion	18,075	178	3,513	1,628	12,756
Operating leases	2,897	262	324	186	2,125
Unfunded pensions and other post-employment benefit plans	2,242	117	244	256	1,625
Research & Development					
Potential milestone commitments	4,175	385	854	2,283	653
Purchase commitments					
Property, plant & equipment	223	200	23		
Total contractual cash obligations	**27,612**	**1,142**	**4,958**	**4,353**	**17,159**

The Group intends to fund the R&D and purchase commitments with internally generated resources.

On December 16, 2016 Novartis entered into an agreement to acquire Ziarco Goup Limited, a privately held company focused on the development of novel treatments in dermatology. The transaction closed on January 20, 2017. The total consideration of $420 million consists of an initial cash payment of $325 million before purchase price adjustments and preliminary present value of contingent consideration of $95 million.

On December 20, 2016 Novartis entered into a definitive agreement for the acquisition of Encore Vision, Inc, focused on the development of a novel treatment in presbyopia. The transaction closed on January 20, 2017. The total consideration of $465 million consists of an initial cash payment of $375 million before purchase price adjustments and preliminary present value of contingent consideration of $90 million. For further details on the

above two transactions, see "Note 2. Significant Transactions" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

For other contingencies, see "Item 4. Information on the Company—4.D Property, Plants and Equipment—Environmental Matters", "Item 8. Financial Information—8.A Consolidated Statements and Other Financial Information", and "Note 20. Provisions and other non-current Liabilities" and "Note 28 Commitments and Contigencies" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

Item 6. Directors, Senior Management and Employees

6.A Directors and Senior Management

The information set forth under "Corporate governance—Our Board Of Directors—Board of Directors" on pages 94 to 97, and "Corporate Governance—Our management—Executive Committee" on pages 100 to 103, in each case of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, is incorporated by reference.

6.B Compensation

The information set forth under "Compensation Report" on pages 110 to 142 of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, is incorporated by reference.

6.C Board Practices

The information set forth under "Corporate governance" on pages 76 to 93, on pages 98 to 99, and on pages 104 to 107, in each case of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, is incorporated by reference.

6.D Employees

The table below sets forth the breakdown of the total year-end number of our full time equivalent employees by main category of activity and geographic area for the past three years.

For the year ended December 31, 2016 (full time equivalents)	Marketing & Sales	Production & Supply	Research & Development	NBS[1]	General & Administration	Total
USA	6,615	6,836	7,363	1,517	706	23,037
Canada and Latin America	4,430	1,404	516	841	491	7,682
Europe	18,034	19,807	10,208	4,683	2,473	55,205
Asia/Africa/Australasia	17,825	7,029	3,504	3,007	1,104	32,469
Total	**46,904**	**35,076**	**21,591**	**10,048**	**4,774**	**118,393**

For the year ended December 31, 2015 (full time equivalents)	Marketing & Sales	Production & Supply	Research & Development	NBS[1]	General & Administration	Total
USA	6,027	6,735	7,684	1,583	653	22,682
Canada and Latin America	4,756	1,470	469	810	503	8,008
Europe	18,278	19,767	10,014	4,568	2,815	55,442
Asia/Africa/Australasia	18,611	6,819	3,413	2,515	1,210	32,568
Total	**47,672**	**34,791**	**21,580**	**9,476**	**5,181**	**118,700**

For the year ended December 31, 2014 (full time equivalents)	Marketing & Sales	Production & Supply	Research & Development	NBS[1]	General & Administration	Total
USA	6,529	8,283	8,147	1,603	738	25,300
Canada and Latin America	5,309	2,435	515	326	1,001	9,586
Europe	20,884	23,997	11,052	3,909	3,225	63,067
Asia/Africa/Australasia	21,454	7,739	3,693	1,670	904	35,460
Total	**54,176**	**42,454**	**23,407**	**7,508**	**5,868**	**133,413**
Thereof Continuing Operations	*48,638*	*36,106*	*21,181*	*7,508*	*4,376*	*117,809*
Thereof Discontinued Operations	*5,538*	*6,348*	*2,226*		*1,492*	*15,604*

(1) NBS relates to full time equivalent employees from our Novartis Business Services organizational unit.

As of December 31, 2015, the number of our full time equivalent employees decreased by approximately 15,000 compared to December 31, 2014, mainly due to the completion in 2015 of a series of transactions intended to transform our portfolio of businesses. For more information on these transactions, see the information set forth under "Note 2. Significant transactions" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

A significant number of our associates are represented by unions or works councils. We have not experienced any material work stoppages in recent years, and we consider our employee relations to be good.

6.E Share Ownership

The aggregate amount of our shares owned by our non-executive Directors and the members of our Executive Committee in 2016 (including persons closely linked to them) as of December 31, 2016 was 1,809,282 shares. This excludes certain unvested shares and other equity rights (such as Restricted Stock Units and Phantom Shares) because such unvested shares and equity rights do not represent shares held by these persons as of December 31, 2016.

The aggregate amount of Novartis share and ADR options, including other information regarding the options, held by our non-executive Directors and the members of our Executive Committee in 2016, as of December 31, 2016 is set forth below:

Title of Options	Amount of shares called for by the options	Exercise Price[1]	Purchase Price (if any)	Expiration Date	Total number of options held
Novas17 Options	1	72.85	0	February 3, 2017	0
Novas18 Options	1	64.05	0	January 10, 2018	0
Novas19 Options	1	53.65	0	January 18, 2019	0
Novas20 Options	1	55.85	0	January 19, 2020	0
Novas21 Options	1	54.70	0	January 19, 2021	141,396
Novas22 Options	1	54.20	0	January 19, 2022	0
Novas23 Options	1	61.70	0	January 17, 2023	0
Total Novartis Share Options					**141,396**
Novartis ADR Options Cycle XI	1	$58.38	0	February 3, 2017	0
Novartis ADR Options Cycle XII	1	$57.96	0	January 10, 2018	0
Novartis ADR Options Cycle XIII	1	$46.42	0	January 18, 2019	0
Novartis ADR Options Cycle XIV	1	$53.70	0	January 19, 2020	0
Novartis ADR Options Cycle XV	1	$57.07	0	January 19, 2021	0
Novartis ADR Options Cycle XVI	1	$58.33	0	January 19, 2022	0
Novartis ADR Options Cycle XVII	1	$66.07	0	January 17, 2023	0
Total Novartis ADR Options					**0**

[1] Exercise price indicated is per share, and denominated in Swiss francs for share options and US dollars for ADR options.

Information above for any former non-executive Directors and members of our Executive Committee who stepped down during 2016 is reported as of the date of their resignation.

Since 2014, we no longer grant any new share or ADR options to our non-executive Directors, the members of our Executive Committee and our associates under our equity based participation plans. For more information on the Novartis shares, share options and other equity based instruments owned by individual members of our Executive Committee and by our current non-executive Directors, see the information set forth under "Compensation Report—Additional information—Shares, ADRs, equity rights and share options owned by Executive Committee members" and "Compensation Report—Additional information—Shares, ADRs and other equity rights owned by Executive Committee members" on page 134, and under "Compensation Report—2016 Board compensation—Shares, ADRs and share options owned by Board members" and "Compensation Report—2016 Board compensation—Shares and ADRs owned by Board members" on page 140, in each case of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, which is incorporated by reference. For more information on our equity based participation plans, see the information set forth under "Note 26. Equity-based participation plans for associates" on pages 229 to 232 of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, which is incorporated by reference.

Item 7. Major Shareholders and Related Party Transactions

7.A Major Shareholders

Novartis shares are widely held. As of December 31, 2016, Novartis had approximately 171,000 shareholders listed in its share register, representing approximately 70.3% of issued shares. Based on the Novartis AG share register and excluding treasury shares, approximately 42.5% of the shares registered by name were held in Switzerland and approximately 23.9% were held in the US. Approximately 13.3% of the shares registered in the

share register were held by individual investors, while approximately 86.7% were held by legal entities, nominees, fiduciaries and the ADS depositary.

Based on our share register, we believe that we are not directly or indirectly owned or controlled by another corporation or government, or by any other natural or legal persons. There are no arrangements that may result in a change of control.

2016

According to the share register, as of December 31, 2016, excluding 4.5% of our share capital held as treasury shares by Novartis AG and its entities that restrict their availability for use, the following registered shareholders (including nominees and the ADS depositary) held more than 2% of the total share capital of Novartis with the right to vote these shares:

- Shareholders: Novartis Foundation for Employee Participation, with its registered office in Basel, Switzerland, holding 2.6%; Emasan AG, with its registered office in Basel, Switzerland, holding 3.4%; and UBS Fund Management (Switzerland) AG, with its registered office in Basel, Switzerland, holding 2.1%;
- Nominees: Chase Nominees Ltd., London, England (holding 8.5%); Nortrust Nominees, London, England (holding 3.9%); and The Bank of New York Mellon, New York, NY (holding 4.4%) through its nominees, Mellon Bank, Everett, MA (holding 1.8%) and The Bank of New York Mellon, Brussels, Belgium (holding 2.6%); and
- ADS depositary: JPMorgan Chase Bank, New York, NY (holding 12%).

According to a disclosure notification filed with Novartis AG, Norges Bank (Central Bank of Norway), Oslo, Norway, held 2.02% of the share capital of Novartis AG as of December 31, 2016.

According to disclosure notifications filed with Novartis AG and the SIX Swiss Exchange, each of the following shareholders held between 3% and 5% of the share capital of Novartis AG as of December 31, 2016:

- Capital Group Companies, Inc., Los Angeles, CA; and
- BlackRock, Inc., New York, NY

As of December 31, 2016, no other shareholder was registered as owner of more than 2% of the registered share capital. Novartis has not entered into any agreement with any shareholder regarding the voting or holding of Novartis shares.

2015

According to the share register, as of December 31, 2015, excluding 6.2% of our share capital held as treasury shares by Novartis AG and its entities that restrict their availability for use, the following registered shareholders (including nominees and the ADS depositary) held more than 2% of the total share capital of Novartis with the right to vote these shares:

- Shareholders: Novartis Foundation for Employee Participation, with its registered office in Basel, Switzerland, holding 2.6%; and Emasan AG, with its registered office in Basel, Switzerland, holding 3.3%;
- Nominees: Chase Nominees Ltd., London, England (holding 8.8%) (Previously reported as JPMorgan Chase Bank, New York, NY but changed to its affiliate Chase Nominees Ltd., London, England, which is entered as nominee in our share register.); Nortrust Nominees, London, England (holding 3.2%); and The Bank of New York Mellon, New York, NY (holding 4.6%) through its nominees, Mellon Bank, Everett, MA (holding 1.7%) and The Bank of New York Mellon, Brussels, Belgium (holding 2.9%); and
- ADS depositary: JPMorgan Chase Bank, New York, NY (holding 11.2%).

According to disclosure notifications filed with Novartis AG and the SIX Swiss Exchange, each of the following shareholders held between 3% and 5% of the share capital of Novartis AG as of December 31, 2015:

- Capital Group Companies, Inc., Los Angeles, CA; and
- BlackRock, Inc., New York, NY

As of December 31, 2015, no other shareholder was registered as owner of more than 2% of the registered share capital. Novartis has not entered into any agreement with any shareholder regarding the voting or holding of Novartis shares.

2014

According to the share register, as of December 31, 2014, excluding 5.7% of our share capital held by Novartis AG, together with Novartis affiliates (excluding foundations), as treasury shares, the following registered shareholders (including nominees and the ADS depositary) held more than 2% of the total share capital of Novartis with the right to vote these shares:

- Shareholders: Novartis Foundation for Employee Participation, with its registered office in Basel, Switzerland, holding 3.2%; and Emasan AG, with its registered office in Basel, Switzerland, holding 3.3%;
- Nominees: JPMorgan Chase Bank, New York, NY (holding 9.1%); Nortrust Nominees, London, England (holding 3.2%); and The Bank of New York Mellon, New York, NY (holding 4.6%) through its nominees, Mellon Bank, Everett, MA (holding 2.6%) and The Bank of New York Mellon, Brussels, Belgium (holding 2.0%); and
- ADS depositary: JPMorgan Chase Bank, New York, NY (holding 11.4%).

According to disclosure notifications filed with Novartis AG and the SIX Swiss Exchange, each of the following shareholders held between 3% and 5% of the share capital of Novartis AG as of December 31, 2014:

- Capital Group Companies, Inc., Los Angeles, CA; and
- BlackRock, Inc., New York, NY

As of December 31, 2014, no other shareholder was registered as owner of more than 2% of the registered share capital. Novartis has not entered into any agreement with any shareholder regarding the voting or holding of Novartis shares.

7.B Related Party Transactions

The information set forth under "Note 27. Transactions with related parties" on pages 233 to 234 of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, is incorporated by reference.

7.C Interests of Experts and Counsel

Not applicable.

Item 8. Financial Information

8.A Consolidated Statements and Other Financial Information

See "Item 18. Financial Statements."

Dividend policy

Subject to the dividend policy described below, our Board of Directors expects to recommend the payment of a dividend in respect of each financial year. If approved by our shareholders at the relevant annual Shareholders' Meeting, the dividends will be payable shortly following such approval. Any shareholder who purchases our shares before the ex-dividend date and holds the shares until that date shall be deemed to be entitled to receive the dividends approved at that meeting. Dividends are reflected in our financial statements in the year in which they are approved by our shareholders.

Our dividend policy is to pay a growing annual dividend. This policy is subject to our financial conditions and outlook at the time, the results of our operations and other factors.

The Board will propose a dividend of CHF 2.75 per share to the shareholders for approval at the Annual General Meeting to be held on February 28, 2017. Because we pay dividends in Swiss francs, exchange rate fluctuations will affect the US dollar amounts received by holders of ADRs. For a summary of dividends we paid in the past five years, see "Item 3. Key Information—3.A Selected Financial Data—Cash Dividends per Share." See also "Item 3. Key Information—3.D Risk Factors—The price of our ADRs and the US dollar value of any dividends may be negatively affected by fluctuations in the US dollar/Swiss franc exchange rate."

Disclosure pursuant to Section 219 of the Iran Threat Reduction & Syria Human Rights Act (ITRA)

At Novartis, it is our mission to discover new ways to improve and extend people's lives, regardless of where they live. This includes the compliant sale of medicines and other healthcare products worldwide. To help us fulfill this mission, we have representative offices located in Iran.

As of October 18, 2010, a non-US affiliate within our Innovative Medicines Division entered into a non-binding Memorandum of Understanding (MoU) with the Ministry of Health and Medical Education of the Islamic Republic of Iran. Pursuant to the MoU, the Iranian Ministry of Health acknowledges certain benefits that may apply to sales of certain Innovative Medicines Division medicines by third-party distributors in Iran. These include fast-track registration, market exclusivity, end-user subsidies and exemptions from customs tariffs. Novartis receives no payments from the Iranian Ministry of Health under the MoU and the MoU creates no obligations on the part of either Novartis or the Iranian Ministry of Health.

In the second quarter of 2016, a non-US affiliate within our Innovative Medicines Division submitted a non-binding written proposal for potential collaboration related to local manufacturing, scientific and medical activities between the Iranian Ministry of Health and certain non-US affiliates within our Innovative Medicines and Sandoz Divisions. In the third quarter of 2016, a non-US affiliate within our Innovative Medicines Division submitted a draft of a proposed binding Memorandum of Understanding (MoU), based on the proposal submitted during the second quarter of 2016, to the Embassy of the Islamic Republic of Iran in Bern, Switzerland, to seek support for a meeting with representatives of the Iranian Ministry of Health to negotiate and finalize the MoU. A draft of the proposed binding MoU was submitted to the Iranian Ministry of Health and the Ministry of Foreign Affairs of Iran in the fourth quarter of 2016.

In 2016, non-US affiliates relating to our Innovative Medicines and Sandoz Divisions made payments to government entities in Iran related to exit fees and other transactions ordinarily incident to travel by doctors and other medical professionals resident in Iran to attend conferences or other events outside Iran.

From time to time, including in 2016, non-US affiliates relating to our Innovative Medicines and Sandoz Divisions enter into agreements with hospitals, research institutes, medical associations and universities in Iran to provide grants, sponsor congresses, seminars and symposia, and with doctors and other healthcare professionals for consulting services, including participation in advisory boards and investigator services for observational (non-interventional) studies. Some of these hospitals and research institutes are owned or controlled by the government of Iran, and some of these doctors and healthcare professionals are employed by hospitals that may be public or government-owned.

Because our Innovative Medicines and Sandoz Divisions have operations in Iran, including employees, they obtain services and have other dealings incidental to their activities in that country, including paying taxes and salaries either directly or indirectly through a service provider, and obtaining office rentals, insurance, electricity, water and telecommunications services, office and similar supplies and customs-related services from Iranian companies that may be owned or controlled by the government of Iran.

Some beneficiaries of payments made by non-US affiliates relating to our Innovative Medicines and Sandoz Divisions in the course of the operations described above maintain accounts at banks that are included on the list of Specially Designated Nationals (SDNs). Nonetheless, pursuant to Executive Order 13599, non-US persons are not subject to secondary sanctions for engaging in activities that involve persons included on the Executive Order 13599 List, given that the activities in question do not involve persons on the SDN List or conduct that remains sanctionable.

8.B Significant Changes

None.

Item 9. The Offer and Listing

9.A Offer and Listing Details

Our shares are listed in Switzerland on the SIX Swiss Exchange (SIX).

American Depositary Shares (ADSs), each representing one share, have been available in the US through an American Depositary Receipts (ADR) program since December 1996. This program was established pursuant to a Deposit Agreement which we entered into with JPMorgan Chase Bank N.A. as Depositary (Deposit Agreement). Our ADRs have been listed on the NYSE since May 2000, and are traded under the symbol "NVS."

The table below sets forth, for the periods indicated, the high and low closing sales prices for our shares traded in Switzerland and for ADRs traded in US. The data below regarding our shares reflects price and volume information for trades completed by members of the SIX during the day as well as for inter- dealer trades completed off the SIX and certain inter-dealer trades completed during trading on the previous business day.

The following share data was taken from SIX; the ADR data was taken from Bloomberg:

	Shares		ADRs	
	High CHF per share	Low CHF per share	High $ per ADR	Low $ per ADR
Annual information for the past five years				
2012	59.00	48.80	63.96	51.48
2013	73.65	58.70	80.39	63.70
2014	93.80	70.65	96.65	78.20
2015	102.30	82.20	106.12	83.96
2016	86.45	68.15	86.21	67.59
Quarterly information for the past two years				
2016				
First Quarter	86.45	69.55	86.21	71.11
Second Quarter	80.15	68.50	82.51	71.40
Third Quarter	82.50	76.10	83.51	78.27
Fourth Quarter	77.60	68.15	79.13	67.59
2015				
First Quarter	99.70	84.30	103.00	91.67
Second Quarter	101.40	92.00	105.50	98.34
Third Quarter	102.30	87.35	106.12	89.52
Fourth Quarter	91.70	82.20	95.03	83.96
Monthly information for most recent six months				
August 2016	81.55	77.30	83.12	78.77
September 2016	79.30	76.10	82.03	78.27
October 2016	77.60	70.40	79.13	71.02
November 2016	73.30	68.15	74.29	68.09
December 2016	74.45	68.50	72.84	67.59
January 2017 (through January 17, 2017)	75.40	71.35	74.17	71.99

Fluctuations in the exchange rate between the Swiss franc and the US dollar will affect any comparisons of Swiss share prices and US ADR prices.

The average daily volumes of shares traded on the SIX (ON/OFF exchange) for the years 2016, 2015 and 2014 were 6,102,338, 5,870,874, and 4,963,517, respectively. These numbers are based on total annual turnover statistics supplied by the SIX via the Swiss Market Feed, which supplies such data to subscribers and to other

information providers. The average daily volumes of ADRs traded in the US for the years 2016, 2015 and 2014 were 2,264,606, 1,787,735, and 1,504,087, respectively.

The Depositary has informed us that as of January 17, 2017, there were 314,369,587 ADRs outstanding, each representing one Novartis share (approximately 12% of total Novartis shares issued). On January 17, 2017, the closing sales price per share on the SIX was CHF 71.35 and $71.99 per ADR on the NYSE.

9.B Plan of Distribution

Not applicable.

9.C Markets

See "9.A Offer and Listing Details."

9.D Selling Shareholders

Not applicable.

9.E Dilution

Not applicable.

9.F Expenses of the Issue

Not applicable.

Item 10. Additional Information

10.A Share capital

Not applicable.

10.B Memorandum and Articles of Association

The following is a summary of certain provisions of our Articles of Incorporation (Articles), our Regulations of the Board of Directors (Board Regulations) and of Swiss law, particularly, the Swiss Code of Obligations (Swiss CO). This is not a summary of all the significant provisions of the Articles, the Board Regulations or of Swiss law and does not purport to be complete. This description is qualified in its entirety by reference to the Articles and the Board Regulations, which are an exhibit to this Form 20-F, and to Swiss law.

At our 2015 Annual General Meeting held on February 27, 2015, our shareholders approved amendments to our Articles to align with the Swiss Ordinance against Excessive Compensation in Stock Exchange Listed Companies on Board and Executive Compensation (the "Ordinance"). Key aspects of these amendments included determining (i) the maximum number of allowable external mandates for members of our Board of Directors (Board) and Executive Committee (ECN), (ii) the principles concerning the tasks and responsibilities of our Compensation Committee, (iii) the details concerning the procedure for the new yearly binding separate shareholder votes on the aggregate compensation of our Board and ECN, and (iv) the principles of our compensation policy.

10.B.1 ***Company Purpose***

Novartis AG is registered in the commercial register of the Canton of Basel-Stadt, Switzerland, under number CHE-103.867.266. Our business purpose, as stated in Article 2 of the Articles, is to hold interests in enterprises in the area of health care or nutrition. We may also hold interests in enterprises in the areas of

biology, chemistry, physics, information technology or related areas. We may acquire, mortgage, liquidate or sell real estate and intellectual property rights in Switzerland or abroad. In pursuing our business purpose, we strive to create sustainable value.

10.B.2 ***Directors***

(a) According to our Board Regulations, a member of our Board (Director) may not participate in deliberations or resolutions on matters which affect, or reasonably might affect, the Director's interests, or the interests of a person close to the Director. In addition, the Swiss CO sets forth that if, in connection with the conclusion of a contract, the Company is represented by the person with whom it is concluding the contract, such contract shall be in writing. Furthermore, the Swiss CO does require directors and members of senior management to safeguard the interests of the corporation and, in this connection, imposes a duty of care and a duty of loyalty on such individuals. This rule is generally interpreted to mean that directors and members of senior management are disqualified from participating in decisions which affect them personally.

(b) A Board resolution requires the affirmative majority of the votes cast. As with any Board resolution, Directors may not vote on their own compensation unless at least a majority of the Directors are present. Such votes are subject to the approval of the aggregate amounts of compensation of the Directors and the members of the ECN by a shareholders' resolution under the Ordinance.

(c) The Articles prohibit the granting of loans or credits to Directors.

(d) Directors who have turned seventy years of age at the date of the General Meeting of Shareholders may no longer be elected as members of the Board. The General Meeting of Shareholders may, under special circumstances, grant an exemption from this rule.

(e) Our Directors are not required to be shareholders under our Articles.

10.B.3 ***Shareholder Rights***

Because Novartis AG has only one class of registered shares, the following information applies to all shareholders.

(a) The Swiss CO requires that at least 5% of our annual profit be retained as general reserves, so long as these reserves amount to less than 20% of our registered share capital. Swiss law and the Articles permit us to accrue additional reserves.

Under the Swiss CO, we may only pay dividends out of the balance sheet profit, out of reserves created for this purpose or out of free reserves. In any event, under the Swiss CO, while the Board may propose that a dividend be paid, we may only pay dividends upon shareholders' approval at a General Meeting of Shareholders. Our auditors must confirm that the dividend proposal of our Board conforms with the Swiss CO and the Articles. Our Board intends to propose a dividend once each year. See "Item 3. Key Information—3.A. Selected Financial Data—Cash Dividends per Share" and "Item 8. Financial Information—8.A. Consolidated Financial Statements and Other Financial Information—Dividend Policy."

Dividends are usually due and payable shortly after the shareholders have passed a resolution approving the payment. Dividends which have not been claimed within five years after the due date revert to us, and are allocated to our general reserves. For information about deduction of the withholding tax or other duties from dividend payments, see "Item 10. Additional Information—10.E Taxation."

(b) Each share is entitled to one vote at a General Meeting of Shareholders. Voting rights may only be exercised for shares registered with the right to vote on the Record Date. In order to do so, the shareholder must file a share registration form with us, setting forth the shareholder's name, address and citizenship (or, in the case of a legal entity, its registered office). If the shareholder has not timely filed the form, then the shareholder may not vote at, or participate in, General Meetings of Shareholders.

To vote its shares, the shareholder must also explicitly declare that it has acquired the shares in its own name and for its own account. If the shareholder refuses to make such a declaration, the shares may not be voted unless the Board recognizes such shareholder as a nominee.

The Articles provide that no shareholder shall be registered with the right to vote shares comprising more than 2% of the registered share capital. The Board may, upon request, grant an exemption from this restriction. Considerations include whether the shareholder supports our goal of creating sustainable value and has a long-term investment horizon. Furthermore, the Articles provide that no nominee shall be registered with the right to vote shares comprising more than 0.5% of the registered share capital. The Board may, upon request, grant an exemption from this restriction if the nominee discloses the names, addresses and number of shares of the persons for whose account it holds more than 0.5% of the registered share capital. The same restrictions indirectly apply to holders of ADRs. We have in the past granted exemptions from the 2% rule for shareholders and the 0.5% rule for nominees. Under the Articles, the Board may delegate the power to grant such exemptions. The Board has delegated this power to the Chairman of the Board.

For purposes of the 2% rule for shareholders and the 0.5% rule for nominees, groups of companies and groups of shareholders acting in concert are considered to be one shareholder. These rules also apply to shares acquired or subscribed by the exercise of subscription, option or conversion rights.

After hearing the registered shareholder or nominee, the Board may cancel, with retroactive effect as of the date of registration, the registration of the shareholders if the registration was effected based on false information.

Registration restrictions in the Articles may only be removed upon a resolution carrying a two-thirds majority of the votes represented at a General Meeting of Shareholders.

Shareholders' resolutions generally require the approval of a majority of the votes present at a General Meeting of Shareholders. As a result, abstentions have the effect of votes against the resolution. Shareholder resolutions requiring a vote by such "absolute majority of the votes" include among others (1) amendments to the Articles; (2) elections of Directors, the Chairman, the Compensation Committee members, the independent proxy and the statutory auditors; (3) approval of the management report and the financial statements; (4) setting the annual dividend; (5) approval of the aggregate amounts of compensation of the Directors and the members of the Executive Committee; (6) decisions to discharge Directors and management from liability for matters disclosed to the General Meeting of Shareholders; and (7) the ordering of an independent investigation into specific matters proposed to the General Meeting of Shareholders.

According to the Articles and Swiss law, the following types of shareholders' resolutions require the approval of a "supermajority" of at least two-thirds of the votes present at a General Meeting of Shareholders: (1) an alteration of our corporate purpose; (2) the creation of shares with increased voting powers; (3) an implementation of restrictions on the transfer of registered shares and the removal of such restrictions; (4) an authorized or conditional increase of the share capital; (5) an increase of the share capital by conversion of equity, by contribution in kind, or for the purpose of an acquisition of property or the grant of special rights; (6) a restriction or an elimination of shareholders' preemptive rights; (7) a change of our domicile; (8) our dissolution; or (9) any amendment to the Articles which would create or eliminate a supermajority requirement.

Our shareholders have to annually elect all of the members of the Board, as well as the Chairman of the Board, the members of the Compensation Committee and the independent proxy. Cumulative voting of shares is not permitted under Swiss law.

At General Meetings of Shareholders, shareholders can be represented by proxy. However, a proxy must either be the shareholder's legal representative, another shareholder with the right to vote, or the independent proxy. Votes are taken either by a show of hands or by electronic voting, unless the General Meeting of Shareholders resolves to have a ballot or where a ballot is ordered by the chairman of the meeting.

American Depositary Shares (ADSs) each representing one Novartis share and evidenced by American Depositary Receipts (ADRs) are issued by our depositary JPMorgan Chase Bank, New York, and not by us. The ADR is vested with rights defined and enumerated in the Deposit Agreement (such as the rights to vote, to receive a dividend and to receive a share of Novartis in exchange for a certain number of ADRs). The enumeration of rights, including any limitations on those rights in the Deposit Agreement, is final. There are no other rights given to the ADR holders. Only the ADS depositary, holding our shares underlying the ADRs, is registered as shareholder in our share register. An ADR is not a Novartis share and an ADR holder is not a Novartis shareholder.

The Deposit Agreement between our depositary, the ADR holder and us has granted certain indirect rights to vote to the ADR holders. ADR holders may not attend Novartis General Meetings in person. ADR holders exercise their voting rights by instructing JPMorgan Chase Bank, our depositary, to exercise the voting rights attached to the registered shares underlying the ADRs. Each ADR represents one Novartis share. JPMorgan Chase Bank exercises the voting rights for registered shares underlying ADRs for which no voting instructions have been given by providing a discretionary proxy to an uninstructed independent designee pursuant to paragraph 13 of the form of ADR. Such designee has to be a shareholder of Novartis. The same voting restrictions apply to ADR holders as to those holding Novartis shares (*i.e.*, the right to vote up to 2% of the Novartis registered share capital—unless otherwise granted an exemption by the Board—and disclosure requirement for nominees).

(c) Shareholders have the right to allocate the profit shown on our balance sheet by vote taken at the General Meeting of Shareholders, subject to the legal requirements described in "Item 10.B.3(a) Shareholder Rights".

(d) Under the Swiss CO, any surplus arising out of a liquidation of our Company (*i.e.*, after the settlement of all claims of all creditors) would be distributed to the shareholders in proportion to the paid-in nominal value of their shares.

(e) The Swiss CO limits a corporation's ability to hold or repurchase its own shares. We and our subsidiaries may only repurchase shares if we have freely disposable equity, in the amount necessary for this purpose, available. The aggregate nominal value of all Novartis shares held by us and our subsidiaries may not exceed 10% of our registered share capital. However, it is accepted that a corporation may repurchase its own shares beyond the statutory limit of 10%, if the repurchased shares are clearly earmarked for cancellation. In addition, we are required to create a special reserve on our balance sheet in the amount of the purchase price of the acquired shares. Repurchased shares held by us or our subsidiaries do not carry any rights to vote at a General Meeting of Shareholders, but are entitled to the economic benefits generally connected with the shares. It should be noted that the definition of what constitutes subsidiaries, and therefore, treasury shares, for purposes of the above described reserves requirement and voting restrictions differs from the definition included in the consolidated financial statements. The definition in the consolidated financial statements requires consolidation for financial reporting purposes of special purpose entities, irrespective of their legal structure, in instances where we have the power to govern the financial and operating policies of the entity so as to obtain benefits from its activities.

Under the Swiss CO, we may not cancel treasury shares without the approval of a capital reduction by our shareholders.

(f) Not applicable.

(g) Since all of our issued and outstanding shares have been fully paid in, we can make no further capital calls on our shareholders.

(h) See Items "10.B.3(b) Shareholder Rights" and "10.B.7 Change in Control".

10.B.4 ***Changes To Shareholder Rights***

Under the Swiss CO, we may not issue new shares without the prior approval of a capital increase by our shareholders. If a capital increase is approved, then our shareholders would generally have certain preemptive rights to obtain newly issued shares in an amount proportional to the nominal value of the shares they already hold. These preemptive rights could be modified in certain limited circumstances with the approval of a resolution adopted at a General Meeting of Shareholders by a supermajority of votes. In addition, we may not create shares with increased voting powers or place restrictions on the transfer of registered shares without the approval of a resolution adopted at a General Meeting of Shareholders by a supermajority of votes. In addition, see Item 10.B.3(b) with regard to the Board's ability to cancel the registration of shares under limited circumstances.

10.B.5 ***Shareholder Meetings***

Under the Swiss CO and the Articles, we must hold an annual ordinary General Meeting of Shareholders within six months after the end of our financial year. General Meetings of Shareholders may be convened by the

Board or, if necessary, by the statutory auditors. The Board is further required to convene an extraordinary General Meeting of Shareholders if so resolved by a General Meeting of Shareholders, or if so requested by shareholders holding an aggregate of at least 10% of the registered shares, specifying the items for the agenda and their proposals. Shareholders holding shares with a nominal value of at least CHF 1,000,000 (*i.e.*, 2,000,000 Novartis shares) have the right to request that a specific proposal be put on the agenda and voted upon at the next General Meeting of Shareholders. A General Meeting of Shareholders is convened by publishing a notice in the official Swiss Commercial Gazette (*Schweizerisches Handelsamtsblatt*) at least 20 days prior to such meeting. Shareholders may also be informed by mail. There is no provision in the Swiss CO or our Articles requiring a quorum for the holding of a General Meeting of Shareholders. In addition, see "Item 10.B.3(b) Shareholder Rights" regarding conditions for exercising a shareholder's right to vote at a General Meeting of Shareholders.

10.B.6 ***Limitations***

There are no limitations under the Swiss CO or our Articles on the right of non-Swiss residents or nationals to own or vote shares other than the restrictions applicable to all shareholders. But see "Item 10.B.3(b) Shareholder Rights" regarding conditions for exercising an ADR holder's right to vote at a shareholder meeting.

10.B.7 ***Change in Control***

The Articles and the Board Regulations contain no provision that would have an effect of delaying, deferring or preventing a change in control of Novartis and that would operate only with respect to a merger, acquisition or corporate restructuring involving us or any of our subsidiaries.

According to the Swiss Merger Act, shareholders may pass a resolution to merge with another corporation at any time. Such a resolution would require the consent of at least two-thirds of all votes present at the necessary General Meeting of Shareholders.

Under the Swiss Financial Market Infrastructure Act, shareholders and groups of shareholders acting in concert who acquire more than 33⅓% of our shares would be under an obligation to make an offer to acquire all remaining Novartis shares. Novartis has neither an opting-out from the mandatory takeover offer obligation nor an opting-up of the threshold for mandatory takeover offers in its Articles.

10.B.8 ***Disclosure of Shareholdings***

Under the Swiss Financial Market Infrastructure Act, holders of our voting shares acting alone or acting in concert with others are required to notify us and the SIX Swiss Exchange of the level of their holdings whenever such holdings reach or exceed, or in some cases, fall short of, certain thresholds—3%, 5%, 10%, 15%, 20%, 25%, 33⅓%, 50% and 66⅔%—of our registered share capital. Following receipt of such notification we are required to inform the public by publishing the information via the electronic publication platform operated by the competent Disclosure Office.

An additional disclosure obligation exists under the Swiss CO which requires us to disclose, once a year in the notes to the financial statements published in our annual report, the identity of all of our shareholders (or related groups of shareholders) who have been granted exemption entitling them to vote more than 2% of our registered share capital, as described in "Item 10.B.3(b) Shareholder Rights".

10.B.9 ***Differences in the Law***

See the references to Swiss law throughout this "Item 10.B Memorandum and Articles of Association".

10.B.10 ***Changes in Capital***

The requirements of the Articles regarding changes in capital are not more stringent than the requirements of Swiss law.

10.C Material contracts

Transactions with GSK

On April 22, 2014, we entered into agreements with GSK for the Consumer Healthcare Joint Venture, the Vaccines Sale and the Oncology Acquisition (each as defined below and, together, the "Transactions"). The Transactions were completed on March 2, 2015.

Consumer Healthcare Joint Venture with GSK

On April 22, 2014 (and as amended, and amended and restated, from time to time), we entered into a Contribution Agreement with GSK under which GSK contributed its consumer healthcare business (the "GSK Consumer Healthcare Business") and we contributed our OTC Division, with certain limited exceptions which include the over-the-counter business of our Sandoz Division, into a newly-created joint venture which operates under the GSK Consumer Healthcare name (the "Consumer Healthcare Joint Venture"). In consideration for those contributions, GSK owns 63.5% of the issued share capital of the Consumer Healthcare Joint Venture and we own 36.5% of the issued share capital of the Consumer Healthcare Joint Venture.

On March 2, 2015 (and as amended from time to time), the Shareholders' Agreement which governs the operation of the Consumer Healthcare Joint Venture became operative concurrently with the creation of the Consumer Healthcare Joint Venture. Under the Shareholders' Agreement, GSK has the right to appoint seven directors to the board of the Consumer Healthcare Joint Venture and we have the right to appoint four directors to the board of the Consumer Healthcare Joint Venture. The Shareholders' Agreement also contains certain minority shareholder protections, including the right to exit the Consumer Healthcare Joint Venture via a put option exercisable in certain windows in the period from the third to the twentieth anniversary of the creation of the Consumer Healthcare Joint Venture.

Sale of Vaccines Business (Excluding our Influenza Vaccines Business) to GSK

On April 22, 2014 (and as amended, and amended and restated, from time to time), we entered into a Share and Business Sale Agreement with GSK under which we sold our Vaccines Division (with certain limited exceptions, and except for our influenza vaccines business) to GSK (the "Vaccines Sale") for up to $7.1 billion, consisting of $5.25 billion upfront and up to $1.8 billion in milestones, of which we have received $450 million as of December 31, 2016, plus royalties. We completed the Vaccines Sale on March 2, 2015.

Oncology Acquisition from GSK

On April 22, 2014 (and as amended, and amended and restated, from time to time), we entered into a Sale and Purchase Agreement with GSK under which we acquired GSK oncology products and certain related assets (the "Oncology Acquisition"). GSK has also granted us a right of first negotiation over the co-development and commercialization of GSK's current and future oncology R&D pipeline, excluding oncology vaccines, for a period of twelve and one half years from closing. We completed the Oncology Acquisition on March 2, 2015. Novartis paid an aggregate cash consideration of $16 billion for the Oncology Acquisition.

Sale of Influenza Vaccines Business to CSL

On October 26, 2014 (and as amended, and amended and restated, from time to time), we entered into a Share and Business Sale Agreement with CSL under which we divested our Vaccines Division's influenza vaccines business to CSL for $275 million. This transaction was completed effective July 31, 2015.

Sale of Animal Health Division to Lilly

On April 22, 2014 (and as amended from time to time), we entered into a Stock and Asset Purchase Agreement with Lilly. Under this agreement, Lilly agreed to purchase our Animal Health Division (with certain limited exceptions) for approximately $5.4 billion. This transaction was completed on January 1, 2015.

10.D Exchange controls

There are no Swiss governmental laws, decrees or regulations that restrict, in a manner material to Novartis, the export or import of capital, including any foreign exchange controls, or that generally affect the remittance of dividends or other payments to non-residents or non-citizens of Switzerland who hold Novartis' shares.

10.E Taxation

The taxation discussion set forth below is intended only as a descriptive summary and does not purport to be a complete analysis or listing of all potential tax effects relevant to the ownership or disposition of our shares or ADRs. The statements of US and Swiss tax laws set forth below are based on the laws and regulations in force as of the date of this 20-F, including the current Convention Between the US and the Swiss Confederation for the Avoidance of Double Taxation with Respect to Taxes on Income, entered into force on December 19, 1997 (the "Treaty"), and the US Internal Revenue Code of 1986, as amended (the "Code"), Treasury regulations, rulings, judicial decisions and administrative pronouncements, and may be subject to any changes in US and Swiss law, and in any double taxation convention or treaty between the US and Switzerland occurring after that date, which changes may have retroactive effect.

Swiss Taxation

Swiss Residents

Withholding Tax on Dividends and Distributions. Dividends which we pay and similar cash or in-kind distributions which we may make to a holder of shares or ADRs (including distributions of liquidation proceeds in excess of the nominal value, stock dividends and, under certain circumstances, proceeds from repurchases of shares by us in excess of the nominal value) are generally subject to a Swiss federal withholding tax (the "Withholding Tax") at a current rate of 35%. Under certain circumstances distributions out of capital contribution reserves made by shareholders after December 31, 1996 are exempt from Withholding Tax. We are required to withhold this Withholding Tax from the gross distribution and to pay the Withholding Tax to the Swiss Federal Tax Administration. The Withholding Tax is refundable in full to Swiss residents who are the beneficial owners of the taxable distribution at the time it is resolved and duly report the gross distribution received on their personal tax return or in their financial statements for tax purposes, as the case may be.

Income Tax on Dividends. A Swiss resident who receives dividends and similar distributions (including stock dividends and liquidation surplus) on shares or ADRs is required to include such amounts in the shareholder's personal income tax return. However, distributions out of qualified capital contribution reserves are not subject to income tax. A corporate shareholder may claim substantial relief from taxation of dividends and similar distributions received if the shares held represent a fair market value of at least CHF 1 million.

Capital Gains Tax upon Disposal of Shares. Under current Swiss tax law, the gain realized on shares held by a Swiss resident who holds shares or ADRs as part of his private property is generally not subject to any federal, cantonal or municipal income taxation on gains realized on the sale or other disposal of shares or ADRs. However, gains realized upon a repurchase of shares by us may be characterized as taxable dividend income if certain conditions are met. Book gains realized on shares or ADRs held by a Swiss corporate entity or by a Swiss resident individual as part of the shareholder's business property are, in general, included in the taxable income of such person. However, the Federal Law on the Direct Federal Tax of December 14, 1990 and several cantonal laws on direct cantonal taxes provide for exceptions for Swiss corporate entities holding more than 10% of our voting stock for more than one year.

Residents of Other Countries

Recipients of dividends and similar distributions on our shares who are neither residents of Switzerland for tax purposes nor holding shares as part of a business conducted through a permanent establishment situated in Switzerland ("Non-resident Holders") are not subject to Swiss income taxes in respect of such distributions. Moreover, gains realized by such recipients upon the disposal of shares are not subject to Swiss income taxes.

Non-resident Holders of shares are, however, subject to the Withholding Tax on dividends and similar distributions mentioned above and under certain circumstances to the Stamp Duty described below. Such Non-resident Holders may be entitled to a partial refund of the Withholding Tax if the country in which they reside has entered into a bilateral treaty for the avoidance of double taxation with Switzerland. Non-resident Holders should be aware that the procedures for claiming treaty refunds (and the time frame required for obtaining a refund) may differ from country to country. Non-resident Holders should consult their own tax advisors regarding receipt, ownership, purchase, sale or other dispositions of shares or ADRs and the procedures for claiming a refund of the Withholding Tax.

As of January 1, 2017, Switzerland has entered into bilateral treaties for the avoidance of double taxation with respect to income taxes with the following countries, whereby a part of the above-mentioned Withholding Tax may be refunded (subject to the limitations set forth in such treaties):

Albania	Finland	Latvia	Russia
Algeria	France	Liechtenstein	Serbia
Argentina	Germany	Lithuania	Singapore
Armenia	Georgia	Luxembourg	Slovak Republic
Australia	Ghana	Macedonia	Slovenia
Austria	Greece	Malaysia	South Africa
Azerbaijan	Hong Kong	Malta	Spain
Bahrain	Hungary	Mexico	Sri Lanka
Bangladesh	Iceland	Moldova	Sweden
Belarus	India	Mongolia	Taiwan
Belgium	Indonesia	Montenegro	Tajikistan
Bulgaria	Iran	Morocco	Thailand
Canada	Israel	Netherlands	Trinidad and Tobago
Chile	Italy	New Zealand	Tunisia
China	Ivory Coast	Norway	Turkey
Colombia	Republic of Ireland	Oman	Turkmenistan
Croatia	Jamaica	Pakistan	Ukraine
Cyprus	Japan	Peru	United Arab Emirates
Czech Republic	Kazakhstan	Philippines	United Kingdom
Denmark	Republic of Korea	Poland	United States of America
Ecuador	(South Korea)	Portugal	Uruguay
Egypt	Kuwait	Qatar	Uzbekistan
Estonia	Kyrgyzstan	Romania	Venezuela
			Vietnam

The tax treaty with Bahrain is not applicable to the healthcare industry. Tax treaty negotiations are under way, or have been conducted, with Bosnia and Herzegovina, Brazil, Costa Rica, Libya, North Korea, Saudi Arabia, Senegal, Syria, and Zimbabwe. Tax treaty negotiations between Switzerland and some of the countries listed in the immediately preceding sentence have been ongoing for an extended period of time, and we are not certain when or if such negotiations will be completed, and when or if the corresponding treaties will come into effect.

A Non-resident Holder of shares or ADRs will not be liable for any Swiss taxes other than the Withholding Tax described above and, if the transfer occurs through or with a Swiss bank or other Swiss securities dealer, the Stamp Duty described below. If, however, the shares or ADRs of Non-resident Holders can be attributed to a permanent establishment or a fixed place of business maintained by such person within Switzerland during the relevant tax year, the shares or ADRs may be subject to Swiss income taxes in respect of income and gains

realized on the shares or ADRs and such person may qualify for a full refund of the Withholding Tax based on Swiss tax law.

Residents of the US. A Non-resident Holder who is a resident of the US for purposes of the Treaty is eligible for a reduced rate of tax on dividends equal to 15% of the dividend, provided that such holder (i) qualifies for benefits under the Treaty, (ii) holds, directly and indirectly, less than 10% of our voting stock, and (iii) does not conduct business through a permanent establishment or fixed base in Switzerland to which the shares or ADRs are attributable. Such an eligible holder must apply for a refund of the amount of the Withholding Tax in excess of the 15% Treaty rate. A Non-resident Holder who is a resident of the US for purposes of the Treaty is eligible for a reduced rate of tax on dividends equal to 5% of the dividend, provided that such holder (i) is a company, (ii) qualifies for benefits under the Treaty, (iii) holds directly at least 10% of our voting stock, and (iv) does not conduct business through a permanent establishment or fixed place of business in Switzerland to which the shares or ADRs are attributable. Such an eligible holder must apply for a refund of the amount of the Withholding Tax in excess of the 5% Treaty rate. Claims for refunds must be filed on Swiss Tax Form 82 (82C for corporations; 82I for individuals; 82E for other entities), which may be obtained from any Swiss Consulate General in the US or from the Federal Tax Administration of Switzerland at the address below, together with an instruction form. Four copies of the form must be duly completed, signed before a notary public of the US, and sent to the Federal Tax Administration of Switzerland, Eigerstrasse 65, CH-3003 Berne, Switzerland. The form must be accompanied by suitable evidence of deduction of Swiss tax withheld at source, such as certificates of deduction, signed bank vouchers or credit slips. The form may be filed on or after July 1 or January 1 following the date the dividend was payable, but no later than December 31 of the third year following the calendar year in which the dividend became payable. For US resident holders of ADRs, JPMorgan Chase Bank, N.A., as Depositary, will comply with these Swiss procedures on behalf of the holders, and will remit the net amount to the holders.

Stamp Duty upon Transfer of Securities. The sale of shares, whether by Swiss residents or Non-resident Holders, may be subject to federal securities transfer Stamp Duty of 0.15%, calculated on the sale proceeds, if the sale occurs through or with a Swiss bank or other Swiss securities dealer, as defined in the Swiss Federal Stamp Duty Act. The Stamp Duty has to be paid by the securities dealer and may be charged to the parties in a taxable transaction who are not securities dealers. Stamp Duty may also be due if a sale of shares occurs with or through a non-Swiss bank or securities dealer, provided (i) such bank or dealer is a member of the SIX, and (ii) the sale takes place on the SIX. In addition to this Stamp Duty, the sale of shares by or through a member of the SIX may be subject to a minor stock exchange levy.

US Federal Income Taxation

The following is a general discussion of the material US federal income tax consequences of the ownership and disposition of our shares or ADRs that may be relevant to you if you are a US Holder (as defined below). Because this discussion does not consider any specific circumstances of any particular holder of our shares or ADRs, persons who are subject to US taxation are strongly urged to consult their own tax advisers as to the overall US federal, state and local tax consequences, as well as to the overall Swiss and other foreign tax consequences, of the ownership and disposition of our shares or ADRs. In particular, additional or different rules may apply to US expatriates, banks and other financial institutions, regulated investment companies, traders in securities who elect to apply a mark-to-market method of accounting, dealers in securities or currencies, tax-exempt entities, insurance companies, broker-dealers, investors liable for alternative minimum tax, investors that hold shares or ADRs as part of a straddle, hedging or conversion transaction, holders whose functional currency is not the US dollar, partnerships or other pass through entities, persons who acquired our shares pursuant to the exercise of employee stock options or otherwise as compensation and persons who hold directly, indirectly or by attribution, 10% or more of the voting power of our outstanding shares. This discussion generally applies only to US Holders who hold the shares or ADRs as a capital asset (generally, for investment purposes), and whose functional currency is the US dollar. Investors are urged to consult their own tax advisors concerning whether they are eligible for benefits under the Treaty.

For purposes of this discussion, a "US Holder" is a beneficial owner of our shares or ADRs who is (i) an individual who is a citizen or resident of the US for US federal income tax purposes, (ii) a corporation (or other entity taxable as a corporation for US federal income tax purposes) created or organized in or under the laws of the US or a state thereof or the District of Columbia, (iii) an estate the income of which is subject to US federal income taxation regardless of its source, or (iv) a trust (i) subject to the primary supervision of a US court and the

control of one or more US persons or (ii) that has a valid election in place to be treated as a US person. If a partnership (or other entity treated as a partnership for US federal income tax purposes) holds shares or ADRs, the tax treatment of a partner generally will depend upon the status of the partner and the activities of the partnership. Partners in a partnership that holds shares or ADRs are urged to consult their own tax advisor regarding the specific tax consequences of the owning and disposing of such shares or ADRs by the partnership.

For US federal income tax purposes, a US Holder of ADRs generally will be treated as the beneficial owner of our shares represented by the ADRs. However, see the discussion below under "—Dividends" regarding certain statements made by the US Treasury concerning depositary arrangements.

This discussion assumes that each obligation in the Deposit Agreement and any related agreement will be performed in accordance with its terms.

Dividends. US Holders will be required to include in gross income, as an item of ordinary income, the full amount (including the amount of any Withholding Tax) of a dividend paid with respect to our shares or ADRs at the time that such dividend is received by the US Holder, in the case of shares, or by the Depository, in the case of ADRs. For this purpose, a "dividend" will include any distribution paid by us with respect to our shares or ADRs (other than certain pro rata distributions of our capital stock) paid out of our current or accumulated earnings and profits, as determined under US federal income tax principles. To the extent the amount of a distribution by us exceeds our current and accumulated earnings and profits, such excess will first be treated as a tax-free return of capital to the extent of a US Holder's tax basis in the shares or ADRs (with a corresponding reduction in such tax basis), and thereafter will be treated as capital gain, which will be long-term capital gain if the US Holder held our shares or ADRs for more than one year. Under the Code, dividend payments by us on the shares or ADRs are not eligible for the dividends received deduction generally allowed to corporate shareholders.

Dividend income in respect of our shares or ADRs will constitute income from sources outside the US for US foreign tax credit purposes. Subject to the limitations and conditions provided in the Code, US Holders generally may claim as a credit against their US federal income tax liability, any Withholding Tax withheld from a dividend. The rules governing the foreign tax credit are complex. Each US Holder is urged to consult its own tax advisor concerning whether, and to what extent, a foreign tax credit will be available with respect to dividends received from us. Alternatively, a US Holder may claim the Withholding Tax as a deduction for the taxable year within which the Withholding Tax is paid or accrued, provided a deduction is claimed for all of the foreign income taxes the US Holder pays or accrues in the particular year. A deduction does not reduce US tax on a dollar-for-dollar basis like a tax credit. The deduction, however, is not subject to the limitations applicable to foreign tax credits.

The US Treasury has expressed concern that parties to whom ADRs are released may be taking actions inconsistent with the claiming of foreign tax credits for US Holders of ADRs. Accordingly, the summary above of the creditability of the Withholding Tax could be affected by future actions that may be taken by the US Treasury.

In general, a US Holder will be required to determine the amount of any dividend paid in Swiss francs, including the amount of any Withholding Tax imposed thereon, by translating the Swiss francs into US dollars at the spot rate on the date the dividend is actually or constructively received by a US Holder, in the case of shares, or by the Depositary, in the case of ADRs, regardless of whether the Swiss francs are in fact converted into US dollars. If a US Holder converts the Swiss francs so received into US dollars on the date of receipt, the US Holder generally should not recognize foreign currency gain or loss on such conversion. If a US Holder does not convert the Swiss francs so received into US dollars on the date of receipt, the US Holder will have a tax basis in the Swiss francs equal to the US dollar value on such date. Any foreign currency gain or loss that a US Holder recognizes on a subsequent conversion or other disposition of the Swiss francs generally will be treated as US source ordinary income or loss.

For a non-corporate US Holder, the US dollar amount of any dividends paid that constitute qualified dividend income generally will be taxable at a maximum rate of 15%. However, for tax year 2016, the top rate is 20% for taxpayers with incomes exceeding $415,050 ($466,950 for joint filing taxpayers) provided that the US Holder meets certain holding period and other requirements. In addition, the dividends could be subject to a 3.8% net investment income tax. This tax is applied against the lesser of the US Holder's net investment income or modified adjusted gross income over $200,000 ($250,000 for joint filing taxpayers). We currently believe that dividends paid with respect to our shares and ADRs will constitute qualified dividend income for US federal

income tax purposes. However, the US Treasury and the US Internal Revenue Service ("IRS") have announced their intention to promulgate rules pursuant to which US Holders of shares and ADRs, among others, will be permitted to rely on certifications from issuers to establish that dividends are treated as qualified dividends. US Holders of shares or ADRs are urged to consult their own tax advisors regarding the availability to them of the reduced dividend rate in light of their own particular situation and the computations of their foreign tax credit limitation with respect to any qualified dividends paid to them, as applicable.

Sale or Other Taxable Disposition. Upon a sale or other taxable disposition of shares or ADRs, US Holders generally will recognize capital gain or loss in an amount equal to the difference between the US dollar value of the amount realized on the disposition and the US Holder's tax basis (determined in US dollars) in the shares or ADRs. This capital gain or loss generally will be US source gain or loss and will be treated as long-term capital gain or loss if the holding period in the shares or ADRs exceeds one year. In the case of certain US Holders (including individuals), any long term capital gain generally will be subject to US federal income tax at preferential rates, which rates are subject to a maximum of 20% for taxpayers with incomes exceeding $415,050 ($466,950 for joint filing taxpayers) for gains recognized after January 1, 2016. In addition, the gains could be subject to a 3.8% investment income tax. This tax is applied against the lesser of the US Holder's net investment income or modified adjusted gross income over $200,000 ($250,000 for joint filing taxpayers). The deductibility of capital losses is subject to significant limitations under the Code. Deposits or withdrawals of our shares by US Holders in exchanges for ADRs will not result in the realization of gain or loss for US federal income tax purposes.

US Information Reporting and Backup Withholding. Dividend payments with respect to shares or ADRs and proceeds from the sale, exchange or other disposition of shares or ADRs received in the United States or through US-related financial intermediaries, may be subject to information reporting to the IRS and possible US backup withholding. Certain exempt recipients (such as corporations) are not subject to these information reporting and backup withholding requirements. Backup withholding will not apply to a US Holder who furnishes a correct taxpayer identification number and makes any other required certification or who is otherwise exempt from backup withholding. Any US Holders required to establish their exempt status generally must provide a properly-executed IRS Form W-9 (Request for Taxpayer Identification Number and Certification). Backup withholding is not an additional tax. Amounts withheld as backup withholding may be credited against a US Holder's US federal income tax liability, and a US Holder may obtain a refund of any excess amounts withheld under the backup withholding rules by timely filing the appropriate claim for refund with the IRS and furnishing any required information.

10.F Dividends and paying agents

Not applicable.

10.G Statement by experts

Not applicable.

10.H Documents on display

Any statement in this Form 20-F about any of our contracts or other documents is not necessarily complete. If the contract or document is filed as an exhibit to the Form 20-F the contract or document is deemed to modify the description contained in this Form 20-F. You must review the exhibits themselves for a complete description of the contract or document.

You may review a copy of our filings with the SEC, as well as other information furnished to the SEC, including exhibits and schedules filed with it, at the SEC's public reference room at 100 F Street, N.E., Room 1580, Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information. In addition, the SEC maintains an Internet site at http://www.sec.gov that contains reports and other information regarding issuers that file electronically with the SEC. These SEC filings are also available to the public from commercial document retrieval services.

We are required to file or furnish reports and other information with the SEC under the Securities Exchange Act of 1934 and regulations under that act. As a foreign private issuer, we are exempt from the rules under the Exchange Act prescribing the form and content of proxy statements and our officers, directors and principal shareholders are exempt from the reporting and short swing profit recovery provisions contained in Section 16 of the Exchange Act.

10.I Subsidiary Information

Not applicable.

Item 11. Quantitative and Qualitative Disclosures about Market Risk

The major financial risks facing the Group are managed centrally by Group Treasury. We have a written Treasury Directive and have implemented a strict segregation of front office and back office controls. The Group does regular reconciliations of its positions with its counterparties. In addition the Treasury function is included in management's internal control assessment.

For information about the effects of currency fluctuations and how we manage currency risk, see "Item 5. Operating and Financial Review and Prospects—Item 5.B Liquidity and Capital Resources".

The information set forth under "Note 29. Financial instruments—additional disclosures" on pages 236 to 244 of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, is incorporated by reference.

Item 12. Description of Securities Other than Equity Securities

12.A Debt Securities

Not applicable.

12.B Warrants and Rights

Not applicable.

12.C Other Securities

Not applicable.

12.D American Depositary Shares

Fees Payable By ADR Holders

According to our Deposit Agreement with the ADS depositary, JPMorgan Chase Bank (JPMorgan), holders of our ADRs may have to pay to JPMorgan, either directly or indirectly, fees or charges up to the amounts set forth below:

Category	Depositary actions	Associated Fee
Depositing or substituting underlying shares	Acceptance of shares surrendered, and issuance of ADRs in exchange, including surrenders and issuances in respect of: —Share distributions —Stock split —Rights —Merger —Exchange of shares or any other transaction or event or other distribution affecting the ADSs or the deposited shares	$5.00 for each 100 ADSs (or portion thereof) evidenced by the new ADRs delivered
Withdrawing underlying shares	Acceptance of ADRs surrendered for withdrawal of deposited shares	$5.00 for each 100 ADSs (or portion thereof) evidenced by the ADRs surrendered
Selling or exercising rights	Distribution or sale of shares, the fee being in an amount equal to the fee for the execution and delivery of ADRs which would have been charged as a result of the deposit of such shares	$5.00 for each 100 ADSs (or portion thereof)
Transferring, splitting or grouping receipts	Transfers, combining or grouping of depositary receipts	$1.50 per ADR
Expenses of the depositary	Expenses incurred on behalf of holders in connection with —compliance with foreign exchange control regulations or any law or regulation relating to foreign investment —the depositary's or its custodian's compliance with applicable law, rule or regulation. —stock transfer or other taxes and other governmental charges —cable, telex and facsimile transmission and delivery —expenses of the depositary in connection with the conversion of foreign currency into US dollars (which are paid out of such foreign currency) —any other charge payable by any of the depositary or its agents	Expenses payable at the sole discretion of the Depositary by billing Holders or by deducting charges from one or more cash dividends or other cash distributions.
Advance tax relief	Tax relief/reclamation process for qualified holders.	A depositary service charge of $0.0075 per ADS

Fees Payable By The Depositary To The Issuer

Pursuant to an agreement effective as of May 11, 2012, JPMorgan, as depositary, has agreed to reimburse Novartis $1.0 million per quarter, a total of $4.0 million per contract year, for expenses incurred directly related to our ADR program (the "Program") which were incurred during the contract year, including Program-related legal fees, expenses related to investor relations in the US, US investor presentations, ADR-related financial advertising and public relations, reasonable accountants' fees in relation to our Form 20-F, maintenance and broker reimbursement expenses. Because our expenses related to these categories exceed $4.0 million (see, for example, the amount of our accountants' fees set forth under "Corporate Governance—Our Independent External Auditors—Audit and Additional Fees" in the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017), the $4.0 million cannot be deemed to have reimbursed us for any particular one or more of these expenses.

JPMorgan has further agreed not to seek reimbursement of up to $50,000 of out-of-pocket expenses incurred annually in providing such administrative services.

PART II

Item 13. Defaults, Dividend Arrearages and Delinquencies

None.

Item 14. Material Modifications to the Rights of Security Holders and Use of Proceeds

None.

Item 15. Controls and Procedures

(a) Novartis AG's chief executive officer and chief financial officer, after evaluating the effectiveness of our disclosure controls and procedures (as defined in Exchange Act Rule 13a-15(e)) as of the end of the period covered by this Form 20-F, have concluded that, as of such date, our disclosure controls and procedures were effective.

(b) Report of Novartis Management on Internal Control Over Financial Reporting: The Board of Directors and management of the Group are responsible for establishing and maintaining adequate internal control over financial reporting. The Group's internal control system was designed to provide reasonable assurance to the Group's management and Board of Directors regarding the reliability of financial reporting and the preparation and fair presentation of its published consolidated financial statements.

All internal control systems, no matter how well designed, have inherent limitations. Therefore, even those systems determined to be effective may not prevent or detect misstatements and can provide only reasonable assurance with respect to financial statement preparation and presentation. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Group management assessed the effectiveness of the Group's internal control over financial reporting as of December 31, 2016. In making this assessment, it used the criteria established in *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on our assessment, management concluded that, as of December 31, 2016, the Group's internal control over financial reporting is effective based on those criteria.

PricewaterhouseCoopers AG, Switzerland, an independent registered public accounting firm, has issued an unqualified opinion on the effectiveness of the Group's internal control over financial reporting which is included in this Form 20-F under "Item 18. Financial Statements—Report of Independent Registered Public Accounting Firm."

(c) See the report of PwC, an independent registered public accounting firm, included under "Item 18. Financial Statements—Report of Independent Registered Public Accounting Firm."

(d) There were no changes to our internal control over financial reporting that occurred during the period covered by this Form 20-F that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 16A. Audit Committee Financial Expert

Our Audit and Compliance Committee has determined that Srikant Datar and Elizabeth Doherty each possess specific accounting and financial management expertise and that each is an Audit Committee Financial Expert as defined by the US Securities and Exchange Commission (SEC). The Board of Directors has also determined that Srikant Datar and Elizabeth Doherty are each "independent" in accordance with the applicable requirements of Rule 10A-3 of the US Securities Exchange Act of 1934, and that other members of the Audit and Compliance Committee have sufficient experience and ability in finance and compliance matters to enable them to adequately discharge their responsibilities.

Item 16B. Code of Ethics

In addition to our Code of Conduct, which is applicable to all of our associates, we have adopted a Code of Ethical Conduct that imposes additional obligations on our principal executive officer, principal financial officer, principal accounting officer, and persons performing similar functions. This document is accessible on our Internet website at

https://www.novartis.com/investors/company-overview/corporate-governance

Item 16C. Principal Accountant Fees and Services

The information set forth under "Corporate governance—Our independent external auditors" on pages 104 to 105 of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, is incorporated by reference.

Item 16D. Exemptions from the Listing Standards for Audit Committees

Not Applicable.

Item 16E. Purchases of Equity Securities by the Issuer and Affiliated Purchasers

2016	Total Number of Shares Purchased (a)[1]	Average Price Paid per Share in $ (b)	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs (c)[2]	Maximum Approximate Value of Shares that may yet be purchased under the Plans or Programs in CHF (d)	Maximum Approximate Value of Shares that may yet be purchased under the Plans or Programs in $[3]
				(CHF millions)	($ millions)
Jan. 1–31	1,437,086	76.49			
Feb. 1–29	155,477	75.52		10,000	10,042
Mar. 1–31	3,139,398	73.30	2,970,000	9,789	10,149
Apr. 1–30	104,523	75.37		9,789	10,161
May 1–31	76,328	77.03		9,789	9,869
Jun. 1–30	82,179	79.75		9,789	9,980
Jul. 1–31	155,309	82.12		9,789	10,006
Aug. 1–31	2,866,371	80.11	2,800,000	9,570	9,734
Sep. 1–30	3,125,617	79.69	3,000,000	9,338	9,666
Oct. 1–31	78,047	77.53		9,338	9,448
Nov. 1–30	1,597,761	68.84	1,500,000	9,233	9,092
Dec. 1–31	99,652	69.81		9,233	9,030
Total	**12,917,748**	**76.37**	**10,270,000**		

(1) Column (a) shows shares we purchased as part of our seventh share repurchase program plus the following types of share purchases outside of our publicly announced repurchase program: (1) shares which we purchased on the open market; and (2) shares which we purchased from Swiss employees who had obtained the shares through a Novartis Employee Ownership Plan. See the information set forth under "Note 26. Equity-based participation plans for associates" on pages 229 to 232 of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, which is incorporated by reference.

(2) Column (c) shows shares purchased as part of our seventh share repurchase program which was approved by the shareholders February 23, 2016 for an amount of up to CHF 10.0 billion. See the information set forth under "Corporate governance—Our shares

and our shareholders—Our shares—Share repurchase programs" on page 80 of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, which is incorporated by reference.

(3) Column (e) shows the Swiss franc amount from column (d) converted into US dollars as of the month-end, using the Swiss franc/US dollar exchange rate at the applicable month-end.

Item 16F. Change in Registrant's Certifying Accountant

Not applicable.

Item 16G. Corporate Governance

The information set forth under "Corporate governance—Our corporate governance framework" on page 105 of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, is incorporated by reference.

Item 16H. Mine Safety Disclosure

Not applicable.

PART III

Item 17. Financial Statements

See response to "Item 18. Financial Statements."

Item 18. Financial Statements

The information set forth under the headings

"Consolidated income statements" on page 178;

"Consolidated statements of comprehensive income" on page 179;

"Consolidated statements of changes in equity" on page 180;

"Consolidated balance sheets" on page 181;

"Consolidated cash flow statements" on page 182; and

"Notes to the Novartis Group consolidated financial statements" on pages 183 to 247,

in each case of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017, is incorporated by reference.

Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors of Novartis AG, Basel

In our opinion, the accompanying consolidated balance sheets and the related consolidated income statements, consolidated statements of comprehensive income, consolidated statements of changes in equity, consolidated cash flow statements and notes (as referred to in item 18 of this Form 20-F) present fairly, in all material respects, the financial position of Novartis AG and its consolidated subsidiaries (Group or Company) at December 31, 2016 and December 31, 2015, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2016 in conformity with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016, based on criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

The Novartis' Board of Directors and management of the Group are responsible for these financial statements, for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the "Report of Novartis Management on Internal Control Over Financial Reporting" in item 15(b) of this Form 20-F. Our responsibility is to express opinions on these financial statements and on the Company's internal control over financial reporting based on our integrated audits. We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board of the United States of America. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with IFRS. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with IFRS, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that

controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

PricewaterhouseCoopers AG

/s/ BRUNO ROSSI

Bruno Rossi
Audit expert
Auditor in charge

/s/ STEPHEN JOHNSON

Stephen Johnson
Global relationship partner

Basel, January 24, 2017

Item 19. Exhibits

1.1 Articles of Incorporation of Novartis AG, as amended February 23, 2016 (English translation).

1.2 Regulations of the Board and Committee Charters of Novartis AG, as amended in relevant part January 1, 2014, March 1, 2015, and November 1, 2015 (incorporated by reference to Exhibit 1.2 to the Form 20-F for the year ended December 31, 2015, as filed with the SEC on January 27, 2016).

2.1 Amended and Restated Deposit Agreement, dated as of May 11, 2000 among Novartis AG, JPMorgan Chase Bank (fka Morgan Guaranty Trust Company of New York), as depositary, and all holders from time to time of ADRs issued thereunder (incorporated by reference to Exhibit (a)(1) to Post-Effective Amendment No. 1 to Novartis AG's registration statement on Form F-6 (File No. 333-11758) as filed with the SEC on September 8, 2000).

2.2 Amendment No. 1 to the Amended and Restated Deposit Agreement (incorporated by reference to Exhibit (a)(2) to Post-Effective Amendment No. 1 to Novartis AG's registration statement on Form F-6 (File No. 333-11758) as filed with the SEC on September 8, 2000).

2.3 Amendment No. 2 to the Amended and Restated Deposit Agreement (incorporated by reference to Exhibit (a)(3) to Novartis AG's registration statement on Form F-6 (File No. 333-13446) as filed with the SEC on May 7, 2001).

2.4 Restricted Issuance Agreement dated as of January 11, 2002 among Novartis AG, J.P. Morgan Chase Bank, as depositary, and all holders from time to time of ADRs representing ADSs issued thereunder (incorporated by reference to Exhibit 4 to the Registration Statement on Form F-3, File No. 333-81862, as filed with the SEC on January 31, 2002).

2.5 Letter Agreement dated December 14, 2007 between Novartis AG and JPMorgan Chase Bank, as depositary (incorporated by reference to Exhibit 2.4 to the Form 20-F for the year ended December 31, 2007 as filed with the SEC on January 28, 2008).

2.6 Form of American Depositary Receipt (incorporated by reference to Exhibit (a)(7) to the Registration Statement on Form F-6, File No. 333-198623, as filed with the SEC on September 8, 2014).

2.7 The total amount of long-term debt securities authorized under any instrument does not exceed 10% of the total assets of the Company and its subsidiaries on a consolidated basis. We hereby agree to furnish to the SEC, upon its request, a copy of any instrument defining the rights of holders of long-term debt of the Company or of its subsidiaries for which consolidated or unconsolidated financial statements are required to be filed.

4.1 Contribution Agreement relating to the Consumer Healthcare Joint Venture made on April 22, 2014, as amended and restated on May 29, 2014 and March 1, 2015, between Novartis AG, GlaxoSmithKline plc and GlaxoSmithKline Consumer Healthcare Holdings Limited (formerly known as Leo Constellation Limited). Confidential portions of this exhibit have been omitted pursuant to a request for confidential treatment and filed separately with the SEC. (Incorporated by reference to Exhibit 4.2 of the Form 20-F for the year ended December 31, 2015, as filed with the SEC on January 27, 2016.)

4.2 Share and Business Sale Agreement relating to the Vaccines Group made on April 22, 2014, as amended and restated on May 29, 2014, as further amended on October 9, 2014, and as further amended and restated on March 1, 2015, between Novartis AG and GlaxoSmithKline plc. Confidential portions of this exhibit have been omitted pursuant to a request for confidential treatment and filed separately with the SEC. (Incorporated by reference to Exhibit 4.3 of the Form 20-F for the year ended December 31, 2015, as filed with the SEC on January 27, 2016.)

4.3 Sale and Purchase Agreement in relation to the Oncology Business made on April 22, 2014, as amended and restated on May 29, 2014, November 21, 2014 and March 1, 2015, between GlaxoSmithKline plc and Novartis AG. Confidential portions of this exhibit have been omitted pursuant to a request for confidential treatment and filed separately with the SEC. (Incorporated by reference to Exhibit 4.4 of the Form 20-F for the year ended December 31, 2015, as filed with the SEC on January 27, 2016.)

4.4 Stock and Asset Purchase Agreement made on April 22, 2014, as amended on December 17, 2014, between Novartis AG and Eli Lilly and Company. Confidential portions of this exhibit have been omitted pursuant to a request for confidential treatment and filed separately with the SEC. (Incorporated by reference to Exhibit 4.6 of the Form 20-F for the year ended December 31, 2014, as filed with the SEC on January 27, 2015.)

4.5 Share and Business Sale Agreement relating to the Flu Group made on October 26, 2014, as amended and restated on July 31, 2015, between Novartis AG and CSL Limited. Confidential portions of this exhibit have been omitted pursuant to a request for confidential treatment and filed separately with the SEC. (Incorporated by reference to Exhibit 4.7 of the Form 20-F for the year ended December 31, 2015, as filed with the SEC on January 27, 2016.)

4.6 Shareholders' Agreement relating to GlaxoSmithKline Consumer Healthcare Holdings Limited made on March 2, 2015, between GlaxoSmithKline Consumer Healthcare Holdings Limited, GlaxoSmithKline plc, Setfirst Limited, Novartis AG, Novartis Holding AG and Novartis Finance Corporation. Confidential portions of this exhibit have been omitted pursuant to a request for confidential treatment and filed separately with the SEC. (Incorporated by reference to Exhibit 4.8 of the Form 20-F for the year ended December 31, 2015, as filed with the SEC on January 27, 2016.)

6.1 Our earnings per share calculation is incorporated by reference to "Note 7. Earnings per share" on page 202 of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

8.1 A list of all of our principal Group subsidiaries and associated companies is incorporated by reference to "Note 32. Principal Group subsidiaries and associated companies" on pages 246 to 247 of the "Excerpts from Novartis Annual Report 2016" furnished to the SEC on Form 6-K on January 25, 2017.

12.1 Certification of Joseph Jimenez, Chief Executive Officer of Novartis AG, pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.

12.2 Certification of Harry Kirsch, Chief Financial Officer of Novartis AG, pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.

13.1 Certification of Joseph Jimenez, Chief Executive Officer of Novartis AG, pursuant to Section 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.

13.2 Certification of Harry Kirsch, Chief Financial Officer of Novartis AG, pursuant to Section 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.

15.1 Consent of Independent Registered Public Accounting Firm, PricewaterhouseCoopers AG, to the incorporation by reference of the audit report contained in this Form 20-F into Novartis AG's Registration Statements on Form S-8 filed on October 1, 2004 (File No. 333-119475), on Form S-8 filed on September 5, 2006 (File No. 333-137112), on Form S-8 filed on October 29, 2009 (File No. 333-162727), on Form S-8 filed on January 18, 2011 (File No. 333-171739), on Form S-8 filed on April 8, 2011 (File No. 333-173382), on Form S-8 filed on September 12, 2014 (File No. 333-198706), and on Form F-3 filed on September 18, 2015 (File No. 333-207004).

15.2 Excerpts from Novartis Annual Report 2016 (incorporated by reference to Exhibit 99.1 to Form 6-K as furnished to the SEC on January 25, 2017).

SIGNATURES

The registrant hereby certifies that it meets all of the requirements for filing on Form 20-F and that it has duly caused and authorized the undersigned to sign this annual report on its behalf.

NOVARTIS AG

By: /s/ HARRY KIRSCH

Name: Harry Kirsch
Title: *Chief Financial Officer, Novartis Group*

By: /s/ FELIX R. EHRAT

Name: Felix R. Ehrat
Title: *General Counsel, Novartis Group*

Date: January 25, 2017

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 6-K

REPORT OF FOREIGN PRIVATE ISSUER
PURSUANT TO RULE 13a-16 OR 15d-16
UNDER THE SECURITIES EXCHANGE ACT OF 1934

Report on Form 6-K dated January 25, 2017
(Commission File No. 1-15024)

Novartis AG
(Name of Registrant)

Lichtstrasse 35
4056 Basel
Switzerland
(Address of Principal Executive Offices)

Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40-F:

Form 20-F ☒ Form 40-F ☐

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(1):

Yes ☐ No ☒

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(7):

Yes ☐ No ☒

Indicate by check mark whether the registrant by furnishing the information contained in this form is also thereby furnishing the information to the Commission pursuant to Rule 12g3-2(b) under the Securities Exchange Act of 1934.

Yes ☐ No ☒

Exhibits:

99.1 Excerpts from Novartis Annual Report 2016

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: January 25, 2017

Novartis AG

By: /s/ HARRY KIRSCH

Name: Harry Kirsch

Title: Chief Financial Officer, Novartis Group

By: /s/ FELIX R. EHRAT

Name: Felix R. Ehrat

Title: General Counsel, Novartis Group

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Exhibit 99.1
Excerpts from
Novartis Annual Report 2016

NOVARTIS

Corporate governance

Contents

Dear shareholder,

In 2016, we refreshed our Board with new members, focused on the new operating model of Novartis, and further strengthened our corporate governance.

The mandate of our Board

Our Board is accountable for stewardship, governance and oversight, and for setting the strategic direction to deliver sustainable value. We achieve this by setting a clear strategy for Novartis and through an effective governance.

Our Board is also responsible for appointing our CEO and the other Executive Committee members. We assert independent judgment and work closely with our Executive Committee to ensure our strategy is properly implemented, our ethical standards are applied, and our performance is optimized.

Board composition

To be effective and independent, our Board must have the right composition, structure and processes, and a clear understanding of its role and responsibilities. Our Board meets these requirements.

Our Board is comprised of 12 non-executive, independent members with diverse education, experience, nationalities and interpersonal skills. This diversity was further strengthened when Ton Buechner and Liz Doherty joined in February 2016, reinforcing our Board's expertise in finance and accounting, as well as in leadership and management. With this, we achieved a substantial Board refreshment. Two-thirds of our Board members have a tenure of less than six years, balancing the benefits of continuity and experience with refreshment, without applying a mandatory term limit.

In line with committee succession plans, Liz joined our Audit and Compliance Committee (ACC), and was designated as Financial Expert. Subject to their re-election at the Annual General Meeting of Shareholders (AGM) 2017, Liz will take over the chairmanship of the ACC from Srikant Datar; Srikant will remain an ACC member, designated as second Financial Expert; and he will take over the chairmanship of the Risk Committee from Andreas von Planta, who has already taken over the chairmanship of the Governance, Nomination and Corporate Responsibilities Committee (GNCRC) from Pierre Landolt.

All Board members are non-executive and independent, as defined by our own rules and those of the Swiss Code of Best Practice for Corporate Governance. We have established processes to ensure our Board functions effectively, promoting efficient and balanced decision-making, and enabling our Board to effectively fulfill its duties in the best interest of our shareholders, employees and other stakeholders.

We emphasize training, performance evaluation and ongoing improvement of our Board and its members, as well as succession planning. To get an outside view on where we could improve further, we initiate a performance and effectiveness evaluation by an independent expert on a regular basis, with the most recent external review being completed during 2014.

The focus of our Board in 2016

The key areas that our Board focused on in 2016 were structural, cultural and leadership changes, as well as the corporate responsibility programs, compliance and the compensation system.
We re-evaluate the strategic direction of Novartis each year and make necessary changes in line with our mandate to create sustainable value.

Last year, a key strategic topic for our Board was the continuing transformation of Novartis. This began in 2014 when we focused our company on our core businesses and created a more integrated organization to facilitate collaboration, drive efficiency, and support productivity gains. In 2016, in close cooperation with our Executive Committee, we implemented additional structural changes aimed at positioning our company for future growth. They included creating Global Drug Development and manufacturing organizations to further enhance efficiency and effectiveness. As a result of these actions, in just over three years, Novartis has transformed from a strongly divisionalized organization to a more integrated, streamlined company focused on key segments and able to take advantage of its global scale. For details on our strategy and structure, please see pages 14 – 19. We also strengthened our focus on the corporate culture of Novartis as defined by the Novartis Values and Behaviors.

The GNCRC also reviewed progress on Novartis Access, our portfolio of 15 on- and off-patent medicines offered to governments and public-sector customers in low- and lower-middle-income countries at a price of USD 1 per treatment per month, which completed its first year of implementation. The Novartis Malaria Initiative, the Healthy Family social business, and our corporate volunteering program were also reviewed. The GNCRC also reviewed Novartis' performance in key sustainability ratings and discussed the potential for introducing more robust reporting on the social impact of our activities. For further information on our corporate responsibility efforts, please see the Corporate Responsibility chapter, beginning on page 60, and our Corporate Responsibility Performance Report on the Novartis website: www.novartis.com/about-us/corporate-responsibility.

To meet the increasing expectations of patients and society in a way that makes us proud, we also took further steps in the compliance area. We enhanced our core compliance processes and strengthened our Integrity & Compliance function. Further, we evolved the way we work to increase access to evidence-based information about our products and services, with the aim of helping doctors deliver the best possible care for patients. We will continue to focus on further strengthening leaders' accountability at all levels of the organization for compliance.

And, finally, we continued to refine our compensation system in line with best practice principles. For further information, please see our Compensation Report, beginning on page 110.

Role of the Chairman

As independent, non-executive Chairman, I am responsible for the leadership of the Board, ensuring its effectiveness in all aspects of its role. I also make sure we effectively collaborate with our CEO and the Executive Committee.

I ensure that our Board and its committees work effectively, setting the agenda, style and tone of Board discussions. I promote constructive challenge and debate, as well as effective decision-making, while ensuring that our performance is regularly evaluated and that our members are provided with appropriate support, education and advice.

In addition, I support, mentor and challenge our CEO, without interfering in the operational management of Novartis.

I am supported in my tasks by our Vice Chairman, Enrico Vanni, who would lead the Board if I were incapacitated.

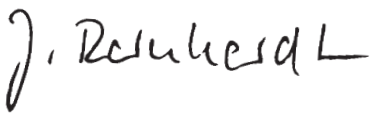
Strengthened governance framework

During the last two years, we took steps to further strengthen our corporate governance, implementing the rules of the Ordinance against Excessive Compensation in Stock Exchange Listed Companies. We introduced annual elections of the Chairman of the Board, of all Board members, and of Compensation Committee members. We also introduced yearly binding shareholder votes on the aggregate compensation of our Board and Executive Committee, as well as a yearly non-binding shareholder vote on the Compensation Report.

Last year we also addressed the question of auditor rotation. We concluded that, at this stage, continuing with the yearly assessment of PwC's objectivity, effectiveness and independence, and with the regular rotation of the audit partner in charge, is in the best interest of Novartis, its investors and other stakeholders.

Importance of shareholder engagement

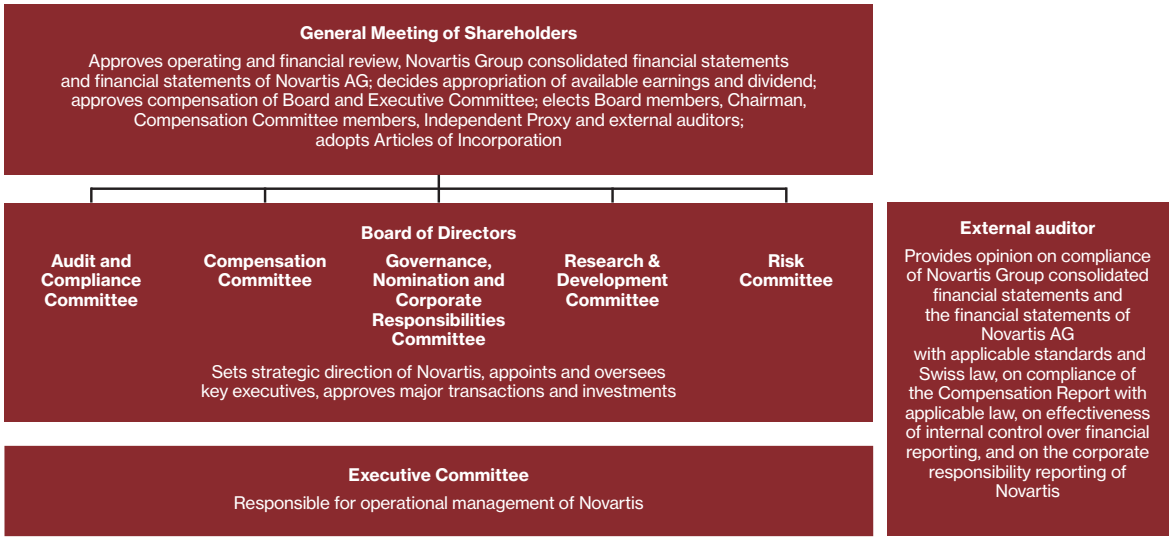
Engagement with our shareholders is critical to our company's long-term success. Our Board is committed to continuous shareholder engagement. We strive to exchange views with our shareholders in an atmosphere of trust and respect that promotes a collaborative dialogue, with views and positions expressed openly to enhance mutual understanding. As part of these efforts, based on a structured annual program, our governance specialists meet regularly with their peers from shareholder groups, and I personally meet with many of our shareholders, discussing strategy and governance. Our shareholder engagement meaningfully contributes to the continuing evolution of our governance framework.



Joerg Reinhardt
Chairman of the Board of Directors

Summary of our corporate governance approach

Governance bodies



Leadership structure

Independent, non-executive Chairman and separate CEO

Board governance

Structure

All Board members are non-executive and independent, as defined by our rules. The Board has assigned responsibilities to five committees:

- Audit and Compliance Committee
- Compensation Committee
- Governance, Nomination and Corporate Responsibilities Committee
- Research & Development Committee
- Risk Committee

Composition

Board members have diverse education, experience, nationalities and interpersonal skills. Their biographies (beginning on page 94) describe their specific qualifications.

Processes

The Board's processes significantly influence its effectiveness. The Board has implemented best practices for all such processes. Important elements include Board meeting agendas (to address all important topics), information submitted to the Board (to ensure the Board receives sufficient information from management to perform its supervisory duty and to make decisions that are reserved for it), and boardroom behavior (to promote an efficient and balanced decision-making process).

Board and Executive Committee compensation

Information on Board and Executive Committee compensation is outlined in our Compensation Report, beginning on page 110.

Our shares and our shareholders

Our shares

Share capital of Novartis AG

As of December 31, 2016, the share capital of Novartis AG is CHF 1 313 557 410 fully paid-in and divided into 2 627 114 820 registered shares, each with a nominal value of CHF 0.50 (Novartis share). Novartis AG has neither authorized nor conditional capital. There are no preferential voting shares; all Novartis shares have equal voting rights. No participation certificates, non-voting equity securities (Genussscheine), or profit-sharing certificates have been issued.

Novartis shares are listed on the SIX Swiss Exchange (ISIN CH0012005267, symbol: NOVN), and on the New York Stock Exchange (NYSE) in the form of American depositary receipts (ADRs) representing Novartis American depositary shares (ADSs) (ISIN US66987V1098, symbol: NVS).

The holder of an ADR has the rights enumerated in the deposit agreement (such as the right to give voting instructions and to receive dividends). The ADS depositary of Novartis AG – JPMorgan Chase Bank, New York – holding the Novartis shares underlying the ADRs is registered as a shareholder in the Novartis Share Register. An ADR is not a Novartis share and an ADR holder is not a Novartis AG shareholder. ADR holders exercise their voting rights by instructing the depositary to exercise their voting rights. Each ADR represents one Novartis share.

Changes in share capital

During the last three years, the following changes were made to the share capital of Novartis AG:

In 2014, the share capital of Novartis AG did not change. In 2015, Novartis AG reduced its share capital by CHF 14.6 million (from CHF 1 353 096 500 to CHF 1 338 496 500) by canceling 29.2 million Novartis shares repurchased on the second trading line during 2013 and 2014. In 2016, Novartis AG reduced its share capital by CHF 24.9 million (from CHF 1 338 496 500 to CHF 1 313 557 410) by canceling 49.9 million Novartis shares repurchased on the second trading line during 2015.

Capital changes

	Number of shares			
Year	As of Jan 1	Changes in shares	As of Dec 31	Changes in CHF
2014	2 706 193 000		2 706 193 000	
2015	2 706 193 000	– 29 200 000	2 676 993 000	– 14 600 000
2016	2 676 993 000	– 49 878 180	2 627 114 820	– 24 939 090

A table with additional information on changes in the Novartis AG share capital can be found in Note 8 to the financial statements of Novartis AG.

Convertible or exchangeable securities

Novartis AG has not issued convertible or exchangeable bonds, warrants, options or other securities granting rights to Novartis shares, other than options (and similar instruments such as stock appreciation rights) granted under or in connection with equity-based participation plans of Novartis associates. Novartis AG does not grant any new stock options under these plans.

Share repurchase programs

At the Annual General Meeting (AGM) in February 2008, shareholders approved the sixth share repurchase program authorizing the Board to repurchase Novartis shares up to a maximum of CHF 10 billion via a second trading line on the SIX Swiss Exchange. In 2008, a total of 6 million Novartis shares were repurchased at an average price of CHF 49.42 per Novartis share, and canceled in 2009. In April 2008, the share repurchases were suspended in favor of debt repayment. In December 2010, the Board announced the reactivation of the share repurchases. In 2011, 39 430 000 Novartis shares were repurchased at an average price of CHF 52.81 per Novartis share, and canceled in 2012. In 2012, no Novartis shares were repurchased. In 2013, 2 160 000 Novartis shares were repurchased at an average price of CHF 70.58 per Novartis share. In 2014, 27 040 000 Novartis shares were repurchased at an average price of CHF 81.18 per Novartis share. In 2015, 29 200 000 Novartis shares repurchased in 2013 and 2014 were canceled. In the same year, 49 878 180 Novartis shares were repurchased at an average price of CHF 93.24 per Novartis share, and canceled in 2016. With those repurchases, the sixth share repurchase program was completed.

At the AGM in February 2016, shareholders approved the seventh share repurchase program authorizing the Board to repurchase Novartis shares up to a maximum of CHF 10 billion. In 2016, a total of 10 270 000 Novartis shares were repurchased at an average price of CHF 74.67 per Novartis share.

Share developments

SHARE DEVELOPMENTS IN 2016

- Swiss-listed Novartis shares decreased 14.6% to CHF 74.10
- ADRs decreased 15.3% to USD 72.84

Novartis shares finished at CHF 74.10, a decrease of 14.6% from the 2015 year-end closing price of CHF 86.80. Novartis ADRs decreased in 2016 by 15.3% to USD 72.84 from USD 86.04. The Swiss Market Index (SMI), in comparison, decreased by 6.8% in 2016, whereas the world pharmaceutical index (MSCI) decreased by 12.0% during the year. Total shareholder return for Novartis shares in 2016 was -11.4% in CHF and -13.8% in USD. The disappointing Alcon performance, the slow uptake of *Entresto* and the patent expiration of *Gleevec* in US weighed on our share price in 2016. Over a longer-term period, Novartis AG has consistently delivered a solid performance, providing a 8.7% compounded annual total shareholder return between January 1, 1996 and December 31, 2016, exceeding the 8.4% compounded returns of its large pharmaceutical peers (see page 115; "benchmark companies"), or the returns of 8.3% of the MSCI.

The market capitalization of Novartis AG based on the number of Novartis shares outstanding (excluding Novartis treasury shares) amounted to USD 172 billion as of December 31, 2016, compared to USD 208 billion as of December 31, 2015.

CONTINUOUSLY RISING DIVIDEND SINCE 1996

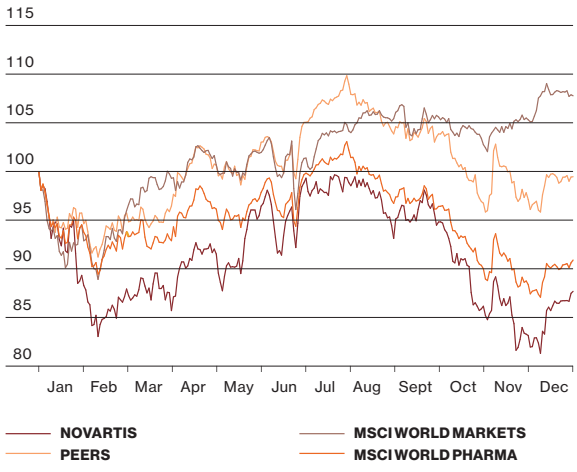
The Board proposes a 2% increase in the dividend payment for 2016 to CHF 2.75 per Novartis share (2015: CHF 2.70) for approval at the AGM on February 28, 2017. This represents the 20th consecutive increase in the dividend paid per share since the creation of Novartis AG in December 1996, which reflects the successful execution of the Group's strategy as well as the performance of the Executive Committee and all Novartis associates. If the 2016 dividend proposal is approved by shareholders, dividends to be paid out will total approximately USD 6.4 billion (2015: USD 6.5 billion). This will result in an expected payout ratio of 96% of net income from continuing operations (2015: 92% and 36% of net income attributable to shareholders of Novartis AG). Based on the 2016 year-end share price of CHF 74.10, the dividend yield will be 3.7% (2015: 3.1%). The dividend payment date has been set for March 6, 2017.

DIRECT SHARE PURCHASE PLAN

As of June 20, 2016, Novartis no longer provides a Direct Share Purchase Plan. All participants were informed about the termination through a letter, which also included details about available options and the modalities of the closure.

Novartis 2016 share price movement

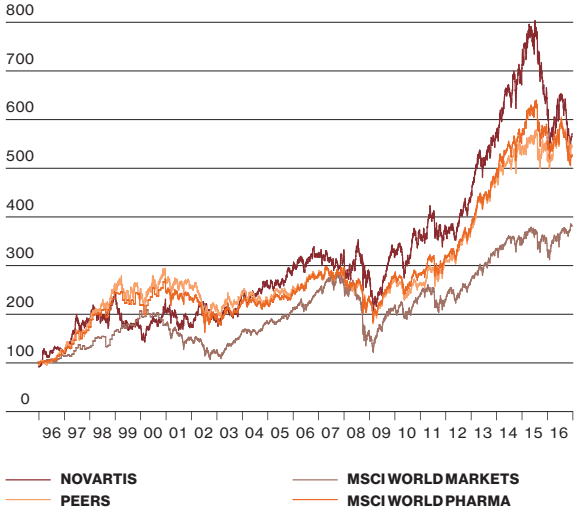
(based on USD amounts)



Source: Datastream; data are converted into US dollars and re-based to 100 at January 1, 2016. Currency fluctuations have an influence on the representation of the relative performance of Novartis vs. indices and peers.

Novartis 1996–2016 total shareholder return

(based on USD amounts)



Source: Datastream; data are converted into US dollars and re-based to 100 at January 1, 1996. Currency fluctuations have an influence on the representation of the relative performance of Novartis vs. indices and peers.

Key Novartis share data

	2016	2015	2014
Issued shares	**2 627 114 820**	2 676 993 000	2 706 193 000
Treasury shares [1]	253 055 807	303 098 183	307 566 743
Outstanding shares at December 31	**2 374 059 013**	2 373 894 817	2 398 626 257
Weighted average number of shares outstanding	**2 378 474 555**	2 402 806 352	2 425 782 324

[1] Approximately 135 million treasury shares (2015: 137 million; 2014: 153 million) are held in entities that restrict their availability for use.

Per-share information[1]

	2016	2015	2014
Basic earnings per share (USD) from continuing operations	2.82	2.92	4.39
Basic earnings per share (USD) from discontinued operations		4.48	– 0.18
Total basic earnings per share (USD)	2.82	7.40	4.21
Diluted earnings per share (USD) from continuing operations	2.80	2.88	4.31
Diluted earnings per share (USD) from discontinued operations		4.41	– 0.18
Total diluted earnings per share	2.80	7.29	4.13
Operating cash flow (USD) from continuing operations	4.82	5.03	5.73
Year-end equity for Novartis AG shareholders (USD)	31.52	32.46	29.50
Dividend (CHF)[2]	2.75	2.70	2.60

[1] Calculated on the weighted average number of shares outstanding, except year-end equity
[2] 2016: proposal to shareholders for approval at the Annual General Meeting on February 28, 2017

Key ratios – December 31

	2016	2015	2014
Price/earnings ratio[1]	25.7	11.9	22.2
Price/earnings ratio from continuing operations[1]	25.7	30.1	21.3
Enterprise value/EBITDA from continuing operations	13	16	15
Dividend yield (%)[1]	3.7	3.1	2.8

[1] Based on the Novartis share price at December 31 of each year

Key data on ADRs issued in the US

	2016	2015	2014
Year-end ADR price (USD)	72.84	86.04	92.66
High[1]	86.21	106.12	96.65
Low[1]	67.59	83.96	78.20
Number of ADRs outstanding[2]	315 349 314	299 578 398	307 623 364

[1] Based on the daily closing prices
[2] The depositary, JPMorgan Chase Bank, holds one Novartis AG share for every ADR issued.

Share price (CHF)

	2016	2015	2014
Year-end share price	74.10	86.80	92.35
High[1]	86.45	102.30	93.80
Low[1]	68.15	82.20	70.65
Year-end market capitalization (USD billions)[2]	**172.0**	**208.3**	**223.7**
Year-end market capitalization (CHF billions)[2]	**175.9**	**206.1**	**221.5**

[1] Based on the daily closing prices
[2] Market capitalization is calculated based on the number of shares outstanding (excluding treasury shares).

Our shareholders

Significant shareholders

According to the Novartis Share Register, as of December 31, 2016, the following registered shareholders (including nominees and the ADS depositary) held more than 2% of the total share capital of Novartis AG, with the right to vote all these Novartis shares based on an exemption granted by the Board (see page 84):[1]

- Shareholders: Novartis Foundation for Employee Participation, with its registered office in Basel, holding 2.6%; Emasan AG, with its registered office in Basel, holding 3.4%; and UBS Fund Management (Switzerland) AG, with its registered office in Basel, holding 2.1%
- Nominees: Chase Nominees Ltd., London, holding 8.5%; Nortrust Nominees, London, holding 3.9%; and The Bank of New York Mellon, New York, holding 4.4% through its nominees, The Bank of New York Mellon, Everett, holding 1.8%, and The Bank of New York Mellon, Brussels, holding 2.6%
- ADS depositary: JPMorgan Chase Bank, New York, holding 12.0%

According to a disclosure filed with Novartis AG, Norges Bank (Central Bank of Norway), Oslo, held 2.02% of the share capital of Novartis AG as of December 31, 2016.

According to disclosure notifications filed with Novartis AG and the SIX Swiss Exchange, each of the following shareholders held between 3% and 5% of the share capital of Novartis AG as of December 31, 2016:

- Capital Group Companies Inc., Los Angeles
- BlackRock Inc., New York

Disclosure notifications pertaining to shareholdings in Novartis AG that were filed with Novartis AG and the SIX Swiss Exchange are published on the latter's electronic publication platform, and can be accessed via: www.six-exchange-regulation.com/en/home/publications/significant-shareholders.html.

Cross shareholdings

Novartis AG has no cross shareholdings in excess of 5% of capital, or voting rights with any other company.

[1] Excluding 4.5% of the share capital held as treasury shares by Novartis AG and its entities that restrict their availability for use

Distribution of Novartis shares

The information in the following tables relates only to registered shareholders and does not include holders of unregistered shares. Also, the information provided in the tables below cannot be assumed to represent the entire Novartis AG investor base because nominees and JPMorgan Chase Bank, as ADS depositary, are registered as shareholders for a large number of beneficial owners.

As of December 31, 2016, Novartis AG had approximately 171 000 registered shareholders.

Number of shares held

As of December 31, 2016	Number of registered shareholders	% of registered share capital
1–100	25 153	0.06
101–1 000	103 217	1.66
1 001–10 000	38 138	4.03
10 001–100 000	3 427	3.40
100 001–1 000 000	481	5.47
1 000 001–5 000 000	71	5.53
5 000 001 or more [1]	35	50.12
Total registered shareholders/shares	170 522	70.27
Unregistered shares		29.73
Total		**100.00**

[1] Including significant registered shareholders as listed above

Registered shareholders by type

As of December 31, 2016	Shareholders in %	Shares in %
Individual shareholders	96.24	13.28
Legal entities [1]	3.70	35.11
Nominees, fiduciaries and ADS depositary	0.06	51.61
Total	**100.00**	**100.00**

[1] Excluding 4.5% of the share capital held as treasury shares by Novartis AG and its entities that restrict their availability for use

Registered shareholders by country

As of December 31, 2016	Shareholders in %	Shares in %
Belgium	0.14	4.08
France	2.37	0.49
Germany	5.27	2.00
Japan	0.16	0.73
Switzerland [1]	88.60	42.53
United Kingdom	0.47	23.43
United States	0.31	23.93
Other countries	2.68	2.81
Total	**100.00**	**100.00**

Registered shares held by nominees are shown in the country where the company/affiliate entered in the Novartis Share Register as shareholder has its registered seat.

[1] Excluding 4.5% of the share capital held as treasury shares by Novartis AG and its entities that restrict their availability for use

Shareholder rights

Shareholders have the right to receive dividends, to vote and to execute all other rights as granted under Swiss law and the Articles of Incorporation.

RIGHT TO VOTE

Each Novartis share registered with the right to vote entitles the holder to one vote at General Meetings of Shareholders (General Meetings). Novartis shares can only be voted if they are registered with voting rights in the Novartis Share Register by the third business day before the General Meeting (for shareholder registration and voting restrictions, see page 84).

ADR holders may vote by instructing JPMorgan Chase Bank, the ADS depositary, to exercise the voting rights attached to the registered Novartis shares underlying the ADRs. JPMorgan Chase Bank exercises the voting rights for registered Novartis shares underlying ADRs for which no voting instructions have been given by providing a discretionary proxy to an uninstructed independent designee. Such designee has to be a Novartis AG shareholder.

POWERS OF GENERAL MEETINGS OF SHAREHOLDERS

The following powers are vested exclusively in the General Meeting:

- Adoption and amendment of the Articles of Incorporation
- Election and removal of the Chairman of the Board, Board and Compensation Committee members, the Independent Proxy and external auditors
- Approval of the management report (if required) and of the consolidated financial statements
- Approval of the financial statements of Novartis AG, and decision on the appropriation of available earnings shown on the balance sheet, including dividends
- Approval of the maximum aggregate amounts of compensation of the Board (for the period from an AGM until the next AGM) and of the Executive Committee (for the financial year following the AGM)
- Grant of discharge to Board and Executive Committee members
- Decision of other matters that are reserved by law or by the Articles of Incorporation to the General Meeting of Shareholders

RESOLUTIONS AND ELECTIONS AT GENERAL MEETINGS

The General Meeting passes resolutions and elections with the absolute majority of the votes represented at the meeting. However, under the Articles of Incorporation (www.novartis.com/corporate-governance), the approval of two-thirds of the votes represented at the meeting is required for:

- An alteration of the purpose of Novartis AG
- The creation of shares with increased voting powers
- An implementation of restrictions on the transfer of registered shares, and the removal of such restrictions

— An authorized or conditional increase of the share capital
— An increase of the share capital out of equity, by contribution in kind, for the purpose of an acquisition of property or the grant of special rights
— A restriction or suspension of rights or options to subscribe
— A change of location of the registered office of Novartis AG
— The dissolution of Novartis AG

In addition, the law provides for a qualified majority for other resolutions, such as a merger or spin-off.

OTHER SHAREHOLDER RIGHTS

Shareholders representing at least 10% of the Novartis share capital may request that an extraordinary General Meeting be convened. Shareholders representing Novartis shares with an aggregate nominal value of at least CHF 1 million may request that an item be included in a General Meeting agenda. Such requests must be made in writing at least 45 days before the meeting, specify the agenda item to be included, and contain the proposal on which the shareholder requests a vote.

Shareholders can vote their Novartis shares by themselves or appoint another shareholder or the Independent Proxy to vote on their behalf. All shareholders (who are not yet registered on the online platform; see below) receive a General Meeting invitation letter with a proxy appointment form for the appointment of the Independent Proxy. On this form, shareholders can instruct the Independent Proxy to vote on alternative or additional motions related to the agenda items either (i) according to the motions of the Board for such alternative or additional motions, or (ii) against such alternative or additional motions. They can also abstain from voting.

Novartis AG offers shareholders the opportunity to use an online platform (the Sherpany Platform) to receive notices of future General Meetings exclusively by email and to electronically give their instructions to the Independent Proxy, grant powers of attorney to other shareholders, and order their admission cards online. The General Meeting registration form enables shareholders who are not yet registered on the Sherpany Platform to order detailed documents related to opening a Sherpany account. They may also do so by contacting the Novartis Share Registry. Shareholders can deactivate their online account at any time and again receive invitations in paper form.

Other rights associated with a registered Novartis share may only be exercised by the shareholder, its legal representative, another shareholder with the right to vote, the Independent Proxy, an usufructuary (a person who is not the owner of the share but who is entitled to exercise shareholder rights), or a nominee who is registered in the Novartis Share Register.

Shareholder registration

Only shareholders, usufructuaries or nominees registered in the Novartis Share Register with voting rights may exercise their voting rights. To be registered with voting rights, a shareholder must declare that he or she acquired the shares in his or her own name and for his or her own account. According to the Articles of Incorporation, the Board may register nominees with the right to vote. For restrictions on the registration of nominees, please see below.

The Articles of Incorporation provide that no shareholder shall be registered with the right to vote for more than 2% of the registered share capital. The Board may, upon request, grant an exemption from this restriction. Considerations include whether the shareholder supports the Novartis goal of creating sustainable value and has a long-term investment horizon. In 2016, the Board approved an exemption requested by UBS Fund Management (Switzerland) AG based on the fulfilment of the requirements as disclosed above. Further exemptions are in force for the registered significant shareholders listed on page 82 under Our Shareholders – Significant Shareholders, and for Norges Bank (Central Bank of Norway), Oslo, which as of December 31, 2016, was not registered in the share register but according to disclosure notification filed with Novartis AG, held 2.02% of the share capital of Novartis AG.

The same registration and voting restrictions indirectly apply to holders of ADRs.

Given that shareholder representation at General Meetings traditionally has been rather low in Switzerland, Novartis AG considers registration restrictions necessary to prevent a minority shareholder from dominating a General Meeting.

The Articles of Incorporation provide that no nominee shall be registered with the right to vote for more than 0.5% of the registered share capital. The Board may, upon request, grant an exemption from this restriction if the nominee discloses the names, addresses and number of shares of the individuals for whose account it holds 0.5% or more of the registered share capital. Exemptions are in force for the nominees listed on page 82 under Our Shareholders – Significant Shareholders, and for the nominee Citi Bank, London, which in 2015 requested an exemption, but as of December 31, 2016, was not registered in the Novartis Share Register.

The same restrictions indirectly apply to holders of ADRs.

Registration restrictions in the Articles of Incorporation may only be removed through a resolution of the General Meeting, with approval of at least two-thirds of the votes represented at the meeting.

Shareholders, ADR holders, or nominees who are linked to each other or who act in concert to circumvent registration restrictions are treated as one person or nominee for the purposes of the restrictions on registration.

No restrictions on trading of shares

No restrictions are imposed on the transferability of Novartis shares. The registration of shareholders in the Novartis Share Register or in the ADR register kept by JPMorgan Chase Bank does not affect the tradability of Novartis shares or ADRs. Registered Novartis shareholders or ADR holders may therefore purchase or sell their Novartis shares or ADRs at any time, including before a General Meeting, regardless of the record date. The record date serves only to determine the right to vote at a General Meeting.

Change-of-control provisions

NO OPTING UP, NO OPTING OUT

According to the Swiss Federal Act on Financial Infrastructures, anyone who – directly, indirectly or acting in concert with third parties – acquires equity securities exceeding 33 1/3% of the voting rights of a company (whether or not such rights are exercisable) is required to make an offer to acquire all listed equity securities of that company. A company may raise this threshold up to 49% of the voting rights ("opting up") or may, under certain circumstances, waive the threshold ("opting out"). Novartis AG has not adopted any such measures.

CHANGE-OF-CONTROL CLAUSES

In accordance with good corporate governance and the rules of the Ordinance against Excessive Compensation in Listed Companies, there are no change-of-control clauses and "golden parachute" agreements benefiting Board members, Executive Committee members, or other members of senior management. Furthermore, employment contracts with Executive Committee members do not contain notice periods or contract periods exceeding 12 months, or commissions for the acquisition or transfer of enterprises or severance payments.

General compensation provisions

NON-EXECUTIVE MEMBERS OF THE BOARD OF DIRECTORS

Compensation of non-executive members of the Board includes fixed compensation elements only. In particular, non-executive members of the Board shall receive no company contributions to any pension plan, no performance-related elements, and no financial instruments (e.g., options).

MEMBERS OF THE EXECUTIVE COMMITTEE

The members of the Executive Committee receive fixed and variable, performance-related compensation. Fixed compensation is comprised of the base salary and may include other elements and benefits such as contributions to pension plans. Variable compensation may be structured into short-term and long-term compensation elements. Short-term variable compensation elements shall be governed by performance metrics that take into account the performance of Novartis and/or parts thereof, and/or individual targets. Achievements are generally measured based on the one-year period to which the short-term compensation relates. The long-term compensation plans are based on performance metrics that take into account strategic objectives of Novartis (such as financial, innovation, shareholder return and/or other metrics). Achievements are generally measured based on a period of not less than three years.

ADDITIONAL AMOUNT

If the maximum aggregate amount of compensation already approved by the General Meeting is not sufficient to cover the compensation of newly appointed or promoted Executive Committee members, Novartis may pay out compensation, in a total amount up to 40% of the total maximum aggregate amount last approved for the Executive Committee per compensation period, to newly appointed or promoted Executive Committee members.

For detailed information on the compensation of the Board and the Executive Committee, see the Compensation Report, beginning on page 110.

Our Board of Directors

Composition of the Board of Directors and its committees (as per December 31, 2016)

Election and term of office

Board members, the Chairman, and Compensation Committee members are elected annually and individually by shareholders at the General Meeting. Board members whose term of office has expired are immediately eligible for re-election.

The average tenure of Board members is seven years, with two-thirds of Board members having a tenure of less than six years. A Board member must retire after reaching age 70. Under special circumstances, shareholders may grant an exemption from this rule and re-elect a Board member for additional terms of office. There is no mandatory term limit for Board members so as to not lose the value of the insight and knowledge of the company's operations and practices that long-serving Board members have developed.

Name	Nationality	Year of birth	First election at AGM	Last election at AGM	End of current term
Joerg Reinhardt, Ph.D.	D	1956	2013	2016	2017
Enrico Vanni, Ph.D.	CH	1951	2011	2016	2017
Nancy C. Andrews, M.D., Ph.D.	US	1958	2015	2016	2017
Dimitri Azar, M.D.	US	1959	2012	2016	2017
Ton Buechner	NLD	1965	2016	2016	2017
Srikant Datar, Ph.D.	US	1953	2003	2016	2017
Elizabeth Doherty	GB	1957	2016	2016	2017
Ann Fudge	US	1951	2008	2016	2017
Pierre Landolt, Ph.D.	CH	1947	1996	2016	2017
Andreas von Planta, Ph.D.	CH	1955	2006	2016	2017
Charles L. Sawyers, M.D.	US	1959	2013	2016	2017
William T. Winters	GB/US	1961	2013	2016	2017

Board profile

Board composition

The composition of the Board must align with our status as a listed company as well as our business portfolio, geographic reach and culture. The Board must be diverse in all aspects. Knowledge and experience in the following fields must be represented on the Board: leadership and management; healthcare, life sciences and medicine; research and development; engineering and technology; marketing; banking, finance and accounting; human resources; legal and public affairs; and risk management.

Individual Board member profile

Board members should have the following personal qualities:

- Interact with other Board members to build an effective and complementary Board
- Establish trusting relationships
- Apply independence of thought and judgment
- Be challenging but supportive in the boardroom
- Influence without creating conflict by applying a constructive, non-confrontational style
- Listen well and offer advice based on sound judgment
- Be able and willing to commit adequate time to Board and committee responsibilities
- Be open to personal feedback and seek to be responsive
- Do not have existing board memberships or hold other positions that could lead to a permanent conflict of interest
- Understand and respect the boundaries of the role, leaving the operational management of the company to the CEO and his Executive Committee

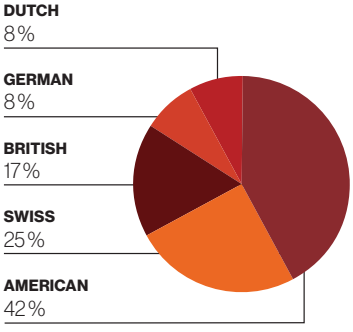
Board members' biographies (pages 94–97) highlight the specific qualifications that led the Board to conclude members are qualified to serve on the Board, which is diverse in terms of background, credentials, interests and skills.

Board diversity

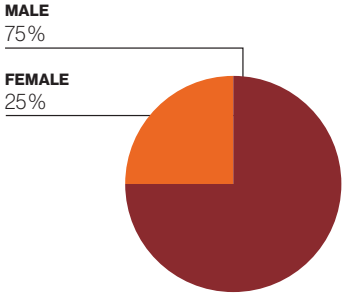
The diversity of a board of directors is critical to its effectiveness. When the Governance, Nomination and Corporate Responsibilities Committee (GNCRC) of Novartis identifies new Board member candidates to be proposed to shareholders for election, the maintenance and improvement of the Board's diversity is an important criterion. The Board's aspiration is to have a diverse Board in all aspects. This includes nationality, gender, background and experience, age, tenure, viewpoints, interests, and technical and interpersonal skills.

Diversity

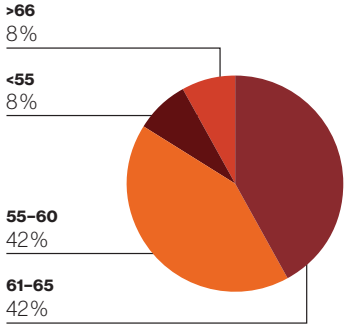
Nationality



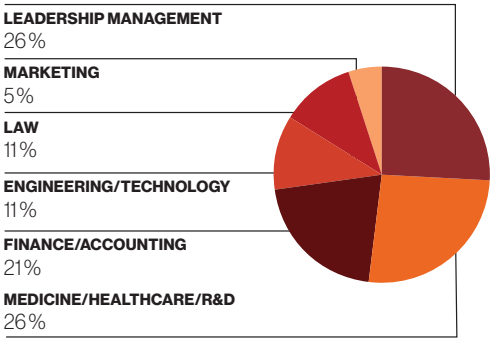
Gender



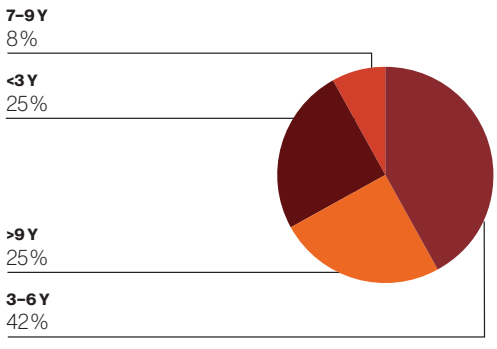
Age



Background/experience



Tenure



Role of the Board and its committees

The Board is responsible for the overall direction and supervision of management, and holds the ultimate decision-making authority for Novartis AG, with the exception of decisions reserved for shareholders.

The Board has delegated certain responsibilities to five committees, as set out below. Responsibilities described with the terms "overseeing" or "reviewing" are subject to final Board approval. The committees enable the Board to work in an efficient and effective manner, ensuring a thorough review and discussion of issues, while giving the Board more time for deliberation and decision-making. Moreover, committees ensure that only Board members who are independent oversee audit and compliance, governance and compensation – as only independent Board members are delegated in the respective committees.

Responsibilities	Members	Number of meetings held in 2016/approximate average duration (hrs) of each meeting/attendance	Documents/ Link
Board of Directors		**11/7:00**	
The primary responsibilities of the Board of Directors include: — Setting the strategic direction of the Group — Appointing, overseeing and dismissing key executives, and planning their succession — Approving major transactions and investments — Determining the organizational structure and governance of the Group — Determining and overseeing financial planning, accounting, reporting and controlling — Approving annual financial statements and corresponding financial results releases	**Joerg Reinhardt**[1]	**11**	Articles of Incorporation of Novartis AG Regulations of the Board of Directors, its Committees and the Executive Committee of Novartis AG (Board regulations) www.novartis.com/corporate-governance
	Enrico Vanni	11	
	Nancy C. Andrews	11	
	Dimitri Azar	11	
	Ton Buechner[3]	7	
	Srikant Datar	11	
	Elizabeth Doherty[3]	8	
	Ann Fudge	11	
	Pierre Landolt	11	
	Andreas von Planta	11	
	Charles L. Sawyers	9	
	William T. Winters	10	
Audit and Compliance Committee		**7/3:00**	
The primary responsibilities of this committee include: — Supervising external auditors, and selecting and nominating external auditors for election by the meeting of shareholders — Overseeing internal auditors — Overseeing accounting policies, financial controls, and compliance with accounting and internal control standards — Approving quarterly financial statements and financial results releases — Overseeing internal control and compliance processes and procedures — Overseeing compliance with laws, and external and internal regulations The Audit and Compliance Committee has the authority to retain external consultants and other advisors.	**Srikant Datar**[1,2]	**7**	Charter of the Audit and Compliance Committee www.novartis.com/corporate-governance
	Dimitri Azar	7	
	Elizabeth Doherty[2,3]	5	
	Andreas von Planta	7	
	Enrico Vanni	7	
Compensation Committee		**6/3:00**	
The primary responsibilities of this committee include: — Designing, reviewing and recommending to the Board compensation policies and programs — Advising the Board on the compensation of Board members and the CEO — Deciding on the compensation of Executive Committee members — Preparing the Compensation Report and submitting it to the Board for approval The Compensation Committee has the authority to retain external consultants and other advisors.	**Enrico Vanni**[1]	**6**	Charter of the Compensation Committee www.novartis.com/corporate-governance
	Srikant Datar	6	
	Ann Fudge	6	
	William T. Winters	6	

[1] Chairman
[2] Audit Committee Financial Expert as defined by the US Securities and Exchange Commission
[3] As of AGM February 2016

Responsibilities	Members	Number of meetings held in 2016/approximate average duration (hrs) of each meeting/attendance	Documents/ Link
Governance, Nomination and Corporate Responsibilities Committee		**3/2:00**	
The primary responsibilities of this committee include: — Designing, reviewing and recommending to the Board corporate governance principles — Identifying candidates for election as Board members — Assessing existing Board members and recommending to the Board whether they should stand for re-election — Preparing and reviewing the succession plan for the CEO — Developing and reviewing an onboarding program for new Board members, and an ongoing education plan for existing Board members — Reviewing on a regular basis the Articles of Incorporation, with a view to reinforcing shareholder rights — Reviewing on a regular basis the composition and size of the Board and its committees — Reviewing annually the independence status of each Board member — Reviewing directorships and agreements of Board members for conflicts of interest, and dealing with conflicts of interest — Overseeing the company's strategy and governance on corporate responsibility The Governance, Nomination and Corporate Responsibilities Committee has the authority to retain external consultants and other advisors.	**Andreas von Planta[1]** **3** Ann Fudge 3 Pierre Landolt 3 Charles L. Sawyers 3 Enrico Vanni 3		Charter of the Governance, Nomination and Corporate Responsibilities Committee www.novartis.com/corporate-governance
Research & Development Committee		**4/8:00**	
The primary responsibilities of this committee include: — Monitoring research and development, and bringing recommendations to the Board — Assisting the Board with oversight and evaluation related to research and development — Informing the Board on a periodic basis about the research and development strategy, the effectiveness and competitiveness of the research and development function, emerging scientific trends and activities critical to the success of research and development, and the pipeline — Advising the Board on scientific, technological, and research and development matters — Providing counsel and know-how to management in the area of research and development — Reviewing such other matters in relation to the company's research and development as the committee may, in its own discretion, deem desirable in connection with its responsibilities The Research & Development Committee has the authority to retain external consultants and other advisors.	**Joerg Reinhardt[1]** **4** Nancy C. Andrews 4 Dimitri Azar 4 Charles L. Sawyers 4		Charter of the Research & Development Committee www.novartis.com/corporate-governance
Risk Committee		**6/2:00**	
The primary responsibilities of this committee include: — Ensuring that Novartis has implemented an appropriate and effective risk management system and process — Ensuring that all necessary steps are taken to foster a culture of risk-adjusted decision-making without constraining reasonable risk-taking and innovation — Approving guidelines and reviewing policies and processes — Reviewing with management, internal auditors and external auditors the identification, prioritization and management of risks; the accountabilities and roles of the functions involved in risk management; the risk portfolio; and the related actions implemented by management The Risk Committee has the authority to retain external consultants and other advisors.	**Andreas von Planta[1]** **6** Nancy C. Andrews 5 Srikant Datar 6 Ann Fudge 6		Charter of the Risk Committee www.novartis.com/corporate-governance

[1] Chairman

The Novartis corporate culture and role of the Board

The corporate culture of Novartis is becoming a key focus of the Board. The Board works to ensure that the Novartis strategy, operating model and compensation system are aligned with Novartis' Values and Behaviors, as endorsed by the Board and that the Novartis compensation system supports the desired corporate culture of Novartis. The Board will also review a regular evaluation of the corporate culture throughout Novartis.

Functioning of the Board

The Board takes decisions as a whole, supported by its five committees. Each committee has a written charter outlining its duties and responsibilities, and is led by a Board-elected Chairman.

The Board and its committees meet regularly throughout the year. The chairs set their meeting agendas. Any Board member may request a Board or committee meeting, and the inclusion of an agenda item. Before meetings, Board members receive materials to help them prepare the discussions and decision-making.

Chairman

Joerg Reinhardt has been the independent, non-executive Chairman since August 1, 2013. He has both industry and Novartis experience, and meets the company's independence criteria. As independent Chairman, he can lead the Board to represent the interests of all stakeholders, being accountable to them and creating sustainable value through effective governance, the right strategy, and delivery of the expected level of performance. The independent chairmanship also ensures an appropriate balance of power between the Board and the Executive Committee.

In this role, Mr. Reinhardt:

- Provides leadership to the Board
- Supports and mentors the CEO
- Supported by the GNCRC, ensures effective succession plans for the Board and the Executive Committee
- Ensures that the Board and its committees work effectively
- Sets the agenda, style and tone of Board discussions, promoting constructive dialogue and effective decision-making
- Supported by the GNCRC, ensures that all Board committees are properly established, composed and operated
- Ensures that the Board's performance is annually evaluated
- Ensures onboarding programs for new Board members, and continuing education and specialization for all Board members
- Ensures effective communication with the company's shareholders
- Promotes effective relationships and communication between Board and Executive Committee members

Vice Chairman

Enrico Vanni has been the independent, non-executive Vice Chairman since February 22, 2013.

In this role, Mr. Vanni:

- Leads the Board in case and as long as the Chairman is incapacitated
- Chairs the sessions of independent Board members, and leads independent Board members if and as long as the Chairman is not independent
- Leads the yearly session of the Board members evaluating the performance of the Chairman, during which the Chairman is not present

Board meetings

The Board has meetings with Executive Committee members, as well as private meetings without them.

In 2016, there were 11 Board meetings. Because all Board members are independent, no separate meetings of the independent Board members were held in 2016.

Key activities of our Board and committees in 2016

In 2016, the Board addressed in its meetings among others the following key standard topics: strategy; Group targets; mergers and acquisitions, business development and licensing review; financial and business reviews; major projects; investments and transactions; governance; and corporate culture. Topics addressed during private meetings included Board self-evaluation and the performance assessment of the Executive Committee members, as well as CEO and Executive Committee succession planning.

In addition, in 2016 our Board and its committees focused on a number of special topics, including:

Board of Directors:
Compliance; the Alcon turnaround; the creation of the new Innovative Medicines Division with two separate business units, Pharmaceuticals and Oncology; and the new operating model of Novartis

Audit and Compliance Committee:
Specific accounting and compliance questions, compensation disclosure; and the legal and regulatory environment concerning the rotation of external auditors

Compensation Committee:
Novartis peer groups; potential risks within the compensation systems for executives and other associates, including the sales force; clawback and malus; and shareholder feedback from the corporate governance roadshow

Governance, Nomination and Corporate Responsibilities Committee:
Shareholder feedback from our corporate governance roadshow; emerging corporate governance practices and whether to adopt them; succession planning for the Board, Board committees, and committee chairs; the search profile for and discussion of potential new Board members; and reviews of our corporate responsibility activities

Research & Development Committee:
The Novartis portfolio of research and development projects in oncology and dermatology; efforts to discover new drug discovery targets; high throughput screening for target and drug discovery; the long term strategy for NIBR after the appointment of new leadership; and incentives and compensation-related topics for the R&D organization

Risk Committee:
The Novartis Integrity & Compliance organization, key business risks in the manufacturing organization; foreign exchange risk management; IT security; and risks potentially arising out of the compensation system

Honorary Chairmen

Dr. Alex Krauer and Dr. Daniel Vasella have been appointed Honorary Chairmen in recognition of their significant achievements on behalf of Novartis. They are not provided with Board documents and do not attend Board meetings.

Independence of Board members

The independence of Board members is a key corporate governance issue. An independent Board member is one who is independent of management and has no business or relationship that could materially interfere with the exercise of objective, unfettered and independent judgment. Only with a majority of Board members being independent can the Board fulfill its obligation to represent the interests of shareholders, being accountable to them and creating sustainable value through the effective governance of Novartis. Accordingly, Novartis established independence criteria based on international best practice standards as outlined on the Novartis website: www.novartis.com/investors/governance-documents.shtml.

- The majority of Board members and any member of the Audit and Compliance Committee, the Compensation Committee, and the GNCRC must meet the company's independence criteria. These include, inter alia, (i) a Board member not having received direct compensation of more than USD 120 000 per year from Novartis, except for dividends or Board compensation, within the last three years; (ii) a Board member not having been an employee of Novartis within the last three years; (iii) a family member not having been an executive officer of Novartis within the last three years; (iv) a Board member or family member not being employed by the external auditor of Novartis; (v) a Board member or family member not being a board member, employee or 10% shareholder of an enterprise that has made payments to, or received payments from, Novartis in excess of the greater of USD 1 million or 2% of that enterprise's gross revenues. For members of the Audit and Compliance Committee and the Compensation Committee, even stricter rules apply.
- In addition, Board members are bound by the Novartis Conflict of Interest Policy, which prevents a Board member's potential personal interests from influencing the decision-making of the Board.
- The GNCRC annually submits to the Board a proposal concerning the determination of the independence of each Board member. For this assessment, the committee considers all relevant facts and circumstances of which it is aware – not only the explicit formal independence criteria. This includes an assessment of whether a Board member is truly independent, in character and judgment, from any member of senior management and from any of his/her current or former colleagues.
- In its meeting on December 15, 2016, the Board determined that all of its members are independent.

Relationship of non-executive Board members with Novartis

No Board member is or was a member of the management of Novartis AG or of any other Novartis Group company in the last three financial years up to December 31, 2016. There are no significant business relationships of any Board member with Novartis AG or with any other Novartis Group company.

Mandates outside the Novartis Group

No Board member may hold more than 10 additional mandates in other companies, of which no more than four shall be in other listed companies. Chairmanships of the boards of directors of other listed companies count as two mandates. Each of these mandates is subject to Board approval.

The following mandates are not subject to these limitations:

a) Mandates in companies that are controlled by Novartis AG
b) Mandates that a Board member holds at the request of Novartis AG or companies controlled by it. No Board member shall hold more than five such mandates.
c) Mandates in associations, charitable organizations, foundations, trusts and employee welfare foundations. No Board member may hold more than 10 such mandates.

"Mandates" means those in the supreme governing body of a legal entity that is required to be registered in the commercial register or a comparable foreign register. Mandates in different legal entities that are under joint control are deemed one mandate.

The Board may issue regulations that determine additional restrictions, taking into account the position of the respective member.

Loans and credits

No loans or credits shall be granted to members of the Board.

Board performance and effectiveness evaluation

Process

The Board conducts an annual review to evaluate its performance and that of individual committees and members. As part of this process, each Board member completes a questionnaire on the performance and effectiveness of the Board and the Chairman, and on his/her committees, which lays the groundwork for a qualitative review led by the Chairman. The Chairman has discussions with each Board member, and then with the entire Board. Also, the Board, without its Chairman, discusses the performance of the Chairman. Further, the committee evaluations are discussed by the respective committees, and the results are debriefed to the Board. Any suggestion for improvement is recorded and actions are agreed upon.

Periodically, this process is conducted by an independent consultant. In 2014, an independent performance and effectiveness evaluation of the Board and its committees, including an individual Board member assessment, was conducted by the independent expert company Russell Reynolds Associates. In 2015 and 2016, the performance evaluation was conducted internally.

Content and results

The performance review examines the performance and effectiveness, and strengths and weaknesses, of individual Board members and of the full Board and each Board committee.

This review covers topics including Board composition; purpose, scope and responsibilities; processes and governance of the Board and its committees; meetings and pre-reading material; team effectiveness; and leadership and culture.

The review also evaluates the ability and willingness of each Board member to commit adequate time and effort to his/her responsibilities as provided for in the charter of the GNCRC.

The results were discussed at the January 2017 meetings. It was concluded that the Board and its committees operate effectively.

Information and control systems of the Board vis-à-vis management

Information on management

The Board ensures that it receives sufficient information from the Executive Committee to perform its supervisory duty and to make decisions that are reserved for it. The Board obtains this information through several means:

— The CEO informs the Board regularly about current developments.
— Executive Committee meeting minutes are made available to the Board.
— Meetings or teleconferences are held as required between Board members and the CEO.
— The Board regularly meets with all Executive Committee members.
— The Board receives detailed, quarterly updates from each Division Head.
— By invitation, other members of management attend Board meetings to report on areas of the business for which they are responsible.
— Board members are entitled to request information from Executive Committee members or any other Novartis associate, and they may visit any Novartis site.

Board committees

Board committees regularly meet with management and, at times, outside consultants, to review the business, better understand applicable laws and policies affecting the Group, and support the Board and management in meeting the requirements and expectations of stakeholders and shareholders.

In particular, the Chief Financial Officer (CFO), the Group General Counsel, and representatives of the external auditors are invited to Audit and Compliance

Committee meetings. Additionally, the heads of Internal Audit, Financial Reporting & Accounting, Compliance and Quality, as well as the Head of the Global Business Practices Office, report on a regular basis to the Audit and Compliance Committee. This committee reviews financial reporting processes on behalf of the Board. For each quarterly and annual release of financial information, the Disclosure Review Committee is responsible for ensuring the accuracy and completeness of disclosures. The Disclosure Review Committee, which is a management committee, is chaired by the CFO and includes the CEO; the Group General Counsel; the heads of the divisions, Novartis Operations, and the Novartis Institutes for BioMedical Research (NIBR), as well as their finance heads; and the heads of the following corporate functions: Treasury, Tax, Financial Reporting & Accounting, Internal Audit and Investor Relations. The Audit and Compliance Committee reviews decisions made by the Disclosure Review Committee before the quarterly and annual releases are published.

The Risk Committee oversees the risk management system and processes, and also reviews the risk portfolio of the Group to ensure appropriate and professional risk management. For this purpose, the Group Risk Office and the risk owners of the divisions report on a regular basis to the Risk Committee. The Group General Counsel, the Head of Group Risk, the Head of Internal Audit, the Head of Ethics and Compliance, and other senior executives are invited to these meetings on a regular basis.

Novartis management information system

Novartis produces comprehensive, consolidated (unaudited) financial statements on a monthly basis for the total Group and its operating divisions. These are typically available within 10 days of the end of the month, and include the following:

- Consolidated income statement of the month, quarter-to-date and year-to-date in accordance with International Financial Reporting Standards (IFRS), as well as adjustments to arrive at core results, as defined by Novartis. The IFRS and core figures are compared to the prior-year period and targets in both USD and on a constant currency basis.
- Consolidated balance sheet as of the month-end in accordance with IFRS in USD
- Consolidated cash flow on a monthly, quarter-to-date and year-to-date basis in accordance with IFRS in USD
- Supplementary data on a monthly, quarterly and year-to-date basis such as free cash flow, gross and net debt, headcount, personnel costs, working capital, and earnings per share on a USD basis where applicable

Constant currencies, core results, free cash flow, net debt and related target figures are non-IFRS measures. An explanation of non-IFRS measures can be found on pages 171 – 175 of the operating and financial review 2016.

This information is made available to Board members on a monthly basis. An analysis of key deviations from the prior year or target is also provided.

Two times per year, the Board also receives an outlook of the full-year results in accordance with IFRS and “core” (as defined by Novartis) along with related commentary prior to the release of the results.

On an annual basis, in the fourth quarter of the year, the Board receives and approves the operating and financial targets for the following year.

In the middle of the year, the Board also reviews and approves the strategic plan for the next five years, which includes a projected consolidated income statement in USD prepared in accordance with IFRS and “core.”

The Board does not have direct access to the company’s financial and management reporting systems but can, at any time, request more detailed financial information on any aspect that is presented to it.

Internal audit

The Internal Audit function carries out operational and system audits in accordance with an audit plan approved by the Audit and Compliance Committee. This function helps organizational units accomplish objectives by providing an independent approach to the evaluation, improvement and effectiveness of their internal control framework. It prepares reports on the audits it has performed, and reports actual or suspected irregularities to the Audit and Compliance Committee and to the CEO. The Audit and Compliance Committee regularly reviews the internal audit scope, audit plans and results.

Risk management

The Group Risk Office is overseen by the Board’s independent Risk Committee. The Compensation Committee works closely with the Risk Committee to ensure that the compensation system does not lead to excessive risk-taking by management (for details, see our Compensation Report, beginning on page 110).

Organizational and process measures have been designed to identify and mitigate risks at an early stage. Organizationally, the responsibility for risk assessment and management is allocated to the divisions, organizational units, and functions, with specialized Corporate functions, such as Group Finance, Group Legal, Group Quality Assurance, Corporate Health, Safety and Environment, Business Continuity Management, Integrity and Compliance and the Business Practices Office, providing support and controlling the effectiveness of the risk management in these respective areas.

Board of Directors

Joerg Reinhardt, Ph.D.

Chairman of the Board of Directors
German, age 60

Joerg Reinhardt, Ph.D., has been Chairman of the Board of Directors since 2013. He is also Chairman of the Research & Development Committee and Chairman of the Board of Trustees of the Novartis Foundation.

Mr. Reinhardt previously was chairman of the board of management and the executive committee of Bayer HealthCare, Germany. Prior to that, he was Chief Operating Officer of Novartis from 2008 to 2010, and Head of the Vaccines and Diagnostics Division of Novartis from 2006 to 2008. He was also Chairman of the Board of the Genomics Institute of the Novartis Research Foundation in the United States from 2000 to 2010, a member of the supervisory board of MorphoSys AG in Germany from 2001 to 2004, and a member of the board of directors of Lonza Group AG in Switzerland from 2012 to 2013.

Mr. Reinhardt graduated with a doctorate in pharmaceutical sciences from Saarland University in Germany. He joined Sandoz Pharma Ltd. in 1982 and held various positions at Sandoz and later Novartis, including Head of Development.

Enrico Vanni, Ph.D.

Vice Chairman of the Board of Directors
Swiss, age 65

Enrico Vanni, Ph.D., has been a member of the Board of Directors since 2011 and qualifies as an independent Non-Executive Director. He is Vice Chairman of the Board of Directors and Chairman of the Compensation Committee. He is also a member of the Audit and Compliance Committee and the Governance, Nomination and Corporate Responsibilities Committee.

Since his retirement as director of McKinsey & Company in 2007, Mr. Vanni has been an independent consultant. He is a board member of several companies in industries from healthcare to private banking – including Advanced Oncotherapy PLC in the United Kingdom, and non-listed companies such as Lombard Odier SA, Banque Privée BCP (Suisse) SA, Eclosion2, and Denzler & Partners SA, all based in Switzerland.

Mr. Vanni holds an engineering degree in chemistry from the Federal Polytechnic School of Lausanne, Switzerland; a doctorate in chemistry from the University of Lausanne; and a Master of Business Administration from INSEAD in Fontainebleau, France. He began his career as a research engineer at the International Business Machines Corp. (IBM) in California, United States, and joined McKinsey in Zurich in 1980. He managed the Geneva office for McKinsey from 1988 to 2004, and consulted for companies in the pharmaceutical, consumer and finance sectors. He led McKinsey's European pharmaceutical practice and served as a member of the firm's partner review committee prior to his retirement in 2007. As an independent consultant, Mr. Vanni has continued to support leaders of pharmaceutical and biotechnology companies on core strategic challenges facing the healthcare industry.

Nancy C. Andrews, M.D., Ph.D.

Member of the Board of Directors
American, age 58

Nancy C. Andrews, M.D., Ph.D., has been a member of the Board of Directors since February 2015. She qualifies as an independent Non-Executive Director and is a member of the Research & Development Committee and the Risk Committee.

Dr. Andrews is dean of the Duke University School of Medicine and vice chancellor for academic affairs at Duke University in the United States. She is also a professor of pediatrics, pharmacology and cancer biology at Duke, and was elected as a fellow of the American Association for the Advancement of Science and to membership in the US National Academy of Sciences, the National Academy of Medicine, and the American Academy of Arts and Sciences. She is former president of the American Society for Clinical Investigation and serves on the council of the National Academy of Medicine, the board of directors of the American Academy of Arts and Sciences, and the Scientific Management Review Board of the US National Institutes of Health.

Dr. Andrews holds a doctorate in biology from the Massachusetts Institute of Technology, and a doctor of medicine from Harvard Medical School, both in the US. She completed her residency and fellowship trainings in pediatrics and hematology/oncology at Boston Children's Hospital and the Dana-Farber Cancer Institute, also in the US, and served as an attending physician at Boston Children's Hospital. Prior to joining Duke, Dr. Andrews was director of the Harvard/MIT M.D.-Ph.D. Program, and dean of basic sciences and graduate studies as well as professor of pediatrics at Harvard Medical School. From 1993 to 2006, she was a biomedical research investigator at the Howard Hughes Medical Institute in the US. Her research expertise is in iron homeostasis and mouse models of human diseases.

Dimitri Azar, M.D.

Member of the Board of Directors
American, age 57

Dimitri Azar, M.D., has been a member of the Board of Directors since 2012. He qualifies as an independent Non-Executive Director and is a member of the Audit and Compliance Committee and the Research & Development Committee.

Dr. Azar is dean of the College of Medicine and professor of ophthalmology, bioengineering and pharmacology at the University of Illinois at Chicago in the United States, where he formerly was head of the Department of Ophthalmology and Visual Sciences. He is a member of the American Ophthalmological Society, former president of the Chicago Ophthalmological Society, and president-elect of the Chicago Medical Society. Additionally, he is on the board of the Tear Film and Ocular Surface Society, the board of Verb Surgical, and the scientific advisory board of Verily.

Dr. Azar began his career at the American University of Beirut Medical Center in Lebanon, and completed his fellowship and residency training at the Massachusetts Eye and Ear Infirmary at Harvard Medical School in the US. His research on matrix metalloproteinases in corneal wound healing and angiogenesis has been funded by the US National Institutes of Health since 1993. Dr. Azar practiced at the Wilmer Eye Institute at the Johns Hopkins Hospital School of Medicine in the US, and then returned to the Massachusetts Eye and Ear Infirmary as director of cornea and external disease. He became professor of ophthalmology with tenure at Harvard Medical School in 2003. Dr. Azar holds an Executive Master of Business Administration from the University of Chicago Booth School of Business in the US.

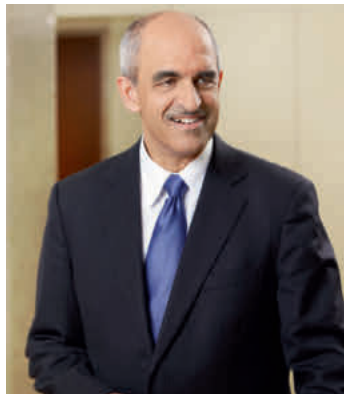
Ton Buechner

Member of the Board of Directors
Dutch, age 51

Ton Buechner has been a member of the Board of Directors since February 23, 2016. He qualifies as an independent Non-Executive Director.

Since 2012, Mr. Buechner has served as chairman and CEO of the executive board of Dutch multinational AkzoNobel. Prior to joining AkzoNobel, he spent almost two decades at the Sulzer Corporation in Switzerland, where he was appointed divisional president in 2001 and served as president and CEO from 2007 to 2011. Mr. Buechner's early career was spent in the oil and gas construction industry, and included roles at Allseas Engineering in the Netherlands and at Aker Kvaerner in Singapore. He is a member of the supervisory board of Voith GmbH.

Mr. Buechner is an engineer by training. He received his master's degree in civil engineering from Delft University of Technology in the Netherlands in 1988, specializing in offshore construction technology and coastal engineering. Mr. Buechner holds a Master of Business Administration from IMD business school in Lausanne, Switzerland.



Srikant Datar, Ph.D.

Member of the Board of Directors
American, age 63

Srikant Datar, Ph.D., has been a member of the Board of Directors since 2003 and qualifies as an independent Non-Executive Director. He is Chairman of the Audit and Compliance Committee, and a member of the Risk Committee and the Compensation Committee. The Board of Directors has appointed him as Audit Committee Financial Expert.

Mr. Datar is the Arthur Lowes Dickinson professor of business administration, faculty chair of the Harvard Innovation Lab, and senior associate dean for university affairs at Harvard Business School in the United States. He is also a member of the boards of directors of ICF International Inc., Stryker Corp. and T-Mobile US, all in the US.

Mr. Datar graduated in 1973 with distinction in mathematics and economics from the University of Bombay in India. He is a chartered accountant, and holds two master's degrees and a doctorate from Stanford University in the US. Mr. Datar has worked as an accountant and planner in industry, and as a professor at Carnegie Mellon University, Stanford University and Harvard University, all in the US. His research interests are in the areas of cost management, measurement of productivity, new product development, innovation, time-based competition, incentives and performance evaluation. He is the author of many scientific publications and has received several academic awards and honors. Mr. Datar has also advised and worked with numerous companies in research, development and training.

Board of Directors (continued)

Elizabeth (Liz) Doherty

Member of the Board of Directors
British, age 59

Elizabeth (Liz) Doherty has been a member of the Board of Directors since February 23, 2016. She qualifies as an independent Non-Executive Director and is a member of the Audit and Compliance Committee. The Board of Directors has appointed her as Audit Committee Financial Expert.

Ms. Doherty is a non-executive director and chairman of the audit committee of Dunelm Group PLC in the United Kingdom, and a member of the supervisory board and audit committee of Corbion NV in the Netherlands. She is a fellow of the Chartered Institute of Management Accountants, a non-executive board member of the UK Ministry of Justice, and a non-executive board member of Her Majesty's Courts and Tribunals Service in the UK. She previously served as a non-executive director and audit committee member at Delhaize Group in Belgium and Nokia Corp. in Finland, and as a non-executive director at SABMiller PLC in the UK.

Ms. Doherty received her bachelor's degree in liberal studies in science (physics) from the University of Manchester in the UK. She began her career as an auditor and has held senior finance and accounting roles at Unilever PLC and Tesco PLC. Additionally, she was chief financial officer of both Brambles Ltd. and Reckitt Benckiser Group PLC.

Ann Fudge

Member of the Board of Directors
American, age 65

Ann Fudge has been a member of the Board of Directors since 2008. She qualifies as an independent Non-Executive Director and is a member of the Risk Committee; the Compensation Committee; and the Governance, Nomination and Corporate Responsibilities Committee.

Ms. Fudge is vice chairman and senior independent director of Unilever NV, London and Rotterdam. She is also chair of the United States Program Advisory Panel of the Bill & Melinda Gates Foundation, a director of Northrop Grumman Corporation in the US, and a trustee of Boston-based WGBH public media.

Ms. Fudge received her bachelor's degree from Simmons College in the US and her Master of Business Administration from Harvard Business School, also in the US. She is former chairman and CEO of Young & Rubicam Brands, New York. Before that, she served as president of the Beverages, Desserts and Post Division of Kraft Foods Inc. in the US.

Pierre Landolt, Ph.D.

Member of the Board of Directors
Swiss, age 69

Pierre Landolt, Ph.D., has been a member of the Board of Directors since 1996. He qualifies as an independent Non-Executive Director and is a member of the Governance, Nomination and Corporate Responsibilities Committee.

Mr. Landolt is chairman of the Sandoz Family Foundation, overseeing its development in several investment fields. He is also chairman of the Swiss private bank Landolt & Cie SA. In Switzerland, he is chairman of Emasan AG and Vaucher Manufacture Fleurier SA, and vice chairman of Parmigiani Fleurier SA. Additionally, he is vice chairman of the Montreux Jazz Festival Foundation and a board member of Amazentis SA, Switzerland, and the Eneas Fund, Cayman Islands. In Brazil, Mr. Landolt is president of AxialPar Ltda. and Moco Agropecuaria Ltda., the Instituto Fazenda Tamanduá and the Instituto Estrela de Fomento ao Microcrédito.

Mr. Landolt graduated with a bachelor's degree in law from the University of Paris-Assas. From 1974 to 1976, he worked for Sandoz Brazil. In 1977, he acquired an agricultural estate in the semi-arid Northeast Region of Brazil, and within several years he converted it into a model farm in organic and biodynamic production. Since 1997, Mr. Landolt has been associate and chairman of AxialPar Ltda., Brazil, an investment company focused on sustainable development. In 2000, he co-founded Eco-Carbone SAS, a company active in the design and development of carbon sequestration processes. In 2007, he co-founded Amazentis SA, a startup company active in the convergence space of medication and nutrition. In 2011, Mr. Landolt received the title of Docteur des Sciences Économiques Honoris Causa from the University of Lausanne in Switzerland.

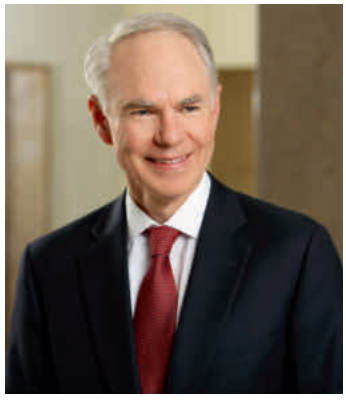
Andreas von Planta, Ph.D.

Member of the Board of Directors
Swiss, age 61

Andreas von Planta, Ph.D., has been a member of the Board of Directors since 2006. He qualifies as an independent Non-Executive Director and is Chairman of the Risk Committee and the Governance, Nomination and Corporate Responsibilities Committee. He is also a member of the Audit and Compliance Committee.

Mr. von Planta is a board member of Helvetia Holding AG in Switzerland, and also serves on the boards of various Swiss subsidiaries of foreign companies and other non-listed Swiss companies, including Burberry (Suisse) SA, Lenz & Staehelin AG, A.P. Moller Finance SA, HSBC Private Bank (Suisse) SA, Socotab Frana SA and Raymond Weil SA. Additionally, he is chairman of the regulatory board of the SIX Swiss Exchange AG.

Mr. von Planta holds a doctorate in law from the University of Basel in Switzerland, and a Master of Laws from Columbia Law School in the United States. He passed his bar examinations in Basel in 1982. Since 1983, he has lived in Geneva and worked for the law firm Lenz & Staehelin, where he became a partner in 1988. His areas of specialization include corporate law, corporate governance, corporate finance, company reorganizations, and mergers and acquisitions.



Charles L. Sawyers, M.D.

Member of the Board of Directors
American, age 57

Charles L. Sawyers, M.D., has been a member of the Board of Directors since 2013. He qualifies as an independent Non-Executive Director and is a member of the Research & Development Committee and the Governance, Nomination and Corporate Responsibilities Committee.

In the United States, Dr. Sawyers is chair of the Human Oncology and Pathogenesis Program at Memorial Sloan Kettering Cancer Center, professor of medicine and of cell and developmental biology at the Weill Cornell Graduate School of Medical Sciences, and an investigator at the Howard Hughes Medical Institute. He was appointed to US President Barack Obama's National Cancer Advisory Board, and is former president of the American Association for Cancer Research and of the American Society for Clinical Investigation. He is also a member of the US National Academy of Sciences, the Institute of Medicine, and the scientific advisory board of Agios Pharmaceuticals Inc. in the US.

Dr. Sawyers received his doctor of medicine from the Johns Hopkins University School of Medicine in the US, and worked at the Jonsson Comprehensive Cancer Center at the University of California, Los Angeles for nearly 18 years before joining Memorial Sloan Kettering in 2006. An internationally acclaimed cancer researcher, he co-developed the Novartis cancer drug *Gleevec/Glivec* and has received numerous honors and awards, including the Lasker-DeBakey Clinical Medical Research Award in 2009.

William T. Winters

Member of the Board of Directors
British/American, age 55

William T. Winters has been a member of the Board of Directors since 2013. He qualifies as an independent Non-Executive Director and is a member of the Compensation Committee.

Mr. Winters is CEO and a board member of Standard Chartered, based in London. He also serves on the board of Colgate University in the United States, and on the boards of the International Rescue Committee, the Young Vic theater and the Print Room theater in the United Kingdom.

Mr. Winters received his bachelor's degree from Colgate University and his Master of Business Administration from the Wharton School of the University of Pennsylvania in the US. He previously ran Renshaw Bay, an alternative asset management firm, and was co-CEO of JPMorgan's investment bank from 2003 to 2010. He joined JPMorgan in 1983 and has held management roles across several market areas and in corporate finance. Additionally, he was a commissioner on the UK Independent Commission on Banking in 2010 and 2011, and was awarded the title of Commander of the Order of the British Empire in 2013.

Honorary Chairmen

Alex Krauer, Ph.D.
Daniel Vasella, M.D.

Corporate Secretary

Charlotte Pamer-Wieser, Ph.D.

Our management

Composition of the Executive Committee

Executive Committee composition

The Executive Committee is headed by the CEO. Its members are appointed by the Board.

There are no contracts between Novartis and third parties whereby Novartis would delegate any business management tasks to such third parties.

Executive Committee role and functioning

The Board has delegated to the Executive Committee overall responsibility for and oversight of the operational management of Novartis. This includes:

- Developing policies and strategic plans for Board approval, and implementing those approved
- Submitting to the Board and its committees proposed changes in management positions of material significance, investments, financial measures, acquisitions and divestments, contracts of material significance, and targets – and implementing those approved
- Preparing and submitting quarterly and annual reports to the Board and its committees
- Informing the Board of all matters of fundamental significance to the businesses
- Recruiting, appointing and promoting senior management
- Ensuring the efficient operation of the Group and the achievement of optimal results
- Promoting an active internal and external communications policy
- Dealing with any other matters delegated by the Board

The Executive Committee is supported by a sub-committee: The Disclosure Committee (members are the CEO, CFO and Group General Counsel) determines whether an event constitutes information that is material to the Group, determines the appropriate disclosure and update of such information, and reviews media releases concerning such information.

CEO

In addition to other Board-assigned duties, the CEO leads the Executive Committee, building and maintaining an effective executive team. With the support of the Executive Committee, the CEO:

- Is responsible for the operational management of Novartis
- Develops strategy proposals to be recommended to the Board, and ensures that approved strategies are implemented
- Plans human resourcing to ensure that Novartis has the capabilities and means to achieve its plans, and that robust management succession and management development plans are in place and presented to the Board
- Develops an organizational structure, and establishes processes and systems to ensure the efficient organization of resources
- Ensures that financial results, business strategies and, when appropriate, targets and milestones are communicated to the investment community – and generally develops and promotes effective communication with shareholders and other stakeholders
- Ensures that the business performance is consistent with business principles, as well as with high legal and ethical standards, and that the culture of Novartis is consistent with the Novartis Values and Behaviors
- Leads the Innovative Medicines Division
- Develops processes and structures to ensure that capital investment proposals are reviewed thoroughly, that associated risks are identified, and that appropriate steps are taken to manage these risks
- Develops and maintains an effective framework of internal controls over risk in relation to all business activities of the company
- Ensures that the flow of information to the Board is accurate, timely and clear

Mandates outside the Novartis Group

No Executive Committee member may hold more than six additional mandates in other companies, of which no more than two additional mandates shall be in other listed companies. Each of these mandates is subject to Board approval. Executive Committee members are not allowed to hold chairmanships of the boards of directors of other listed companies.

The following mandates are not subject to these limitations:

a) Mandates in companies that are controlled by Novartis AG
b) Mandates that an Executive Committee member holds at the request of Novartis AG or companies controlled by it. No Executive Committee member shall hold more than five such mandates.
c) Mandates in associations, charitable organizations, foundations, trusts and employee welfare foundations. No Executive Committee member may hold more than 10 such mandates.

"Mandates" means those in the supreme governing body of a legal entity that is required to be registered in the commercial register or a comparable foreign register. Mandates in different legal entities that are under joint control are deemed one mandate.

The Board may issue regulations that determine additional restrictions, taking into account the position of the respective member.

Loans and credits

No loans or credits shall be granted to members of the Executive Committee.

Executive Committee

Joseph Jimenez

Chief Executive Officer of Novartis
American, age 57

Joseph Jimenez has been Chief Executive Officer (CEO) of Novartis since 2010.

Mr. Jimenez previously held the position of Division Head, Novartis Pharmaceuticals. He joined Novartis in 2007 as Division Head, Novartis Consumer Health. Before that, he served as president and CEO of the North American and European businesses for the H.J. Heinz Company. He also served on the board of directors of Colgate-Palmolive Co. from 2009 to 2015, and of AstraZeneca PLC from 2002 to 2007.

Mr. Jimenez is a member of the board of directors of General Motors Co. He graduated in 1982 with a bachelor's degree from Stanford University and in 1984 with a Master of Business Administration from the University of California, Berkeley, both in the United States.

Steven Baert

Head of Human Resources of Novartis
Belgian, age 42

Steven Baert has been Head of Human Resources (CHRO) of Novartis since 2014. He is a member of the Executive Committee of Novartis.

Mr. Baert joined Novartis in 2006 as Head of Human Resources Global Functions in Switzerland. He has held several other senior HR roles, including Head of Human Resources for Emerging Growth Markets, and Global Head, Human Resources, Oncology. Mr. Baert also served as Head of Human Resources, United States and Canada, for Novartis Pharmaceuticals Corporation. Prior to joining Novartis, he held HR positions at Bristol-Myers Squibb Co. and Unilever.

Mr. Baert represents Novartis on the board of the GSK Consumer Healthcare joint venture. He holds a Master of Business Administration from the Vlerick Business School in Belgium and a Master of Laws from the Katholieke Universiteit Leuven, also in Belgium. Additionally, he has a Bachelor of Laws from the Katholieke Universiteit Brussels.

F. Michael (Mike) Ball

CEO, Alcon
American, age 61

F. Michael (Mike) Ball was appointed CEO of Alcon on February 1, 2016. He is a member of the Executive Committee of Novartis.

Mr. Ball previously served as CEO of Hospira from 2011 to 2015. At Hospira, a world leader in injectable pharmaceuticals and infusion devices, he successfully turned the company around and grew it by focusing on product and quality improvements, and expanding its global footprint. Prior to Hospira, Mr. Ball held a number of senior leadership positions at Allergan, beginning in 1995. He served as president from 2006 to 2011 after having led the strategy and execution of global commercial activities for a wide range of businesses, including eye care pharmaceuticals, over-the-counter products and surgical devices. Before joining Allergan, Mr. Ball held roles of increasing responsibility in marketing and sales at Syntex Corporation and Eli Lilly. He began his career in the healthcare industry in 1981.

Mr. Ball holds a Bachelor of Science and a Master of Business Administration from Queen's University in Canada.

James (Jay) Bradner, M.D.

President of the Novartis Institutes for BioMedical Research (NIBR)
American, age 44

James (Jay) Bradner, M.D., joined Novartis on January 1, 2016 and became President of the Novartis Institutes for BioMedical Research (NIBR) on March 1, 2016. He is a member of the Executive Committee of Novartis.

Prior to joining Novartis, Dr. Bradner was on the faculty of Harvard Medical School in the Department of Medical Oncology at the Dana-Farber Cancer Institute in the United States. He was also associate director of the Center for the Science of Therapeutics at the Broad Institute of MIT and Harvard. Dr. Bradner is a co-founder of five biotechnology companies and has co-authored more than 150 scientific publications and 30 US patent applications.

Dr. Bradner is a graduate of Harvard University and the University of Chicago Medical School in the US. He completed his residency in medicine at Brigham and Women's Hospital and his fellowship in medical oncology and hematology at the Dana-Farber Cancer Institute. He has been honored with many awards and was elected into the American Society for Clinical Investigation in 2011 and the Alpha Omega Alpha Honor Medical Society in 2013.

Felix R. Ehrat, Ph.D.

Group General Counsel of Novartis
Swiss, age 59

Felix R. Ehrat, Ph.D., has been Group General Counsel of Novartis since 2011. He is a member of the Executive Committee of Novartis.

Mr. Ehrat is a leading practitioner of corporate, banking, and mergers and acquisitions law, as well as an expert in corporate governance and arbitration. He started his career as an associate at Bär & Karrer Ltd. in Zurich in 1987, became partner in 1992, and advanced to senior partner (2003 to 2011) and executive chairman of the board (2007 to 2011). Mr. Ehrat is chairman of Globalance Bank AG in Switzerland, and chairman of SwissHoldings (the federation of industrial and service groups in Switzerland). He is a board member of Geberit AG and Avenir Suisse (a think tank for economic and social issues), and previously served as chairman and board member of several listed and non-listed companies.

Mr. Ehrat was admitted to the Zurich bar in 1985 and received his doctorate in law from the University of Zurich in Switzerland in 1990. He received his Master of Laws from McGeorge School of Law in the United States in 1986. Some of his past memberships include the International Bar Association, where he was co-chair of the Corporate and M&A Law Committee from 2007 to 2008, and Association Internationale des Jeunes Avocats, where he was president from 1998 to 1999.

Richard Francis

CEO, Sandoz
British, age 48

Richard Francis has been CEO of Sandoz since 2014. He is a member of the Executive Committee of Novartis.

Mr. Francis joined Novartis from Biogen Idec, where he held global and country leadership positions during his 13-year career with the company. Most recently, he was senior vice president of the company's United States commercial organization. From 1998 to 2001, he was at Sanofi in the United Kingdom, and held various marketing roles across the company's urology, analgesics and cardiovascular products. He has also held sales and marketing positions at Lorex Synthélabo and Wyeth.

Mr. Francis received a Bachelor of Arts in economics from Manchester Metropolitan University in the UK.

Executive Committee (continued)

Paul Hudson

CEO, Novartis Pharmaceuticals
British, age 49

Paul Hudson has been CEO of Novartis Pharmaceuticals since July 1, 2016. He is a member of the Executive Committee of Novartis.

Mr. Hudson joined Novartis from AstraZeneca, where he most recently was president, AstraZeneca United States and executive vice president, North America. He also served as representative director and president of AstraZeneca K.K. in Japan; as president of AstraZeneca's business in Spain; and as vice president and primary care director, United Kingdom. Before AstraZeneca, Mr. Hudson held roles of increasing responsibility at Schering-Plough, including leading biologics global marketing. He began his career in sales and marketing roles at GlaxoSmithKline UK and Sanofi-Synthélabo UK.

Mr. Hudson holds a degree in economics from Manchester Metropolitan University in the UK and a diploma in marketing from the Chartered Institute of Marketing, also in the UK.

Harry Kirsch

Chief Financial Officer of Novartis
German, age 51

Harry Kirsch has been Chief Financial Officer (CFO) of Novartis since 2013. He is a member of the Executive Committee of Novartis.

Mr. Kirsch joined Novartis in 2003 and, prior to his current position, served as CFO of the company's Pharmaceuticals Division. Under his leadership, the division's core operating income margin increased, in constant currencies, every quarter of 2011 and 2012 despite patent expirations. At Novartis, he also served as CFO of Pharma Europe, and as Head of Business Planning & Analysis and Financial Operations for the Pharmaceuticals Division. Mr. Kirsch joined Novartis from Procter & Gamble (P&G) in the United States, where he was CFO of P&G's global pharmaceutical business. Prior to that, he held finance positions in various categories of P&G's consumer goods business, technical operations, and Global Business Services organization.

Mr. Kirsch represents Novartis on the board of the GSK Consumer Healthcare joint venture. He holds a diploma degree in industrial engineering and economics from the University of Karlsruhe in Germany.

Vasant (Vas) Narasimhan, M.D.

Global Head of Drug Development and Chief Medical Officer for Novartis
American, age 40

Vasant (Vas) Narasimhan, M.D., has been Global Head of Drug Development and Chief Medical Officer for Novartis since February 1, 2016. He is a member of the Executive Committee of Novartis.

Dr. Narasimhan joined Novartis in 2005 and has held numerous leadership positions in development and commercial functions. His most recent role was Global Head of Development for Novartis Pharmaceuticals, overseeing the entire general medicines pipeline. He previously served as Global Head of the Sandoz Biopharmaceuticals and Oncology Injectables business unit, overseeing the division's biosimilars pipeline, and as Global Head of Development for Novartis Vaccines. Dr. Narasimhan has also held commercial and strategic roles at Novartis, including North America Region Head for Novartis Vaccines, and United States Country President for Novartis Vaccines and Diagnostics. Before joining Novartis, he worked at McKinsey & Company.

Dr. Narasimhan received his medical degree from Harvard Medical School in the US and obtained a master's degree in public policy from Harvard's John F. Kennedy School of Government. He received his bachelor's degree in biological sciences from the University of Chicago, also in the US. He is an elected member of the US National Academy of Medicine.

Bruno Strigini

CEO, Novartis Oncology
French, age 55

Bruno Strigini has been CEO of Novartis Oncology since July 1, 2016. He is a member of the Executive Committee of Novartis.

Mr. Strigini joined Novartis in 2014 as President of Oncology. Prior to Novartis, he was president of MSD for Europe and Canada (Merck & Co. in the United States and Canada). He previously worked at Schering-Plough, UCB Celltech and SmithKline Beecham, and his roles included president of international operations, president of Japan and Asia-Pacific, head of global marketing and business development, and managing director positions.

Mr. Strigini holds a Master of Business Administration from IMD business school in Switzerland, a doctorate in pharmacy from the University of Montpellier in France, and a master's degree in microbiology from Heriot-Watt University in the United Kingdom. He is an elected member of the French National Academy of Pharmacy, and in 2014, he was awarded a doctor honoris causa from Universidad Internacional Menéndez Pelayo in Spain.

André Wyss

President of Novartis Operations and Country President for Switzerland
Swiss, age 49

André Wyss has been President of Novartis Operations since February 1, 2016, and is responsible for manufacturing, shared services and public affairs. He is also Country President for Switzerland and a member of the Executive Committee of Novartis.

Mr. Wyss joined Novartis in 1984 as a chemistry apprentice in manufacturing. Before being appointed President of Novartis Operations, he served as Head of Novartis Business Services, building and implementing a shared services organization across Novartis. Prior to that, he held several other leadership positions, including US Country Head and President of Novartis Pharmaceuticals Corporation; Head of the Pharmaceuticals Division for the AMAC region (Asia-Pacific, Middle East and African countries); Group Emerging Markets Head; and Country President and Head of Pharmaceuticals, Greece.

Mr. Wyss received a graduate degree in economics from the School of Economics and Business Administration (HWV) in Switzerland in 1995. He is a member of the board of economiesuisse.

Secretary

Bruno Heynen

Our independent external auditors

Duration of the mandate and terms of office of the auditors

Based on a recommendation by the Audit and Compliance Committee, the Board nominates an independent auditor for election at the AGM. PricewaterhouseCoopers (PwC) assumed its existing auditing mandate for Novartis in 1996. Bruno Rossi, auditor in charge, began serving in his role in 2013, and Stephen Johnson, global relationship partner, began serving in his role in 2014. PwC ensures that these partners are rotated at least every five years.

Information to the Board and the Audit and Compliance Committee

PwC is responsible for providing an opinion on whether the consolidated financial statements comply with IFRS and Swiss law, and whether the separate parent company financial statements of Novartis AG comply with Swiss law. Additionally, PwC is responsible for opining on the effectiveness of internal control over financial reporting, on the Compensation Report and on the corporate responsibility reporting of Novartis.

The Audit and Compliance Committee, acting on behalf of the Board, is responsible for overseeing the activities of PwC. In 2016, this committee held 7 meetings. PwC was invited to 6 of these meetings to attend during the discussion of agenda items that dealt with accounting, financial reporting or auditing matters and any other matters relevant to its audit.

On an annual basis, PwC provides the Audit and Compliance Committee with written disclosures required by the US Public Company Accounting Oversight Board, and the committee and PwC discuss PwC's independence from Novartis.

The Audit and Compliance Committee recommended to the Board to approve the audited consolidated financial statements and the separate parent company financial statements of Novartis AG for the year ended December 31, 2016. The Board proposed the acceptance of these financial statements for approval by the shareholders at the next AGM.

The Audit and Compliance Committee regularly evaluates the performance of PwC, and once a year determines whether PwC should be proposed to the shareholders for election. Also once a year, the auditor in charge and the global relationship partner report to the Board on PwC's activities during the current year and on the audit plan for the coming year. They also answer any questions or concerns that Board members have about the performance of PwC, or about the work it has conducted or is planning to conduct.

To assess the performance of PwC, the Audit and Compliance Committee holds private meetings with the CFO and the Head of Internal Audit and, if necessary, obtains an independent external assessment. Criteria applied for the performance assessment of PwC include an evaluation of its technical and operational competence; its independence and objectivity; the sufficiency of the resources it has employed; its focus on areas of significant risk to Novartis; its willingness to probe and challenge; its ability to provide effective, practical recommendations; and the openness and effectiveness of its communications and coordination with the Audit and Compliance Committee, the Internal Audit function, and management.

Approval of audit and non-audit services

The Audit and Compliance Committee approves a budget for audit services, whether recurring or non-recurring in nature, and for audit-related services not associated with internal control over financial reporting. PwC reports quarterly to the Audit and Compliance Committee regarding the extent of services provided in accordance with the applicable pre-approval, and the fees for services performed to date. The Audit and Compliance Committee individually approves all audit-related services associated with internal control over financial reporting, tax services and other services prior to the start of work.

Audit and additional fees

PwC charged the following fees for professional services rendered for the 12-month periods ended December 31, 2016 and December 31, 2015:

	2016 USD million	2015[1] USD million
Audit services	26.7	25.9
Audit-related services	2.9	1.1
Tax services	0.7	0.0
Other services	1.3	0.7
Total	**31.6**	**27.7**

[1] Amounts for 2015 have been reclassified in line with the new 2016 classification criteria to allow comparison with 2016 amounts.

Audit services include work performed to issue opinions on consolidated financial statements and parent company financial statements of Novartis AG, to issue opinions relating to the effectiveness of the Group's internal control over financial reporting, and to issue reports on local statutory financial statements. Also included are audit services that generally can only be provided by the statutory auditor, such as the audit of the Compensation Report, audits of non-recurring transactions, audits of the adoption of new accounting policies, audits of information systems and the related control environment, reviews of quarterly financial results, as well as procedures required to issue consents and comfort letters.

Audit-related services include other assurance services provided by the independent auditor but not restricted to those that can only be provided by the statutory auditor. They include services such as audits of pension and other employee benefit plans, contract audits of third-party arrangements, corporate responsibility assurance, and other audit-related services.

Tax services represent tax compliance, assistance with historical tax matters, and other tax-related services.

Other services include procedures related to corporate integrity agreements, training in the finance area, benchmarking studies, and license fees for use of accounting and other reporting guidance databases.

Our corporate governance framework

Laws and regulations

Novartis AG is subject to the laws of Switzerland, in particular Swiss company and securities laws, and to the securities laws of the US as applicable to foreign private issuers of securities.

In addition, Novartis AG is subject to the rules of the SIX Swiss Exchange, including the Directive on Information Relating to Corporate Governance.

Novartis AG is also subject to the rules of the NYSE as applicable to foreign private issuers of securities. The NYSE requires Novartis AG to describe any material ways in which its corporate governance differs from that of domestic US companies listed on the exchange. These differences are:

— Novartis AG shareholders do not receive written reports directly from Board committees.
— External auditors are appointed by shareholders at the AGM, as opposed to being appointed by the Audit and Compliance Committee.
— While shareholders cannot vote on all equity compensation plans, they are entitled to hold separate, yearly binding shareholder votes on Board and Executive Committee compensation.
— The Board has set up a separate Risk Committee that is responsible for business risk oversight, as opposed to delegating this responsibility to the Audit and Compliance Committee.
— The full Board is responsible for overseeing the performance evaluation of the Board and Executive Committee.
— The full Board is responsible for setting objectives relevant to the CEO's compensation and for evaluating his performance.

Swiss Code of Best Practice for Corporate Governance

Novartis applies the Swiss Code of Best Practice for Corporate Governance.

Novartis corporate governance standards

Novartis has incorporated the aforementioned corporate governance standards described above into the Articles of Incorporation and the Regulations of the Board of Directors, its Committees and the Executive Committee of Novartis AG (www.novartis.com/corporate-governance).

The GNCRC regularly reviews these standards and principles, taking into account best practices, and recommends improvements to the corporate governance framework for consideration by the full Board.

Additional corporate governance information can be found on the Novartis website: www.novartis.com/corporate-governance.

Printed copies of the Novartis Articles of Incorporation, regulations of the Board, and charters of Board committees can be obtained by writing to: Novartis AG, Attn: Corporate Secretary, Lichtstrasse 35, CH-4056 Basel, Switzerland.

Further information

Group structure of Novartis

Novartis AG and Group companies

Under Swiss company law, Novartis AG is organized as a corporation that has issued shares of common stock to investors. The registered office of Novartis AG is Lichtstrasse 35, CH-4056 Basel, Switzerland.

Business operations are conducted through Novartis Group companies. Novartis AG, a holding company, owns or controls directly or indirectly all entities worldwide belonging to the Novartis Group. Except as described below, the shares of these companies are not publicly traded. The principal Novartis subsidiaries and associated companies are listed in Note 32 to the Group's consolidated financial statements.

Divisions

The businesses of Novartis are divided on a worldwide basis into three operating divisions: Innovative Medicines, with the two business units Novartis Pharmaceuticals and Novartis Oncology; Sandoz (generics); and Alcon (eye care). These businesses are supported by a number of global organizations including NIBR, which focuses on discovering new drugs; the Global Drug Development organization, which oversees the clinical development of new medicines; and Novartis Operations, which includes Novartis Technical Operations (the global manufacturing organization) and Novartis Business Services (which consolidates support services across Novartis).

Majority holdings in publicly-traded Group companies

The Novartis Group owns 73.4% of Novartis India Ltd., with its registered office in Mumbai, India, and listed on the Bombay Stock Exchange (ISIN INE234A01025, symbol: HCBA). The total market value of the 26.6% free float of Novartis India Ltd. was USD 74.2 million at December 31, 2016, using the quoted market share price at year-end. Applying this share price to all the shares of the company, the market capitalization of the whole company was USD 279.0 million, and that of the shares owned by Novartis was USD 204.8 million.

Significant minority shareholding owned by the Novartis Group

The Novartis Group owns 33.3% of the bearer shares of Roche Holding AG, with its registered office in Basel, Switzerland, and listed on the SIX Swiss Exchange (ISIN CH0012032113, symbol: RO). The market value of the Group's interest in Roche Holding AG, as of December 31, 2016, was USD 12.4 billion. The total market value of Roche Holding AG was USD 197.1 billion. Novartis does not exercise control over Roche Holding AG, which is independently governed, managed and operated.

The Novartis Group owns a 36.5% share of a joint venture created by GlaxoSmithKline PLC (GSK) and Novartis, which combined the Novartis OTC and GSK Consumer Healthcare businesses. Novartis holds four of the 11 seats on the joint venture's board. Furthermore, Novartis has certain minority rights and exit rights, including a put option that is exercisable as of March 2, 2018.

Political contributions

Novartis makes political contributions to support the political dialogue on issues of relevance to the company.

Political contributions made by Novartis are not intended to give rise to any obligations of the party receiving it, or with the expectation of a direct or immediate return for Novartis. Such contributions are fully compliant with applicable laws, regulations and industry codes. Novartis only makes political contributions in countries where such contributions from corporations are considered to reflect good corporate citizenship. Moreover, Novartis only makes modest political contributions so as to not create any dependency from the political parties receiving these contributions.

In 2016 Novartis issued a guideline on Responsible Lobbying, describing the overarching principles of transparency in lobbying activities. For more information on responsible lobbying see the public policy and advocacy section of the Novartis website (https://www.novartis.com/about-us/corporate-responsibility/doing-business-responsibly/public-policy-advocacy).

In 2016, Novartis made political contributions totaling approximately USD 1.0 million, thereof approximately USD 620 000 in Switzerland, USD 250 000 in the US, USD 110 000 in Australia and USD 10 000 in the UK. In addition, in the US, a political action committee established by Novartis used funds received from Novartis employees (but not from the company) to make political contributions totaling approximately USD 240 000.

In Switzerland, Novartis supports political parties that have a political agenda and hold positions that support the strategic interests of Novartis, its shareholders and other stakeholders. Swiss political parties are completely privately financed, and the contributions of companies are a crucial part thereof. This private financing of parties is a deeply-rooted trait of the Swiss political culture, and contributing to that system is an important element of being a good corporate citizen.

Shareholder relations

The CEO, with the CFO and Investor Relations team, supported by the Chairman, are responsible for ensuring effective communication with shareholders to keep them informed of the company's strategy, prospects, business operations and governance. Through communication, the Board also learns about and addresses shareholders' expectations and concerns.

Novartis communicates with its shareholders through the AGM, meetings with groups of shareholders and individual shareholders, and written and electronic communications.

At the AGM, the Chairman, CEO and other Executive Committee members, as well as representatives of the external auditors, are present and can answer shareholders' questions. Other meetings with shareholders may be attended by the Chairman, CEO, CFO, Executive Committee members, and other members of senior management.

Topics discussed with shareholders may include strategy, business performance and corporate governance, while fully respecting all applicable laws and stock exchange rules.

Information for our stakeholders

Introduction

Novartis is committed to open and transparent communication with shareholders, financial analysts, customers, suppliers and other stakeholders. Novartis aims to disseminate material developments in its businesses in a broad and timely manner that complies with the rules of the SIX Swiss Exchange and the NYSE.

Communications

Novartis publishes this Annual Report to provide information on the Group's results and operations. In addition, Novartis prepares an annual report on Form 20-F that is filed with the US Securities and Exchange Commission (SEC). Novartis discloses quarterly financial results in accordance with IFRS, and issues press releases from time to time regarding business developments.

Novartis furnishes press releases relating to financial results and material events to the SEC via Form 6-K. An archive containing recent Annual Reports, annual reports on Form 20-F, quarterly results releases, and all related materials – including presentations and conference call webcasts – is on the Novartis website at www.novartis.com/investors.

Novartis also publishes a consolidated Corporate Responsibility Performance Report, available on the Novartis website at www.novartis.com/about-us/corporate-responsibility, which details progress and demonstrates the company's commitment to be a leader in corporate responsibility. This report reflects the best-in-class reporting standard, the Global Reporting Initiative's G4 guidelines, and fulfills the company's reporting requirement as a signatory of the UN Global Compact.

Information contained in reports and releases issued by Novartis is only correct and accurate at the time of release. Novartis does not update past releases to reflect subsequent events, and advises against relying on them for current information.

Investor Relations program

An Investor Relations team manages the Group's interactions with the international financial community. Several events are held each year to provide institutional investors and analysts with various opportunities to learn more about Novartis.

Investor Relations is based at the Group's headquarters in Basel. Part of the team is located in the US to coordinate interaction with US investors. Information is available on the Novartis website: www.novartis.com/investors. Investors are also welcome to subscribe to a free email service on this site.

Website information

Topic	Information
Share capital	Articles of Incorporation of Novartis AG www.novartis.com/corporate-governance Novartis key share data www.novartis.com/key-share-data
Shareholder rights	Articles of Incorporation of Novartis AG www.novartis.com/corporate-governance Investor Relations information www.novartis.com/investors
Board regulations	Board regulations www.novartis.com/corporate-governance
Executive Committee	Executive Committee www.novartis.com/executive-committee
Novartis code for senior financial officers	Novartis Code of Ethical Conduct for CEO and Senior Financial Officers www.novartis.com/corporate-governance
Additional information	Novartis Investor Relations www.novartis.com/investors

Compensation Report

Contents

Dear shareholder,

As Chairman of the Compensation Committee of the Board of Directors, I am pleased to share with you the 2016 Compensation Report of Novartis AG.

Our strategy at Novartis is to use science-based innovation to deliver better outcomes for patients in growing areas of healthcare. Our executive compensation system is aligned with our success in implementing that strategy, as well as with the interests of our shareholders.

We introduced our new compensation system in 2014 with a combination of performance-related incentives, including a short-term Annual Incentive and two new Long-Term Incentive plans with three-year performance-periods. For the first time in 2016, the three-year performance-period for the two Long-Term Incentive plans has concluded.

In the interests of shareholders and proxy advisors, while remaining compliant with the Ordinance against Excessive Compensation in Listed Companies, the Compensation Committee has worked to further enhance, on a voluntary basis, our compensation disclosures. Additional information has been provided on the process for setting compensation targets for the Executive Committee, and the payout outcomes affecting realized compensation of the CEO. We believe this is a meaningful way to illustrate the alignment of the Compensation Committee's decisions on CEO pay for performance with our shareholders' interests.

Engagement with shareholders

The Compensation Committee would like to acknowledge the strong shareholder support at the 2016 Annual General Meeting (AGM) for all compensation-related resolutions, and express appreciation for the opportunity to meet many of our shareholders during 2016 to discuss various compensation topics.

Based on their feedback, in 2016 the Compensation Committee continued to evaluate the effectiveness of our compensation programs and concluded that they are well aligned with our strategic objectives and business priorities. However, with the evolution of the healthcare industry both in Europe and the US, as well as the emergence of large US biotechnology companies, the Compensation Committee has introduced a revised global healthcare peer group for performance-periods starting in 2017. This revised peer group will be used as the primary benchmark for determining the compensation opportunities of the CEO and other key executives, and for evaluating relative Total Shareholder Return (TSR) performance and ranking under the LTRPP. Further detail is provided on page 136.

In 2016, to strengthen integrity and compliance across the company and in line with the expectations of our shareholders, the Compensation Committee held a joint meeting with the Risk Committee focused on doing

business responsibly. The Committees endorsed new policies, systems and governance, including sales force compensation, to support the highest ethical conduct at all levels of the organization. While it will take time for the organization to truly embed our Values and Behaviors, the Board believes that these changes support our culture of delivering high performance with integrity and long-term sustainable value to shareholders.

2016 company performance

Novartis delivered in most of its key priority areas despite a challenging year. The company achieved solid financials absorbing US *Gleevec* loss of exclusivity. Operationally, in constant currencies, the company was slightly below its sales target, met its free cash flow target, and was below its net income target. Innovative Medicines delivered strong performance, Sandoz's was solid, outperformed peers and gained market share, while Alcon negatively impacted consolidated results.

Novartis achieved several breakthrough innovations and drove the growth products including the successful launch of *Cosentyx* and the steady growth of *Entresto* following positive treatment guidelines in the US and Europe. Significant changes to the company structure were implemented effective from July 1, 2016 to improve effectiveness by increasing the scale of the key functions, while at the same time lowering costs. Important progress has also been made in embedding a culture of integrity. Compliance failures mainly related to legacy issues.

2016 CEO realized compensation

The Compensation Committee focused on the CEO's performance compared to his financial and strategic objectives, our Values and Behaviors, and the overall performance of Novartis. The Compensation Committee used its judgment and support from an independent external compensation advisor to make decisions about individual compensation elements, variable compensation payouts (which can vary between 0%–200% of the target) and total compensation. Compensation Committee members also considered a variety of qualitative factors, including the business environment in which 2016 results were achieved.

- The CEO was awarded a 2016 Annual Incentive of CHF 2 835 010, representing 90% of target, based on a combination of our company's performance and his own performance. Half of the Annual Incentive is delivered in cash, and the remainder in restricted share units with a three-year vesting period.
- The three-year performance-period for the two new Long-Term Incentive plans introduced in 2014 was completed in 2016. For the first – our Long-Term Performance Plan (LTPP) – following the assessment of performance against the three-year Novartis Cash Value Added (NCVA) and Group innovation targets, the Compensation Committee approved a payout of 112% of target for the CEO. For the second – our Long-Term Relative Performance Plan (LTRPP) – following the assessment of the Novartis three-year TSR against the Novartis global healthcare peer group, the Compensation Committee noted that Novartis ranked 10th out of 13 companies. Considering our TSR was flat in USD, and was up +15% in CHF, over the three-year performance-period 2014–2016, the Compensation Committee approved a payout of 20% of target.

In light of the above, 2016 CEO realized total compensation was CHF 10 556 685 including his fixed compensation, his 2016 Annual Incentive, and the vesting of his LTPP and LTRPP awards for the performance-period 2014–2016. The total LTPP and LTRPP payout was CHF 5 392 347 including CHF 528 346 of dividend equivalents accrued over the three-year performance-period.

2017 AGM

We will continue to exchange views with our shareholders in an atmosphere of trust and respect that promotes a collaborative dialogue. Shareholder engagement is critical to our long-term success, and the Compensation Committee is committed to continue meeting with our shareholders. In line with our Articles of Incorporation, shareholders will be asked to approve the total maximum amount of Board compensation from the 2017 AGM to the 2018 AGM, the Executive Committee compensation for financial year 2018, and to endorse this Compensation Report in an advisory vote.

On behalf of Novartis and the Compensation Committee, I would like to thank you for your continued support and feedback, which I consider extremely valuable in driving improvements in our compensation systems and practices. I invite you to send your comments to me at the following email address: investor.relations@novartis.com.

Respectfully,

Enrico Vanni, Ph.D.
Chairman of the Compensation Committee

Compensation at a glance

Executive Committee compensation

Executive Committee compensation system (pages 116–120)

	Fixed compensation and benefits		Variable compensation			
	Annual base compensation	**Pension and other benefits**	**Annual Incentive**	**Long-Term Performance Plan (LTPP)**	**Long-Term Relative Performance Plan (LTRPP)**	
Purpose	Reflects associates' responsibilities, job characteristics, experience and skill sets	Establishes a level of security for associates and their dependents tailored to local market practices and regulations	Rewards performance against key short-term targets, and Values and Behaviors	Rewards long-term shareholder value creation and long-term innovation	Rewards relative total shareholder return	
Performance period	n/a	n/a	1 year	3 years	3 years	
Performance measures	n/a	n/a	Based on a payout matrix made up of: — Individual Balanced Scorecard, including financial targets and individual objectives — Assessed Values and Behaviors	Based on: — 75% Novartis Cash Value Added — 25% divisional long-term innovation milestones	Based on Novartis' relative total shareholder return vs. our peer group of global healthcare companies[1]	
Delivery (at the end of the performance period for variable compensation)	Cash	Country-specific	50% cash 50% deferred equity[2] (3-year holding of restricted shares/ restricted share units)	Equity (includes dividend equivalents)	Equity (includes dividend equivalents)	**Total variable compensation**
CEO variable opportunity[3]	n/a	n/a	Target: 150%	Target: 200%	Target: 125%[4]	Target: 475%
Other Executive Committee members' variable opportunity[3]	n/a	n/a	Target: 90–120%	Target: 140–190%	Target: 30–80%	Target: 260%–390%

[1] For the performance period 2016-2018, the companies in our global healthcare peer group consist of Abbott, AbbVie, Amgen, AstraZeneca, Bristol-Myers Squibb, Eli Lilly & Co., GlaxoSmithKline, Johnson & Johnson, Merck & Co., Pfizer, Roche and Sanofi.
[2] Executive Committee members may elect to receive more of their Annual Incentive in equity instead of cash.
[3] The shown information represents the variable compensation opportunity as a percentage of annual base compensation. The payout range for each element is 0–200% of target.
[4] Effective from the performance-period 2016-18 (previously 100%).

2016 CEO realized compensation (pages 124–126)

The following table provides a summary of the 2016 CEO realized compensation in relation to the performance periods ended December 31, 2016. We believe reporting realized compensation provides a meaningful way to transparently illustrate the alignment between the Compensation Committee's decisions on CEO pay for performance and shareholders' interests. In addition, this complements the disclosures required by the Ordinance against Excessive Compensation in Listed Companies (pages 129–135).
The CEO realized compensation includes the payouts, based on actual performance assessed, from the two Long-Term Incentive plans newly introduced in 2014 following the conclusion of their first three-year performance-period 2014–2016.

	2016 fixed compensation and benefits		Variable compensation			
	Annual base compensation	**Pension and other benefits**	**2016 Annual Incentive**	**Long-Term Performance Plan (LTPP) 2014–2016[1]**	**Long-Term Relative Performance Plan (LTRPP) 2014–2016[1]**	**Total realized compensation**
Joseph Jimenez (CEO)	2 093 417	235 911[2]	2 835 010	4 950 334	442 013	10 556 685

[1] The shown amounts represent the underlying share value of the total number of shares vested (including dividend equivalents) to the CEO for the LTPP and LTRPP performance-period 2014-2016.
[2] Includes an amount of CHF 4 336 for mandatory employer contributions for the CEO paid by Novartis to Swiss governmental social security systems. This amount is out of total employer contributions of CHF 1 144 673, and provides a right to the maximum future insured government pension benefit.

2017 Executive Committee compensation system (page 136)

The Executive Committee compensation system will remain unchanged in 2017 with the exception of a revised global healthcare peer group and corresponding LTRPP payout matrix.

Board compensation

2016 Board compensation system (page 137)

Delivery: 50% cash/50% equity (up to 100% equity at the option of each Board member)

(CHF)	Annual fee
Chairman of the Board	3 800 000
Board membership	300 000
Vice Chairman	50 000
Chairman of the Audit and Compliance Committee	120 000
Chairman of the following committees: — Compensation Committee — Governance, Nomination and Corporate Responsibilities Committee — Research & Development Committee — Risk Committee	60 000
Membership of the Audit and Compliance Committee	60 000
Membership of the following committees: — Compensation Committee — Governance, Nomination and Corporate Responsibilities Committee — Research & Development Committee — Risk Committee	30 000

2016 Board compensation (pages 138–140)

Amounts earned for financial year 2016

(CHF)	Cash	Equity	Other benefits[1]	**Total**
Chairman Dr. Joerg Reinhardt[2]	1 900 000	1 900 000	4 336	3 804 336
Other Board members active on December 31, 2016	1 625 000	2 540 000	12 147	4 177 147
Other Board members who stepped down at the 2016 AGM	27 500	27 500	579	55 579
Total	**3 552 500**	**4 467 500**	**17 062**	**8 037 062**[3]

[1] Includes an amount of CHF 17 062 for mandatory employer contributions for all Board members paid by Novartis to Swiss governmental social security systems. This amount is out of total employer contributions of CHF 387 308, and provides a right to the maximum future insured government pension benefit for the Board member.
[2] The Chairman of the Board also received payment for the loss of other entitlements at his previous employer totaling EUR 2 665 051, staggered in three installments from 2014 to 2016. In January 2016, the Chairman of the Board received the third and final installment. No additional committee fees for chairing the Research & Development Committee were delivered to the Chairman of the Board.
[3] Please see page 139 for a reconciliation between the amount reported in this table and the amount approved by shareholders at the 2016 AGM to be used to compensate Board members for the period from the 2016 AGM to the 2017 AGM. The amount paid is within the maximum amount approved by shareholders.

2017 Board compensation system

The Board compensation system will remain unchanged in 2017.

Compensation governance

Governance and risk management (pages 141–142)

Decision on	Decision making authority
Compensation of Chairman and other Board members	Board of Directors
Compensation of CEO	Board of Directors
Compensation of other Executive Committee members	Compensation Committee

Executive Committee compensation risk management principles

- Rigorous performance management process
- Balanced mix of short-term and long-term variable compensation elements
- Matrix approach to performance evaluation under the Annual Incentive, including an individual Balanced Scorecard and assessed Values and Behaviors
- Performance-based Long-Term Incentives only, with three-year overlapping cycles
- All variable compensation is capped at 200% of target
- Contractual notice period of 12 months
- Post-contractual non-compete limited to a maximum of 12 months (annual base compensation and Annual Incentive of the prior year only)
- No severance payments or change-of-control clauses
- Clawback principles apply to all elements of variable compensation
- Share ownership requirements; no hedging or pledging of Novartis share ownership position

Executive Committee compensation philosophy and principles

Novartis compensation philosophy

Our compensation philosophy aims to ensure that the Executive Committee is rewarded according to its success in implementing the company strategy and to its contribution to company performance. The Executive Committee compensation system is designed in line with the following key elements:

Pay for performance	Variable compensation is tied directly to the achievement of strategic company targets.
Shareholder alignment	A significant part of our incentives are equity-based. Also, the LTRPP rewards on the basis of relative total shareholder return.
Balanced rewards to create sustainable value	Mix of targets are based on financial metrics, innovation, individual objectives, Values and Behaviors, and performance vs. competitors.
Business ethics	The Values and Behaviors are an integral part of our compensation system.
Competitive compensation	Compensation competitive to relevant benchmarks ensures we are able to attract and retain the most talented global Executive Committee members.

Alignment with company strategy

The Novartis strategy is to use science-based innovation to deliver better patient outcomes. We aim to lead in growing areas of healthcare focusing on innovative pharmaceuticals and oncology medicines, generics and biosimilars, and eye care. To align the compensation system with this strategy, and to ensure that Novartis is a high-performing organization over the long term, the Board of Directors determines specific, measurable and time-bound performance metrics for both the short-term Annual Incentive and the Long-Term Incentive plans. The targets include financial metrics such as sales, profit and cash flow, as well as non-financial metrics in areas such as quality, talent, integrity and reputation, which are reinforced by our Values and Behaviors. The CEO and the other Executive Committee members are compensated according to the extent to which the targets are achieved.

Executive Committee compensation benchmarking

To attract and retain key talent, it is important for us to offer competitive compensation opportunities.

The Compensation Committee reviews the competitiveness of the compensation of the CEO and Executive Committee members on a regular basis. For this purpose, the Compensation Committee uses benchmark data from publicly available sources, as well as reputable market data providers where appropriate. All data is reviewed and evaluated by the Compensation Committee's independent advisor, who also provides independent research and advice regarding the compensation of the CEO and the other Executive Committee members.

While benchmarking information regarding executive pay is considered by the Compensation Committee, any decisions on compensation are ultimately based on the specific business needs of Novartis and on the executive's experience, skill sets and performance.

Executives meeting their objectives are generally awarded target compensation in line with the market median benchmark for comparable roles within a peer group of global competitors in the healthcare industry. Our peer group is made up of companies that are similar in size to Novartis and that also have similar business models and needs for talent and skills. In the event of under- or over-performance by an executive, the actual compensation may be lower or higher than the benchmark median.

The Compensation Committee considers the global healthcare peer group the most relevant benchmark given the fierce competition within the pharmaceutical and biotechnology industries for top executive talent with deep expertise and competences. The composition of the peer group accurately reflects the competitive landscape of Novartis. Although Novartis is headquartered in Switzerland, more than a third of sales come from the US market and the US will remain a significant recruitment talent pool for the company (e.g., all current Executive Committee members have extensive experience with the US). In addition to providing a benchmark for compensation, the global healthcare peer group is used to evaluate relative total shareholder return (TSR) performance and ranking under the Long-Term Relative Performance Plan (LTRPP), as a reference point for pay and performance alignment as well as for compensation plan design and practices.

Global healthcare peer group for 2016[1]

Abbott	AbbVie	Amgen
AstraZeneca	Bristol-Myers Squibb	Eli Lilly & Co.
GlaxoSmithKline	Johnson & Johnson	Merck & Co.
Pfizer	Roche	Sanofi

[1] This global healthcare peer group is used as the basis for the TSR comparator group featured in the LTRPP for the performance periods 2014-2016, 2015-2017 and 2016-2018.

The Compensation Committee reviews the companies in our global healthcare peer group annually and considers adjustments over time in line with the evolution of the competitive environment in the healthcare industry.

Following the latest review, the Compensation Committee approved changes to the global healthcare peer group for 2017 onwards, which are reflected on page 136.

The Compensation Committee also uses a cross-industry peer group of European-headquartered multi national companies as an additional reference point to assess regional pay practices and trends. These companies were selected on the basis of comparability in size, scale, global scope of operations, and economic influences to Novartis. This European cross-industry peer group is comprised of five global companies focusing exclusively on healthcare – AstraZeneca, GlaxoSmithKline, Novo Nordisk, Roche and Sanofi – and 10 companies selected from the STOXX® All Europe 100 Index representing all sectors (excluding financial services, energy and utilities, apparel, media, and real estate investment trusts): Anheuser-Busch, Bayer, BMW, Daimler, Danone, Heineken, L'Oréal, Merck KgaA, Nestlé and Unilever.

Novartis comparison to peer group median

Against the global healthcare peer group, Novartis is among the largest in key dimensions including market capitalization, sales and operating income. The table below compares our market capitalization, sales and operating income to the median market capitalization, sales and operating income for our global healthcare peer group.

(USD billions)	Novartis	Median of global healthcare peer group for 2016[3]
Market capitalization[1]	172.0	103.0
Net sales[2]	48.5	30.8
Operating income[2]	8.3	7.0

[1] Market capitalization at December 31, 2016 is calculated based on the number of shares outstanding (excluding treasury shares).
[2] Continuing operations
[3] Data source: Bloomberg database; most recently disclosed (as of January 18, 2017) trailing 12-month net sales and operating income.

2016 Executive Committee compensation system

The 2016 Executive Committee compensation system consists of the following components:

Fixed compensation and benefits		Variable compensation		
Annual base compensation	Pension and other benefits	Annual Incentive	Long-Term Performance Plan (LTPP)	Long-Term Relative Performance Plan (LTRPP)

Fixed compensation and benefits

Annual base compensation

The level of annual base compensation reflects each associate's key responsibilities, job characteristics, experience and skill sets. It is paid in cash, typically monthly.

Annual base compensation is reviewed regularly, and any increase reflects merit based on performance, as well as market movements.

Pension and other benefits

The primary purpose of pension and insurance plans is to establish a level of security for associates and their dependents with respect to age, health, disability and death. The level and scope of pension and insurance benefits provided are country-specific, influenced by local market practices and regulations.

Company policy is to change from defined benefit pension plans to defined contribution pension plans. All major pension plans have now been aligned with this policy as far as reasonably practicable. Please also see Note 25 to the Group's audited consolidated financial statements (page 226).

Novartis may provide other benefits in a specific country – such as a company car, and tax and financial planning services – according to local market practices and regulations. Executive Committee members who have been transferred on an international assignment also receive benefits (such as tax equalization) in line with the company's international assignment policies.

Variable compensation

Annual Incentive

For the Annual Incentive of the CEO and other Executive Committee members, a target incentive is defined as a percentage of annual base compensation at the beginning of each performance year. The target incentive is 150% of annual base compensation for the CEO, and ranges from 90% to 120% for the other Executive Committee members. It is delivered half in cash and half in equity deferred for three years.

The formula for the target Annual Incentive is outlined below.

Annual Incentive formula

Annual base compensation	x	Target incentive %	=	Target Annual Incentive value

PERFORMANCE MEASURES

The Annual Incentive payout is based on a matrix made up of two elements: a balanced scorecard and our Values and Behaviors, which are described in more detail below.

BALANCED SCORECARD

The first element used to determine the payout of the Annual Incentive is a balanced scorecard within which Group, divisional or unit targets are weighted 60%, and individual objectives are weighted 40%. For more details on the target-setting and performance management process, please refer to pages 121–122.

GROUP, DIVISIONAL AND UNIT TARGETS

Within the Group, divisional and unit targets, each measure is weighted individually. The CEO and corporate function heads share the same Group financial targets (further described below). In place of the Group targets, division and business unit heads have targets that include divisional or business unit sales, operating income, free cash flow as a percentage of sales, and market share of peers. Organizational unit heads have financial and non-financial targets specific to their organization. The Board of Directors sets the Group, divisional and unit targets at the start of each performance year in constant currencies, where applicable, and evaluates achievement against these targets at the end of that year.

INDIVIDUAL OBJECTIVES

Individual objectives differ for each Executive Committee member depending on their responsibilities, and may include additional financial and non-financial targets. Examples of additional financial targets are implementation of growth, productivity and development initiatives. Non-financial targets may include leadership as well as people and talent management, workforce diversity, quality, social initiatives such as access to medicines, and ethical business practices.

By way of illustration, the balanced scorecard measures used for the CEO in 2016 are set out in the table below.

2016 balanced scorecard measures used for the CEO

Performance measures	Weight	Breakdown of performance measures
Group financial targets	60%	Group net sales Corporate net result Group net income Group free cash flow as % of sales
CEO individual objectives	40%	Additional financial targets (e.g., EPS) Innovation and growth Cross-divisional synergies High-performing organization
Overall total	**100%**	

OUR VALUES AND BEHAVIORS

The second element used to determine the payout of the Annual Incentive ensures that the performance of all Novartis associates, including Executive Committee members, is achieved in line with our Values and Behaviors. Associates are held accountable to demonstrate innovation, quality, collaboration, performance, courage and integrity. All Novartis associates are expected to live up to these on a daily basis, and to align and energize other associates to do the same. Detailed descriptors are used to assess performance against our Values and Behaviors.

PERFORMANCE EVALUATION AND PAYOUT DETERMINATION

Following a thorough review of the two elements that compose the Annual Incentive – performance against the balanced scorecard objectives and an assessment against our Values and Behaviors – a rating from 1 to 3 is assigned to each.

The following payout matrix shows how the Annual Incentive performance factor is derived using a combination of performance against the balanced scorecard and demonstration of our Values and Behaviors. The Board of Directors for the CEO, and the Compensation Committee for the other Executive Committee members, determine the final payout factor, taking into account the ranges shown. Payouts are capped at 200% of target.

2016 Annual Incentive payout matrix

			% Payout		
Performance vs. Balanced Scorecard	Exceeding expectations	3	60–90%	130–160%	170–200%
	Meeting expectations	2	0–70%	90–120%	130–160%
	Partially meeting expectations	1	0%	0–70%	60–90%
			1 Partially meeting expectations	2 Meeting expectations	3 Exceeding expectations
			Values and Behaviors assessment		

The payout matrix for the Annual Incentive equally recognizes performance against the objectives in the balanced scorecard and demonstration of our Values and Behaviors.

FORM AND DELIVERY OF THE AWARD

The Annual Incentive is paid 50% in cash in the first quarter of the year following the performance-period, and 50% in Novartis restricted shares or restricted share units (RSUs) that are deferred and vest after three years. Each restricted share is entitled to voting rights and payment of dividends during the vesting period. Each RSU is equivalent in value to one Novartis share but does not carry any dividend, dividend equivalent or voting rights. Following the vesting period, settlement of RSUs is made in unrestricted Novartis shares or American Depositary Receipts (ADRs).

If a participant leaves Novartis due to voluntary resignation or misconduct, unvested restricted shares and RSUs are forfeited. The Board of Directors and the Compensation Committee retain accountability for ensuring that the plan rules are applied correctly, and for determining whether a different treatment should apply in exceptional circumstances. This is necessary to ensure that the treatment of any award in the event of cessation of employment is appropriate.

Executives may choose to receive all or part of the cash portion of their Annual Incentive in Novartis shares or ADRs (US only) that will not be subject to forfeiture conditions. In the US, awards may also be delivered in cash under the US-deferred compensation plan.

Long-Term Incentive plans

Novartis operates two Long-Term Incentive plans (the Long-Term Performance Plan and the Long-Term Relative Performance Plan) for the Executive Committee members, which are granted under the same plan rules, differing only with respect to the performance conditions applied.

GRANT OF LONG-TERM INCENTIVE PLANS

At the beginning of every performance-period, Executive Committee members are granted a target number of performance share units (PSUs) under each of the Long-Term Incentive plans according to the following formula:

STEP 1	Annual base compensation	x	Target incentive %	=	**Grant value**
STEP 2	Grant value	/	Share price	=	**Target number of PSUs**

VESTING OF LONG-TERM INCENTIVE PLANS

At the end of the three-year performance-period, the Compensation Committee adjusts the number of PSUs realized based on actual performance.

Long-Term Incentive plans payout formula

Target number of PSUs	x	Performance factor	=	**Realized PSUs** + dividend equivalents

The performance factor can range from 0% to 200% of target. Each realized PSU is converted into one Novartis share at the vesting date. PSUs do not carry voting rights, but do accrue dividend equivalents that are reinvested in additional PSUs and delivered at vesting to the extent that performance conditions have been met. In the US, awards may also be delivered in cash under the US-deferred compensation plan.

If a participant leaves Novartis due to voluntary resignation or termination by the company for misconduct, none of the awards vest. When a member is terminated by the company for reasons other than performance or conduct, the award vests on a pro-rata basis for time spent with the company during the performance-period. In such a case, the award will vest on the regular vesting date (no acceleration), will be subject to performance should an evaluation be possible, and will also be subject to other conditions such as observing the conditions of a non-compete agreement. Executives leaving Novartis due to approved retirement, including approved early retirement, death or disability, will receive full vesting of their award on the normal vesting date (acceleration will only apply in the case of death). The award will be subject to performance, should an evaluation be possible, and will also be subject to other conditions such as observing the conditions of a non-compete agreement. Further details can be found in Note 26 to the Group's audited consolidated financial statements (page 229).

The Board of Directors and the Compensation Committee retain accountability for ensuring that the plan rules are applied correctly, and for determining whether different treatment should apply in exceptional circumstances. This is necessary to ensure that the treatment of any award in the event of cessation of employment is appropriate.

LONG-TERM PERFORMANCE PLAN (LTPP)

This is the first of the two Long-Term Incentive plans.

OVERVIEW

The LTPP, as described below, was granted for the first time to the CEO and other Executive Committee members in 2014, and the first payout under this plan for performance-period 2014–2016 is disclosed on page 127. The LTPP target incentive is 200% of annual base compensation for the CEO, and ranges from 140% to 190% for the other Executive Committee members.

PERFORMANCE MEASURES

Awards under the LTPP are based on three-year performance objectives and split as follows:

	75% financial	25% innovation
Measure	Novartis Cash Value Added	Up to 10 key innovation milestones
CEO, corporate function and certain organizational unit heads	100% Group	Weighted average of divisional/unit performance
Commercial division and unit heads, and head of research unit		100% divisional/unit performance

FINANCIAL MEASURE (NOVARTIS CASH VALUE ADDED): 75% OF LTPP

The Novartis Cash Value Added (NCVA) is a metric that incentivizes sales growth and margin improvement as well as asset efficiency. A summary of the calculation is below.

Calculation formula for NCVA

in constant currencies

Operating income

+ Amortization, impairments and adjusting for gains/losses from non-operating financial assets

– Taxes

– Capital charge (based on WACC[1]) on gross operational assets

= NCVA[2]

[1] WACC = weighted average cost of capital
[2] NCVA = (cash flow return on investment % – WACC[1]) x gross operational assets

The NCVA targets are determined considering expected growth rates in sales, operating income, and return from invested capital (under foreseen economic circumstances).

At the end of the performance-period, the NCVA performance factor is calculated using results in constant currencies. The NCVA performance factor is based on a 1:3 payout curve, where a 1% deviation in realization versus target leads to a 3% change in payout (for example, a realization of 105% leads to a payout factor of 115%). Accordingly, if performance over the three-year vesting period falls below 67% of target, no payout is made for this portion of the LTPP. If performance over the three-year vesting period is above 133% of target, payout for this portion of the LTPP is capped at 200% of target.

The calculated performance realization is adjusted for unplanned major events during the performance-period (e.g., significant merger and acquisition transactions).

INNOVATION MEASURE: 25% OF LTPP

Innovation is a key element of the Novartis strategy. Divisional and unit innovation targets are set at the beginning of the performance-period, comprised of up to 10 target milestones that represent the most important research and development project milestones for each division and unit. These milestones are chosen because of the expected future impact to Novartis in terms of potential revenue, or due to their qualitative potential impact to science, medicine, and the treatment or care of patients.

A payout matrix has been established for this metric that allows a 0–150% payout for the achievement of target milestones. A 150–200% payout may be awarded for extraordinary additional achievement. The CEO and corporate function heads receive the weighted average of divisional and unit innovation payouts.

The Research & Development Committee assists the Board of Directors and the Compensation Committee in setting the innovation targets and reviewing achievements at the end of the performance-period.

LONG-TERM RELATIVE PERFORMANCE PLAN (LTRPP)
This is the second of the two Long-Term Incentive plans.

OVERVIEW
The LTRPP was granted for the first time to the CEO and other Executive Committee members in 2014, and the first payout under this plan for performance-period 2014–2016 is disclosed on page 128. As of 2016, the target incentive is 125% of annual base compensation for the CEO (a 25 percentage-point increase from 2015), and ranges from 30% to 80% for the other Executive Committee members.

PERFORMANCE MEASURE
The LTRPP is based on the achievement of long-term relative TSR versus the global healthcare peer group over rolling three-year performance-periods. TSR is calculated in USD as share price growth plus dividends over the three-year performance-period. The calculation is based on Bloomberg standard published TSR data, which is publicly available.

The peer group for the 2016–2018 performance-period is the same as for benchmarking the compensation of the CEO and other Executive Committee members and is comprised of: Abbott, AbbVie, Amgen, AstraZeneca, Bristol-Myers Squibb, Eli Lilly & Co., GlaxoSmithKline, Johnson & Johnson, Merck & Co., Pfizer, Roche and Sanofi.

At the end of the performance-period, all companies are ranked in order of highest to lowest TSR, and the position in the peer group determines the payout range as follows:

LTRPP payout matrix

Position in peer group	Payout range
Positions 1–3	160–200%
Positions 4–6	100–140%
Positions 7–10	20–80%
Positions 11–13	0%

The Compensation Committee uses its discretion to determine the payout factor within the ranges shown, and takes into consideration factors such as absolute TSR, overall economic conditions, currency fluctuations and other unforeseeable situations. The Compensation Committee believes that the LTRPP payout matrix is aligned with the company's pay-for-performance principle, including a very significant reduction in the actual payout relative to target payout if the company's TSR is below the median of the peer group. The LTRPP payout matrix is aligned with practices at the companies in our global healthcare peer group.

Target disclosure
To allow shareholders to assess the link between company performance and compensation, Novartis is committed to disclosing in the Compensation Report the targets of our compensation programs at the end of each performance-period – including judgment used in assessing actual performance versus targets. In line with this principle, the targets and achievements of the CEO for the 2016 Annual Incentive, the LTPP and the LTRPP for the performance-period 2014–2016 can be found on pages 124–126.

This approach is proposed to our shareholders given that disclosing our short- and long-term targets under our compensation programs before the end of the relevant performance-period would give substantial insight into the company's confidential, forward-looking strategies, and could therefore place the company and its shareholders at a competitive disadvantage.

Executive Committee performance management process

To foster a high-performance culture, the company applies a uniform performance management process worldwide based on quantitative and qualitative criteria, including our Values and Behaviors. Novartis associates, including the CEO and other Executive Committee members, are subject to a formal three-step process.

CEO objective setting

This section describes the objective-setting process to determine the stretch targets of our Annual Incentive plan and the LTPP. No objective setting is required for the LTRPP.

INDIVIDUAL TARGETS OF THE CEO ANNUAL INCENTIVE

The CEO discusses his individual objectives for the coming year directly with the Chairman of the Board of Directors prior to the start of the performance-period. The Chairman reviews the CEO's individual objectives before they are discussed and approved by the Board of Directors. The agreed individual objectives are also part of the CEO's balanced scorecard and laid out as Novartis priorities for the coming year.

GROUP FINANCIAL TARGETS OF THE CEO ANNUAL INCENTIVE AND LTPP

The Board of Directors and the Compensation Committee use a rigorous process to establish Group financial targets for the Annual Incentive and the LTPP. The objective-setting process for Group financial targets begins with bottom-up input from our commercial and organizational divisions and units by country and brands. The bottom-up input process takes into account both internal and external market and regulatory factors, such as new product launches, patent expiries, pricing pressures, changes in the healthcare environment, investments in capital expenditure, and resource allocation decisions. The Group financial targets support our ambition to be a leader in the healthcare industry without encouraging unnecessary or excessive risk taking, while being fully in line with Group compliance, conduct and accounting standards.

The financial targets are reviewed and challenged at the country, regional and Group levels as well as by the Executive Committee before they are proposed in December – prior to the start of the performance-period – to the Board of Directors.

The Board of Directors reviews and assesses the proposed financial targets in detail to ensure that they are set at levels that are sufficiently and appropriately challenging. This review takes into account a variety of relevant information including internal business plans, external market consensus, strategic choices to be made by the company, and industry expectations for the companies of our global healthcare peer group. Following this thorough review by the Board of Directors, the final objectives are approved early in the year and incorporated into the CEO Annual Incentive balanced scorecard and the LTPP.

INNOVATION TARGETS OF LTPP

Each year, the divisions and units evaluate their long-term strategic plans to develop recommendations for innovation targets that are focused on challenging milestones of critical importance to the long-term success of the business, and that should be the best- or first-in-class development projects that can significantly advance treatment outcomes for patients worldwide. These targets are presented by the Global Head of Drug Development and Chief Medical Officer for Novartis as well as the President of the Novartis Institutes for BioMedical Research (NIBR) at a joint meeting of the Research & Development Committee and the Compensation Committee. Both Committees review, discuss and challenge the targets before they are finalized and approved by the Board of Directors. The innovation targets of the LTPP are largely aligned with the major development projects outlined in the pipeline schedule of the Annual Report (see page 52).

CEO performance evaluation

The Board of Directors periodically assesses Group business performance, as well as the CEO's progress against his objectives and incentive plan targets. At the mid-year performance review, the performance of the CEO is reviewed by the Chairman of the Board of Directors.

For the year-end review, the CEO prepares and presents to the Chairman of the Board of Directors, and later to the full Board of Directors, the actual results against the previously agreed-upon objectives, taking into account the financial results as well as an assessment against our Values and Behaviors. At the year-end review, the Board of Directors discusses the performance of the CEO without him being present. The Board of Directors evaluates the degree to which the set objectives have been achieved and – to the extent possible – compares these results with peer industry companies, taking into account general economic and financial criteria as well as industry developments. The Board of Directors later shares its assessment with the CEO.

CEO compensation determination

As part of the review of CEO compensation, the Compensation Committee considers a competitive analysis of CEO target compensation prepared by its independent advisor and, based on competitive factors as well as individual and company performance, determines any recommendations for changes to target compensation for the coming year.

At its January meeting, following a recommendation from the Compensation Committee, the Board of Directors approves the CEO's variable compensation for the prior performance-periods and the target compensation for the coming year. This meeting takes place without the CEO being present. The Board of Directors later shares its decisions with the CEO.

Performance management process for the other Executive Committee members (excluding the CEO)

The other Executive Committee members propose the financial and non-financial targets for their division or unit for review, challenge and approval by the CEO and, subsequently (as previously described), by the Board of Directors and Compensation Committee. In addition, each Executive Committee member agrees on individual objectives with the CEO, who also reviews each member's performance at mid-year and year-end.

Following the year-end evaluation, the CEO meets with the Chairman of the Board of Directors, who reviews the performance of each Executive Committee member. Subsequently, the CEO presents and discusses at the Board of Directors meeting the recommended performance rating for each Executive Committee member.

Shortly after year-end, the CEO proposes a payout for the Annual Incentive for each Executive Committee member based on the performance ratings and corresponding to the payout matrix. The Compensation Committee discusses each member's performance with the CEO and approves the Annual Incentive payouts for the prior year as well as any changes to target compensation for the coming year. The Compensation Committee informs the Board of Directors of its final decisions, and the CEO later shares these decisions with each Executive Committee member.

Assessment of Values and Behaviors at Novartis

Values and Behaviors have been an integral part of the company's compensation system since its foundation. In 2015, to reinforce the culture of the company, Novartis rolled out six new Values and Behaviors – which are innovation, quality, collaboration, performance, courage and integrity.

What we value	Observed behaviors
Innovation	
Experiment and deliver solutions	— Experiment and encourage others to do so — Take smart risks that benefit patients and customers — Deliver new solutions with speed and simplicity
Quality	
Take pride in doing ordinary things extra-ordinarily well	— Look for better ways to do things — Do not compromise on quality and safety; strive for excellence — Always work on your strengths and weaknesses
Collaboration	
Champion high-performing teams with diversity and inclusion	— Champion working together in high-performing teams — Know yourself and your impact on others — Welcome diversity and inclusion of styles, ideas and perspectives
Performance	
Prioritize and make things happen with urgency	— Show passion to achieve goals; go the extra mile — Put team results before your own success; acknowledge the contributions of others — Prioritize, make decisions, and make things happen with urgency
Courage	
Speak up, and give and receive feedback	— Speak up and challenge the norm — Acknowledge when things do not work; learn — Give and accept constructive feedback
Integrity	
Advocate and apply high ethical standards every day	— Operate with high ethical standards — Be humble and caring, and show trust, respect and empathy to others — Live by the Code of Conduct even when facing resistance or difficulties

These values are embedded in all aspects of employees' lives at Novartis, including recruitment, development and promotions; performance assessments through 360-degree evaluations and organizational employee surveys; and Annual Incentive awards; to measure individual and organizational performance against our values. As part of the Annual Incentive award process, training programs and toolkits were established to evaluate behavior related to the six new values. They are one of the elements used to assess associates' performance.

In 2015 and again in 2016, we further improved the framework for measuring individual performance against our values, ensuring that fair, objective assessments can be made in a uniform way across all levels of the organization. The assessment is part of a rigorous management process review in which observed Values and Behaviors are evaluated based on globally-defined principles. The assessment initially takes place during a discussion between associates and line managers, followed by a calibration and validation at multiple levels of the organization to allow for a fair, consistent, objective and transparent evaluation. During the calibration sessions, line managers share the proposed ratings of their direct reports with management peers to ensure all apply a common framework, and they seek input and feedback on observed behaviors.

The Values and Behaviors assessments for the CEO and other Executive Committee members are made and calibrated by the Board of Directors.

2016 CEO compensation

This section provides information on the CEO target compensation followed by the 2016 CEO realized compensation on a voluntary basis.

1. 2016 CEO target compensation

Following a competitive analysis of the CEO's compensation and an evaluation of the CEO's performance in 2015, the Compensation Committee approved an increase in the CEO's target compensation effective for 2016. The target compensation is the amount that the CEO is eligible to receive if there is 100% achievement of all short-term and long-term targets for the respective performance-periods, excluding any dividend equivalents and share price movement.

Among other things, the Compensation Committee considered that the CEO's target compensation had not been increased in three years and that his compensation was falling further below the median level of our global healthcare peer group. In recognition of this, the Compensation Committee approved:

— An increase in annual base compensation from CHF 2 060 500 to CHF 2 100 000 with effect from March 1, 2016
— A 25 percentage-point increase in CEO LTRPP target from 100% to 125% of annual base compensation as from the 2016–2018 performance-period to increase the competitiveness of the CEO's target total compensation versus peers through the incentive vehicle most aligned to shareholders' interests

In 2016, at target value, the CEO's compensation included Annual Incentive at 150%, LTPP at 200% and LTRPP at 125% of annual base compensation. The payout range for all of these plans can vary between 0%–200% of the target. Therefore the total target compensation for the CEO is CHF 12 075 000 and can range from a minimum of CHF 2 100 000 to a maximum of CHF 22 050 000 (excluding pension and other benefits, any share price movements and any accrued dividend equivalents), based on the extent to which financial and strategic objectives for payout of short-term Annual Incentive and Long-Term Incentive plans are achieved. As a result, the 2016 CEO's compensation at target was comprised of 19% fixed compensation (i.e. annual base compensation, pension and other benefits), 26% Annual Incentive, and 55% Long-Term Incentives.

2. 2016 CEO realized compensation

This section provides a detailed summary and breakdown by component of the total realized compensation of the CEO in relation to the performance-periods ended December 31, 2016. This includes, for the first time, reporting of CEO realized total compensation in a single table.

To give context to the 2016 CEO realized compensation, within this section, we include details of the CEO's achievements against his balanced scorecard targets along with the achievements under the LTPP (NCVA and Group Innovation) and LTRPP for the performance-period 2014–2016.

Reporting compensation at realized value in this way provides enhanced transparency to shareholders of the CEO's compensation. We also consider that this approach is an important method of demonstrating the alignment between the Compensation Committee's decisions on CEO pay for performance and shareholders' interests.

2016 CEO realized total compensation breakdown

The Compensation Committee believes it is critical to assess performance against a mix of targets (both short-term and long-term) for compensation-related purposes to reflect the full operational performance of the organization and to ensure that results are delivered with high integrity and long-term financial sustainability. The Compensation Committee uses its judgment when determining final compensation outcomes and any discretionary adjustments, positive or negative.

The CEO's 2016 realized total compensation was CHF 10 556 685. This amount is comprised of 2016 annual base compensation, pension and other benefits, Annual Incentive and, for the 2014–2016 performance-period, the vesting of his LTPP and LTRPP awards including accrued dividend equivalents.

A detailed breakdown by component of the 2016 CEO realized compensation is set out below.

ANNUAL BASE COMPENSATION

The CEO annual base compensation paid in 2016 was CHF 2 093 417 (representing a 1.6% increase from 2015).

PENSION AND OTHER BENEFITS

The CEO received pension benefits of CHF 160 283 and other benefits of CHF 75 628 during 2016.

ANNUAL INCENTIVE

Given the 2016 CEO balanced scorecard and assessed Values and Behaviors, the Annual Incentive award was CHF 2 835 010.

Following the performance evaluation of the CEO by the Board of Directors, the Compensation Committee thoroughly reviewed the assessment against the previously agreed objectives as set out in the 2016 CEO balanced scorecard (see following page).

In reaching its recommendation to the Board of Directors on the CEO's 2016 Annual Incentive payout factor of 90% (which was subsequently approved by the Board of Directors), the Compensation Committee recognized that overall he met expectations, was successful in achieving significant milestones in innovation, and that Novartis met its free cash flow target while it was slightly below its sales target in a year of absorbing *Gleevec* US LOE. Group net income was below target mainly due to Alcon performance.

Among the major achievements in 2016 were *Cosentyx* reaching blockbuster status, *Gilenya* delivering double digit growth, Sandoz biopharmaceuticals reaching USD 1 billion of sales, and *Entresto* receiving positive treatment guidelines in the US and Europe.

2016 CEO BALANCED SCORECARD

The Annual Incentive performance is measured in constant currencies to reflect the operational performance that can be influenced.

	Performance metrics for continuing operations (weight)	Target[1]	Achievement vs. target (in constant currencies)
Group financial targets (60%)	Group net sales (30%)	USD 49 540 m	Slightly below
	Corporate net result[2] (20%)	USD –1 675 m	Slightly above
	Group net income (30%)	USD 7 203 m	Below
	Group free cash flow as % of sales (20%)	18.8%	At target
	Achievement of Group financial targets		**Slightly below**
Individual objectives (40%)	**Additional financial targets for continuing operations** In constant currencies, core operating income and EPS were below target. Core EPS was slightly below. Divisional share of peers (Innovative Medicines and Sandoz) were ahead of target while Alcon was behind.		Below
	Innovation and growth The company continued to strengthen its pipeline, with the NIBR unit producing 13 new Proof of Concepts (above target). In total, Novartis secured 14 approvals in Innovative Medicines, as well as 15 major submissions. Progress was made with the biosimilars pipeline at Sandoz, with the FDA approval of Etanercept and filing of Rituximab with the EMA. LEE011 (ribociclib) achieved FDA breakthrough therapy designation. Growth Products contributed USD 17.1 billion or 35% of net sales, up 20% (USD) over the prior year. *Cosentyx* was ahead of target, and reached blockbuster status. *Entresto* continued to grow steadily following positive treatment guidelines in the US and Europe.		Exceeded
	Cross-divisional synergies In January 2016, Novartis announced plans to further focus its divisions to better leverage our development and marketing capabilities. Novartis Business Services (NBS) continued to leverage the global scale of Novartis to streamline and consolidate operations. Novartis Technical Operations completed the organizational integration including a more efficient utilization of functional capabilities and resources. Novartis completed the creation of its new Global Drug Development (GDD) organization to further streamline drug development. A total of 38 000 associates realigned to new business organizations with effect from July 1, 2016 with minimal business disruption. All these actions will increase the productivity of the company and provide a solid foundation for the future growth and profitability of Novartis.		At target
	High-performing organization (e.g., quality, talent) Novartis continues to proactively drive compliance, reliable product quality and sustainable efficiency as part of the quality strategy. Compliance issues which were uncovered and remediated mainly related to legacy failures. A total of 206 global health authority inspections were completed in 2016, 26 of which were conducted by the FDA. All but 4 out of 206 inspections were deemed good or acceptable. Corrective and preventative actions to address all observations have been defined and are being implemented. In 2016, Novartis combined several innovative Access programs into a single portfolio under unified leadership. The Group was successful in filing approximately three quarters of its Novartis Top Leader roles (the company's 360 most senior executives) internally. Women in management increased to 42% and Novartis continues to be recognized in the market for its efforts in diversity and inclusion. Our Values and Behaviors continued to progress in employee pulse surveys and have been embedded in all aspects of associates' lives at Novartis and significant progress has been made in embedding a culture of integrity in a sustainable way.		At target
	Achievement of individual objectives		**At target**

[1] The target was set using July 2015 forward currency exchange rates.
[2] Includes corporate cost, income from associated companies, net financial income and income taxes.

As a result of the CEO's achievements as described above, a payout factor of 90% was approved for the CEO and the value of his 2016 Annual Incentive award was determined as follows:

	Annual base compensation[1] CHF thousands	x	Target incentive % of annual base compensation	x	Performance factor % of target	=	**Final award CHF thousands**
2016 Annual Incentive	2 100	x	150%	x	90%	=	**2 835**[2]

[1] As per plan rules, the Annual Incentive is calculated based on the annual base compensation effective March 1, 2016
[2] 50% of the Annual Incentive is paid in cash and the other 50% as 19 867 RSUs, which have a three-year vesting period.

OUTCOME OF THE LTPP PERFORMANCE-PERIOD 2014–2016

The LTPP payout for the CEO for performance-period 2014–2016 is CHF 4 950 334, including CHF 485 037 of dividend equivalents. The LTPP payout factor for the CEO was 112% based on the outcome of the performance objectives below.

Measure	Weight	Targets and achievements
Novartis Cash Value Added (NCVA)	75%	Over the three-year performance period, 2014 to 2016, Novartis performed 4.4% ahead of the USD 10.1 billion NCVA target in constant currencies. This was mainly due to over achievements in the beginning of the performance-period driven by stronger than anticipated performance of *Gleevec* and the successful launch of *Cosentyx*. NCVA was negatively impacted by Alcon underperformance at the end of the cycle. Overall this corresponded to a payout of 113% following the application of the 1:3 payout curve. In arriving at the NCVA performance score, the Compensation Committee excluded, as a major item, the favorable impact from lower cost of capital.
Group Innovation	25%	Novartis delivered strong innovation performance over the period 2014–2016 despite usual attrition rates inherent to pharmaceutical drug development. The majority of innovation targets were achieved by our divisions and units many of which will have a significant positive impact for both the company and patient outcomes. The company successfully achieved major innovation milestones, including *Entresto* (approved in the US and the EU), *Cosentyx* (approved for AS and PsA in EU and in the US) and submissions of biosimilar etanercept and pegfilgrastim. *Zarxio* (filgrastim) was the first biosimilar approved in the US under the BPCIA pathway. Based on the evaluation performed by the R&D Committee, the Board of Directors approved, in line with a recommendation from the Compensation Committee, a payout factor for group innovation of 107% applicable to the CEO. This corresponds to the weighted average of divisional and unit innovation payouts.

OUTCOME OF THE LTRPP PERFORMANCE-PERIOD 2014–2016

The LTRPP payout for the CEO for performance-period 2014–2016 is CHF 442 013, including CHF 43 309 of dividend equivalents. The LTRPP payout factor applicable to the CEO was 20% based on Novartis TSR rank position, in USD, being 10th in the comparator group of 13 healthcare companies (Novartis and 12 other companies).

In USD our TSR was flat for the three-year period 2014–2016 while in CHF TSR was up +15%. In reaching its decision on the payout factor, the Compensation Committee exercised its discretion within the boundaries of the LTRPP payout matrix (see page 120) and decided that the minimum of the payout range should apply.

2016 CEO realized total compensation table

The following table is newly introduced to aid shareholders' understanding of 2016 realized total compensation of the CEO. It reports, the aggregate fixed and variable compensation in the year, including the LTPP and the LTRPP payouts for performance-period 2014–2016 following their respective completed performance assessments.

Equity relating to the 2016 Annual Incentive is disclosed using the underlying value of Novartis shares on the date of grant, while the realized value for the LTPP and LTRPP payouts (including dividend equivalents) is calculated using the share price on the date of vest. In both cases the applicable date is January 17, 2017 and the share price was CHF 71.35 per Novartis share.

		2016 base compensation	2016 pension benefits	2016 Annual Incentive		Realized LTPP 2014–2016 period	Realized LTRPP 2014–2016 period	Other 2016 compensation	Total realized compensation
	Currency	Cash (amount)	Amount[1]	Cash (amount)	Equity (value at grant date)[2]	Shares (value at vesting date)[3]	Shares (value at vesting date)[3]	Amount[4]	Amount[5]
Joseph Jimenez (CEO)	CHF	2 093 417	160 283	1 417 500	1 417 510	4 950 334	442 013	75 628	10 556 685

[1] Includes service costs of pension and post-retirement healthcare benefits accumulated in 2016, in accordance with IAS19. It also includes an amount of CHF 4 336 for mandatory employer contributions for the CEO paid by Novartis to Swiss governmental social security systems. This amount is out of total employer contributions of CHF 1 144 673, and provides a right to the maximum future insured government pension benefit.

[2] The portion of the Annual Incentive delivered in RSUs is rounded up to the nearest share.

[3] For the performance-period 2014-2016, the accrued dividend equivalent amounts were CHF 485 037 and CHF 43 309 respectively for the LTPP and the LTRPP.

[4] Includes any other perquisites and benefits in kind.

[5] All amounts are before deduction of the employee's social security contribution and income tax due by the CEO.

2015 CEO realized compensation

It should be noted that a direct year over year comparison to the 2016 realized compensation is not possible given the changes made in 2014 to our Long-Term Incentive plans from the Old LTPP (OLTPP) to the LTPP and LTRPP, and the fact that OLTPP awards did not accrue dividend equivalents.

However, using the 2016 methodology for reporting realized compensation, the CEO's 2015 realized total compensation is calculated as CHF 10 911 330 (with no dividend equivalents accrued, per the OLTPP rules), including CHF 5 496 351 OLTPP payout for the performance-period 2013–2015.

CEO and other Executive Committee members' 2014–2016 Long-Term Incentive plans vesting

Overview

In this section, the tables reconcile the target values at grant date with the total value of shares delivered to the CEO and other Executive Committee members (including dividend equivalents) following the vesting of the first performance-period 2014–2016 for the LTPP and the LTRPP respectively. Details of the LTPP and the LTRPP can be found on pages 118–120.

We recognize the importance to our shareholders of being able to easily reconcile the payout of our Long-Term Incentive plans against the original amounts granted. It allows an assessment of pay for performance decisions by the Compensation Committee.

The Long-Term Incentive plans' payout outcomes for the other Executive Compensation members is determined using an approach closely aligned to the methodology used for the CEO described on page 126. For the LTPP, the NCVA measure applies to the other Executive Committee members as it does for the CEO. However, the innovation measure is specific to the performance of the respective division or unit. To determine the LTRPP payout, the same principles apply as for the CEO.

Payout schedule for the LTPP performance-period 2014–2016[1]

	PSUs at grant			Shares delivered at vesting				
	PSUs (target number)	PSUs (target value at grant date) (CHF)[2]	Payout factor for LTPP (% of target)	Performance shares delivered at vesting (number)	Performance shares delivered at vesting (value at vesting date) (CHF)[3]	Dividend equivalent shares delivered at vesting (number)[4]	Dividend equivalent shares delivered at vesting (value at vesting date) (CHF)	Total shares delivered at vesting (value at vesting date) (CHF)
Joseph Jimenez (CEO)	55 878	4 121 003	112%	62 583	4 465 297	6 798	485 037	4 950 334
Other 7 members of the Executive Committee who were active members on December 31, 2016[5]	75 962	5 602 506	107%–114%	84 539	6 030 352	9 080	647 739	6 678 091
Subtotal	**131 840**	**9 723 509**		**147 122**	**10 495 649**	**15 878**	**1 132 776**	**11 628 425**
Other 3 members of the Executive Committee members who stepped down during 2016	72 699	5 366 905	106%–115%	81 651	5 799 375	9 150	649 864	6 449 239
Total	**204 539**	**15 090 414**		**228 773**	**16 295 024**	**25 028**	**1 782 640**	**18 077 664**

[1] For those who joined the Executive Committee in the course of the performance-period 2014-2016, the information disclosed reflects the pro-rata LTPP 2014-2016 payout attributable to the period they were a member of the Executive Committee. Includes 3 039 target PSUs granted to Vasant Narasimhan under the OLTPP for the performance-period 2014-2016. The payout factor for the OLTPP 2014-2016 is 113% of target.

[2] The shown amounts represent the underlying share value of the target number of PSUs granted to each Executive Committee member for the performance-period 2014-2016 based on the closing share price on the grant date (January 22, 2014) of CHF 73.75 per Novartis share and USD 80.79 per ADR.

[3] The shown amounts represent the underlying share value of the target number of PSUs vested for the performance-period 2014-2016 based on the closing share price on the vesting date (January 17, 2017) of CHF 71.35 per Novartis share and USD 71.99 per ADR.

[4] Dividend equivalent shares are calculated on the dividend each member of the Executive Committee would have received based on the actual number of shares delivered at the end of the performance-period 2014-2016. At vesting, the dividend equivalents are credited in shares or ADRs.

[5] Excludes F. Michael Ball, James Bradner and Paul Hudson, who joined the Executive Committee in 2016 and have not participated in the LTPP for the performance-period 2014-2016

For the CEO and other Executive Committee members, including those who stepped down during the year, the combined impact of the performance factor and share price movements over the performance-period to determine the value of performance shares delivered at vesting, compared to the target value at grant date, was CHF 1.2 million excluding dividend equivalents. Of that amount, the impact of the share price movement over the performance-period was CHF –583 548.

Payout schedule for the LTRPP performance-period 2014–2016[1]

	PSUs at grant			Shares delivered at vesting				
	PSUs (target number)	PSUs (target value at grant date) (CHF)[2]	Payout factor for LTRPP (% of target)	Performance shares delivered at vesting (number)	Performance shares delivered at vesting (value at vesting date) (CHF)[3]	Dividend equivalent shares delivered at vesting (number)[4]	Dividend equivalent shares delivered at vesting (value at vesting date) (CHF)	Total shares delivered at vesting (value at vesting date) (CHF)
Joseph Jimenez (CEO)	27 939	2 060 501	20%	5 588	398 704	607	43 309	442 013
Other 6 members of the Executive Committee who were active members on December 31, 2016[5]	20 043	1 478 226	20%	4 008	285 926	435	31 033	316 959
Subtotal	**47 982**	**3 538 727**		**9 596**	**684 630**	**1 042**	**74 342**	**758 972**
Other 3 members of the Executive Committee members who stepped down during 2016	30 042	2 218 214	20%	6 008	426 414	677	48 048	474 462
Total	**78 024**	**5 756 941**		**15 604**	**1 111 044**	**1 719**	**122 390**	**1 233 434**

[1] For those who joined the Executive Committee in the course of the performance-period 2014-2016, the information disclosed reflects the pro-rata LTRPP 2014-2016 payout attributable to the period they were a member of the Executive Committee.

[2] The shown amounts represent the underlying share value of the target number of PSUs granted to each Executive Committee member for the performance-period 2014-2016 based on the closing share price on the grant date (January 22, 2014) of CHF 73.75 per Novartis share and USD 80.79 per ADR.

[3] The shown amounts represent the underlying share value of the target number of PSUs vested for the performance-period 2014-2016 based on the closing share price on the vesting date (January 17, 2017) of CHF 71.35 per Novartis share and USD 71.99 per ADR.

[4] Dividend equivalent shares are calculated on the dividend each member of the Executive Committee would have received based on the actual number of shares delivered at the end of the performance-period 2014-2016. At vesting, the dividend equivalents are credited in shares or ADRs.

[5] Excludes F. Michael Ball, James Bradner, Paul Hudson and Vasant Narasimhan, who joined the Executive Committee in 2016 and have not participated in the LTRPP for the performance-period 2014-2016

For the CEO and other Executive Committee members, including those who stepped down during the year, the combined impact of the performance factor and share price movements over the performance-period to determine the value of performance shares delivered at vesting, compared to the target value at grant date, was CHF –4.6 million excluding dividend equivalents. Of that amount, the impact of the share price movement over the performance-period was CHF –40 285.

CEO and other Executive Committee members' compensation at grant value

In accordance with the Ordinance against Excessive Compensation in Listed Companies in Switzerland we continue to disclose, in this section, total compensation at grant value for the CEO and other Executive Committee members.

In 2016, Novartis implemented organizational changes to pursue its growth and innovation strategy with the following appointments to the Executive Committee:

— Effective February 1, 2016, F. Michael Ball was appointed CEO of Alcon following the departure of Jeff George. In line with the company's priorities for 2016, Mr. Ball received a one-off performance-based Long-Term Incentive award linked to Alcon-specific growth targets over a three-year period to further incentivize him to return the division to growth, accelerate innovation and sales, strengthen customer relationships, and improve basic operations.

— Also effective February 1, 2016, Dr. Vasant Narasimhan was appointed Global Head of Drug Development and Chief Medical Officer to lead our drive to improve resource allocation and standards in drug development across divisions and business units.

— On March 1, 2016, as previously announced in the 2015 Compensation Report, Dr. James Bradner became President of NIBR when Dr. Mark Fishman retired. Prior to joining Novartis, Dr. Bradner was on the faculty of Harvard Medical School in the Department of Medical Oncology at the Dana-Farber Cancer Institute in the US. Dr. Bradner also advised and served on the boards of several scientific companies he founded, and served on the supervisory board of another company. As previously disclosed, in reaching the terms of the offer for Dr. Bradner, the Board of Directors recognized the need to make up compensation that he forfeited by joining Novartis.

— On July 1, 2016, Novartis created two separate business units, Novartis Pharmaceuticals and Novartis Oncology, which together form the Innovative Medicines Division. As part of this reorganization, Bruno Strigini was appointed CEO of Novartis Oncology, and Paul Hudson was appointed CEO of Novartis Pharmaceuticals. Prior to joining Novartis, Mr. Hudson served as an executive at another company. In reaching the terms of the offer for Mr. Hudson, the Board of Directors recognized the need to make up compensation that he forfeited by joining Novartis. With these changes, David Epstein, former Division Head of Novartis Pharmaceuticals, stepped down from the Executive Committee on June 30, 2016. In accordance with the terms of his retirement agreement as well as his employment contract, Mr. Epstein will leave the company in July 2017 after the expiry of his contractual 12-month notice period.

The tables below disclose for the CEO and the other Executive Compensation members the fixed compensation (e.g., base compensation and pension benefits), variable compensation (e.g., the cash portion of the 2016 Annual Incentive and the granted share based compensation of the 2016 Annual Incentive, and the LTPP and LTRPP for the performance-period 2016–2018), plus other compensation. Other 2016 compensation includes the full amount of compensation for lost entitlements from former employers either paid in cash or granted in equity in the year.

PSUs awarded under the Long-Term Incentive plans are reported at target value on the respective grant dates (i.e. assuming the PSUs will vest at 100% achievement and excluding any dividend equivalents that may be accrued during the performance-period). The actual payout outcomes for the PSUs will be assessed after the relevant performance-periods complete, with a payout range of 0–200% of the target value.

CEO and other Executive Committee members' compensation at grant value for financial year 2016

		Fixed compensation and pension benefits		Variable compensation					
		Actual compensation paid or granted for 2016				Long-Term Incentive 2016 grants at target			
		2016 base compensation	2016 pension benefits	2016 Annual Incentive		LTPP 2016–2018 period	LTRPP 2016–2018 period	Other 2016 compensation	Total compensation
	Currency	Cash (amount)	Amount[1]	Cash (amount)	Equity (value at grant date)[2]	PSUs (target value at grant date)[3]	PSUs (target value at grant date)[3]	Amount[4]	Amount[5]
Executive Committee members active on December 31, 2016[6]									
Joseph Jimenez (CEO)	CHF	2 093 417	160 283	1 417 500	1 417 510	4 200 031	2 625 079	75 628	11 989 448
Steven Baert	CHF	721 667	147 442	554 730	554 746	1 050 048	350 042	139 159	3 517 834
F. Michael Ball (from February 1, 2016)[7]	USD	1 012 308	60 574	553 574	553 603	1 742 284	762 269	4 040 748	8 725 360
James Bradner (from March 1, 2016)[8]	USD	888 462	58 859	579 393	579 448	1 687 473	794 195	1 155 169	5 742 999
Felix R. Ehrat	CHF	915 833	148 122	202 400	809 680	1 564 033	552 002	14 852	4 206 922
Richard Francis	CHF	786 667	188 738	520 000	520 070	1 280 062	480 033	1 116 054	4 891 624
Paul Hudson (from July 1, 2016)[9]	CHF	475 000	108 818	288 945	288 968	0	0	3 090 313	4 252 044
Harry Kirsch	CHF	1 025 000	141 510	736 450	736 475	1 751 009	824 018	51 361	5 265 823
Vasant Narasimhan (from February 1, 2016)	CHF	764 993	157 348	537 531	537 551	1 093 245	364 468	102 868	3 558 004
Bruno Strigini (from July 1, 2016)	CHF	445 000	109 057	211 863	211 910	1 074 442	268 670	45 696	2 366 638
André Wyss	CHF	830 834	146 289	0	1 275 025	1 360 001	425 040	95 595	4 132 784
Subtotal[10]	**CHF**	**9 931 091**	**1 425 275**	**5 585 643**	**7 468 241**	**16 751 942**	**7 422 814**	**9 850 656**	**58 435 662**
Executive Committee members who stepped down during 2016[11]									
David Epstein (until June 30, 2016)[12]	USD	699 767	290 385	428 400	428 412	1 285 264	642 632	4 529 809	8 304 669
Mark C. Fishman (until February 29, 2016)[13]	USD	175 154	107 706	195 000	0	0	0	126 454	604 314
Jeff George (until January 31, 2016)[14]	USD	80 000	18 558	44 000	43 986	0	0	2 996 905	3 183 449
Subtotal[10]	**CHF**	**940 809**	**410 492**	**657 537**	**465 417**	**1 266 270**	**633 135**	**7 540 067**	**11 913 726**
Total[10]	**CHF**	**10 871 900**	**1 835 767**	**6 243 180**	**7 933 658**	**18 018 212**	**8 055 949**	**17 390 723**	**70 349 389**

See page 131 for 2015 compensation figures

[1] Includes service costs of pension and post-retirement healthcare benefits accumulated in 2016, in accordance with IAS19. It also includes an amount of CHF 75 216 for mandatory employer contributions for all Executive Committee members paid by Novartis to governmental social security systems. This amount is out of total employer contributions of CHF 3 263 989, and provides a right to the maximum future insured government pension benefit for the Executive Committee member.

[2] The portion of the Annual Incentive delivered in equity is rounded up to the nearest share based on the closing share price on the grant date (January 17, 2017) of CHF 71.35 per Novartis share and USD 71.99 per ADR.

[3] The shown amounts represent the underlying share value of the target number of PSUs granted to Executive Committee members for the performance-period 2016-2018 based on the closing share price on the grant date (January 20, 2016) of CHF 79.70 per Novartis share and USD 80.49 per ADR. For F. Michael Ball, who joined Novartis on February 1, 2016, the target PSUs were granted on February 1, 2016, at the closing share price of the same date (USD 77.27 per ADR).

[4] Includes any other perquisites, benefits in kind, and international assignment benefits as per the global mobility policy (e.g., housing, international health insurance, children's school fees, tax equalization). Tax equalization benefits included for David Epstein, Richard Francis and Jeff George are USD 478 904, CHF 862 101 and USD 961 519, respectively.

[5] All amounts are before deduction of the social security contribution and income tax due by the Executive Committee member.

[6] For those members who joined the Executive Committee in 2016, the information under the columns "Base compensation," "Pension benefits" and "Annual Incentive" includes their pro-rata compensation from the date they joined the Executive Committee to December 31, 2016. The information under "LTPP" and "LTRPP" reflects their pro-rata compensation at target for the period to December 31, 2018.

[7] F. Michael Ball received 50 000 target PSUs, mainly subject to the achievement of Alcon's sales and core operating income growth targets, as well as successful launches of new products and solving critical supply issues. The total target value at grant date was USD 3.9 million. The 50 000 target PSUs are subject to performance conditions assessed annually in three tranches of 16 667, 16 667 and 16 666 for the calendar years 2016, 2017 and 2018, respectively. The PSUs vest on February 1, 2019, provided the relevant performance conditions are met and he remains employed with Novartis on that date. Subject to the extent to which the performance conditions are fulfilled, between 0% and 200% of the target PSUs may vest. The full value of the target PSUs is included under the column "Other 2016 compensation."

[8] James Bradner received 3 607 RSUs for lost entitlements in connection with his former supervisory board mandate, with a total value at grant date of USD 309 300. The vesting of the RSUs will be staggered based on the original vesting period of the lost entitlements, in January 2018 and January 2020, provided that he remains employed with Novartis on the respective vesting dates. In addition, Dr. Bradner received as compensation for lost entitlements at one of his former scientific companies a cash payment of USD 844 250. Both awards, made in 2016, are included in full under the column "Other 2016 compensation" and were previously disclosed in the 2015 Annual Report.

[9] Paul Hudson received a cash payment of CHF 191 300 in July 2016. In addition, he received 2 992 RSUs and 31 510 target PSUs, with total target value at grant date of CHF 2.8 million. These amounts are for lost entitlements at his former employer. The vesting of the RSUs will be staggered based on the original vesting period of the lost entitlements, between March 2017 and March 2019. The vesting of the target PSUs will be subject to the achievement of performance conditions under the Novartis LTPP, and staggered based on the original vesting period of the lost entitlements, between March 2017 and December 2023. Both awards will vest provided he remains employed with Novartis on the respective vesting dates. The full value of the cash payment and the awards is included under the column "Other 2016 compensation."

[10] Amounts in USD for Mr. Ball, Dr. Bradner, Mr. Epstein, Mark C. Fishman and Mr. George were converted at a rate of CHF 1.00 = USD 1.015, which is the same average exchange rate used in the Group's 2016 consolidated financial statements.

[11] For those members who left the Executive Committee in 2016, the information under the columns "Base compensation," "Pension benefits," "Annual Incentive," "LTPP" and "LTRPP" reflects the pro-rata compensation during 2016 for the period they were an Executive Committee member. The information under the column "Other 2016 compensation" includes, inter alia, their pro-rata compensation from the date they stepped down from the Executive Committee to December 31, 2016.

[12] Mr. Epstein stepped down from the Executive Committee on June 30, 2016. In accordance with the contractual notice period of his employment agreement, he will leave the company in July 2017. Until the end of the notice period, he will receive further contractual compensation that includes the base salary, pension and other benefits, and the vesting of his incentive awards under the approved early retirement conditions of the Novartis plan rules.

[13] Dr. Fishman stepped down from the Executive Committee on February 29, 2016 and retired from Novartis. Until the retirement date, he received further contractual compensation that included base salary, pension and other benefits, and the vesting of his incentive awards in accordance with the terms of the Novartis plan rules. As of March 1, 2016, Dr. Fishman provided certain consulting services to Novartis for which he is compensated for a period of up to two years until February 28, 2018. The fees for these services are capped at USD 250 000 p.a. and are in line with those for other scientists who provide consultancy services to the NIBR organization. In 2016, no payments were made in relation to such services.

[14] Mr. George stepped down from the Executive Committee on January 31, 2016. In accordance with the contractual notice period of his employment agreement, he will leave the company in January 2017. Until the end of the notice period, he will receive further contractual compensation that includes the base salary, pension and other benefits, and the vesting of his incentive awards in accordance with the terms of the Novartis plan rules. Mr. George was not granted LTPP and LTRPP awards for the performance-period 2016-2018. In accordance with the applicable plan rules, the LTPP and LTRPP awards for the performance-period 2015-2017 will be eligible to vest on the normal vesting date pro-rata based on the number of months of Novartis employment during the performance-period. The vesting of these awards is subject to performance conditions assessed at the end of the period.

CEO and other Executive Committee members' compensation at grant value for financial year 2015[1] (comparative information)

		Fixed compensation and pension benefits		Variable compensation					
		Actual compensation paid or granted for 2015				Long-Term Incentive 2015 grants at target			
		2015 base compensation	2015 pension benefits	2015 Annual Incentive		LTPP 2015–2017 period	LTRPP 2015–2017 period	Other 2015 compensation	Total compensation
	Currency	Cash (amount)	Amount[2]	Cash (amount)	Equity (value at grant date)[3]	PSUs (target value at grant date)[4]	PSUs (target value at grant date)[4]	Amount[5]	Amount[6]
Executive Committee members active on December 31, 2015									
Joseph Jimenez (CEO)	CHF	2 060 500	175 289	1 545 375	1 545 383	4 121 054	2 060 527	88 432	11 596 560
Steven Baert	CHF	653 333	158 099	543 900	543 953	960 048	256 030	94 716	3 210 079
Felix R. Ehrat	CHF	892 500	153 054	648 875	648 917	1 521 517	447 565	12 669	4 325 097
David Epstein	USD	1 400 000	362 819	1 428 000	1 428 054	2 520 001	1 260 050	569 737	8 968 661
Mark C. Fishman[7]	USD	990 000	248 910	861 300	861 323	1 881 089	891 021	129 825	5 863 468
Richard Francis	CHF	716 667	193 635	599 400	599 424	1 080 054	360 018	954 170	4 503 368
Jeff George	USD	956 539	200 946	158 400	158 404	1 536 056	576 009	1 260 286	4 846 640
Harry Kirsch	CHF	950 000	160 431	757 625	757 628	1 480 074	647 575	51 476	4 804 809
André Wyss	CHF	735 000	127 237	0	1 176 053	1 102 513	294 083	83 688	3 518 574
Subtotal[8]	**CHF**	**9 225 826**	**1 749 163**	**6 448 733**	**7 624 994**	**15 974 055**	**6 687 990**	**3 169 620**	**50 880 381**
Executive Committee members who stepped down during 2015									
Brian McNamara (until March 1, 2015)[9]	USD	131 154	69 008	115 100	0	58 361	11 751	40 670	426 044
Andrin Oswald (until March 1, 2015)[9]	CHF	138 333	27 634	136 500	0	64 580	13 899	283 236	664 182
Subtotal[8]	**CHF**	**264 443**	**93 988**	**247 173**	**0**	**120 696**	**25 198**	**322 342**	**1 073 840**
Total[8]	**CHF**	**9 490 269**	**1 843 151**	**6 695 906**	**7 624 994**	**16 094 751**	**6 713 188**	**3 491 962**	**51 954 221**

As published in the 2015 Compensation Report, with the exception of the tabular format

[1] Does not include reimbursement for travel and other necessary business expenses incurred by Executive Committee members in the performance of their services, as these amounts are not considered compensation

[2] Includes service costs of pension and post-retirement healthcare benefits accumulated in 2015, in accordance with IAS19. It also includes an amount of CHF 58 757 for mandatory employer contributions paid by Novartis to governmental social security systems. This amount is out of total employer contributions of CHF 3 457 097, and provides a right to the maximum future insured government pension benefit for the Executive Committee member.

[3] The portion of the Annual Incentive delivered in shares is rounded up to the nearest share based on the closing share price on the grant date (January 20, 2016). The closing share price on this date was CHF 79.70 per Novartis share and USD 80.49 per ADR.

[4] The shown amounts in these columns represent the underlying share value of the target number of PSUs granted to each Executive Committee member for the performance cycle 2015-2017 based on the closing share price on the grant date (January 21, 2015). The closing share price on this date was CHF 84.75 per Novartis share and USD 98.75 per ADR.

[5] Includes any other perquisites, benefits in kind and international assignment benefits as per global mobility policy (e.g., housing, international health insurance, children's school fees, tax equalization). Tax equalization benefits included for David Epstein, Richard Francis, Jeff George and Andrin Oswald are USD 305 867, CHF 739 086, USD 1 153 361 and CHF 249 728, respectively.

[6] All amounts are before deduction of social security contribution and income tax due by the Executive Committee member.

[7] Mark C. Fishman, President of NIBR and Executive Committee member, will step down from the Executive Committee on February 29, 2016 and retire from Novartis. He will receive further contractual compensation that includes the base salary, pension and other benefits (pro-rata until February 29, 2016) and the vesting of his incentive awards in accordance with the terms of the Novartis plan rules. As of March 1, 2016, Dr. Fishman will provide certain consulting services to Novartis for which he will be compensated for a period of up to two years until February 28, 2018. The fees for these services are capped at USD 250 000 p.a. and are in line with those paid to other scientists who provide consultancy services to the NIBR organization.

[8] Amounts in USD for Mr. Epstein, Dr. Fishman, Mr. George and Mr. McNamara were converted at a rate of CHF 1.00 = USD 1.040, which is the same average exchange rate used in the Group's 2015 consolidated financial statements.

[9] Brian McNamara (Division Head of Novartis OTC) and Andrin Oswald (Division Head of Novartis Vaccines) transitioned to the GlaxoSmithKline (GSK) group on March 2, 2015 following the completion of the Novartis OTC and Vaccines transactions with GSK. The information disclosed under columns "LTPP" and "LTRPP" in the table above reflects their pro-rata compensation at target. Following their transition to GSK, and in accordance with the applicable plan rules, the LTPP and LTRPP awards for the performance-period 2015-2017 (as well as for those granted for the performance-period 2014-2016) will be eligible to vest on the normal vesting date and on a pro-rata basis based on the number of months worked with Novartis during the performance-period. The vesting of these awards is subject to performance conditions assessed at the end of the performance-period.

Number of equity instruments awarded at grant value to the CEO and other Executive Committee members for financial year 2016[1]

The table below provides the number of equity instruments awarded to the CEO and other Executive Committee members for financial year 2016, and the awards for 2015 are on the next page for comparison purposes.

	Variable compensation			
	2016 Annual Incentive	LTPP 2016–2018 period	LTRPP 2016–2018 period	Other
	Equity (number)[2]	PSUs (target number)[3]	PSUs (target number)[3]	Equity/PSUs (number)
Executive Committee members active on December 31, 2016				
Joseph Jimenez (CEO)	19 867	52 698	32 937	0
Steven Baert	7 775	13 175	4 392	0
F. Michael Ball (from February 1, 2016)	7 690	22 548	9 865	50 000
James Bradner (from March 1, 2016)	8 049	20 965	9 867	3 607
Felix R. Ehrat	11 348	19 624	6 926	0
Richard Francis	7 289	16 061	6 023	0
Paul Hudson (from July 1, 2016)[4]	4 050	0	0	34 502
Harry Kirsch	10 322	21 970	10 339	0
Vasant Narasimhan (from February 1, 2016)	7 534	13 717	4 573	0
Bruno Strigini (from July 1, 2016)	2 970	13 549	3 388	0
André Wyss	17 870	17 064	5 333	0
Subtotal	**104 764**	**211 371**	**93 643**	**88 109**
Executive Committee members who stepped down during 2016				
David Epstein (until June 30, 2016)	5 951	15 968	7 984	29 902
Mark C. Fishman (until February 29, 2016)[4]	0	0	0	0
Jeff George (until January 31, 2016)[4]	611	0	0	6 724
Subtotal	**6 562**	**15 968**	**7 984**	36 626
Total	**111 326**	**227 339**	**101 627**	**124 735**

See next page for 2015 compensation figures

[1] The values of the awards are reported in the table "CEO and other Executive Committee member's compensation at grant value for financial year 2016" on page 130.

[2] Vested shares, restricted shares and/or RSUs granted under the Annual Incentive for performance-period 2016

[3] Target number of PSUs granted under the LTPP and LTRPP as applicable for the performance-period 2016-2018

[4] Paul Hudson, Mark C. Fishman and Jeff George were not granted LTPP and LTRPP awards for the performance-period 2016-2018.

Number of equity instruments awarded at grant value to the CEO and other Executive Committee members for financial year 2015[1] (comparative information)

	Variable compensation		
	2015 Annual Incentive	LTPP 2015–2017 period	LTRPP 2015–2017 period
	Equity (number)[2]	PSUs (target number)[3]	PSUs (target number)[3]
Executive Committee members active on December 31, 2015			
Joseph Jimenez (CEO)	19 390	48 626	24 313
Steven Baert	6 825	11 328	3 021
Felix R. Ehrat	8 142	17 953	5 281
David Epstein	17 742	25 519	12 760
Mark C. Fishman	10 701	19 049	9 023
Richard Francis	7 521	12 744	4 248
Jeff George	1 968	15 555	5 833
Harry Kirsch	9 506	17 464	7 641
André Wyss	14 756	13 009	3 470
Subtotal	**96 551**	**181 247**	**75 590**
Executive Committee members who stepped down during 2015			
Brian McNamara (until March 1, 2015)[4]	0	591	119
Andrin Oswald (until March 1, 2015)[4]	0	762	164
Subtotal	0	1 353	283
Total	**96 551**	**182 600**	**75 873**

As published in the 2015 Compensation Report, with the exception of the tabular format

[1] The values of the awards included in this table are reported in the table "CEO and other Executive Committee members' compensation at grant value for financial year 2015."

[2] Vested shares, restricted shares and/or RSUs granted under the Annual Incentive for performance-period 2015

[3] Target number of PSUs granted under the LTPP and LTRPP as applicable for the performance-period 2015-2017

[4] Target number of PSUs granted under the LTPP and LTRPP is reported on a pro-rata basis. See footnote 9 of the table "CEO and other Executive Committee members' compensation at grant value for financial year 2015."

CEO and other Executive Committee members' base compensation and variable compensation mix for financial year 2016[1]

	Base compensation	Variable compensation[2]
Joseph Jimenez (CEO)	17.8%	82.2%
Steven Baert	22.3%	77.7%
F. Michael Ball	21.9%	78.1%
James Bradner	19.6%	80.4%
Felix R. Ehrat	22.6%	77.4%
Richard Francis	21.9%	78.1%
Paul Hudson	45.1%	54.9%
Harry Kirsch	20.2%	79.8%
Vasant Narasimhan	23.2%	76.8%
Bruno Strigini	20.1%	79.9%
André Wyss	21.4%	78.6%
Total	**21.1%**	**78.9%**

[1] Excludes pension and other benefits. Also excludes David Epstein, Mark C. Fishman and Jeff George, who stepped down from the Executive Committee during 2016

[2] See the table "CEO and other Executive Committee members' compensation at grant value for financial year 2016" on page 130 with regard to the disclosure principles of variable compensation.

Additional information

This part provides additional disclosures, including information about the shareholdings of the CEO and the other Executive Committee members, collectively referred to in this section as Executive Committee members.

Share ownership requirements for Executive Committee members

Executive Committee members are required to own at least a minimum multiple of their annual base compensation in Novartis shares, RSUs or share options within five years of hire or promotion, as set out in the table below.

In the event of a substantial rise or drop in the share price, the Board of Directors may, at its discretion, amend that time period accordingly.

Function	Ownership level
CEO	5 x base compensation
Other Executive Committee members	3 x base compensation

The determination of equity amounts against the share ownership requirements is defined to include vested and unvested Novartis shares or ADRs, as well as RSUs acquired under our compensation plans. However, unvested matching shares granted under the Leveraged Share Savings Plan (LSSP), the Employee Share Ownership Plan (ESOP), and any unvested PSUs are excluded. The determination also includes other shares as well as vested options of Novartis shares or ADRs that are owned directly or indirectly by "persons closely linked" to an Executive Committee member. The Compensation Committee reviews compliance with the share ownership guideline on an annual basis.

As at December 31, 2016, all members who have served at least five years on the Executive Committee have met or exceeded their personal Novartis share ownership requirements.

Shares, ADRs, equity rights and share options owned by Executive Committee members

The following table shows the total number of shares, ADRs, and other equity rights owned by Executive Committee members and "persons closely linked" to them as at December 31, 2016.

As at December 31, 2016, no members of the Executive Committee together with "persons closely linked" to them owned 1% or more of the outstanding shares (or ADRs) of Novartis. As at the same date, no members of the Executive Committee held any share options to purchase Novartis shares, with the exception of André Wyss who held 373 000.

Shares, ADRs and other equity rights owned by Executive Committee members[1]

	Vested shares and ADRs	Unvested shares and other equity rights[2]	**Total at December 31, 2016**
Joseph Jimenez (CEO)	347 278	273 930	621 208
Steven Baert	11 111	50 827	61 938
F. Michael Ball	0	49 081	49 081
James Bradner	0	14 479	14 479
Felix R. Ehrat	137 290	122 196	259 486
Richard Francis	22 424	49 550	71 974
Paul Hudson	0	24 027	24 027
Harry Kirsch	47 437	108 686	156 123
Vas Narasimhan	7 271	79 703	86 974
Bruno Strigini	4 310	92 383	96 693
André Wyss	61 475	92 875	154 350
Total[3]	**638 596**	**957 737**	**1 596 333**

[1] Includes holdings of "persons closely linked" to Executive Committee members (see definition on page 135)

[2] Includes restricted shares, RSUs and target number of PSUs. Matching shares under the ESOP and LSSP, and target number of PSUs are disclosed pro-rata to December 31, unless the award qualified for full vesting under the relevant plan rules. Awards under all other incentive plans are disclosed in full.

[3] David Epstein, Mark C. Fishman and Jeff George stepped down from the Executive Committee in 2016. At the time they stepped down from the Executive Committee, Mr. Epstein owned 116 027 vested shares, and 250 225 unvested shares and other equity rights; Dr. Fishman owned 117 792 vested shares, and 83 311 unvested shares and other equity rights; and Mr. George owned 144 368 vested shares, 141 396 vested share options, and 74 189 unvested shares and other equity rights.

Other payments to Executive Committee members

During 2016, no other payments or waivers of claims other than those set out in the tables (including their footnotes) contained in this Compensation Report were made to Executive Committee members or to "persons closely linked" to them.

Payments to former Executive Committee members

Under the former Executive Committee members' contracts and in line with the company's Long-Term Incentive plan rules, payments were made to five former members of the Executive Committee totaling CHF 5 243 670. The payments related to the vesting of Long-Term Incentives for the 2014–2016 performance-period based on actual performance outcomes plus any dividend equivalents. In addition, in line with the company's policies, a total amount of CHF 87 780 was paid by the company for tax, financial services and tax equalization provided to two former Executive Committee members. With the exception of the above amounts, during 2016, no other payments (or waivers of claims) were made to former Executive Committee members or to "persons closely linked" to them.

Loans to Executive Committee members

No loans were granted to current or former Executive Committee members or to "persons closely linked" to them in 2016. In addition, no such loans were outstanding as of December 31, 2016.

Persons closely linked

"Persons closely linked" are (i) their spouse, (ii) their children below age 18, (iii) any legal entities that they own or otherwise control, and (iv) any legal or natural person who is acting as their fiduciary.

Note 27 to the Group's audited consolidated financial statements

The total expense for the year for the compensation awarded to Executive Committee and Board members using International Financial Reporting Standards (IFRS) measurement rules is presented in the Financial Report in Note 27 on page 233 to the Group's audited consolidated financial statements.

Award and delivery of equity to Novartis associates

During 2016, 13.1 million unvested restricted shares (or ADRs), RSUs and target PSUs were granted, and 10.4 million Novartis vested shares (or ADRs) were delivered to Novartis associates under various equity-based participation plans. Current unvested equity instruments (restricted shares, RSUs and target PSUs) – as well as outstanding equity options held by associates – represent 2.2% of issued shares. Novartis delivers treasury shares to associates to fulfill these obligations, and aims to offset the dilutive impact from its equity-based participation plans.

2017 Executive Committee compensation system

The Compensation Committee has evaluated the Executive Committee compensation system and has decided that it will remain largely unchanged in 2017, with the exception of the revised LTRPP payout matrix to reflect the new global healthcare peer group effective from performance-periods starting in 2017, as described below. The Compensation Committee believes that the compensation system is operating as intended, supports the company's strategy, and is aligned with market and best practices.

Global healthcare peer group for 2017

With effect from performance-periods starting in 2017, our global healthcare peer group will consist of 15 global pharmaceutical and biotechnology companies, factoring the following changes:

— Removed Abbott Laboratories, as this company's core business is primarily in medical devices and nutrition
— Added Celgene, Biogen, Gilead and Novo Nordisk, reflecting the evolution of the healthcare industry and the emergence of large and global biotechnology companies with which we directly compete for executive talent

Global healthcare peer group for 2017		
AbbVie	Amgen	AstraZeneca
Biogen	Bristol-Myers Squibb	Celgene
Eli Lilly & Co.	Gilead Sciences	GlaxoSmithKline
Johnson & Johnson	Merck & Co.	Novo Nordisk
Pfizer	Roche	Sanofi

In accordance with the above global healthcare peer group, a new LTRPP payout matrix for performance-periods 2017–2019 has been developed, which can be found below.

LTRPP payout matrix for performance-period 2017–2019

Position in peer group	Payout range
Positions 1–4	160–200%
Positions 5–8	100–150%
Positions 9–12	20–80%
Positions 13–16	0%

2016 Board compensation system

Board compensation philosophy and benchmarking

The Board of Directors sets compensation for its members at a level that allows for the attraction and retention of high-caliber individuals with global experience, including a mix of Swiss and international members. Board members do not receive variable compensation, underscoring their focus on corporate strategy, supervision and governance.

The Board of Directors sets the level of compensation for its Chairman and the other members to be in line with relevant benchmark companies, which include other large Swiss-headquartered multinational companies: ABB, Credit Suisse, LafargeHolcim, Nestlé, Roche, Syngenta and UBS. This peer group has been chosen for Board compensation due to the comparability of Swiss legal requirements, including broad personal and individual liabilities under Swiss law (and new criminal liability under the Swiss rules regarding compensation of Board and Executive Committee members related to the Ordinance against Excessive Compensation in Listed Companies), and under US law (due to the company's secondary listing on the New York Stock Exchange).

The Board of Directors reviews the compensation of its members, including the Chairman, each year based on a proposal by the Compensation Committee and on advice from its independent advisor, including relevant benchmarking information.

Compensation of the Chairman of the Board of Directors

As Chairman, Dr. Joerg Reinhardt receives total annual compensation valued at CHF 3.8 million. The total compensation is comprised equally of cash and shares, as follows:

— Cash compensation: CHF 1.9 million per year
— Share compensation: annual value equal to CHF 1.9 million of unrestricted Novartis shares

Dr. Reinhardt also received compensation for lost entitlements at his former employer, with a total value of EUR 2.6 million, as reported in previous Compensation Reports. Payments were staggered based on the vesting period at his former employer during the period 2014–2016, provided that he remained in office as Chairman at the respective due dates. On January 31, 2016, he received the final installment of EUR 1 045 800 in cash.

For 2016, the Chairman voluntarily waived the increase in compensation to which he is contractually entitled, which is an amount not lower than the average annual compensation increase awarded to associates based in Switzerland (1% for 2016). For the year 2017, the Chairman will also voluntarily waive this increase.

Compensation of the other Board members

The annual fee rates for Board membership and additional functions are included in the table below. These were approved by the Board of Directors with effect from the 2014 AGM, and align our aggregate Board compensation with the current levels of other large Swiss companies.

2016 Board member annual fee rates

	Annual fee (CHF)
Chairman of the Board	3 800 000
Board membership	300 000
Vice Chairman	50 000
Chairman of the Audit and Compliance Committee	120 000
Chairman of the following committees: — Compensation Committee — Governance, Nomination and Corporate Responsibilities Committee — Research & Development Committee — Risk Committee	60 000
Membership of the Audit and Compliance Committee	60 000
Membership of the following committees: — Compensation Committee — Governance, Nomination and Corporate Responsibilities Committee — Research & Development Committee — Risk Committee	30 000

In addition, the following policies apply regarding Board compensation:

— 50% of compensation is delivered in cash, paid on a quarterly basis in arrears. Board members may choose to receive more of their compensation in shares instead of cash.
— At least 50% of compensation is delivered in shares in two installments: one six months after the AGM and one 12 months after the AGM.
— Board members bear the full cost of their employee social security contributions, if any, and do not receive share options or pension benefits.

The Board compensation system will remain unchanged in 2017.

2016 Board compensation

Board member compensation tables

The following tables disclose the 2016 Board member compensation and prior-year comparative information. Board compensation is reported as the amount earned in the financial year.

Board member compensation earned for financial year 2016

	Board membership	Vice Chairman	Audit and Compliance Committee	Compensation Committee	Governance, Nomination and Corporate Responsibilities Committee	Research & Development Committee	Risk Committee	Shares (number)[1]	Cash (CHF) (A)	Shares (CHF) (B)	Other (CHF) (C)[2]	Total (CHF) (A)+(B)+(C)[3]
Board members active on December 31, 2016												
Joerg Reinhardt[4]	Chair					Chair		25 020	1 900 000	1 900 000	4 336	3 804 336
Enrico Vanni	•	•	•	Chair	•[5]	•[6]		3 291	250 000	250 000	4 336	504 336
Nancy Andrews	•					•	•[5]	2 265	177 500	177 500	–	355 000
Dimitri Azar	•		•			•		2 567	195 000	195 000	–	390 000
Ton Buechner (from February 24, 2016)	•							1 864	–	250 000	–	250 000
Srikant Datar	•		Chair	•			•	3 159	240 000	240 000	–	480 000
Elizabeth Doherty (from February 24, 2016)	•		•					1 118	150 000	150 000	–	300 000
Ann Fudge	•			•	•		•	2 567	195 000	195 000	–	390 000
Pierre Landolt[7]	•				•[8]			4 553	–	335 000	3 475	338 475
Andreas von Planta	•		•		Chair[5]		Chair	3 055	237 500	237 500	4 336	479 336
Charles L. Sawyers	•				•	•		2 369	180 000	180 000	–	360 000
William T. Winters	•			•				4 344	–	330 000	–	330 000
Subtotal								**56 172**	**3 525 000**	**4 440 000**	**16 483**	**7 981 483**
Board members who stepped down at the 2016 AGM												
Verena A. Briner (until February 23, 2016)	•						•	1 147	27 500	27 500	579	55 579
Subtotal								**1 147**	**27 500**	**27 500**	**579**	**55 579**
Total								**57 319**	**3 552 500**	**4 467 500**	**17 062**	**8 037 062**

See next page for 2015 compensation figures

[1] The shown amounts represent the gross number of shares delivered to each Board member in 2016 for the respective Board member's service period. The number of shares reported in this column represent: (i) the second and final equity installment delivered in February 2016 for the services from the 2015 AGM to the 2016 AGM, and (ii) the first of two equity installments delivered in August 2016 for the services from the 2016 AGM to the 2017 AGM. The second and final equity installment for the services from the 2016 AGM to the 2017 AGM will take place in February 2017.

[2] Includes an amount of CHF 17 062 for mandatory employer contributions for all Board members paid by Novartis to Swiss governmental social security systems. This amount is out of total employer contributions of CHF 387 308, and provides a right to the maximum future insured government pension benefit for the Board member.

[3] All amounts are before deduction of the social security contribution and income tax due by the Board member.

[4] Does not include EUR 1 045 800 paid to Joerg Reinhardt on January 31, 2016 for lost entitlements at his former employer. This amount is the third and final of three installments totaling EUR 2 665 051, which compensates him for lost entitlements at his former employer. The lost entitlements of EUR 2 665 051 were included in full on page 124 of the 2014 Compensation Report. No additional committee fees for chairing the Research & Development Committee were delivered to Dr. Reinhardt.

[5] From February 24, 2016

[6] Until February 23, 2016

[7] According to Pierre Landolt, the Sandoz Family Foundation is the economic beneficiary of the compensation.

[8] Until February 23, 2016, Chair of the Governance, Nomination and Corporate Responsibilities Committee

Board member compensation earned for financial year 2015[1] (comparative information)

	Board membership	Vice Chairman	Audit and Compliance Committee	Compensation Committee	Governance, Nomination and Corporate Responsibilities Committee	Research & Development Committee	Risk Committee	Shares (number)[2]	Cash (CHF) (A)	Shares (CHF) (B)	Other (CHF) (C)[3]	Total (CHF) (A)+(B)+(C)[4]
Board members active on December 31, 2015												
Joerg Reinhardt[5]	Chair					Chair		19 397	1 900 000	1 900 000	29 197	3 829 197
Enrico Vanni	•	•	•	Chair		•		2 552	250 000	250 000	4 357	504 357
Nancy Andrews (from February 27, 2015)	•					•		812	137 500	137 500	–	275 000
Dimitri Azar	•		•			•		2 712	172 250	217 750	–	390 000
Verena A. Briner	•						•	1 684	165 000	165 000	4 357	334 357
Srikant Datar	•		Chair	•			•	2 450	240 000	240 000	–	480 000
Ann Fudge	•			•	•		•	1 990	195 000	195 000	–	390 000
Pierre Landolt[6]	•				Chair			3 674	–	360 000	3 492	363 492
Andreas von Planta	•		•		•		Chair	2 296	225 000	225 000	4 357	454 357
Charles L. Sawyers	•				•[7]	•		1 757	177 500	177 500	–	355 000
William T. Winters	•			•[7]				3 210	–	325 000	–	325 000
Subtotal								**42 534**	**3 462 250**	**4 192 750**	**45 760**	**7 700 760**
Board members who stepped down at the 2015 AGM												
Ulrich Lehner (until February 26, 2015)	•	•	•	•	•			1 242	39 167	39 167	582	78 916
Subtotal								**1 242**	**39 167**	**39 167**	**582**	**78 916**
Total								**43 776**	**3 501 417**	**4 231 917**	**46 342**	**7 779 676**

As published in the 2015 Compensation Report, with the exception of the tabular format

[1] Does not include reimbursement for travel and other necessary business expenses incurred by Board members in the performance of their services, as these are not considered compensation

[2] The shown amounts represent the gross number of shares delivered to each Board member in 2015 for the respective Board member's service period. The number of shares reported in this column represent: (i) the second and final equity installment delivered in February 2015 for the services from the 2014 AGM to the 2015 AGM, and (ii) the first of two equity installments delivered in August 2015 for the services from the 2015 AGM to the 2016 AGM. The second and final equity installment for the services from the 2015 AGM to the 2016 AGM will take place in February 2016.

[3] Includes an amount of CHF 21 502 for mandatory employer contributions paid by Novartis to Swiss governmental social security systems. This amount is out of total employer contributions of CHF 429 806, and provides a right to the maximum future insured government pension benefit for the Board member.

[4] All amounts are before the deduction of the social security contribution and income tax due by the Board member.

[5] Does not include EUR 871 251 paid to Joerg Reinhardt on January 31, 2015 for lost entitlements at his former employer. This amount is the second of three installments totaling EUR 2 665 051, which compensates him for lost entitlements at his previous employer that were due to him on joining Novartis. The third and last installment of EUR 1 045 800 will be delivered on January 31, 2016, provided that he remains in office as our Chairman at the due dates. The lost entitlements of EUR 2 665 051 were included in full in the 2013 Board compensation table on page 124 of the 2014 Compensation Report based on our disclosure policy to report compensation for lost entitlements in full in the year the member of the Board or Executive Committee joined Novartis.

[6] According to Pierre Landolt, the Sandoz Family Foundation is the economic beneficiary of the compensation.

[7] From February 27, 2015

Reconciliation between the reported Board compensation and the amount approved by shareholders at the AGM

(CHF)	Compensation earned for the respective financial year (A)[1]	Compensation earned for the period from January 1 to the AGM (2 months) of the financial year (B)	Compensation to be earned for the period from January 1 to the AGM (2 months) in the year following the financial year (C)	Total compensation earned from AGM to AGM (A)-(B)+(C)	Amount approved by shareholders at the respective AGM	Amount within the amount approved by shareholders at the respective AGM
	2016	**January 1, 2016 to 2016 AGM**	**January 1, 2017 to 2017 AGM[2]**	**2016 AGM to 2017 AGM**	**2016 AGM**	**2016 AGM**
Joerg Reinhardt	3 804 336	633 334	633 334	3 804 336	3 805 000	Yes
Other Board members	4 232 726	653 334	713 334	4 292 726	4 355 000	Yes
Total	**8 037 062**	**1 286 668**	**1 346 668**	**8 097 062**	**8 160 000**	**Yes**

	2015	January 1, 2015 to 2015 AGM	January 1, 2016 to 2016 AGM	2015 AGM to 2016 AGM	2015 AGM	2015 AGM
Joerg Reinhardt	3 829 197	658 174	633 334	3 804 357	3 805 000	Yes
Other Board members	3 950 479	667 250	653 334	3 936 563	3 940 000	Yes
Total	**7 779 676**	**1 325 424**	**1 286 668**	**7 740 920**	**7 745 000**	**Yes**

[1] See previous page for 2016 Board member compensation.

[2] To be confirmed and reported in the 2017 Compensation Report

Loans to Board members

No loans were granted to current or former members of the Board of Directors or to "persons closely linked" to them during 2016. In addition, no such loans were outstanding as of December 31, 2016.

Other payments to Board members

During 2016, no payments (or waivers of claims) other than those set out in the Board member compensation table (including its footnotes) on page 138 were made to current members of the Board of Directors or to "persons closely linked" to them.

Payments to former Board members

During 2016, no payments (or waivers of claims) were made to former Board members or to "persons closely linked" to them, except for the following amounts:

- Dr. William R. Brody and Dr. Rolf M. Zinkernagel, who stepped down from the Board of Directors at the 2014 AGM, received delegated Board membership fees for their work on the Boards of the Novartis Institute for Tropical Diseases (Dr. Zinkernagel) and the Genomics Institute of the Novartis Research Foundation (Dr. Brody and Dr. Zinkernagel). During 2016, an amount of CHF 25 000 and CHF 50 000 was paid to Dr. Brody and Dr. Zinkernagel, respectively, for their work on these Boards. No further payments related to these Board memberships will be made to Dr. Brody and Dr. Zinkernagel, as their respective mandates have ended.
- The payments reported in Note 27 to the Group's audited consolidated financial statements (page 233)

Share ownership requirements for Board members

The Chairman is required to own a minimum of 30 000 Novartis shares, and other members of the Board of Directors are required to own at least 4 000 Novartis shares within three years after joining the Board of Directors, to ensure their interests are aligned with shareholders'. Board members are prohibited from hedging or pledging their ownership positions in Novartis shares that are part of their guideline share ownership requirement, and are required to hold these shares for 12 months after retiring from the Board of Directors. As at December 31, 2016, all members of the Board of Directors who have served at least three years on the Board, as well as former members who stepped down from the Board at the 2016 AGM, have complied with the share ownership requirements.

Shares, ADRs and share options owned by Board members

The total number of vested Novartis shares and ADRs owned by members of the Board of Directors and "persons closely linked" to them as of December 31, 2016 is shown in the table below.

As of December 31, 2016, no members of the Board of Directors together with "persons closely linked" to them owned 1% or more of the outstanding shares (or ADRs) of Novartis. As of the same date, no members of the Board of Directors held any share options to purchase Novartis shares.

Shares and ADRs owned by Board members[1]

	Number of shares[2]
	At December 31, 2016
Joerg Reinhardt	497 762
Enrico Vanni	17 853
Nancy Andrews	2 308
Dimitri Azar	11 217
Ton Buechner	1 398
Srikant Datar	34 998
Elizabeth Doherty	839
Ann Fudge	17 530
Pierre Landolt[3]	58 061
Andreas von Planta	127 740
Charles L. Sawyers	6 029
William T. Winters	9 257
Total[4]	**784 992**

[1] Includes holdings of "persons closely linked" to Board members (see definition on page 135)

[2] Each share provides entitlement to one vote.

[3] According to Pierre Landolt, the Sandoz Family Foundation is the economic beneficiary of the shares.

[4] Verena A. Briner stepped down from the Board of Directors on February 23, 2016. On February 23, 2016, Dr. Briner owned 7 507 shares.

Compensation governance

Legal framework

The Swiss Code of Obligations and the Corporate Governance Guidelines of the SIX Swiss Exchange require listed companies to disclose certain information about the compensation of Board and Executive Committee members, their equity participation in the Group, and loans made to them. This Annual Report fulfills that requirement. In addition, the Annual Report is in line with the principles of the Swiss Code of Best Practice for Corporate Governance of the Swiss Business Federation (economiesuisse).

Compensation decision-making authorities

Authority for decisions related to compensation is governed by the Articles of Incorporation, Board regulations and the Compensation Committee Charter, which are all published on the company website: www.novartis.com/corporate-governance.

The Compensation Committee serves as the supervisory and governing body for compensation policies and plans within Novartis, and has overall responsibility for determining, reviewing and proposing compensation policies and plans for approval by the Board of Directors in line with the Compensation Committee Charter. A summary of discussions and conclusions of each committee meeting is delivered to the full Board of Directors. A summary of the compensation decision-making authorities is set out below.

Compensation authorization levels within the parameters set by the shareholders' meeting

Decision on	Decision making authority
Compensation of Chairman and other Board members	Board of Directors
Compensation of CEO	Board of Directors
Compensation of other Executive Committee members	Compensation Committee

Committee member independence

The Compensation Committee is composed exclusively of members of the Board of Directors who meet the independence criteria set forth in the Board regulations. From the 2016 AGM, the Compensation Committee had the following four members: Ann Fudge, Srikant Datar, Enrico Vanni and William Winters. Mr. Vanni has served as member since 2011 and as Chair since 2012.

Role of the Compensation Committee's independent advisor

The Compensation Committee retained Frederic W. Cook & Co. Inc. as its independent external compensation advisor for 2016. The advisor was hired directly by the Compensation Committee in 2011, and the Compensation Committee has been fully satisfied with the performance and independence of the advisor since its engagement. Frederic W. Cook & Co. Inc. is independent of management and does not perform any other consulting work for Novartis. In determining whether or not to renew the engagement with the advisor, the Compensation Committee evaluates, at least annually, the quality of the consulting service, the independence of the advisor, and the benefits of rotating advisors.

Compensation Committee meetings held in 2016

In 2016, the Compensation Committee held six formal meetings, and two additional joint meetings with the Research & Development Committee to review and endorse for approval by the Board of Directors the innovation targets and achievements of our LTPP. It also held one additional joint meeting with the Risk Committee to review risk within the compensation systems for executives and other associates, including the sales force. The Compensation Committee conducted a performance self-evaluation and a review of its charter in 2016, as it does every year.

Compensation governance and risk management

The Compensation Committee, with support from its independent advisor, reviews market trends in compensation and changes in corporate governance rules. Together with the Risk Committee, it also reviews the Novartis compensation systems to ensure that they do not encourage inappropriate or excessive risk taking, and instead encourage behaviors that support sustainable value creation.

A summary of the risk management principles is outlined below.

Risk management principles

- Rigorous performance management process, with approval of targets and evaluation of performance for the CEO by the Board of Directors
- Balanced mix of short-term and long-term variable compensation elements
- Balanced scorecard approach to performance evaluation under the Annual Incentive, including Values and Behaviors
- Clawback principles
- Performance-vesting Long-Term Incentives only, with three-year overlapping cycles
- Variable compensation is capped at 200% of target
- Contractual notice period of 12 months
- Post-contractual non-compete limited to a maximum of 12 months (annual base compensation and Annual Incentive of the prior year only)
- No severance payments or change-of-control clauses
- Share ownership requirements; no hedging or pledging of Novartis share ownership position by Board and Executive Committee members

Executive Committee employment contracts provide for a notice period of up to 12 months and contain no change-of-control clauses or severance provisions (e.g., agreements concerning special notice periods, longer-term contracts, "golden parachutes," waiver of lock-up periods for equities and bonds, shorter vesting periods, and additional contributions to occupational pension schemes).

Malus and clawback

Any incentive compensation paid to Executive Committee members is subject to malus and clawback rules. This means that the Board of Directors for the CEO, or the Compensation Committee for the other Executive Committee members, may decide – subject to applicable law – to not pay any unpaid or unvested incentive compensation (malus), or to seek to recover incentive compensation that has been paid in the past (clawback), where the payout has been proven to conflict with internal management standards, including company and accounting policies, or violate laws. This principle applies to both the short-term Annual Incentive and the Long-Term Incentive plans. In 2016, the Compensation Committee did not exercise malus or clawback for current or former Executive Committee members.

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Novartis Group consolidated financial statements

Consolidated income statements

(For the years ended December 31, 2016, 2015 and 2014)

(USD millions unless indicated otherwise)	Note	2016	2015	2014
Net sales to third parties from continuing operations	3	**48 518**	**49 414**	**52 180**
Sales to discontinued segments			26	239
Net sales from continuing operations	3	**48 518**	**49 440**	**52 419**
Other revenues		918	947	1 215
Cost of goods sold		– 17 520	– 17 404	– 17 345
Gross profit from continuing operations		**31 916**	**32 983**	**36 289**
Marketing & Sales		– 11 998	– 11 772	– 12 377
Research & Development		– 9 039	– 8 935	– 9 086
General & Administration		– 2 194	– 2 475	– 2 616
Other income		1 927	2 049	1 391
Other expense		– 2 344	– 2 873	– 2 512
Operating income from continuing operations	3	**8 268**	**8 977**	**11 089**
Income from associated companies	4	703	266	1 918
Interest expense	5	– 707	– 655	– 704
Other financial income and expense	5	– 447	– 454	– 31
Income before taxes from continuing operations		**7 817**	**8 134**	**12 272**
Taxes	6	– 1 119	– 1 106	– 1 545
Net income from continuing operations		**6 698**	**7 028**	**10 727**
Net income/loss from discontinued operations	30		10 766	– 447
Net income		**6 698**	**17 794**	**10 280**
Attributable to:				
Shareholders of Novartis AG		*6 712*	*17 783*	*10 210*
Non-controlling interests		*– 14*	*11*	*70*
Basic earnings per share (USD) from continuing operations		2.82	2.92	4.39
Basic earnings per share (USD) from discontinued operations			4.48	– 0.18
Total basic earnings per share (USD)	**7**	**2.82**	**7.40**	**4.21**
Diluted earnings per share (USD) from continuing operations		2.80	2.88	4.31
Diluted earnings per share (USD) from discontinued operations			4.41	– 0.18
Total diluted earnings per share (USD)	**7**	**2.80**	**7.29**	**4.13**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated statements of comprehensive income

(For the years ended December 31, 2016, 2015 and 2014)

(USD millions)	Note	2016	2015	2014
Net income		**6 698**	**17 794**	**10 280**
Other comprehensive income to be eventually recycled into the consolidated income statement:				
Fair value adjustments on marketable securities, net of taxes	8.1	– 113	28	89
Fair value adjustments on deferred cash flow hedges, net of taxes	8.1	15	20	21
Total fair value adjustments on financial instruments, net of taxes	8.1	– 98	48	110
Novartis share of other comprehensive income recognized by associated companies, net of taxes		671	– 48	– 5
Currency translation effects	8.2	– 2 391	– 1 662	– 2 220
Total of items to eventually recycle		– 1 818	– 1 662	– 2 115
Other comprehensive income never to be recycled into the consolidated income statement:				
Actuarial losses from defined benefit plans, net of taxes	8.3	– 515	– 147	– 822
Total comprehensive income		**4 365**	**15 985**	**7 343**
Attributable to:				
Shareholders of Novartis AG		*4 382*	*15 977*	*7 274*
Continuing operations		*4 382*	*5 238*	*7 820*
Discontinued operations			*10 739*	*– 546*
Non-controlling interests		*– 17*	*8*	*69*

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated statements of changes in equity

(For the years ended December 31, 2016, 2015 and 2014)

(USD millions)	Note	Share capital	Treasury shares	Retained earnings	Total value adjustments	Issued share capital and reserves attributable to Novartis shareholders	Non-controlling interests	Total equity
Total equity at January 1, 2014		**1 001**	**– 89**	**73 065**	**366**	**74 343**	**129**	**74 472**
Net income				10 210		10 210	70	10 280
Other comprehensive income	8			– 5	– 2 931	– 2 936	– 1	– 2 937
Total comprehensive income				**10 205**	**– 2 931**	**7 274**	**69**	**7 343**
Dividends	9.1			– 6 810		– 6 810		– 6 810
Purchase of treasury shares	9.2		– 43	– 6 883		– 6 926		– 6 926
Exercise of options and employee transactions	9.4		23	2 377		2 400		2 400
Equity-based compensation	9.5		6	1 137		1 143		1 143
Increase of treasury share repurchase obligation under a share buyback trading plan	9.7			– 658		– 658		– 658
Changes in non-controlling interests	9.8						– 120	– 120
Total of other equity movements			**– 14**	**– 10 837**		**– 10 851**	**– 120**	**– 10 971**
Total equity at December 31, 2014		**1 001**	**– 103**	**72 433**	**– 2 565**	**70 766**	**78**	**70 844**
Net income				17 783		17 783	11	17 794
Other comprehensive income	8			– 48	– 1 758	– 1 806	– 3	– 1 809
Total comprehensive income				**17 735**	**– 1 758**	**15 977**	**8**	**15 985**
Dividends	9.1			– 6 643		– 6 643		– 6 643
Purchase of treasury shares	9.2		– 33	– 6 086		– 6 119		– 6 119
Reduction of share capital	9.3	– 10	15	– 5				
Exercise of options and employee transactions	9.4		14	1 578		1 592		1 592
Equity-based compensation	9.5		6	809		815		815
Decrease of treasury share repurchase obligation under a share buyback trading plan	9.7			658		658		658
Changes in non-controlling interests	9.8						– 10	– 10
Fair value adjustments related to divestments	8			– 100	100			
Total of other equity movements		**– 10**	**2**	**– 9 789**	**100**	**– 9 697**	**– 10**	**– 9 707**
Total equity at December 31, 2015		**991**	**– 101**	**80 379**	**– 4 223**	**77 046**	**76**	**77 122**
Net income				6 712		6 712	– 14	6 698
Other comprehensive income	8			671	– 3 001	– 2 330	– 3	– 2 333
Total comprehensive income				**7 383**	**– 3 001**	**4 382**	**– 17**	**4 365**
Dividends	9.1			– 6 475		– 6 475		– 6 475
Purchase of treasury shares	9.2		– 7	– 985		– 992		– 992
Reduction of share capital	9.3	– 19	25	– 6				
Exercise of options and employee transactions	9.4		2	212		214		214
Equity-based compensation	9.5		5	659		664		664
Impact of change in ownership of consolidated entities	9.6			– 7		– 7		– 7
Fair value adjustments related to divestments	8			– 12	12			
Total of other equity movements		**– 19**	**25**	**– 6 614**	**12**	**– 6 596**		**– 6 596**
Total equity at December 31, 2016		**972**	**– 76**	**81 148**	**– 7 212**	**74 832**	**59**	**74 891**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated balance sheets

(At December 31, 2016 and 2015)

(USD millions)	Note	2016	2015
Assets			
Non-current assets			
Property, plant & equipment	10	15 641	15 982
Goodwill	11	30 980	31 174
Intangible assets other than goodwill	11	31 340	34 217
Investments in associated companies	4	14 304	15 314
Deferred tax assets	12	10 034	8 957
Financial assets	13	2 196	2 466
Other non-current assets	13	698	601
Total non-current assets		**105 193**	**108 711**
Current assets			
Inventories	14	6 255	6 226
Trade receivables	15	8 202	8 180
Marketable securities, commodities, time deposits and derivative financial instruments	16	770	773
Cash and cash equivalents	16	7 007	4 674
Other current assets	17	2 697	2 992
Total current assets		**24 931**	**22 845**
Total assets		**130 124**	**131 556**
Equity and liabilities			
Equity			
Share capital	18	972	991
Treasury shares	18	– 76	– 101
Reserves		73 936	76 156
Issued share capital and reserves attributable to Novartis AG shareholders		**74 832**	**77 046**
Non-controlling interests		59	76
Total equity		**74 891**	**77 122**
Liabilities			
Non-current liabilities			
Financial debts	19	17 897	16 327
Deferred tax liabilities	12	6 657	6 355
Provisions and other non-current liabilities	20	8 470	8 044
Total non-current liabilities		**33 024**	**30 726**
Current liabilities			
Trade payables		4 873	5 668
Financial debts and derivative financial instruments	21	5 905	5 604
Current income tax liabilities		1 603	1 717
Provisions and other current liabilities	22	9 828	10 719
Total current liabilities		**22 209**	**23 708**
Total liabilities		**55 233**	**54 434**
Total equity and liabilities		**130 124**	**131 556**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated cash flow statements

(For the years ended December 31, 2016, 2015 and 2014)

(USD millions)	Note	**2016**	2015	2014
Net income from continuing operations		**6 698**	**7 028**	**10 727**
Reversal of non-cash items	23.1	8 437	9 070	6 725
Dividends received from associated companies and others		899	432	479
Interest received		43	34	35
Interest paid		– 723	– 646	– 668
Other financial receipts			714	553
Other financial payments		– 155	– 23	– 24
Taxes paid [1]		– 2 111	– 2 454	– 2 179
Cash flows before working capital and provision changes from continuing operations		**13 088**	**14 155**	**15 648**
Payments out of provisions and other net cash movements in non-current liabilities		– 1 536	– 1 207	– 1 125
Change in net current assets and other operating cash flow items	23.2	– 77	– 863	– 625
Cash flows from operating activities from continuing operations		**11 475**	**12 085**	**13 898**
Cash flows used in operating activities from discontinued operations [1]			– 188	– 1
Total cash flows from operating activities		**11 475**	**11 897**	**13 897**
Purchase of property, plant & equipment		– 1 862	– 2 367	– 2 624
Proceeds from sales of property, plant & equipment		161	237	60
Purchase of intangible assets		– 1 017	– 1 138	– 780
Proceeds from sales of intangible assets		847	621	246
Purchase of financial assets		– 247	– 264	– 239
Proceeds from sales of financial assets		247	166	431
Purchase of other non-current assets		– 149	– 82	– 60
Proceeds from sales of other non-current assets			1	2
Divestments of interests in associated companies				1 370
Acquisitions and divestments of businesses, net	23.3	– 765	– 16 507	– 331
Purchase of marketable securities and commodities		– 530	– 595	– 169
Proceeds from sales of marketable securities and commodities		622	262	2 086
Cash flows used in investing activities from continuing operations		**– 2 693**	**– 19 666**	**– 8**
Cash flows used in/from investing activities from discontinued operations [1]	23.4	– 748	8 882	889
Total cash flows used in/from investing activities		**– 3 441**	**– 10 784**	**881**
Dividends paid to shareholders of Novartis AG		– 6 475	– 6 643	– 6 810
Acquisition of treasury shares		– 1 109	– 6 071	– 6 915
Proceeds from exercise options and other treasury share transactions		214	1 581	2 400
Increase in non-current financial debts		1 935	4 596	6 024
Repayment of non-current financial debts		– 1 696	– 3 086	– 2 599
Change in current financial debts		1 816	451	– 107
Impact of change in ownership of consolidated entities		– 6		
Dividends paid to non-controlling interests and other financing cash flows		7	– 4	– 140
Cash flows used in financing activities		**– 5 314**	**– 9 176**	**– 8 147**
Effect of exchange rate changes on cash and cash equivalents		– 387	– 286	– 295
Net change in cash and cash equivalents		**2 333**	**– 8 349**	**6 336**
Cash and cash equivalents at January 1		4 674	13 023	6 687
Cash and cash equivalents at December 31		**7 007**	**4 674**	**13 023**

The accompanying Notes form an integral part of the consolidated financial statements.

[1] In 2016, the total net tax payment amounted to USD 2 299 million, of which USD 188 million was included in the cash flows used in investing activities from discontinued operations.
In 2015, the total net tax payment amounted to USD 3 325 million, of which a refund of USD 94 million was included in the cash flows used in operating activities from discontinued operations, and a USD 965 million payment in the cash flows from investing activities of discontinued operations.
In 2014, the total net tax payment amounted to USD 2 645 million, of which USD 7 million was included in the cash flows used in operating activities from discontinued operations, and a USD 459 million payment in the cash flows from investing activities from discontinued operations.

Notes to the Novartis Group consolidated financial statements

1. Significant accounting policies

The Novartis Group (Novartis or Group) is a multinational group of companies specializing in the research, development, manufacturing and marketing of a broad range of healthcare products led by innovative pharmaceuticals and also including eye care products and cost saving generic pharmaceuticals. It is headquartered in Basel, Switzerland.

The consolidated financial statements of the Group are prepared in accordance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB). They are prepared in accordance with the historical cost convention except for items that are required to be accounted for at fair value.

The Group's financial year-end is December 31 which is also the annual closing date of the individual entities' financial statements incorporated into the Group's consolidated financial statements.

The preparation of financial statements requires management to make certain estimates and assumptions, either at the balance sheet date or during the year that affect the reported amounts of assets and liabilities, including any contingent amounts, as well as of revenues and expenses. Actual outcomes and results could differ from those estimates and assumptions.

Listed below are accounting policies of significance to Novartis or, in cases where IFRS provides alternatives, the option adopted by Novartis.

Scope of consolidation

The consolidated financial statements include all entities, including structured entities, over which Novartis AG, Basel, Switzerland, directly or indirectly has control (generally as a result of owning more than 50% of the entity's voting interest). Consolidated entities are also referred to as "subsidiaries".

In cases where Novartis does not fully own a subsidiary it has elected to value any remaining outstanding non-controlling interest at the time of acquiring control of the subsidiary at its proportionate share of the fair value of the net identified assets.

The contribution of a business to an associate or joint venture is accounted for by applying the option under IFRS that permits the accounting for the retained interest of the business contributed at its net book value at the time of the contribution.

Investments in associated companies (generally defined as investments in entities in which Novartis holds between 20% and 50% of voting shares or over which it otherwise has significant influence) and joint ventures are accounted for using the equity method except for selected venture fund investments for which the Group has elected to apply the method of fair value through the consolidated income statement.

Foreign currencies

The consolidated financial statements of Novartis are presented in US dollars (USD). The functional currency of subsidiaries is generally the local currency of the respective entity. The functional currency used for the reporting of certain Swiss and foreign finance entities is USD instead of their respective local currencies. This reflects the fact that the cash flows and transactions of these entities are primarily denominated in these currencies.

For subsidiaries not operating in hyperinflationary economies, the subsidiary's results, financial position and cash flows that do not have USD as their functional currency are translated into USD using the following exchange rates:

— income, expense and cash flows using for each month the average exchange rate with the US dollar values for each month being aggregated during the year.
— balance sheets using year-end exchange rates.
— resulting exchange rate differences are recognized in other comprehensive income.

The only hyperinflationary economy applicable to Novartis is Venezuela. The financial statements of the major subsidiaries in this country are first adjusted for the effect of inflation with any gain or loss on the net monetary position recorded in the related functional lines in the consolidated income statement and then translated into USD.

Acquisition of assets

Acquired assets are initially recognized on the balance sheet at cost if they meet the criteria for capitalization. If acquired as part of a business combination, the fair value of identified assets represents the cost for these assets. If separately acquired, the cost of the asset includes the purchase price and any directly attributable costs for bringing the asset into the condition to operate as intended. Expected costs for obligations to dismantle and remove property, plant and equipment when it is no longer used are included in their cost.

Property, plant and equipment

Property, plant and equipment are depreciated on a straight-line basis in the consolidated income statement over their estimated useful lives. Leasehold land is depreciated over the period of its lease whereas freehold land is not depreciated. The related depreciation expense is included in the costs of the functions using the asset.

Property, plant and equipment are assessed for impairment whenever there is an indication that the balance sheet carrying amount may not be recoverable using cash flow projections for the useful life.

The following table shows the respective useful lives for property, plant and equipment:

	Useful life
Buildings	20 to 40 years
Machinery and other equipment	
Machinery and equipment	7 to 20 years
Furniture and vehicles	5 to 10 years
Computer hardware	3 to 7 years

Government grants obtained for construction activities, including any related equipment, are deducted from the gross acquisition cost to arrive at the balance sheet carrying value of the related assets.

Goodwill and intangible assets

Goodwill

Goodwill arises in a business combination and is the excess of the consideration transferred to acquire a business over the underlying fair value of the net identified assets acquired. It is allocated to groups of cash generating units (CGUs) which are usually represented by the reported segments. Goodwill is tested for impairment annually at the CGU level and any impairment charges are recorded under "Other Expense" in the consolidated income statement.

Intangible assets available-for-use

Novartis has the following classes of available-for-use intangible assets: Currently marketed products; Marketing know-how; Technologies; Other intangible assets (including computer software) and the Alcon brand name.

Currently marketed products represent the composite value of acquired intellectual property, patents, and distribution rights and product trade names.

Marketing know-how represents the value attributable to the expertise acquired for marketing and distributing Alcon surgical equipment.

Technologies represent identified and separable acquired know-how used in the research, development and production processes.

Significant investments in internally developed and acquired computer software are capitalized and included in the "Other" category and amortized once available for use.

The Alcon brand name is shown separately as it is the only Novartis intangible asset that is available for use with an indefinite useful life. Novartis considers that it is appropriate that the Alcon brand name has an indefinite life since Alcon-branded products have a history of strong revenue and cash flow performance, and Novartis has the intent and ability to support the brand with spending to maintain its value for the foreseeable future.

Except for the Alcon brand name, intangible assets available for use are amortized over their estimated useful lives on a straight-line basis and evaluated for potential impairment whenever facts and circumstances indicate that their carrying value may not be recoverable. The Alcon brand name is not amortized, but evaluated for potential impairment annually.

The following table shows the respective useful lives for available-for-use intangible assets and the location in the consolidated income statement in which the respective amortization and any potential impairment charge is recognized:

	Useful life	Income statement location for amortization and impairment charges
Currently marketed products	5 to 20 years	"Cost of goods sold"
Marketing know-how	25 years	"Cost of goods sold"
Technologies	10 to 20 years	"Cost of goods sold" or "Research and Development"
Other (including computer software)	3 to 7 years	In the respective functional expense
Alcon brand name	Not amortized, indefinite useful life	Not applicable

Intangible assets not yet available-for-use

Acquired research and development intangible assets, which are still under development and have accordingly not yet obtained marketing approval, are recognized as In-Process Research & Development (IPR&D).

IPR&D is not amortized, but evaluated for potential impairment on an annual basis or when facts and circumstances warrant. Any impairment charge is recorded in the consolidated income statement under "Research & Development". Once a project included in IPR&D has been successfully developed it is transferred to the "Currently marketed product" category.

Impairment of goodwill and intangible assets

An asset is considered impaired when its balance sheet carrying amount exceeds its estimated recoverable amount, which is defined as the higher of its fair value less costs of disposal and its value in use. Usually, Novartis applies the fair value less costs of disposal method for its impairment assessment. In most cases no directly observable market inputs are available to measure the fair value less costs of disposal. Therefore, an estimate is derived indirectly and is based on net present value techniques utilizing post-tax cash flows and discount rates. In the limited cases where the value in use method would be applied, net present value techniques would be applied using pre-tax cash flows and discount rates.

Fair value less costs of disposal reflects estimates of assumptions that market participants would be expected to use when pricing the asset or CGUs, and for this purpose management considers the range of economic conditions that are expected to exist over the remaining useful life of the asset.

The estimates used in calculating the net present values are highly sensitive and depend on assumptions specific to the nature of the Group's activities with regard to:

- amount and timing of projected future cash flows;
- outcome of R&D activities (compound efficacy, results of clinical trials, etc.);
- amount and timing of projected costs to develop IPR&D into commercially viable products;
- probability of obtaining regulatory approval;
- long-term sales forecasts for periods of up to 20 years;
- sales erosion rates after the end of patent or other intellectual property rights protection and timing of the entry of generic competition;
- selected tax rate;
- behavior of competitors (launch of competing products, marketing initiatives, etc.); and
- selected discount rate.

Generally, for intangible assets with a definite useful life Novartis uses cash flow projections for the whole useful life of these assets. For goodwill and the Alcon brand name, Novartis generally utilizes cash flow projections for a five-year period based on management forecasts, with a terminal value based on cash flow projections usually in line with inflation rates for later periods. Probability-weighted scenarios are typically used.

Discount rates used consider the Group's estimated weighted average cost of capital adjusted for specific country and currency risks associated with cash flow projections to approximate the weighted average cost of capital of a comparable market participant.

Due to the above factors, actual cash flows and values could vary significantly from forecasted future cash flows and related values derived using discounting techniques.

Impairment of associated companies accounted for at equity

Novartis considers investments in associated companies for impairment evaluation whenever objective evidence indicates the net investment may be impaired, including when a quoted share price indicates a fair value less than the per-share balance sheet carrying value for the investment.

If the recoverable amount of the investment is estimated to be lower than the balance sheet carrying amount an impairment charge is recognized for the difference in the consolidated income statement under "Income from associated companies".

Cash and cash equivalents, marketable securities, commodities, derivative financial instruments and non-current financial assets

Cash and cash equivalents include highly liquid investments with original maturities of three months or less which are readily convertible to known amounts of cash. Bank overdrafts are usually presented within current financial debts on the consolidated balance sheet except in cases where a right of offset has been agreed with a bank which then allows for presentation on a net basis.

Marketable securities are financial assets consisting principally of equity and debt securities as well as fund investments. Marketable securities held for short-term non-strategic purposes are principally traded in liquid markets and are classified as marketable securities on the consolidated balance sheet. Marketable securities held for long-term strategic purposes are classified as non-current financial assets on the consolidated balance sheet.

Marketable securities are initially recorded at fair value on their trade date which is different from the settlement date when the transaction is ultimately effected. Quoted securities are re-measured at each reporting date to fair value based on current market prices. If the market for a financial asset is not active or no market is available, fair values are established using valuation techniques. Apart from discounted cash flow analysis and other pricing models, for the majority of investments in what is known as the "Level 3" hierarchy, the valuation is based on the acquisition cost as the best approximation of the fair value of the investee. This is adjusted for a higher or lower valuation in connection with a partial disposal, a new round of financing and for the investee's performance below or above expectations. The fair value of investments in "Level 3" is reviewed regularly for a possible diminution in value.

The Group has classified all its equity and quoted debt securities as well as fund investments as available-for-sale, as they are not acquired to generate profit from short-term fluctuations in price. Unrealized gains, except exchange gains related to quoted debt instruments, are recorded as a fair value adjustment in the consolidated statement of comprehensive income. They are recognized in the consolidated income statement when the

financial asset is sold, at which time the gain is transferred either to "Other financial income and expense", for the marketable securities held for short-term non-strategic purposes, or to "Other income", for all other equity securities and fund investments. Exchange gains related to quoted debt instruments are immediately recognized in the consolidated income statement under "Other financial income and expense".

A security is assessed for impairment when its market value at the balance sheet date is less than initial cost reduced by any previously recognized impairment. Impairments on equity securities, quoted debt securities and fund investments, and exchange rate losses on quoted debt securities in a foreign currency which are held for short-term non-strategic purposes are recorded in "Other financial income and expense". Impairments are recorded for all other equity securities and other fund investments in "Other expense" in the consolidated income statement.

Commodities include gold bullion or coins which are valued at the lower of cost or fair value using current market prices. The changes in fair value below cost are immediately recorded in "Other financial income and expense".

Other non-current financial assets including loans are carried at amortized cost, which reflects the time value of money, less any allowances for uncollectable amounts. Impairments and exchange rate gains and losses on other non-current financial assets, including loans, as well as interest income using the effective interest rate method, are immediately recorded in "Other income" or "Other expense" in the consolidated income statement.

Derivative financial instruments are initially recognized in the balance sheet at fair value and are re-measured to their current fair value at the end of each subsequent reporting period. The valuation of a forward exchange rate contract is based on the discounted cash flow model, using interest curves and spot rates at the reporting date as observable inputs.

Options are valued based on a modified Black-Scholes model using volatility and exercise prices as major observable inputs.

The Group utilizes derivative financial instruments for the purpose of hedging to reduce the volatility in the Group's performance due to the exposure to various types of business risks. The Group, therefore, enters into certain derivative financial instruments which provide effective economic hedges. The risk reduction is obtained because the derivative's value or cash flows are expected, wholly or partly, to move inversely to the hedged item and, therefore, offset changes in the value or cash flows of the hedged item. The overall hedging strategy is aiming to mitigate the currency and interest exposure risk of positions which are contractually agreed and to partially hedge the exposure risk of selected anticipated transactions. However, the Group generally does not hedge the translation risk related to its foreign investments.

Not all of the financial impact of derivative financial instruments can be matched with the financial impact of the economically hedged item. A prerequisite for obtaining this accounting-hedge relationship is extensive documentation on inception and proving on a regular basis that the economic hedge is effective for accounting purposes. Changes in the fair value of any derivative instruments that do not qualify for cash flow hedge accounting are recognized immediately in "Other financial income and expense" in the consolidated income statement.

Inventories

Inventory is valued at acquisition or production cost determined on a first-in first-out basis. This value is used for the "Cost of goods sold" in the consolidated income statement. Unsalable inventory is fully written off in the consolidated income statement under "Cost of goods sold".

Trade receivables

Trade receivables are initially recognized at their invoiced amounts including any related sales taxes less adjustments for estimated revenue deductions such as rebates, chargebacks and cash discounts.

Provisions for doubtful trade receivables are established once there is an indication that it is likely that a loss will be incurred. These provisions represent the difference between the trade receivable's carrying amount in the consolidated balance sheet and the estimated net collectible amount. Significant financial difficulties of a customer, such as probability of bankruptcy, financial reorganization, default or delinquency in payments are considered indicators that recovery of the trade receivable is doubtful. Charges for doubtful trade receivables are recognized in the consolidated income statement within "Marketing & Sales" expenses.

Legal and environmental liabilities

Novartis and its subsidiaries are subject to contingencies arising in the ordinary course of business such as patent litigation, environmental remediation liabilities and other product-related litigation, commercial litigation, and governmental investigations and proceedings. Provisions are recorded where a reliable estimate can be made of the probable outcome of legal or other disputes against the subsidiary.

Contingent consideration

In a business combination or divestment of a business, it is necessary to recognize contingent future payments to previous or from new owners representing contractually defined potential amounts as a liability or asset. Usually for Novartis, these are linked to milestone or royalty payments related to certain assets and are recognized as a financial liability or asset at their fair value which is then re-measured at each subsequent reporting date. These estimations typically depend on factors such as technical milestones or market performance and are adjusted for the probability of their likelihood of payment and if material, appropriately discounted to reflect the impact of time.

Changes in the fair value of contingent consideration liabilities in subsequent periods are recognized in the consolidated income statement in "Cost of goods sold" for currently marketed products and in "Research & Development" for IPR&D. Changes in contingent consideration assets are recognized in "Other revenue", "Other income" or "Other expense", depending on its nature. The effect of unwinding the discount over time is recognized in "Interest expense" in the consolidated income statement.

Novartis does not recognize contingent consideration associated with asset purchases outside of a business combination that are conditional upon future events which are within its control until such time as there is an unconditional obligation. If the contingent consideration is outside the control of Novartis, a liability is recognized once it becomes probable that the contingent consideration will become due. In both cases, if appropriate, a corresponding asset is recorded.

Defined benefit pension plans and other post-employment benefits

The liability in respect of defined benefit pension plans and other post-employment benefits is the defined benefit obligation calculated annually by independent actuaries using the projected unit credit method. The current service cost for such post-employment benefit plans is included in the personnel expenses of the various functions where the associates are employed, while the net interest on the net defined benefit liability or asset is recognized as "Other expense" or "Other income".

Treasury shares

Treasury shares are initially recorded at fair value on their trade date which is different from the settlement date when the transaction is ultimately effected. Treasury shares are deducted from consolidated equity at their nominal value of CHF 0.50 per share. Differences between the nominal amount and the transaction price on purchases or sales of treasury shares with third parties, or the value of services received for the shares allocated to associates as part of share-based compensation arrangements, are recorded in "Retained earnings" in the consolidated statement of changes in equity.

Revenue recognition

Revenue

Revenue is recognized on the sale of Novartis Group products and services and recorded as "Net sales" in the consolidated income statement when there is persuasive evidence that a sales arrangement exists, title and risks and rewards for the products are transferred to the customer, the price is determinable and collectability is reasonably assured. When contracts contain customer acceptance provisions, sales are recognized upon the satisfaction of acceptance criteria. If products are stockpiled at the request of the customer, revenue is only recognized once the products have been inspected and accepted by the customer and there is no right of return or replenishment on product expiry.

Surgical equipment may be sold together with other products and services under a single contract. The total consideration is allocated to the separate elements based on their relative fair values. Revenue is recognized once the recognition criteria have been met for each element of the contract.

For surgical equipment, in addition to cash and instalment sales, revenue is recognized under finance and operating lease arrangements. Arrangements in which Novartis transfers substantially all the risks and rewards incidental to ownership to the customer are treated as finance lease arrangements. Revenue from finance lease arrangements is recognized at amounts equal to the fair values of the equipment, which approximate the present values of the minimum lease payments under the arrangements. As interest rates embedded in lease arrangements are approximately market rates, revenue under finance lease arrangements is comparable to revenue for outright sales. Finance income for arrangements in excess of twelve months is deferred and subsequently recognized based on a pattern that approximates the use of the effective interest method and recorded in "Other income". Operating lease revenue for equipment rentals is recognized on a straight-line basis over the lease term.

Provisions for rebates and discounts granted to government agencies, wholesalers, retail pharmacies, managed healthcare organizations and other customers are recorded as a deduction from revenue at the time the related revenues are recorded or when the incentives are offered. They are calculated on the basis of historical experience and the specific terms in the individual agreements. Provisions for refunds granted to healthcare providers under innovative pay-for-performance agreements are recorded as a revenue deduction at the time the related sales are recorded. They are calculated on the basis of historical experience and clinical data available for the product as well as the specific terms in the individual agreements. In cases where historical

experience and clinical data are not sufficient for a reliable estimation of the outcome, revenue recognition is deferred until such history is available.

Cash discounts are offered to customers to encourage prompt payment and are recorded as revenue deductions. Following a decrease in the price of a product, we generally grant customers a "shelf stock adjustment" for a customer's existing inventory for the involved product. Provisions for shelf stock adjustments, which are primarily relevant within the Sandoz Division, are determined at the time of the price decline or at the point of sale, if the impact of a price decline on the products sold can be reasonably estimated based on the customer's inventory levels of the relevant product. When there is historical experience of Novartis agreeing to customer returns and Novartis can reasonably estimate expected future returns, a provision is recorded for estimated sales returns. In doing so the estimated rate of return is applied, determined based on historical experience of customer returns and considering any other relevant factors. This is applied to the amounts invoiced also considering the amount of returned products to be destroyed versus products that can be placed back in inventory for resale. Where shipments are made on a re-sale or return basis, without sufficient historical experience for estimating sales returns, revenue is only recorded when there is evidence of consumption or when the right of return has expired.

Provisions for revenue deductions are adjusted to actual amounts as rebates, discounts and returns are processed. The provision represents estimates of the related obligations, requiring the use of judgment when estimating the effect of these sales deductions.

Other revenue

"Other revenue" includes royalty income and revenue from activities such as manufacturing services or other services rendered to the extent such revenue is not recorded under net sales.

Research & Development

Internal Research & Development (R&D) costs are fully charged to "Research & Development" in the consolidated income statement in the period in which they are incurred. The Group considers that regulatory and other uncertainties inherent in the development of new products preclude the capitalization of internal development expenses as an intangible asset until marketing approval from a regulatory authority is obtained in a major market such as the United States, the European Union, Switzerland or Japan.

Payments made to third parties in compensation for subcontracted R&D, such as contract research and development organizations, that is deemed not to transfer intellectual property to Novartis are expensed as internal R&D expenses in the period in which they are incurred. Such payments are only capitalized if they meet the criteria for recognition of an internally generated intangible asset, usually when marketing approval has been achieved from a regulatory authority in a major market.

Payments made to third parties in order to in-license or acquire intellectual property rights, compounds and products, including initial upfront and subsequent milestone payments, are capitalized as are payments for other assets, such as technologies to be used in R&D activities. If additional payments are made to the originator company to continue to perform R&D activities, an evaluation is made as to the nature of the payments. Such additional payments will be expensed if they are deemed to be compensation for subcontracted R&D services not resulting in an additional transfer of intellectual property rights to Novartis. Such additional payments will be capitalized if they are deemed to be compensation for the transfer to Novartis of additional intellectual property developed at the risk of the originator company. Subsequent internal R&D costs in relation to IPR&D and other assets are expensed since the technical feasibility of the internal R&D activity can only be demonstrated by the receipt of marketing approval for a related product from a regulatory authority in a major market.

Costs for post-approval studies performed to support the continued registration of a marketed product are recognized as marketing expenses. Costs for activities that are required by regulatory authorities as a condition for obtaining marketing approval are capitalized and recognized as currently marketed product.

Inventory produced ahead of regulatory approval is provisioned against and the charge is included in "Other expense" in the consolidated income statement, as its ultimate use cannot be assured. If this inventory can be subsequently sold, the provision is released to "Other income" in the consolidated income statement either on approval by the appropriate regulatory authority or, exceptionally in Europe, on recommendation by the Committee for Medicinal Products for Human Use (CHMP), if approval is virtually certain.

Share-based compensation

Vested Novartis shares and American Depositary Receipts (ADRs) which are granted as compensation are valued at their market value on the grant date and are immediately expensed in the consolidated income statement.

The fair values of unvested restricted shares, restricted share units (RSUs) and performance share units (PSUs) in Novartis shares and ADRs granted to associates as compensation are recognized as an expense over the related vesting period. The expense recorded in the consolidated income statement is included in the personnel expenses of the various functions where the associates are employed.

Unvested restricted shares, restricted ADRs and RSUs are only conditional on the provision of services by the plan participant during the vesting period. They are valued using their fair value on the grant date. As

RSUs do not entitle the holder to dividends the fair value is based on the Novartis share price at the grant date adjusted for the net present value of the dividends expected to be paid during the holding period. The fair value of these grants, after making adjustment for assumptions related to their forfeiture during the vesting period, are expensed on a straight-line basis over the respective vesting period.

PSUs require the plan participant to not only provide services during the vesting period but they are also subject to certain performance criteria being achieved during the vesting period. PSUs granted under plans defined as "Long-Term Performance Plans" are subject to performance criteria based on Novartis internal performance metrics. The expense is determined taking into account assumptions concerning performance during the period against targets and expected forfeitures due to plan participants not meeting their service conditions. These assumptions are periodically adjusted. Any change in estimates for past services are recorded immediately as an expense or income in the consolidated income statement and amounts for future periods are expensed over the remaining vesting period. As a result, at the end of the vesting period, the total charge during the whole vesting period represents the amount which will finally vest. The number of equity instruments that finally vest is determined at the vesting date.

PSUs granted under the Long-Term Relative Performance Plan (LTRPP) are not only conditional on the provision of services by the plan participant during the vesting period but are also conditional on the Total Shareholder Return (TSR) performance of Novartis relative to a specific peer group of companies over the vesting period. These performance conditions are based on variables which can be observed in the market. IFRS requires that these observations are taken into account in determining the fair value of these PSUs at the date of grant. Novartis has determined the fair value of these PSUs at the date of grant using a "Monte Carlo" simulation model. The total fair value of this grant is expensed on a straight-line basis over the vesting period. Adjustments to the number of equity instruments granted are only made if a plan participant does not fulfill the service conditions.

If a plan participant leaves Novartis, for reasons other than retirement, disability or death, then unvested restricted shares, restricted ADRs, RSUs and related share options and PSUs are forfeited, unless determined otherwise by the provision of the plan rules or by the Compensation Committee, for example, in connection with a reorganization or divestment.

Measuring the fair values of PSUs granted under the LTRPP, requires an estimation of the probability of uncertain future events and various other factors used in the valuation models. The Monte Carlo simulation used for determining the fair value of the PSUs related to the LTRPP requires as input parameters the probability of factors related to uncertain future events; the term of the award; grant price of underlying shares or ADRs; expected volatilities; expected correlation matrix of the underlying equity instruments with those of the peer group of companies and the risk free interest rate.

Government grants

Grants from governments or similar organizations are recognized at their fair value when there is a reasonable assurance that the grant will be received and the Group will comply with all attached conditions.

Government grants related to income are deferred and recognized in the consolidated income statement over the period necessary to match them with the related costs which they are intended to compensate.

The accounting policy for property, plant and equipment describes the treatment of any related grants.

Restructuring charges

Restructuring provisions are recognized for the direct expenditures arising from the restructuring, where the plans are sufficiently detailed and where appropriate communication to those affected has been made.

Charges to increase restructuring provisions are included in "Other expense" in the consolidated income statements. Corresponding releases are recorded in "Other income" in the consolidated income statement.

Taxes

Taxes on income are provided in the same periods as the revenues and expenses to which they relate and include any interest and penalties incurred during the period. Deferred taxes are determined using the comprehensive liability method and are calculated on the temporary differences that arise between the tax base of an asset or liability and its carrying value in the balance sheet prepared for consolidation purposes, except for those temporary differences related to investments in subsidiaries and associated companies, where the timing of their reversal can be controlled and it is probable that the difference will not reverse in the foreseeable future. Since generally the retained earnings are reinvested, withholding or other taxes on eventual distribution of a subsidiary's retained earnings are only taken into account when a dividend has been planned.

The estimated amounts for current and deferred tax assets or liabilities, including any amounts related to any uncertain tax positions, are based on currently known facts and circumstances. Tax returns are based on an interpretation of tax laws and regulations and reflect estimates based on these judgments and interpretations. The tax returns are subject to examination by the competent taxing authorities which may result in an assessment being made requiring payments of additional tax, interest or penalties. Inherent uncertainties exist in the estimates of the tax positions.

Non-current assets held for sale

Non-current assets are classified as assets held for sale when their carrying amount is to be recovered principally through a sale transaction and a sale is considered highly

probable. They are stated at the lower of carrying amount and fair value less costs of disposal. Assets held for sale, included within a disposal group or included within discontinued operations are not depreciated or amortized.

Status of adoption of significant new or amended IFRS standards or interpretations

The adoption of new or amended standards and interpretations which are effective for the financial year beginning on January 1, 2016 did not have a material impact on the Group's consolidated financial statements.

The following new IFRS standards will, based on a Novartis analysis, be of significance to the Group, but have not yet been early adopted:

— IFRS 9 *Financial Instruments* will substantially change the classification and measurement of financial instruments; will require impairments to be based on a forward-looking model; will change the approach to hedging financial exposures and related documentation and also the recognition of certain fair value changes. However, the Group does not expect IFRS 9 to have a significant impact on its consolidated financial statements and will implement the new standard on January 1, 2018.

— IFRS 15 *Revenue from contracts with customers* amends revenue recognition requirements and establishes principles for reporting information about the nature, amount, timing and uncertainty of revenue and cash flows arising from contracts with customers. The standard replaces IAS 18 *Revenue* and IAS 11 *Construction contracts* and related interpretations. However, the Group does not expect IFRS 15 to have a significant impact on its consolidated financial statements and will implement the new standard on January 1, 2018.

— IFRS 16 *Leases* substantially changes the financial statements as the majority of leases will become on-balance sheet liabilities with corresponding right of use assets on the balance sheet. The standard replaces IAS 17 *Leases* and is effective January 1, 2019. The current operating lease commitments of USD 2.9 billion as of December 31, 2016 and disclosed in Note 28 provide, subject to the provision of the standard, an indicator of the impact of the implementation of IFRS 16 on the Group's consolidated balance sheet.

There are no other IFRS standards or interpretations which are not yet effective which would be expected to have a material impact on the Group.

2. Significant transactions

Significant transactions in 2016

ALCON – ACQUISITION OF TRANSCEND MEDICAL, INC.

On February 17, 2016, Alcon entered into an agreement to acquire Transcend Medical, Inc. (Transcend), a privately-held, US-based company focused on developing minimally-invasive surgical devices to treat glaucoma. The transaction closed on March 23, 2016, and the fair value of the total purchase consideration was USD 332 million. The amount consisted of an initial cash payment of USD 240 million and the net present value of the contingent consideration of USD 92 million due to the Transcend shareholders, which they are eligible to receive upon achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 294 million and goodwill of USD 38 million. Results of operations since the date of acquisition were not material.

INNOVATIVE MEDICINES – ACQUISITION OF SELEXYS PHARMACEUTICALS CORPORATION

On November 18, 2016, Novartis acquired Selexys Pharmaceuticals Corporation (Selexys), a privately held, US-based company specializing in development of therapeutics in certain hematologic and inflammatory disorders following receipt of results of the SUSTAIN study. The previously held interest of 19% is adjusted to its fair value of USD 64 million through the consolidated income statement at acquisition date. This re-measurement resulted in a gain of USD 53 million.

The fair value of the total purchase consideration for acquiring the 81% stake Novartis did not already own amounted to USD 268 million. The amount consisted of an initial cash payment of USD 194 million and the net present value of the contingent consideration of USD 74 million due to the Selexys shareholders, which they are eligible to receive upon achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 332 million. No goodwill was recognized. Results of operations since the date of acquisition were not material.

Significant transactions entered into in 2016 and closed in January 2017

INNOVATIVE MEDICINES – ACQUISITION OF ZIARCO GROUP LIMITED

On December 16, 2016, Novartis entered into an agreement to acquire Ziarco Group Limited, a privately held company focused on the development of novel treatments in dermatology. This acquisition will add a once daily oral H4 receptor antagonist in development for atopic dermatitis (AD), commonly known as eczema, to complement the Novartis dermatology portfolio and pipeline. The transaction closed on January 20, 2017, and the preliminary fair value of the total purchase consideration was USD 420 million before ordinary purchase price adjustments. The amount consisted of an initial cash payment of USD 325 million before ordinary purchase price adjustments and the preliminary net pres-

ent value of the contingent consideration of USD 95 million, due to the Ziarco shareholders, which they are eligible to receive upon achievement of specified development milestones. The preliminary purchase price allocation resulted in net identifiable assets of USD 382 million and goodwill of USD 38 million.

INNOVATIVE MEDICINES – ACQUISITION OF ENCORE VISION, INC.

On December 20, 2016, Novartis entered into a definitive agreement for the acquisition of Encore Vision, Inc., a privately-held company in Fort Worth, Texas, USA, focused on the development of a novel treatment in presbyopia. The transaction closed on January 20, 2017, and the preliminary fair value of the total purchase consideration was USD 465 million before ordinary purchase price adjustments. The amount consisted of an initial cash payment of USD 375 million before ordinary purchase price adjustments and the preliminary net present value of the contingent consideration of USD 90 million, due to the Encore shareholders, which they are eligible to receive upon achievement of specified development and commercialization milestones. The preliminary purchase price allocation resulted in net identifiable assets of USD 374 million and goodwill of USD 91 million.

Significant transactions in 2015

Portfolio transformation transactions

TRANSACTION WITH ELI LILLY AND COMPANY

On January 1, 2015, Novartis closed its transaction with Eli Lilly and Company, USA (Lilly) announced in April 2014 to divest its Animal Health business for USD 5.4 billion in cash. This resulted in a pre-tax gain of USD 4.6 billion, which is recorded in operating income from discontinued operations.

TRANSACTIONS WITH GLAXOSMITHKLINE PLC

On March 2, 2015, Novartis closed its transactions with GlaxoSmithKline plc, Great Britain (GSK) announced in April 2014, with the following consequences:

INNOVATIVE MEDICINES – ACQUISITION OF GSK ONCOLOGY PRODUCTS

Novartis acquired GSK's oncology products and certain related assets for an aggregate cash consideration of USD 16.0 billion. Up to USD 1.5 billion of this cash consideration at the acquisition date is contingent on certain development milestones. The fair value of this potentially refundable consideration as at the acquisition date is USD 0.1 billion. In addition, under the terms of the agreement, Novartis is granted a right of first negotiation over the co-development or commercialization of GSK's current and future oncology R&D pipeline, excluding oncology vaccines. The right of first negotiation is for a period of 12.5 years from the acquisition closing date. The purchase price allocation of the fair value of the consideration of USD 15.9 billion resulted in net identified assets of USD 13.5 billion and goodwill of USD 2.4 billion. In 2015, from the date of the acquisition the business generated net sales of USD 1.8 billion. Management estimates net sales for the entire year 2015 would have amounted to USD 2.1 billion had the oncology products been acquired at the beginning of the 2015 reporting period. The 2015 net results from operations on a reported basis since the acquisition date were not material.

VACCINES – DIVESTMENT

Novartis divested its Vaccines business (excluding its Vaccines influenza business) to GSK for up to USD 7.1 billion plus royalties. The USD 7.1 billion consists of USD 5.25 billion paid at closing and up to USD 1.8 billion in future milestone payments. The fair value of the contingent future milestones and royalties as at the acquisition date is USD 1.0 billion, resulting in a fair value of consideration received of USD 6.25 billion. Included in this amount is a USD 450 million milestone payment received in late March 2015. The sale of this business resulted in a pre-tax gain of USD 2.8 billion, which is recorded in operating income from discontinued operations.

Novartis's Vaccines influenza business was excluded from the GSK Vaccines business acquisition. However, GSK entered into a future option arrangement with Novartis in relation to the Vaccines influenza business, pursuant to which Novartis could have unilaterally required GSK to acquire the entire or certain parts of its Vaccines influenza business for consideration of up to USD 250 million (the Influenza Put Option) if the divestment to CSL Limited, Australia (CSL), discussed below, had not been completed. The option period was 18 months from the closing date of the GSK transaction, but terminated with the sale of the Vaccines influenza business to CSL on July 31, 2015. Novartis paid GSK a fee of USD 5 million in consideration for the grant of the Influenza Put Option.

CONSUMER HEALTH – COMBINATION OF NOVARTIS OTC WITH GSK CONSUMER HEALTHCARE

Novartis and GSK agreed to create a combined consumer healthcare business through the combination between Novartis OTC and GSK Consumer Healthcare businesses. On March 2, 2015, a new entity, GlaxoSmithKline Consumer Healthcare Holdings Ltd. (GSK Consumer Healthcare) was formed via contribution of businesses from both Novartis and GSK. Novartis has a 36.5% interest in the newly created entity. Novartis has valued the contribution of 63.5% of its OTC Division in exchange for 36.5% of the GSK Consumer Healthcare business at fair value. Based on the estimates of fair values exchanged, an investment in an associated company of USD 7.6 billion was recorded. The resulting pre-tax gain, net of transaction related costs, of USD 5.9 billion is recorded in operating income from discontinued operations.

Novartis has four of eleven seats on the GSK Consumer Healthcare Board of Directors. Furthermore, Novartis has customary minority rights and also exit rights at a pre-defined, market based pricing mechanism.

The investment is accounted for using the equity method of accounting using estimated results for the last quarter of the year. Any differences between this estimate and actual results, when available, will be adjusted in the Group's consolidated financial statements in the following year.

ADDITIONAL GSK RELATED COSTS

The GSK transaction resulted in USD 0.6 billion of additional transaction-related costs that were expensed, thereof USD 0.3 billion paid in 2015.

TRANSACTION WITH CSL

On October 26, 2014, Novartis entered into an agreement with CSL to sell its Vaccines influenza business to CSL for USD 275 million. Entering into the separate divestment agreement with CSL resulted in the Vaccines influenza business being classified as a separate disposal group consisting of a group of cash generating units within the Vaccines Division, requiring the performance of a separate valuation of the Vaccines influenza business net assets. This triggered the recognition of an exceptional impairment charge in 2014 of USD 1.1 billion as the estimated net book value of the Vaccines influenza business net assets was above the USD 275 million consideration. The transaction with CSL was completed on July 31, 2015, resulting in a partial reversal of the impairment recorded in 2014 in the amount of USD 0.1 billion, which is included in operating income from discontinued operations.

Other significant transactions in 2015

INNOVATIVE MEDICINES – ACQUISITION OF SPINIFEX PHARMACEUTICALS, INC.

On June 29, 2015, Novartis entered into an agreement to acquire Spinifex Pharmaceuticals, Inc. (Spinifex), a US and Australia based, privately held development stage company, focused on developing a peripheral approach to treat neuropathic pain. The transaction closed on July 24, 2015, and the fair value of the total purchase consideration was USD 312 million. The amount consisted of an initial cash payment of USD 196 million and the net present value of the contingent consideration of USD 116 million due to previous Spinifex shareholders, which they are eligible to receive upon achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 263 million and goodwill of USD 49 million. The 2015 results of operations since the date of acquisition were not material.

INNOVATIVE MEDICINES – ACQUISITION OF ADMUNE THERAPEUTICS LLC

On October 16, 2015, Novartis entered into an agreement to acquire Admune Therapeutics LLC (Admune), a US-based, privately held company, broadening Novartis' pipeline of cancer immunotherapies. The fair value of the total purchase consideration amounted to USD 258 million. This amount consists of an initial cash payment of USD 140 million and the net present value of the contingent consideration of USD 118 million due to Admune's previous owners, which they are eligible to receive upon the achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 258 million. No goodwill was recognized. The 2015 results of operations since the date of acquisition were not material.

Significant transactions in 2014

VACCINES – DIVESTMENT OF BLOOD TRANSFUSION DIAGNOSTICS UNIT

On January 9, 2014, Novartis completed the divestment of its blood transfusion diagnostics unit announced on November 11, 2013 to the Spanish company Grifols S.A., for USD 1.7 billion in cash. The pre-tax gain on this transaction was USD 0.9 billion and was recorded in operating income from discontinued operations.

INNOVATIVE MEDICINES – ACQUISITION OF COSTIM PHARMACEUTICALS, INC.

On February 17, 2014, Novartis acquired all of the outstanding shares of CoStim Pharmaceuticals, Inc., a Cambridge, Massachusetts, US-based, privately held biotechnology company focused on harnessing the immune system to eliminate immune-blocking signals from cancer, for a total purchase consideration of USD 248 million (at fair value excluding cash acquired). This amount consists of an initial cash payment and the net present value of contingent consideration of USD 153 million due to previous CoStim shareholders, which they are eligible to receive upon the achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identified assets of USD 152 million (excluding cash acquired) and goodwill of USD 96 million. The 2014 results of operations since the acquisition were not material.

INNOVATIVE MEDICINES – DIVESTMENT OF IDENIX PHARMACEUTICALS, INC. (IDENIX) SHAREHOLDING

On August 5, 2014, Merck & Co., USA completed a tender offer for Idenix. As a result, Novartis divested its 22% shareholding in Idenix and realized a gain of approximately USD 0.8 billion which was recorded in income from associated companies.

ALCON – ACQUISITION OF WAVETEC VISION SYSTEMS, INC. (WAVETEC)

On October 16, 2014, Alcon acquired all of the outstanding shares of WaveTec, a privately held company, for USD 350 million in cash. The purchase price allocation resulted in net identified assets of USD 180 million and goodwill of USD 170 million. The 2014 results of operations since the date of acquisition were not material.

CORPORATE – DIVESTMENT OF LTS LOHMANN THERAPIE-SYSTEME AG (LTS) SHAREHOLDING

On November 5, 2014, Novartis divested its 43% shareholding in LTS and realized a gain of approximately USD 0.4 billion which was recorded in income from associated companies.

3. Segmentation of key figures 2016, 2015 and 2014

The businesses of Novartis are divided operationally on a worldwide basis into three identified reporting segments, Innovative Medicines, Sandoz and Alcon. In addition, we separately report Corporate activities.

Reporting segments are presented in a manner consistent with the internal reporting to the chief operating decision maker which is the Executive Committee of Novartis. The reporting segments are managed separately because they each research, develop, manufacture, distribute, and sell distinct products that require differing marketing strategies.

The Executive Committee of Novartis is responsible for allocating resources and assessing the performance of the reporting segments.

Following the internal reorganization announced on January 27, 2016, the reporting segments and their financial results have been adapted to reflect in all years presented the transfers of:

- Alcon Ophthalmic Pharmaceuticals business franchise from the Alcon Division to the Innovative Medicines Division, the products of which will continue to be marketed with the Alcon brand name.
- Selected mature products from the Innovative Medicines Division to the Retail Generics business franchise of the Sandoz Division.
- The Alcon brand name intangible asset from the Alcon Division to Corporate as it is used to market the products of Alcon Division and products within the Ophthalmology business franchise of the Innovative Medicines Division.

The consolidated financial statement disclosures by segment have been restated to reflect the above mentioned internal reorganization. Accordingly, the net assets, including a proportionate share of goodwill, and the income and expenses related to the activities transferred have been reallocated to the respective reporting segment in all periods presented in this financial report.

Innovative Medicines – formerly named the 'Pharmaceuticals Division' – researches, develops, manufactures, distributes and sells patented prescription medicines. The Innovative Medicines Division is organized into two global business units: Novartis Oncology business unit, which consists of the global business franchises Oncology and Novartis Pharmaceuticals business unit, which consists of the global business franchises Ophthalmology, Neuroscience, Immunology and Dermatology, Respiratory, Cardio-Metabolic and Established Medicines.

Sandoz develops, manufactures, distributes and sells prescription medicines, as well as pharmaceutical active substances, which are not protected by valid and enforceable third-party patents. The Sandoz Division is organized globally in three business franchises: Retail Generics, Anti-Infectives and Biopharmaceuticals. In Retail Generics, Sandoz develops, manufactures and markets active ingredients and finished dosage forms of pharmaceuticals to third parties. Retail Generics includes the areas of dermatology, respiratory, oncology and ophthalmics, as well as cardiovascular, metabolism, central nervous system, pain, gastrointestinal and hormonal therapies. Finished dosage form anti-infectives sold to third parties are also part of Retail Generics. In Anti-Infectives, Sandoz manufactures active pharmaceutical ingredients and intermediates – mainly antibiotics – for internal use by Retail Generics and for sale to third party customers. In Biopharmaceuticals, Sandoz develops, manufactures and markets protein- or other biotechnology-based products known as biosimilars, and provides biotechnology manufacturing services to other companies.

Alcon researches, discovers, develops, manufactures, distributes and sells eye care products. The Alcon Division is the global leader in eye care, with product offerings in eye care devices and vision care. The Alcon Division is organized globally in two global business franchises as follows: In Surgical, Alcon develops, manufactures, distributes and sells ophthalmic surgical equipment, instruments, disposable products and intraocular lenses. In Vision Care, Alcon develops, manufactures, distributes and sells contact lenses and lens care products.

Income and expenses relating to Corporate include the costs of the Group headquarters and those of corporate coordination functions in major countries. In addition, Corporate includes other items of income and expense that are not attributable to specific segments, such as certain revenues from intellectual property rights, certain expenses related to post-employment benefits, environmental remediation liabilities, charitable activities, donations and sponsorships. Usually, no allocation of Corporate items is made to the segments. As a result, Corporate assets and liabilities principally consist of net liquidity (cash and cash equivalents, marketable securities less financial debts), investments in associated companies and current and deferred taxes and non-segment specific environmental remediation and post-employment benefit liabilities. Corporate also includes the Alcon brand name intangible asset as it is used to market the products of Alcon Division and products within the Ophthalmology business franchise of the Innovative Medicines Division.

Our divisions are supported by the Novartis Institutes for BioMedical Research, Novartis Business Services, Global Drug Development and Novartis Technical Operations organizations.

— The Novartis Institutes for BioMedical Research (NIBR) conducts research activities of the Innovative Medicines Division.
— Novartis Business Services (NBS) started operations in January 2015 as a shared services organization providing business support services across the Group such as information technology, real estate and facility services, procurement, product lifecycle services, human resources and financial reporting and accounting operations.
— Global Drug Development organization started operations in July 2016 to oversee all drug development activities for our Innovative Medicines Division and the biosimilars portfolio of our Sandoz division.
— Novartis Technical Operations organization started operations in July 2016, in order to centralize management of our manufacturing operations across our Innovative Medicines and Sandoz divisions.

Following the Portfolio Transformation transactions in 2015, described in Note 2, Novartis has separated the Group's reported financial data into "continuing" operations and "discontinued" operations:

Continuing operations comprise:
— Innovative Medicines: Innovative patent-protected prescription medicines
— Sandoz: Generic and biosimilar pharmaceuticals
— Alcon: Eye care devices and vision care
— Corporate activities

Discontinued operations comprise:
— Vaccines: Preventive human vaccines and the blood transfusion diagnostics unit. Excluded are certain intellectual property rights and related other revenues of the Vaccines Division which are now reported under Corporate activities.
— Consumer Health: OTC (over-the-counter medicines) and Animal Health. These two divisions were managed separately. However, neither was material enough to the Group to be disclosed separately as a reporting segment.
— Corporate: certain transactional and other expenses related to the portfolio transformation.

The accounting policies mentioned in Note 1 are used in the reporting of segment results. Inter-segmental sales are made at amounts which are considered to approximate arm's length transactions. The Executive Committee of Novartis evaluates segmental performance and allocates resources among the segments based on a number of measures including net sales, operating income and net operating assets. Segment net operating assets consist primarily of property, plant and equipment, intangible assets, goodwill, inventories and trade and other operating receivables less operating liabilities.

Segmentation – Consolidated income statements

	Innovative Medicines[1]		Sandoz		Alcon		Corporate (including eliminations)		Group	
(USD millions)	**2016**	2015 restated[2]	**2016**	2015 restated[2]	**2016**	2015 restated[2]	**2016**	2015 restated[2]	**2016**	2015
Net sales to third parties from continuing operations	**32 562**	**33 345**	**10 144**	**10 070**	**5 812**	**5 999**			**48 518**	**49 414**
Sales to other segments	624	518	104	128			– 728	– 620		26
Net sales from continuing operations	**33 186**	**33 863**	**10 248**	**10 198**	**5 812**	**5 999**	**– 728**	**– 620**	**48 518**	**49 440**
Other revenues	815	792	37	25	4	23	62	107	918	947
Cost of goods sold	– 9 331	– 9 204	– 5 971	– 5 844	– 3 092	– 3 145	874	789	– 17 520	– 17 404
Gross profit from continuing operations	**24 670**	**25 451**	**4 314**	**4 379**	**2 724**	**2 877**	**208**	**276**	**31 916**	**32 983**
Marketing & Sales	– 8 435	– 8 430	– 1 681	– 1 679	– 1 882	– 1 663			– 11 998	– 11 772
Research & Development	– 7 709	– 7 685	– 814	– 782	– 516	– 468			– 9 039	– 8 935
General & Administration	– 978	– 1 031	– 300	– 346	– 410	– 450	– 506	– 648	– 2 194	– 2 475
Other income	1 091	1 149	185	109	48	54	603	737	1 927	2 049
Other expense	– 1 213	– 1 639	– 259	– 381	– 96	– 69	– 776	– 784	– 2 344	– 2 873
Operating income from continuing operations	**7 426**	**7 815**	**1 445**	**1 300**	**– 132**	**281**	**– 471**	**– 419**	**8 268**	**8 977**
Income from associated companies			6	2			697	264	703	266
Interest expense									– 707	– 655
Other financial income and expense									– 447	– 454
Income before taxes from continuing operations									**7 817**	**8 134**
Taxes									– 1 119	– 1 106
Net income from continuing operations									**6 698**	**7 028**
Net income from discontinued operations										10 766
Net income									**6 698**	**17 794**
Attributable to:										
Shareholders of Novartis AG									*6 712*	*17 783*
Non-controlling interests									*– 14*	*11*
Included in net income from continuing operations are:										
Interest income									43	33
Depreciation of property, plant & equipment	– 883	– 839	– 260	– 277	– 229	– 237	– 117	– 117	– 1 489	– 1 470
Amortization of intangible assets	– 2 470	– 2 384	– 450	– 450	– 929	– 912	– 12	– 9	– 3 861	– 3 755
Impairment charges on property, plant & equipment, net	– 93	39	– 2	– 97	– 5	– 1	– 2	– 21	– 102	– 80
Impairment charges on intangible assets, net	– 522	– 138	– 65	– 27	– 4	– 1			– 591	– 166
Impairment charges and fair value gains on financial assets, net	– 55	– 32					– 77	– 72	– 132	– 104
Additions to restructuring provisions	– 236	– 232	– 46	– 93	– 36	– 25	– 25	– 49	– 343	– 399
Equity-based compensation of Novartis equity plans	– 582	– 620	– 47	– 53	– 53	– 66	– 164	– 164	– 846	– 903

[1] Formerly named the Pharmaceuticals Division
[2] Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

(USD millions)	Innovative Medicines[1] 2015 restated[2]	Innovative Medicines[1] 2014 restated[2]	Sandoz 2015 restated[2]	Sandoz 2014 restated[2]	Alcon 2015 restated[2]	Alcon 2014 restated[2]	Corporate (including eliminations) 2015 restated[2]	Corporate (including eliminations) 2014 restated[2]	Group 2015	Group 2014
Net sales to third parties from continuing operations	**33 345**	**34 828**	**10 070**	**10 736**	**5 999**	**6 616**			**49 414**	**52 180**
Sales to other segments	518	698	128	287			– 620	– 746	26	239
Net sales from continuing operations	**33 863**	**35 526**	**10 198**	**11 023**	**5 999**	**6 616**	**– 620**	**– 746**	**49 440**	**52 419**
Other revenues	792	631	25	12	23	32	107	540	947	1 215
Cost of goods sold	– 9 204	– 8 724	– 5 844	– 6 293	– 3 145	– 3 204	789	876	– 17 404	– 17 345
Gross profit from continuing operations	**25 451**	**27 433**	**4 379**	**4 742**	**2 877**	**3 444**	**276**	**670**	**32 983**	**36 289**
Marketing & Sales	– 8 430	– 8 809	– 1 679	– 1 871	– 1 663	– 1 697			– 11 772	– 12 377
Research & Development	– 7 685	– 7 787	– 782	– 833	– 468	– 466			– 8 935	– 9 086
General & Administration	– 1 031	– 1 114	– 346	– 376	– 450	– 508	– 648	– 618	– 2 475	– 2 616
Other income	1 149	737	109	97	54	76	737	481	2 049	1 391
Other expense	– 1 639	– 1 634	– 381	– 189	– 69	– 89	– 784	– 600	– 2 873	– 2 512
Operating income from continuing operations	**7 815**	**8 826**	**1 300**	**1 570**	**281**	**760**	**– 419**	**– 67**	**8 977**	**11 089**
Income from associated companies		812	2	4			264	1 102	266	1 918
Interest expense									– 655	– 704
Other financial income and expense									– 454	– 31
Income before taxes from continuing operations									**8 134**	**12 272**
Taxes									– 1 106	– 1 545
Net income from continuing operations									**7 028**	**10 727**
Net income/loss from discontinued operations									10 766	– 447
Net income									**17 794**	**10 280**
Attributable to:										
Shareholders of Novartis AG									*17 783*	*10 210*
Non-controlling interests									*11*	*70*
Included in net income from continuing operations are:										
Interest income									33	33
Depreciation of property, plant & equipment	– 839	– 902	– 277	– 317	– 237	– 261	– 117	– 106	– 1 470	– 1 586
Amortization of intangible assets	– 2 384	– 1 416	– 450	– 448	– 912	– 906	– 9	– 5	– 3 755	– 2 775
Impairment charges on property, plant & equipment, net	39	– 15	– 97	– 7	– 1	1	– 21	– 23	– 80	– 44
Impairment charges on intangible assets, net	– 138	– 238	– 27	– 39	– 1				– 166	– 277
Impairment charges and fair value gains on financial assets, net	– 32	– 20		– 1			– 72	– 48	– 104	– 69
Additions to restructuring provisions	– 232	– 464	– 93	– 4	– 25	– 33	– 49	– 3	– 399	– 504
Equity-based compensation of Novartis and Alcon equity plans	– 620	– 705	– 53	– 51	– 66	– 72	– 164	– 179	– 903	– 1 007

[1] Formerly named the Pharmaceuticals Division

[2] Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

Segmentation – Consolidated balance sheets

(USD millions)	Innovative Medicines[1] 2016	Innovative Medicines[1] 2015 restated[2]	Sandoz 2016	Sandoz 2015 restated[2]	Alcon 2016	Alcon 2015 restated[2]	Corporate (including eliminations) 2016	Corporate (including eliminations) 2015 restated[2]	Group 2016	Group 2015
Total assets	**51 911**	**54 769**	**17 611**	**18 530**	**22 970**	**23 291**	**37 632**	**34 966**	**130 124**	**131 556**
Total liabilities	**– 10 007**	**– 10 798**	**– 3 168**	**– 3 545**	**– 2 520**	**– 2 403**	**– 39 538**	**– 37 688**	**– 55 233**	**– 54 434**
Total equity									**74 891**	**77 122**
Net debt									16 025	16 484
Net operating assets	**41 904**	**43 971**	**14 443**	**14 985**	**20 450**	**20 888**			**90 916**	**93 606**
Included in assets and liabilities are:										
Total property, plant & equipment	10 410	10 464	2 374	2 788	2 163	2 025	694	705	15 641	15 982
Additions to property, plant & equipment[3]	996	1 380	316	421	396	494	127	224	1 835	2 519
Total goodwill and intangible assets	31 630	33 783	10 774	11 253	16 914	17 343	3 002	3 012	62 320	65 391
Additions to goodwill and intangible assets[3]	865	996	45	44	63	108	5	11	978	1 159
Total investment in associated companies	16	8	18	15			14 270	15 291	14 304	15 314
Additions to investment in associated companies[3]	4	5					37	57	41	62
Cash and cash equivalents, marketable securities, commodities, time deposits and derivative financial instruments							7 777	5 447	7 777	5 447
Financial debts and derivative financial instruments							23 802	21 931	23 802	21 931
Current income tax and deferred tax liabilities							8 260	8 072	8 260	8 072

[1] Formerly named the Pharmaceuticals Division
[2] Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016
[3] Excluding impact of business combinations

The following table shows countries that accounted for more than 5% of at least one of the respective Group totals and regional information for net sales for the years ended December 31, 2016, 2015 and 2014 and for selected non-current assets for the years ended December 31, 2016 and 2015:

(USD millions)	Net sales[1] 2016	%	2015	%	2014	%	Total of selected non-current assets[2] 2016	%	2015	%
Country										
Switzerland	830	2	774	2	658	1	44 413	48	47 054	49
United States	17 117	35	18 079	37	17 337	33	28 484	31	28 677	30
United Kingdom	1 182	2	1 277	3	1 379	3	6 892	7	7 769	8
Germany	3 634	7	3 262	7	3 742	7	2 733	3	2 908	3
France	2 390	5	2 269	5	2 638	5	199		188	
Japan	3 267	7	3 163	6	3 781	7	145		142	
Other	20 098	42	20 590	40	22 645	44	9 399	11	9 949	10
Group	**48 518**	**100**	**49 414**	**100**	**52 180**	**100**	**92 265**	**100**	**96 687**	**100**
Region										
Europe	17 079	35	16 472	33	18 690	36	59 879	65	63 681	66
Americas	20 998	43	22 414	45	22 218	43	29 831	32	30 375	31
Asia/Africa/Australasia	10 441	22	10 528	22	11 272	21	2 555	3	2 631	3
Group	**48 518**	**100**	**49 414**	**100**	**52 180**	**100**	**92 265**	**100**	**96 687**	**100**

[1] Net sales from operations by location of third-party customer
[2] Total of property, plant and equipment; goodwill; intangible assets; and investment in associated companies

The Group's largest, second and third largest customer accounts for approximately 16%, 12% and 6% of net sales, respectively (2015: 14%, 11% and 5%; 2014: 12%, 11% and 5% respectively). No other customer accounted for 5% or more of net sales, in any year.

The highest amounts of trade receivables outstanding were for these same three customers. They amounted to 14%, 9% and 6%, respectively, of the trade receivables at December 31, 2016 (2015: 13%, 9% and 6% respectively).

Innovative Medicines[1] net sales by business franchise

	2016 USD millions	2015 restated USD millions[2]	Change (2015 to 2016) USD %	2014 restated USD millions[2]	Change (2014 to 2015) USD %
Oncology					
Gleevec/Glivec	3 323	4 658	– 29	4 746	– 2
Tasigna	1 739	1 632	7	1 529	7
Subtotal Bcr-Abl portfolio	**5 062**	**6 290**	**– 20**	**6 275**	**0**
Sandostatin	1 646	1 630	1	1 650	– 1
Afinitor/Votubia	1 516	1 607	– 6	1 575	2
Exjade/Jadenu	956	917	4	926	– 1
Votrient	729	565	nm	0	nm
Tafinlar/Mekinist	672	453	nm	0	nm
Promacta/Revolade	635	402	nm	0	nm
Jakavi	581	410	42	279	47
Zykadia	91	79	15	31	155
Other	902	951	– 5	918	4
Total Oncology business unit	**12 790**	**13 304**	**– 4**	**11 654**	**14**
Ophthalmology					
Lucentis	1 835	2 060	– 11	2 441	– 16
Travoprost Group	619	631	– 2	734	– 14
Systane Group	377	380	– 1	378	1
Topical Olopatadine Group	335	457	– 27	515	– 11
Other	2 297	2 395	– 4	2 647	– 10
Total Ophthalmology	**5 463**	**5 923**	**– 8**	**6 715**	**– 12**
Neuroscience					
Gilenya	3 109	2 776	12	2 477	12
Exelon/Exelon Patch	444	728	– 39	1 009	– 28
Other	124	141	– 12	243	– 42
Total Neuroscience	**3 677**	**3 645**	**1**	**3 729**	**– 2**
Immunology and Dermatology					
Cosentyx	1 128	261	nm	0	nm
Neoral/Sandimmun(e)	515	570	– 10	684	– 17
Zortress/Certican	398	335	19	327	2
Myfortic	383	441	– 13	543	– 19
Ilaris	283	236	20	199	19
Other	172	160	8	173	– 8
Subtotal Immunology and Dermatology, excluding everolimus stent drug	**2 879**	**2 003**	**44**	**1 926**	**4**
Everolimus stent drug	136	134	1	205	– 35
Total Immunology and Dermatology	**3 015**	**2 137**	**41**	**2 131**	**0**
Respiratory					
Ultibro Breezhaler	363	260	40	118	120
Seebri Breezhaler	149	150	– 1	146	3
Onbrez Breezhaler/ Arcapta Neohaler	143	166	– 14	220	– 25
Subtotal COPD[3] portfolio	**655**	**576**	**14**	**484**	**19**
Xolair[4]	835	755	11	777	– 3
Other	31	37	– 16	39	– 5
Total Respiratory	**1 521**	**1 368**	**11**	**1 300**	**5**
Cardio-Metabolic					
Galvus	1 193	1 140	5	1 224	– 7
Entresto	170	21	nm	0	nm
Other	14	0	nm	8	nm
Total Cardio-Metabolic	**1 377**	**1 161**	**19**	**1 232**	**– 6**
Established Medicines					
Diovan/Co-Diovan	1 073	1 284	– 16	2 345	– 45
Exforge	926	1 047	– 12	1 396	– 25
Voltaren/Cataflam	525	558	– 6	632	– 12
Ritalin/Focalin	282	365	– 23	492	– 26
Other	1 913	2 553	– 25	3 202	– 20
Total Established Medicines	**4 719**	**5 807**	**– 19**	**8 067**	**– 28**
Total Pharmaceutical business unit	**19 772**	**20 041**	**– 1**	**23 174**	**– 14**
Total division net sales	**32 562**	**33 345**	**– 2**	**34 828**	**– 4**

[1] Formerly named the Pharmaceuticals Division
[2] Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016
[3] Chronic obstructive pulmonary disease
[4] Net sales reflect *Xolair* sales for all indications (e.g., including *Xolair* SAA and *Xolair* CSU, which is managed by the Immunology and Dermatology franchise)
nm = not meaningful

The product portfolio of other segments is widely spread in 2016, 2015 and 2014.

4. Associated companies

	Net income statement effect			Other comprehensive income effect			Total comprehensive income effect		
(USD millions)	**2016**	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Roche Holding AG, Switzerland	464	343	599	– 39	– 149	– 51	425	194	548
GlaxoSmithKline Consumer Healthcare Holdings Ltd., UK	234	– 79		710	– 4		944	– 83	
Idenix Pharmaceuticals Inc., US			812						812
LTS Lohmann Therapie-Systeme AG, Germany			436						436
Others	5	2	71			20	5	2	91
Associated companies related to continuing operations	**703**	**266**	**1 918**	**671**	**– 153**	**– 31**	**1 374**	**113**	**1 887**

Novartis has significant investments in Roche Holding AG, Basel (Roche) and in GlaxoSmithKline Consumer Healthcare Holdings Ltd, Brentford, Middlesex, UK as well as certain other smaller investments which are accounted for as associated companies.

	Balance sheet value	
(USD millions)	**December 31, 2016**	December 31, 2015
Roche Holding AG, Switzerland	7 644	7 919
GlaxoSmithKline Consumer Healthcare Holdings Ltd., UK	6 448	7 194
Others	212	201
Total	**14 304**	**15 314**

Roche Holding AG

The Group's holding in Roche voting shares was 33.3% at December 31, 2016, 2015 and 2014. This investment represents approximately 6.3% of Roche's total outstanding voting and non-voting equity instruments at December 31, 2016, 2015 and 2014.

Since full-year 2016 financial data for Roche is not available when Novartis produces its consolidated financial results, a survey of analyst estimates is used to estimate the Group's share of Roche's net income. Any differences between these estimates and actual results will be adjusted in the Group's 2017 consolidated financial statements when available.

The following tables show summarized financial information of Roche, including current values of fair value adjustments made at the time of the acquisition of the shares, for the year ended December 31, 2015 and for the six months ended June 30, 2016 (since full year 2016 data is not yet available):

(CHF billions)	Current assets	Non-current assets	Current liabilities	Non-current liabilities
December 31, 2015	28.2	63.7	23.8	28.7
June 30, 2016	26.6	62.6	24.5	29.0

(CHF billions)	Revenue	Net income	Other comprehensive income	Total comprehensive income
December 31, 2015	48.1	6.8	– 0.8	6.0
June 30, 2016	25.0	4.3	– 0.5	3.8

A purchase price allocation was performed on the basis of publicly available information at the time of acquisition of the investment. The December 31, 2016 balance sheet value allocation is as follows:

(USD millions)	**December 31, 2016**
Novartis share of Roche's estimated net assets	2 200
Novartis share of re-appraised intangible assets	824
Implicit Novartis goodwill	2 785
Current value of share in net identifiable assets and goodwill	**5 809**
Accumulated equity accounting adjustments and translation effects less dividends received	1 835
Balance sheet value	**7 644**

The identified intangible assets principally relate to the value of currently marketed products and are amortized on a straight-line basis over their estimated average useful life of 20 years.

In 2016, dividends received from Roche in relation to the distribution of its 2015 net income amounted to USD 433 million (2015: USD 429 million in relation with the distribution of its 2014 net income).

The consolidated income statement effects from applying Novartis accounting principles for this investment in 2016, 2015 and 2014 are as follows:

(USD millions)	**2016**	2015	2014
Novartis share of Roche's estimated current-year consolidated net income	678	650	813
Prior-year adjustment	– 68	– 157	– 56
Amortization of fair value adjustments relating to intangible assets, net of taxes of USD 42 million (2015: USD 41 million; 2014: USD 45 million)	– 146	– 150	– 158
Net income effect	**464**	**343**	**599**

The publicly quoted market value of the Novartis interest in Roche (SIX symbol: RO) at December 31, 2016, was USD 12.4 billion (2015: USD 14.9 billion).

GlaxoSmithKline Consumer Healthcare Holdings Ltd.

On March 2, 2015, Novartis closed its transactions with GlaxoSmithKline plc, Great Britain (GSK) announced in April 2014. As part of these transactions, Novartis and GSK agreed to create a combined consumer healthcare business through a combination between Novartis OTC and GSK Consumer Healthcare. On March 2, 2015, a new entity GlaxoSmithKline Consumer Healthcare Holdings Ltd (GSK Consumer Healthcare) was formed via the contribution of businesses from both Novartis and GSK.

At December 31, 2016 and 2015, Novartis has a 36.5% interest in GSK Consumer Healthcare and four of eleven seats on the GSK Consumer Healthcare Board of Directors. Furthermore, Novartis has customary minority rights and also exit rights at a pre-defined, market-based pricing mechanism.

Novartis has valued the contribution of 63.5% of its OTC Division in exchange for 36.5% of the GSK Consumer Healthcare business at fair value. Based on the estimates of fair values exchanged, an investment in associated company of USD 7.6 billion was recorded on March 2, 2015.

The December 31, 2016 balance sheet value allocation is as follows:

(USD millions)	December 31, 2016
Novartis share of GSK Consumer Healthcare's estimated net assets	1 502
Novartis share of re-appraised intangible assets	3 517
Implicit Novartis goodwill	1 606
Current value of share in net identifiable assets and goodwill	**6 625**
Accumulated equity accounting adjustments and translation effects less dividends received	– 177
Balance sheet value	**6 448**

The identified intangible assets principally relate to the value of the indefinite life GSK Consumer Healthcare intangible assets. The identified intangible assets with a definite life are amortized on a straight-line basis over their estimated average useful life of 20 years.

The following tables show summarized financial information of GSK Consumer Healthcare, including current values of fair value adjustments made at the time of acquisition, for the ten-month period ended December 31, 2015, and for the nine months ended September 30, 2016 (interim unaudited), since full year 2016 data is not yet available:

(GBP billions)	Current assets	Non-current assets	Current liabilities	Non-current liabilities
December 31, 2015	3.8	19.5	2.8	1.8
September 30, 2016	4.2	21.2	3.0	2.1

(GBP billions)	Revenue	Net income	Other comprehensive income	Total comprehensive income
December 31, 2015	4.6	0.0	0.0	0.0
September 30, 2016	4.7	0.5	2.1	2.6

Since full-year 2016 financial data for GSK Consumer Healthcare is not available when Novartis produces its consolidated financial results, a projection of the latest internal management reporting is used to estimate the Group's share of GSK Consumer Healthcare's net result for the year. Any differences between this estimate and actual results will be adjusted in the Group's 2017 consolidated financial statements when available.

In 2016, dividends received from GSK Consumer Healthcare amounted to USD 463 million (2015: nil).

The consolidated income statement effects from applying Novartis accounting principles for this investment in 2016 and 2015 are as follows:

(USD millions)	2016	2015
Novartis share of GSK Consumer Healthcare's estimated current-year consolidated net income	268	– 17
Prior-year adjustment	– 22	
Amortization of fair value adjustments relating to intangible assets and inventory, net of taxes of USD 2 million (2015: USD 18 million)	– 12	– 62
Net income effect	**234**	**– 79**

Other associated companies

During 2014, the shareholdings of 22% in Idenix Pharmaceuticals, Inc. and 43% in LTS Lohmann Therapie-Systeme AG were sold, realizing gains of USD 812 million and USD 421 million, respectively. Others include a gain of USD 64 million recorded on investments in associated companies held by the Novartis Venture Funds, which are accounted at fair value from January 1, 2014 onwards, consistent with other investments held by these Funds.

5. Interest expense and other financial income and expense

Interest expense

(USD millions)	2016	2015	2014
Interest expense	– 709	– 669	– 701
Income/(expense) arising from discounting long-term liabilities	2	14	– 3
Total interest expense	**– 707**	**– 655**	**– 704**

Other financial income and expense

(USD millions)	2016	2015	2014
Interest income	43	33	33
Dividend income	1	1	1
Net capital losses on available-for-sale securities	– 1	– 8	– 2
Income on forward contracts and options		1	1
Impairment of commodities and available-for-sale securities, net	7	– 132	
Other financial expense	– 20	– 23	– 25
Monetary loss from hyperinflation accounting		– 72	– 61
Currency result, net	– 477	– 254	22
Total other financial income and expense	**– 447**	**– 454**	**– 31**

6. Taxes

Income before taxes

(USD millions)	2016	2015	2014
Switzerland	3 110	5 765	5 245
Foreign	4 707	2 369	7 027
Income before taxes from continuing operations	**7 817**	**8 134**	**12 272**
Income/(loss) before taxes from discontinued operations		12 479	– 351
Total income before taxes	**7 817**	**20 613**	**11 921**

Current and deferred income tax expense

(USD millions)	2016	2015	2014
Switzerland	– 709	– 317	– 661
Foreign	– 1 418	– 1 333	– 1 952
Current income tax expense from continuing operations	**– 2 127**	**– 1 650**	**– 2 613**
Switzerland	765	– 68	309
Foreign	243	612	759
Deferred tax income from continuing operations	**1 008**	**544**	**1 068**
Income tax expense from continuing operations	**– 1 119**	**– 1 106**	**– 1 545**
Income tax expense from discontinued operations		– 1 713	– 96
Total income tax expense	**– 1 119**	**– 2 819**	**– 1 641**

Analysis of tax rate

The main elements contributing to the difference between the Group's overall applicable tax rate (which can change each year since it is calculated as the weighted average tax rate based on pre-tax income of each subsidiary) and the effective tax rate are:

(As a percentage)	2016	2015	2014
Applicable tax rate	13.2	12.4	11.7
Effect of disallowed expenditures	3.5	3.5	2.9
Effect of utilization of tax losses brought forward from prior periods	– 0.2	– 0.2	– 0.3
Effect of income taxed at reduced rates	– 0.2	– 0.3	– 0.6
Effect of tax credits and allowances	– 2.8	– 2.7	– 1.8
Effect of tax rate change on opening balance	0.2	– 0.5	
Effect of write-off of deferred tax assets	0.5		
Effect of write down and reversal of write-down of investments in subsidiaries	– 1.0	– 0.9	0.9
Effect of tax benefits expiring in 2017	– 0.5	– 0.4	– 0.8
Effect of non-deductible losses in Venezuela	1.3	1.2	
Effect of prior year items	0.2	1.0	0.8
Effect of other items [1]	0.1	0.5	– 0.2
Effective tax rate for continuing operations	**14.3**	**13.6**	**12.6**
Effective tax rate for discontinued operations		13.7	– 27.4
Effective tax rate	**14.3**	**13.7**	**13.8**

[1] Other items in 2016 (+0.1%) include one-time impacts for the deferred tax effects on the net assets of certain subsidiaries resulting from the change in their tax status (-6.2%), the changes in uncertain tax positions (+5.1%) and other items (+1.2%).

Novartis has a substantial business presence in many countries and is therefore subject to different income and expense items that are non-taxable (permanent differences) or taxed at different rates in those tax jurisdictions. This results in a difference between our applicable tax rate and effective tax rate, as shown in the table above.

The utilization of tax-loss carry-forwards lowered the tax charge by USD 18 million in 2016 and by USD 15 million and USD 34 million in 2015 and 2014, respectively.

7. Earnings per share

	2016	2015	2014
Net income/loss attributable to shareholders of Novartis AG (USD millions)			
– Continuing operations	6 712	7 025	10 654
– Discontinued operations		10 758	– 444
– Total	**6 712**	**17 783**	**10 210**
Number of shares (in millions)			
Weighted average number of shares outstanding used in basic earnings per share	2 378	2 403	2 426
Adjustment for vesting of restricted shares, restricted share units and dilutive shares from options	22	35	44
Weighted average number of shares in diluted earnings per share	2 400	2 438	2 470
Basic earnings per share (USD)			
– Continuing operations	2.82	2.92	4.39
– Discontinued operations		4.48	– 0.18
– Total	**2.82**	**7.40**	**4.21**
Diluted earnings per share (USD)			
– Continuing operations	2.80	2.88	4.31
– Discontinued operations		4.41	– 0.18
– Total	**2.80**	**7.29**	**4.13**

Basic earnings per share (EPS) is calculated by dividing net income attributable to shareholders of Novartis AG by the weighted average number of shares outstanding in a reporting period. This calculation excludes the average number of issued shares purchased by the Group and held as treasury shares.

For diluted EPS, the weighted average number of shares outstanding is adjusted to assume the vesting of all restricted shares, restricted share units and the conversion of all potentially dilutive shares arising from options on Novartis shares that have been issued.

No options were excluded from the calculation of diluted EPS in 2014, 2015, or 2016 as all options were dilutive in all years.

8. Changes in consolidated statements of comprehensive income

The consolidated statements of comprehensive income include the Group's net income for the year as well as all other valuation adjustments recorded in the Group's consolidated balance sheet but which under IFRS are not recorded in the consolidated income statement. These include fair value adjustments to financial instruments, actuarial gains or losses on defined benefit pension and other post-employment plans and currency translation effects, net of tax.

The following table summarizes these value adjustments and currency translation effects attributable to Novartis shareholders:

(USD millions)	Fair value adjustments on marketable securities	Fair value adjustments on deferred cash flow hedges	Actuarial losses from defined benefit plans	Cumulative currency translation effects	Total value adjustments
Value adjustments at January 1, 2014	**344**	**– 59**	**– 4 544**	**4 625**	**366**
Fair value adjustments on financial instruments	89	21			110
Net actuarial losses from defined benefit plans [1]			– 822		– 822
Currency translation effects [2]				– 2 219	– 2 219
Total value adjustments in 2014	**89**	**21**	**– 822**	**– 2 219**	**– 2 931**
Value adjustments at December 31, 2014	**433**	**– 38**	**– 5 366**	**2 406**	**– 2 565**
Fair value adjustments on financial instruments	28	20			48
Net actuarial losses from defined benefit plans [1]			– 147		– 147
Currency translation effects [2]				– 1 659	– 1 659
Total value adjustments in 2015	**28**	**20**	**– 147**	**– 1 659**	**– 1 758**
Fair value adjustments related to divestments			100		100
Value adjustments at December 31, 2015	**461**	**– 18**	**– 5 413**	**747**	**– 4 223**
Fair value adjustments on financial instruments	– 113	15			– 98
Net actuarial losses from defined benefit plans			– 514		– 514
Currency translation effects				– 2 389	– 2 389
Total value adjustments in 2016	**– 113**	**15**	**– 514**	**– 2 389**	**– 3 001**
Fair value adjustments related to divestments			12		12
Value adjustments at December 31, 2016	**348**	**– 3**	**– 5 915**	**– 1 642**	**– 7 212**

[1] Net actuarial gains of USD 10 million in 2015 and net actuarial losses of USD 65 million in 2014 were attributable to discontinued operations up to the respective divestment dates
[2] Currency translation losses of USD 29 million in 2015 and USD 37 million in 2014 were attributable to discontinued operations up to the respective divestment dates

8.1) The 2016, 2015 and 2014 changes in the fair value of financial instruments were as follows:

(USD millions)	Fair value adjustments on marketable securities	Fair value adjustments on deferred cash flow hedges	Total
Fair value adjustments at January 1, 2016	**461**	**– 18**	**443**
Changes in fair value:			
– Available-for-sale marketable securities	1		1
– Available-for-sale financial investments	– 87		– 87
Realized net gains transferred to the consolidated income statement:			
– Marketable securities sold	– 1		– 1
– Other financial assets sold	– 154		– 154
Amortized net losses on cash flow hedges transferred to the consolidated income statement		16	16
Impaired financial assets transferred to the consolidated income statement	131		131
Deferred tax on above items	– 3	– 1	– 4
Fair value adjustments during the year	**– 113**	**15**	**– 98**
Fair value adjustments at December 31, 2016	**348**	**– 3**	**345**

(USD millions)	Fair value adjustments on marketable securities	Fair value adjustments on deferred cash flow hedges	Total
Fair value adjustments at January 1, 2015	**433**	**– 38**	**395**
Changes in fair value:			
– Available-for-sale marketable securities	– 130		– 130
– Available-for-sale financial investments	80		80
– Associated companies' movements in comprehensive income	– 8		– 8
Realized net gains transferred to the consolidated income statement:			
– Marketable securities sold	– 1		– 1
– Other financial assets sold	– 103		– 103
Amortized net losses on cash flow hedges transferred to the consolidated income statement		21	21
Impaired financial assets transferred to the consolidated income statement	194		194
Deferred tax on above items	– 4	– 1	– 5
Fair value adjustments during the year	**28**	**20**	**48**
Fair value adjustments at December 31, 2015	**461**	**– 18**	**443**

(USD millions)	Fair value adjustments on marketable securities	Fair value adjustments on deferred cash flow hedges	Total
Fair value adjustments at January 1, 2014	**344**	**– 59**	**285**
Changes in fair value:			
– Available-for-sale marketable securities	– 3		– 3
– Available-for-sale financial investments	91		91
– Associated companies' movements in comprehensive income	5		5
Realized net gains transferred to the consolidated income statement:			
– Marketable securities sold	– 4		– 4
– Other financial assets sold	– 81		– 81
Amortized net losses on cash flow hedges transferred to the consolidated income statement		23	23
Impaired financial assets transferred to the consolidated income statement	87		87
Deferred tax on above items	– 6	– 2	– 8
Fair value adjustments during the year	**89**	**21**	**110**
Fair value adjustments at December 31, 2014	**433**	**– 38**	**395**

8.2) In 2015, cumulative currency translation losses of USD 10 million have been recycled through the income statement as a result of the divestments of subsidiaries. No currency translation losses have been recycled through income statement in 2016 and 2014.

8.3) Remeasurements from defined benefit plans arise as follows:

(USD millions)	**2016**	2015	2014
Defined benefit pension plans before tax	– 667	– 252	– 999
Other post-employment benefit plans before tax	12	168	– 235
Taxation on above items	140	– 63	412
Total after tax	**– 515**	**– 147**	**– 822**
Attributable to:			
Shareholders of Novartis AG	*– 514*	*– 147*	*– 822*
Non-controlling interests	*– 1*		

9. Changes in consolidated equity

9.1) A dividend of CHF 2.70 per share was approved at the 2016 Annual General Meeting (AGM) for the year ended December 31, 2015, resulting in a total dividend payment of USD 6.5 billion in 2016 (2015: the CHF 2.60 per share dividend amounted to USD 6.6 billion, 2014: the CHF 2.45 per share dividend amounted to USD 6.8 billion). The amount available for distribution as a dividend to shareholders is based on the available distributable retained earnings of Novartis AG determined in accordance with the legal provisions of the Swiss Code of Obligations.

9.2) During 2016, 12.9 million shares were purchased for USD 1.0 billion (2015: 63.6 million shares for USD 6.1 billion, 2014: 79.2 million shares for USD 6.9 billion). These share purchases comprise of 10.3 million shares, which were repurchased for USD 0.8 billion on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback approved by the shareholders at the Annual General Meeting (AGM) in 2016, to offset the dilutive impact from equity-based participation plans (2015, 49.9 million shares for USD 4.8 billion, and in 2014, 27.0 million shares for USD 2.4 billion repurchased on the SIX Swiss Exchange second trading line under the USD 5 billion share buyback announced in November 2013, which was completed in November 2015). Furthermore, 2.6 million shares were acquired for USD 0.2 billion from employees which were previously granted to them under the respective programs (2015: 4.1 million shares for USD 0.4 billion, 2014: 5.4 million shares for USD 0.5 billion). In 2016 no shares were repurchased on the SIX Swiss Exchange first trading line (2015: 9.6 million shares were repurchased for USD 0.9 billion, 2014: 46.8 million shares for USD 4.1 billion).

9.3) In 2016, Novartis reduced its share capital by cancelling a total of 49.9 million shares which were repurchased during 2015 on the SIX Swiss Exchange second trading line. In 2015, 29.2 million shares were cancelled which were repurchased during 2013 and 2014. In 2014 no shares were cancelled.

9.4) 4.1 million shares were delivered as a result of options being exercised related to equity-based participation plans and the delivery of treasury shares, which contributed USD 0.2 billion (2015: 27.0 million shares for USD 1.6 billion, 2014: 41.4 million shares for USD 2.4 billion). The average share price of the shares delivered was significantly below market price reflecting the strike price of the options exercised.

9.5) Equity-settled share-based compensation is expensed in the consolidated income statement in accordance with the vesting period of the share-based compensation plans. The value for the shares and options granted is credited to consolidated equity over the respective vesting period. In 2016, 9.0 million shares were transferred to associates as part of equity-settled compensation (2015: 11.9 million shares, 2014: 10.3 million shares). In addition, tax benefits arising from tax deductible amounts exceeding the expense recognized in the income statement are credited to equity.

9.6) During 2016, interests in subsidiaries were acquired. The reduction in equity of USD 7 million represents the excess of the amount paid to non-controlling interest over their carrying value and equity allocation to non-controlling interest due to change in ownership percentage (2015: nil, 2014: nil).

9.7) In 2014, Novartis entered into an irrevocable, non-discretionary arrangement with a bank to repurchase Novartis own shares on the second trading line under its USD 5 billion share buyback as well as to mitigate dilution from equity-based participation plans. The commitment under this arrangement amounted to USD 658 million as of December 31, 2014, reflecting the expected purchases by the bank under such trading plan over a rolling 90 days period. In 2015, this trading plan was fully executed and expired. As a result, there is no contingent liability related to this plan as of December 31, 2015 and December 31, 2016.

9.8) Changes in non-controlling interests in subsidiaries resulted in a reduction in consolidated equity of USD 10 million in 2015 and USD 120 million in 2014. No change to non-controlling interests in subsidiaries in 2016.

10. Property, plant & equipment

The following table summarizes the movements of property, plant and equipment during 2016:

(USD millions)	Land	Buildings	Construction in progress	Machinery & other equipment	Total
Cost					
January 1, 2016	**688**	**12 857**	**2 810**	**15 093**	**31 448**
Reclassifications [1]	4	630	– 1 226	592	
Additions	24	176	1 226	409	1 835
Disposals and derecognitions [2]	– 8	– 178	– 19	– 656	– 861
Currency translation effects	– 21	– 372	– 111	– 622	– 1 126
December 31, 2016	**687**	**13 113**	**2 680**	**14 816**	**31 296**
Accumulated depreciation					
January 1, 2016	**– 40**	**– 5 188**	**– 7**	**– 10 231**	**– 15 466**
Depreciation charge	– 3	– 530		– 956	– 1 489
Accumulated depreciation on disposals and derecognitions [2]	5	157	1	630	793
Impairment charge	– 3	– 47	– 11	– 61	– 122
Reversal of impairment charge		6	1	13	20
Currency translation effects	1	166	1	441	609
December 31, 2016	**– 40**	**– 5 436**	**– 15**	**– 10 164**	**– 15 655**
Net book value at December 31, 2016	**647**	**7 677**	**2 665**	**4 652**	**15 641**
Net book value of property, plant & equipment under finance lease contracts					**81**
Commitments for purchases of property, plant & equipment					**223**

[1] Reclassifications between various asset categories due to completion of plant and other equipment under construction
[2] Derecognition of assets that are no longer used and are not considered to have a significant disposal value or other alternative use

Borrowing costs on new additions to property, plant and equipment eligible for capitalization have been capitalized and amounted to USD 9 million in 2016 (2015: USD 21 million, 2014: USD 20 million). The capitalization rate used to determine the amount of borrowing costs eligible for capitalization is 25% (2015: 25%, 2014: 25%) and the interest rate used is 4% (2015: 4%, 2014: 4%).

The following table summarizes the movements of property, plant and equipment during 2015:

(USD millions)	Land	Buildings	Construction in progress	Machinery & other equipment	Total
Cost					
January 1, 2015	**744**	**11 312**	**3 985**	**15 387**	**31 428**
Reclassifications [1]	12	1 833	– 2 601	756	
Additions	4	408	1 665	442	2 519
Disposals and derecognitions [2]	– 41	– 332	– 59	– 704	– 1 136
Currency translation effects	– 31	– 364	– 180	– 788	– 1 363
December 31, 2015	**688**	**12 857**	**2 810**	**15 093**	**31 448**
Accumulated depreciation					
January 1, 2015	**– 30**	**– 5 093**	**– 37**	**– 10 285**	**– 15 445**
Depreciation charge	– 3	– 462		– 1 005	– 1 470
Accumulated depreciation on disposals and derecognitions [2]	2	246	32	594	874
Impairment charge	– 12	– 37	– 4	– 82	– 135
Reversal of impairment charge		9		46	55
Currency translation effects	3	149	2	501	655
December 31, 2015	**– 40**	**– 5 188**	**– 7**	**– 10 231**	**– 15 466**
Net book value at December 31, 2015	**648**	**7 669**	**2 803**	**4 862**	**15 982**
Net book value of property, plant & equipment under finance lease contracts					**85**
Commitments for purchases of property, plant & equipment					**359**

[1] Reclassifications between various asset categories due to completion of plant and other equipment under construction
[2] Derecognition of assets that are no longer used and are not considered to have a significant disposal value or other alternative use

11. Goodwill and intangible assets

The following table summarizes the movements of goodwill and intangible assets in 2016:

	Goodwill	Intangible Assets other than Goodwill						
(USD millions)	Total	Acquired research & development	Alcon brand name	Technologies	Currently marketed products	Marketing know-how	Other intangible assets	Total
Cost								
January 1, 2016	**31 585**	**4 119**	**2 980**	**6 563**	**33 385**	**5 960**	**1 341**	**54 348**
Impact of business combinations	56	690			451			1 141
Reclassifications [1]		– 158			6		152	
Additions		599			223		156	978
Disposals and derecognitions [2]		– 23			– 464		– 130	– 617
Currency translation effects	– 260	– 77		– 15	– 594		– 27	– 713
December 31, 2016	**31 381**	**5 150**	**2 980**	**6 548**	**33 007**	**5 960**	**1 492**	**55 137**
Accumulated amortization								
January 1, 2016	**– 411**	**– 650**		**– 3 070**	**– 14 221**	**– 1 192**	**– 998**	**– 20 131**
Reclassifications		225			– 225			
Amortization charge				– 576	– 2 926	– 238	– 121	– 3 861
Accumulated impairments on disposals and derecognitions [2]		22			390		123	535
Impairment charge		– 490			– 96		– 5	– 591
Currency translation effects	10	7		9	215		20	251
December 31, 2016	**– 401**	**– 886**		**– 3 637**	**– 16 863**	**– 1 430**	**– 981**	**– 23 797**
Net book value at December 31, 2016	**30 980**	**4 264**	**2 980**	**2 911**	**16 144**	**4 530**	**511**	**31 340**

[1] Reclassifications between various asset categories as a result of product launches of acquired In-Process Research & Development and completion of software development.
[2] Derecognitions of assets that are no longer used or being developed and are not considered to have a significant disposal value or other alternative use.

The following table summarizes the allocation of the net book values of goodwill and intangible assets by reporting segment at December 31, 2016:

	Goodwill	Intangible Assets other than Goodwill						
(USD millions)	Total	Acquired research & development	Alcon brand name	Technologies	Currently marketed products	Marketing know-how	Other intangible assets	Total
Innovative Medicines	15 010	3 512		11	12 821		276	16 620
Sandoz	7 669	613		563	1 904		25	3 105
Alcon	8 293	139		2 337	1 419	4 530	196	8 621
Corporate	8		2 980				14	2 994
Net book value at December 31, 2016	**30 980**	**4 264**	**2 980**	**2 911**	**16 144**	**4 530**	**511**	**31 340**

The Innovative Medicines, Sandoz and Alcon divisions' cash generating units, to which goodwill are allocated, each comprise a group of smaller cash generating units. The valuation method of the recoverable amount of the cash generating units, to which goodwill is allocated, is based on the fair value less costs of disposal.

The Alcon brand name is a Corporate asset with an indefinite life. The intangible asset is allocated to Corporate as it is used to market the Alcon-branded products of both the Alcon Division and the Ophthalmology business franchise of the Innovative Medicines Division. Net sales of these products together are the grouping of cash generating units, which is used to determine the recoverable amount. The valuation method is based on the fair value less costs of disposal.

The following assumptions are used in the calculations:

(As a percentage)	Innovative Medicines	Sandoz	Alcon	Corporate
Terminal growth rate	1.5	2.0	3.0	2.5
Discount rate (post-tax)	6.5	6.5	6.5	6.5

The Alcon terminal growth rate assumption of 3% is higher than the expected inflation rate of the medical device industry, and more specifically the ophthalmic sub-segment of the industry. The growth rates are expected to exceed such long-term inflation rate, due to the impact of the demographic trend of the aging population to which Alcon's products are prescribed is growing faster than the general population.

The discount rates for all Divisions consider the Group's weighted average cost of capital, adjusted to approximate the weighted average cost of capital of a comparable market participant.

The fair value less costs of disposal, for all groupings of cash generating units containing goodwill or indefinite life intangible assets, is reviewed for the impact of reasonably possible changes in key assumptions. In particular we considered an increase in the discount rate, a decrease in the terminal growth rate and certain negative impacts on the forecasted cash flows. These reasonably possible changes in key assumptions did not indicate an impairment.

Note 1, Significant accounting policies – Impairment of goodwill and intangible assets, provides additional disclosures on how the Group performs goodwill and intangible asset impairment testing.

In 2016, intangible asset impairment charges for continuing operations amounted to USD 591 million (USD 522 million in the Innovative Medicines Division, USD 65 million in the Sandoz Division and USD 4 million in the Alcon Division).

In 2015, intangible asset impairment charges in continuing operations amounted to USD 206 million (USD 178 million in the Innovative Medicines Division and USD 27 million in the Sandoz Division and USD 1 million in the Alcon Division).

In 2016, there was no reversal of prior year impairment charges (2015: USD 40 million).

The following table summarizes the movements of goodwill and intangible assets in 2015:

	Goodwill	Intangible Assets other than Goodwill						
(USD millions)	Total	Acquired research & development	Alcon brand name	Technologies	Currently marketed products	Marketing know-how	Other intangible assets	Total
Cost								
January 1, 2015	**29 737**	**2 843**	**2 980**	**6 658**	**20 916**	**5 960**	**1 251**	**40 608**
Impact of business combinations	2 438	730			12 970		15	13 715
Reclassifications [1]		– 36			5		31	
Additions		881			217		61	1 159
Disposals and derecognitions [2]		– 294			– 26		– 4	– 324
Currency translation effects	– 590	– 5		– 95	– 697		– 13	– 810
December 31, 2015	**31 585**	**4 119**	**2 980**	**6 563**	**33 385**	**5 960**	**1 341**	**54 348**
Accumulated amortization								
January 1, 2015	**– 426**	**– 685**		**– 2 539**	**– 11 684**	**– 954**	**– 914**	**– 16 776**
Amortization charge				– 580	– 2 848	– 238	– 89	– 3 755
Accumulated impairments on disposals and derecognitions,[2] reclassifications		68			241		4	313
Impairment charge		– 33			– 164		– 9	– 206
Reversal of impairment charge					40			40
Currency translation effects	15			49	194		10	253
December 31, 2015	**– 411**	**– 650**		**– 3 070**	**– 14 221**	**– 1 192**	**– 998**	**– 20 131**
Net book value at December 31, 2015	**31 174**	**3 469**	**2 980**	**3 493**	**19 164**	**4 768**	**343**	**34 217**

[1] Reclassifications between various asset categories as a result of product launches of acquired In-Process Research & Development and completion of software development.
[2] Derecognitions of assets that are no longer used or being developed and are not considered to have a significant disposal value or other alternative use.

The following table summarizes the allocation of the net book values of goodwill and intangible assets by reporting segment at December 31, 2015:

	Goodwill[1]	Intangible Assets other than Goodwill[1]						
(USD millions)	Total	Acquired research & development	Alcon brand name	Technologies	Currently marketed products	Marketing know-how	Other intangible assets	Total
Innovative Medicines	15 110	2 770		13	15 698		192	18 673
Sandoz	7 802	490		631	2 308		22	3 451
Alcon	8 255	202		2 849	1 158	4 768	111	9 088
Corporate	7	7	2 980				18	3 005
Net book value at December 31, 2015	**31 174**	**3 469**	**2 980**	**3 493**	**19 164**	**4 768**	**343**	**34 217**

[1] Restated to reflect the new divisional structures and product transfers between divisions, announced on January 27, 2016

12. Deferred tax assets and liabilities

(USD millions)	Property, plant & equipment	Intangible assets	Pensions and other benefit obligations of associates	Inventories	Tax loss carry-forwards	Other assets, provisions and accruals	Total
Gross deferred tax assets at January 1, 2016	**216**	**611**	**1 730**	**3 821**	**62**	**2 866**	**9 306**
Gross deferred tax liabilities at January 1, 2016	**– 639**	**– 3 962**	**– 401**	**– 565**	**– 5**	**– 1 132**	**– 6 704**
Net deferred tax balance at January 1, 2016	**– 423**	**– 3 351**	**1 329**	**3 256**	**57**	**1 734**	**2 602**
At January 1, 2016	**– 423**	**– 3 351**	**1 329**	**3 256**	**57**	**1 734**	**2 602**
Credited/(charged) to income	– 13	1 057	53	373	55	– 517	1 008
Charged to equity						– 44	– 44
Credited/(charged) to other comprehensive income			140			– 2	138
Impact of business combinations	4	– 400			23	37	– 336
Other movements	27	6	– 41	20	11	– 14	9
Net deferred tax balance at December 31, 2016	**– 405**	**– 2 688**	**1 481**	**3 649**	**146**	**1 194**	**3 377**
Gross deferred tax assets at December 31, 2016	224	1 331	1 839	4 160	146	2 597	10 297
Gross deferred tax liabilities at December 31, 2016	– 629	– 4 019	– 358	– 511		– 1 403	– 6 920
Net deferred tax balance at December 31, 2016	**– 405**	**– 2 688**	**1 481**	**3 649**	**146**	**1 194**	**3 377**

After offsetting USD 263 million of deferred tax assets and liabilities within the same tax jurisdiction the balance amounts to:	
Deferred tax assets at December 31, 2016	10 034
Deferred tax liabilities at December 31, 2016	– 6 657
Net deferred tax balance at December 31, 2016	**3 377**

Gross deferred tax assets at January 1, 2015	**268**	**214**	**1 749**	**3 470**	**85**	**2 587**	**8 373**
Gross deferred tax liabilities at January 1, 2015	**– 639**	**– 4 242**	**– 410**	**– 578**	**– 3**	**– 606**	**– 6 478**
Net deferred tax balance at January 1, 2015	**– 371**	**– 4 028**	**1 339**	**2 892**	**82**	**1 981**	**1 895**
At January 1, 2015	**– 371**	**– 4 028**	**1 339**	**2 892**	**82**	**1 981**	**1 895**
Credited/(charged) to income	– 57	296	83	376	– 22	– 132	544
Charged to equity						– 216	– 216
(Charged)/credited to other comprehensive income			– 63			29	– 34
Impact of business combinations		390				– 13	377
Other movements	5	– 9	– 30	– 12	– 3	85	36
Net deferred tax balance at December 31, 2015	**– 423**	**– 3 351**	**1 329**	**3 256**	**57**	**1 734**	**2 602**
Gross deferred tax assets at December 31, 2015	216	611	1 730	3 821	62	2 866	9 306
Gross deferred tax liabilities at December 31, 2015	– 639	– 3 962	– 401	– 565	– 5	– 1 132	– 6 704
Net deferred tax balance at December 31, 2015	**– 423**	**– 3 351**	**1 329**	**3 256**	**57**	**1 734**	**2 602**

After offsetting USD 349 million of deferred tax assets and liabilities within the same tax jurisdiction the balance amounts to:	
Deferred tax assets at December 31, 2015	8 957
Deferred tax liabilities at December 31, 2015	– 6 355
Net deferred tax balance at December 31, 2015	2 602

Deferred tax assets of USD 4.8 billion (2015: USD 3.9 billion) and deferred tax liabilities of USD 5.9 billion (2015: USD 5.8 billion) are expected to have an impact on current taxes payable after more than twelve months.

At December 31, 2016, unremitted earnings of USD 63 billion (2015: USD 65 billion) have been retained by consolidated entities for reinvestment. Therefore, no provision is made for income taxes that would be payable upon the distribution of these earnings. If these earnings were remitted, an income tax charge could result based on the tax statutes currently in effect.

(USD millions)	**2016**	2015
Temporary differences on which no deferred tax has been provided as they are permanent in nature related to:		
– Investments in subsidiaries	2 358	2 644
– Goodwill from acquisitions	– 28 189	– 28 202

The gross value of tax-loss carry-forwards that have, or have not, been capitalized as deferred tax assets, with their expiry dates is as follows:

(USD millions)	Not capitalized	Capitalized	**2016 total**
One year	21	12	33
Two years	30	5	35
Three years	50	5	55
Four years	75	3	78
Five years	73	25	98
More than five years	405	1 913	2 318
Total	**654**	**1 963**	**2 617**

In 2016, USD 19 million (2015: USD 13 million, 2014: USD 14 million) of tax-loss carry-forwards expired.

(USD millions)	Not capitalized	Capitalized	**2015 total**
One year	22	39	61
Two years	80	25	105
Three years	37	6	43
Four years	54	7	61
Five years	222		222
More than five years	465	712	1 177
Total	**880**	**789**	**1 669**

Deferred tax assets related to taxable losses of relevant Group entities are recognized to the extent it is considered probable that future taxable profits will be available against which such losses can be utilized in the foreseeable future.

13. Financial and other non-current assets

Financial assets

(USD millions)	**2016**	2015
Available-for-sale long-term financial investments	1 096	1 263
Long-term receivables from customers	231	317
Minimum lease payments from finance lease agreements	147	216
Contingent consideration receivables [1]	586	550
Long-term loans, advances and security deposits	136	120
Total financial assets	**2 196**	**2 466**

[1] Note 29 provides additional disclosures related to contingent consideration.

Other non-current assets

(USD millions)	**2016**	2015
Deferred compensation plans	451	409
Prepaid post-employment benefit plans	47	36
Other non-current assets	200	156
Total other non-current assets	**698**	**601**

Minimum finance lease payments

The following table shows the receivables of the gross investments in finance leases and the net present value of the minimum lease payments, as well as unearned finance income, related to surgical equipment lease arrangements. The finance income is recorded in "Other income".

	2016				
(USD millions)	Total future payments	Unearned interest income	Present value	Provision	Net book value
Not later than one year [1]	91	– 5	86	– 2	84
Between one and five years	182	– 16	166	– 37	129
Later than five years	63	– 4	59	– 41	18
Total	**336**	**– 25**	**311**	**– 80**	**231**

[1] The current portion of the minimum lease payments is recorded in trade receivables or other current assets (to the extent not yet invoiced).

	2015				
(USD millions)	Total future payments	Unearned interest income	Present value	Provision	Net book value
Not later than one year [1]	89	– 6	83	– 1	82
Between one and five years	221	– 17	204	– 10	194
Later than five years	61	– 5	56	– 34	22
Total	**371**	**– 28**	**343**	**– 45**	**298**

[1] The current portion of the minimum lease payments is recorded in trade receivables or other current assets (to the extent not yet invoiced).

14. Inventories

(USD millions)	**2016**	2015
Raw material, consumables	705	658
Work in progress	2 700	2 905
Finished products	2 850	2 663
Total inventories	**6 255**	**6 226**

The amount of inventory recognized as an expense in "Cost of goods sold" in the consolidated income statements during 2016 amounted to USD 10.3 billion (2015: USD 10.5 billion, 2014: USD 11.6 billion).

The group recognized inventory provisions amounting to USD 283 million (2015: USD 356 million, 2014: USD 1.1 billion) and reversed inventory provisions amounting to USD 67 million (2015: USD 148 million, 2014: USD 379 million).

The reversals mainly result from the release of products initially requiring additional quality control inspections and from the reassessment of inventory values manufactured prior to regulatory approval but for which approval was subsequently received.

15. Trade receivables

(USD millions)	**2016**	2015
Total gross trade receivables	8 364	8 322
Provisions for doubtful trade receivables	– 162	– 142
Total trade receivables, net	**8 202**	**8 180**

The following table summarizes the movement in the provision for doubtful trade receivables:

(USD millions)	**2016**	2015	2014
January 1	**– 142**	**– 156**	**– 195**
Provisions for doubtful trade receivables related to discontinued operations			15
Provisions for doubtful trade receivables charged to the consolidated income statement	– 76	– 68	– 92
Utilization or reversal of provisions for doubtful trade receivables	54	71	101
Currency translation effects	2	11	15
December 31	**– 162**	**– 142**	**– 156**

The following sets forth the trade receivables that are not overdue as specified in the payment terms and conditions established with Novartis customers as well as an analysis of overdue amounts and related provisions for doubtful trade receivables:

(USD millions)	**2016**	2015
Not overdue	7 386	7 318
Past due for not more than one month	262	265
Past due for more than one month but less than three months	223	255
Past due for more than three months but less than six months	185	193
Past due for more than six months but less than one year	145	156
Past due for more than one year	163	135
Provisions for doubtful trade receivables	– 162	– 142
Total trade receivables, net	**8 202**	**8 180**

Trade receivable balances include sales to drug wholesalers, retailers, private health systems, government agencies, managed care providers, pharmacy benefit managers and government-supported healthcare systems. Novartis continues to monitor sovereign debt issues and economic conditions in Greece, Italy, Portugal, Spain, Brazil, Russia and Saudi Arabia and evaluates trade receivables in these countries for potential collection risks. The majority of the outstanding trade receivables from these closely monitored countries are due directly from local governments or from government-funded entities except for Russia, which are due from private entities. Deteriorating credit and economic conditions and other factors in these closely monitored countries have resulted in, and may continue to result in an increase in the average length of time that it takes to collect these trade receivables and may require Novartis to re-evaluate the collectability of these trade receivables in future periods.

The gross trade receivables from these closely monitored countries at December 31, 2016 amount to USD 1.5 billion (2015: USD 1.6 billion), of which USD 82 million are past due for more than one year (2015: USD 80 million) and for which provisions of USD 62 million have been recorded (2015: USD 56 million). At December 31, 2016 amounts past due for more than one year are not significant in any of these countries on a standalone basis.

Trade receivables include amounts denominated in the following major currencies:

(USD millions)	**2016**	2015
US dollar (USD)	3 432	3 311
Euro (EUR)	1 366	1 536
Japanese yen (JPY)	567	740
Chinese yuan (CNY)	264	244
British pound (GBP)	160	187
Swiss franc (CHF)	135	124
Other currencies	2 278	2 038
Total trade receivables, net	**8 202**	**8 180**

16. Marketable securities, commodities, time deposits, derivative financial instruments and cash and cash equivalents

Marketable securities, commodities, time deposits and derivative financial instruments

(USD millions)	2016	2015
Debt securities	306	339
Equity securities		6
Fund investments	31	33
Total available-for-sale marketable securities	**337**	**378**
Commodities	94	86
Time deposits with original maturity more than 90 days	108	164
Derivative financial instruments	230	143
Accrued interest on debt securities and time deposits	1	2
Total marketable securities, commodities, time deposits and derivative financial instruments	**770**	**773**

At December 31, 2016 all debt securities are denominated in USD except for USD 12 million in EUR (2015: USD 22 million) and USD 10 million in JPY (2015: nil).

Cash and cash equivalents

(USD millions)	2016	2015
Current accounts	1 912	3 074
Time deposits and short-term investments with original maturity less than 90 days	5 095	1 600
Total cash and cash equivalents	**7 007**	**4 674**

17. Other current assets

(USD millions)	2016	2015
VAT receivable	521	609
Withholding tax recoverable	282	97
Income tax receivables	156	171
Prepaid expenses		
– Third parties	692	617
– Associated companies	5	4
Receivables from associated companies	7	31
Other receivables and current assets	1 034	1 463
Total other current assets	**2 697**	**2 992**

18. Details of share capital and share movements

The following table shows the movement in the share capital:

(USD millions)	Jan 1, 2014	Movement in year	Dec 31, 2014	Movement in year	Dec 31, 2015	Movement in year	**Dec 31, 2016**
Share capital	1 001		1 001	– 10	991	– 19	972
Treasury shares	– 89	– 14	– 103	2	– 101	25	– 76
Outstanding share capital	**912**	**– 14**	**898**	**– 8**	**890**	**6**	**896**

The following table shows the movement in the shares:

(Number of shares) [1]	Jan 1, 2014	Movement in year	Dec 31, 2014	Movement in year	Dec 31, 2015	Movement in year	**Dec 31, 2016**
Total Novartis shares	2 706 193 000		2 706 193 000	– 29 200 000	2 676 993 000	– 49 878 180	2 627 114 820
Total treasury shares	– 280 108 692	– 27 458 051	– 307 566 743	4 468 560	– 303 098 183	50 042 376	– 253 055 807
Total outstanding shares	**2 426 084 308**	**– 27 458 051**	**2 398 626 257**	**– 24 731 440**	**2 373 894 817**	**164 196**	**2 374 059 013**

[1] All shares are voting shares, which are registered, authorized, issued and fully paid

In 2016, Novartis reduced its share capital by cancelling a total of 49.9 million shares which were repurchased during 2015 on the SIX Swiss Exchange second trading line.

During 2016, 13.1 million treasury shares were delivered as a result of options being exercised and physical share deliveries related to equity-based participation plans (2015: 38.9 million shares, 2014: 51.7 million shares). Novartis repurchased 10.3 million shares on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback approved at the Annual General Meeting (AGM) in 2016, to offset the dilutive impact from equity-based participation plans (in 2015 49.9 million shares and in 2014 27.0 million shares under the USD 5 billion share buyback announced in November 2013, which was completed in November 2015). In addition, 2.6 million shares were acquired from employees, which were previously granted to them under the respective programs (2015: 4.1 million, 2014: 5.4 million). No shares were repurchased on the SIX Swiss Exchange first trading line in 2016 (2015: 9.6 million, 2014: 46.8 million). With these transactions, the total number of shares outstanding was increased by 0.2 million shares in 2016 (2015: reduction of 24.7 million shares; 2014: reduction of 27.5 million shares). At December 31, 2016, the market maker held 10 million written call options, originally issued as part of the share-based compensation for associates that have not yet been exercised. The weighted average exercise price of these options is USD 62.40 and they have contractual lives of 10 years.

19. Non-current financial debt

(USD millions)	2016	2015
Straight bonds	17 285	17 193
Liabilities to banks and other financial institutions [1]	708	706
Finance lease obligations	82	87
Total, including current portion of non-current financial debt	**18 075**	**17 986**
Less current portion of non-current financial debt	– 178	– 1 659
Total non-current financial debts	**17 897**	**16 327**

Straight bonds		
5.125% USD 3 000 million bond 2009/2019 of Novartis Securities Investment Ltd., Hamilton, Bermuda, issued at 99.822%	2 995	2 993
4.25% EUR 1 500 million bond 2009/2016 of Novartis Finance S.A., Luxembourg, Luxembourg, issued at 99.757%		1 639
4.4% USD 1 000 million bond 2010/2020 of Novartis Capital Corporation, New York, United States, issued at 99.237%	996	994
2.4% USD 1 500 million bond 2012/2022 of Novartis Capital Corporation, New York, United States, issued at 99.225%	1 490	1 488
3.7% USD 500 million bond 2012/2042 of Novartis Capital Corporation, New York, United States, issued at 98.325%	489	488
3.4% USD 2 150 million bond 2014/2024 of Novartis Capital Corporation, New York, United States, issued at 99.287%	2 132	2 130
4.4% USD 1 850 million bond 2014/2044 of Novartis Capital Corporation, New York, United States, issued at 99.196%	1 823	1 823
0.75% EUR 600 million bond 2014/2021 of Novartis Finance S.A., Luxembourg, Luxembourg, issued at 99.134%	625	650
1.625% EUR 600 million bond 2014/2026 of Novartis Finance S.A., Luxembourg, Luxembourg, issued at 99.697%	627	652
0.25% CHF 500 million bond 2015/2025 of Novartis AG, Basel, Switzerland, issued at 100.64%	491	507
0.625% CHF 550 million bond 2015/2029 of Novartis AG, Basel, Switzerland, issued at 100.502%	539	557
1.050% CHF 325 million bond 2015/2035 of Novartis AG, Basel, Switzerland, issued at 100.479%	318	329
3.0% USD 1 750 million bond 2015/2025 of Novartis Capital Corporation, New York, United States, issued at 99.010%	1 728	1 726
4.0% USD 1 250 million bond 2015/2045 of Novartis Capital Corporation, New York, United States, issued at 98.029%	1 217	1 217
0.125% EUR 1 250 million bond 2016/2023 of Novartis Finance S.A., Luxembourg, Luxembourg, issued at 99.127%	1 299	
0.625% EUR 500 million bond 2016/2028 of Novartis Finance S.A., Luxembourg, Luxembourg, issued at 98.48%	516	
Total straight bonds	**17 285**	**17 193**

[1] Average interest rate 0.4% (2015: 0.7%)

The following tables provide a breakdown of total non-current financial debt, including current portion by maturity and currency:

Breakdown by maturity:

(USD millions)	2016	2015
2016		1 659
2017	178	170
2018	345	335
2019	3 168	3 161
2020	1 000	998
2021	628	658
After 2021	12 756	11 005
Total	**18 075**	**17 986**

Breakdown by currency:

(USD millions)	2016	2015
USD	12 952	12 946
EUR	3 092	2 981
JPY	683	665
CHF	1 348	1 393
Others		1
Total	**18 075**	**17 986**

The following table shows the comparison of balance sheet and fair value of total non-current financial debt, including current portion:

(USD millions)	2016 Balance sheet	2016 Fair values	2015 Balance sheet	2015 Fair values
Straight bonds	17 285	17 943	17 193	17 770
Others	790	790	793	793
Total	**18 075**	**18 733**	**17 986**	**18 563**

The fair values of straight bonds are determined by quoted market prices. Other financial debts are recorded at notional amounts which are a reasonable approximation of the fair values.

The following table shows the collateralized non-current financial debt and pledged assets:

(USD millions)	2016	2015
Total amount of collateralized non-current financial debts		7
Total net book value of property, plant & equipment pledged as collateral for non-current financial debts	94	112

The Group's collateralized non-current financial debt consists of loan facilities at usual market conditions.

The percentage of fixed rate financial debt to total financial debt was 76% at December 31, 2016, and 82% at December 31, 2015.

Financial debts, including current financial debts, contain only general default covenants. The Group is in compliance with these covenants.

The average interest rate on total financial debt in 2016 was 2.8% (2015: 2.9%).

20. Provisions and other non-current liabilities

(USD millions)	**2016**	2015
Accrued liability for employee benefits:		
Defined benefit pension plans [1]	4 490	3 952
Other long-term employee benefits and deferred compensation	545	507
Other post-employment benefits [1]	1 005	960
Environmental remediation provisions	708	791
Provisions for product liabilities, governmental investigations and other legal matters	264	451
Contingent consideration [2]	840	712
Other non-current liabilities	618	671
Total provisions and other non-current liabilities	**8 470**	**8 044**

[1] Note 25 provides additional disclosures related to post-employment benefits.
[2] Note 29 provides additional disclosures related to contingent consideration.

Novartis believes that its total provisions are adequate based upon currently available information. However, given the inherent difficulties in estimating liabilities in this area, Novartis may incur additional costs beyond the amounts provided. Management believes that such additional amounts, if any, would not be material to the Group's financial condition but could be material to the results of operations or cash flows in a given period.

Environmental remediation provisions

The material components of the environmental remediation provisions consist of costs to sufficiently clean and refurbish contaminated sites to the extent necessary, and to treat, and where necessary, continue surveillance at sites where the environmental remediation exposure is less significant. The provision recorded at December 31, 2016, totals USD 0.8 billion (2015: USD 0.9 billion), of which USD 65 million (2015: USD 80 million) is current.

A substantial portion of the environmental remediation provisions relate to the remediation of Basel regional landfills in the adjacent border areas in Switzerland, Germany and France. The provisions are re-assessed on a yearly basis and are adjusted as necessary.

In the United States, Novartis has been named under federal legislation (the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended) as a potentially responsible party (PRP) in respect of certain sites. Novartis actively participates in, or monitors, the clean-up activities at the sites in which it is a PRP. The provision takes into consideration the number of other PRPs at each site, and the identity and financial position of such parties in light of the joint and several nature of the liability.

The following table shows the movements in the environmental liability provisions during 2016, 2015 and 2014:

(USD millions)	**2016**	2015	2014
January 1	**871**	**923**	**1 061**
Cash payments	– 75	– 52	– 33
Releases		– 5	– 6
Additions	1	6	2
Currency translation effects	– 24	– 1	– 101
December 31	**773**	**871**	**923**
Less current provision	– 65	– 80	– 95
Non-current environmental remediation provisions at December 31	**708**	**791**	**828**

The expected timing of the related cash outflows as of December 31, 2016, is currently projected as follows:

(USD millions)	Expected cash outflows
Due within two years	127
Due later than two years, but within five years	76
Due later than five years, but within ten years	427
Due after ten years	143
Total environmental remediation liability provisions	**773**

Provisions for product liabilities, governmental investigations and other legal matters

Novartis has established provisions for certain product liabilities, governmental investigations and other legal matters, where a potential cash outflow is probable and Novartis can make a reliable estimate of the amount of the outflow. These provisions represent the Group's current best estimate of the total financial effect for the matters described below and for other less significant mat-

ters. Potential cash outflows reflected in a provision may be fully or partially off-set by insurance in certain circumstances.

Novartis has not established provisions for potential damage awards for certain additional legal claims against its subsidiaries if Novartis currently believes that a payment is either not probable or cannot be reliably estimated. In total, these not-provisioned-for matters include fewer than 500 individual product liability cases and certain other legal matters. Plaintiffs' alleged claims in these matters, which Novartis does not believe to be entirely remote but which do not fulfill the conditions for the establishment of provisions, currently aggregate to, according to Novartis' current best belief, approximately USD 1.5 billion. In addition, in some of these matters there are claims for punitive or multiple (treble) damages, civil penalties and disgorgement of profits that in Novartis' view are either wholly or partially unspecified or wholly or partially unquantifiable at present; the Group believes that information about these amounts claimed by plaintiffs generally is not meaningful for purposes of determining a reliable estimate of a loss that is probable or more than remote.

A number of other legal matters are in such early stages or the issues presented are such that the Group has not made any provisions since it cannot currently estimate either a potential outcome or the amount of any potential losses. For these reasons, among others, the Group generally is unable to make a reliable estimate of possible loss with respect to such cases. It is therefore not practicable to provide information about the potential financial impact of those cases.

There might also be cases for which the Group was able to make a reliable estimate of the possible loss or the range of possible loss, but the Group believes that publication of such information on a case-by-case basis would seriously prejudice the Group's position in ongoing legal proceedings or in any related settlement discussions. Accordingly, in such cases, information has been disclosed with respect to the nature of the contingency, but no disclosure is provided as to an estimate of the possible loss or range of possible loss.

Note 28 contains additional information on contingencies.

Summary of significant legal proceedings

The following is a summary of significant legal proceedings to which Novartis or its subsidiaries are a party or were a party and that concluded in 2016.

Investigations and related litigations

SOUTHERN DISTRICT OF NEW YORK (S.D.N.Y.) MARKETING PRACTICES INVESTIGATION AND LITIGATION

In April 2013, the US government filed a civil complaint in intervention to an individual *qui tam* action against Novartis Pharmaceuticals Corporation (NPC) in the United States District Court (USDC) for the S.D.N.Y. involving several of NPC's cardiovascular medications. The suit is related to a previously disclosed 2011 investigation of the United States Attorney's Office (USAO) for the S.D.N.Y. relating to marketing practices, including the remuneration of healthcare providers, in connection with three NPC products (*Lotrel*, *Starlix* and *Valturna*). The complaint, as subsequently amended, asserts federal False Claims Act and common law claims with respect to speaker programs and other promotional activities for certain NPC cardiovascular medications allegedly serving as mechanisms to provide kickbacks to healthcare professionals (HCPs). It seeks unspecified damages, which according to the complaint are "substantial", including treble damages and maximum civil penalties per claim, as well as disgorgement of Novartis profits from the alleged unlawful conduct. In August 2013, New York State filed a civil complaint in intervention asserting similar claims. Neither government complaint in intervention adopted the individual relator's claims with respect to off-label promotion of *Valturna*, which were subsequently dismissed with prejudice by the court. The individual relator continues to litigate the kickback claims on behalf of other states and municipalities. NPC vigorously contests the S.D.N.Y., New York State and individual claims, both as to alleged liability and amount of damages and penalties.

S.D.N.Y. / WESTERN DISTRICT OF NEW YORK HEALTHCARE FRAUD INVESTIGATION

In 2011, Alcon Laboratories, Inc. (ALI) received a subpoena from the United States Department of Health & Human Services relating to an investigation into allegations of healthcare fraud. The subpoena requests the production of documents relating to marketing practices, including the remuneration of healthcare providers, in connection with certain ALI products (*Vigamox*, *Nevanac*, *Omnipred*, *Econopred*; surgical equipment). ALI is cooperating with this investigation.

S.D.N.Y. *GILENYA* MARKETING PRACTICES INVESTIGATION

In 2013, NPC received a civil investigative demand from the USAO for the S.D.N.Y. requesting the production of documents and information relating to marketing practices for *Gilenya*, including the remuneration of healthcare providers in connection therewith. NPC is cooperating with this investigation.

NEW YORK STATE PRICING POLICY INVESTIGATION

In November 2014, ALI received a civil subpoena from the New York state attorney general relating to an investigation into a unilateral pricing policy program. ALI is cooperating with this investigation.

EASTERN DISTRICT OF PENNSYLVANIA (E.D. PA.) GENERIC PRICING ANTITRUST INVESTIGATION, ANTITRUST CLASS ACTIONS

In March 2016, Sandoz Inc. received a subpoena from the Antitrust Division of the US Department of Justice (DoJ) requesting documents related to the marketing and pricing of generic pharmaceutical products sold by Sandoz Inc. and its subsidiaries, including Fougera Pharmaceuticals, Inc. (Fougera), and related communications with competitors. Sandoz Inc. is cooperating with this investigation which it believes to be part of a broader inquiry into industry practice.

Since September 2016, Sandoz Inc., Fougera, Lek Pharmaceuticals d.d., Novartis AG (NAG), and Novartis International AG (NIAG) have been sued alongside other generic pharmaceutical companies in more than 25 putative class actions in the S.D.N.Y. and E.D. Pa. alleging that defendants engaged in anti-competitive conduct with regard to the sales of various generic drugs, asserting violations of federal and state antitrust laws as well as consumer protection laws. The claims are being vigorously contested.

DISTRICT OF MASSACHUSETTS (D. MASS.) CHARITABLE FOUNDATION INVESTIGATION

In May 2016, NPC received a subpoena from the USAO for the D. Mass. requesting documents related to NPC's support of 501(c)(3) organizations that provide co-payment assistance to Medicare patients who are prescribed Novartis medicines, as well as related to pricing strategies related to *Gleevec*. NPC is cooperating with this investigation which it believes to be part of a broader inquiry into industry practices.

LUCENTIS/AVASTIN® MATTERS IN ITALY AND FRANCE

In 2013, the Italian Competition Authority (ICA) opened an investigation to assess whether Novartis Farma S.p.A., NAG, F. Hoffmann-La Roche AG, Genentech Inc. and Roche S.p.A. colluded to artificially preserve the market positions of Avastin® and *Lucentis*. In March 2014, the ICA imposed a fine equivalent to USD 125 million on NAG and Novartis Farma S.p.A. and a fine on F. Hoffmann-La Roche AG and Roche S.p.A. equivalent to USD 122 million. As required by Italian law, Novartis paid the ICA fine, subject to the right to later claim recoupment. Novartis is appealing against the fines before the Consiglio di Stato (CdS) which has referred five legal questions to the European Court of Justice (ECJ) for a preliminary ruling. The ECJ's judgment is pending. Novartis is also appealing at the CdS the decision of the Tribunale amministrativo regionale del Lazio which has upheld a decision by the Italian Medicines Agency to include Avastin® in a list of drugs to be reimbursed off-label for age-related macular degeneration (AMD). The CdS has referred four legal questions to the ECJ for a preliminary ruling. The ECJ's judgment is pending. In the second quarter of 2014, the Italian Ministry of Health indicated in a letter that it intended to seek a total equivalent of approximately USD 1.2 billion in damages from Novartis and Roche entities based on the above allegations, and in the first quarter of 2015 the Lombardia region sent a payment request equivalent to approximately USD 61 million.

In 2014, the French Competition Authority opened an investigation against Novartis Groupe France with respect to the French market for anti-vascular endothelial growth factor (VEGF) products indicated for the treatment of wet AMD. Novartis' appeal against the Authority's inspection was rejected by the Supreme Court in 2016. Also in France, Novartis' appeal is pending against a temporary recommendation of use and reimbursement of off-label Avastin® for neovascular AMD by hospital ophthalmologists, in force since September 2015. Novartis' appeal against the decree on which the recommendation is based was rejected by the Administrative Supreme Court in 2016. In both Italy and France, Novartis believes that allowing the widespread off-label use and reimbursement of Avastin®, despite the presence of available licensed alternatives, would result in a breach of applicable regulations. Novartis continues to vigorously contest all claims in Italy and France.

JAPAN INVESTIGATION

In December 2015, trial started against a former Novartis Pharma K.K. (NPKK) employee, and also NPKK under the dual liability concept in Japanese law, over allegations brought by the Tokyo District Public Prosecutor Office in two counts for alleged manipulation of data in sub-analysis publications of the Kyoto Heart Study regarding valsartan. The charges against NPKK are subject to a maximum total fine of JPY 4 million.

SOUTH KOREA INVESTIGATION

In Q1 2016, the Seoul Western District Prosecutor initiated a criminal investigation into, among other things, allegations that Novartis Korea utilized medical journals to provide inappropriate economic benefits to HCPs. In September 2016, a criminal trial began concerning the Prosecutor's allegations that Novartis Korea utilized medical journals to provide inappropriate economic benefits to HCPs. Separately, upon request by the Prosecutor's office, the Korea Fair Trade Commission is investigating whether sponsorships by Novartis Korea of HCPs to overseas academic conferences constitute a violation of fair trade laws. In addition, the Ministry of Food and Drug Safety and the Ministry of Health and Welfare are also reviewing the matter and are evaluating administrative sanctions on Novartis Korea.

GREECE INVESTIGATION

Novartis is investigating allegations of potentially inappropriate economic benefits in Greece to HCPs and others. Information has been provided to the Greek authorities by Novartis (Hellas) S.A.C.I. related to these allegations. Novartis is also responding to document requests from the US Securities and Exchange Commission (SEC) and DoJ in connection with such allegations and is cooperating with their investigation.

Antitrust class actions

SOLODYN®

Since the third quarter of 2013, seventeen putative class action complaints and three other complaints have been filed against manufacturers of the brand drug Solodyn® and its generic equivalent, including Sandoz Inc. The cases have been consolidated and transferred for pretrial purposes to the federal district court in Mass. The plaintiffs purport to represent direct and indirect purchasers of Solodyn® branded products and assert violations of federal and state antitrust laws, including allegations in connection with separate settlements by Medicis with each of the other defendants, including Sandoz Inc., of patent litigation relating to Solodyn®. Sandoz is vigorously contesting the claims.

CONTACT LENSES

Since March 2015, more than 50 putative class action complaints have been filed in several courts across the US naming contact-lens manufacturers, including ALI, and alleging violations of federal antitrust law as well as state antitrust, consumer protection and unfair competition laws of various states in connection with the sale of contact lenses. The cases have been consolidated in the Middle District of Florida by the Judicial Panel on Multidistrict Litigation and the claims are being vigorously contested.

GLEEVEC

Since June 2015, NPC, Novartis Corporation (NC) and NAG have been sued in five putative antitrust class action complaints alleging that Novartis unlawfully obtained delayed generic entry of *Gleevec*. The initial complaint seeking to prevent Novartis from enforcing the agreement with Sun Pharmaceuticals was dismissed in the first quarter of 2016. Plaintiffs have filed a consolidated amended complaint in the D. Mass. seeking damages on behalf of all indirect purchasers of *Gleevec* in 24 different states based on alleged violations of the respective state antitrust laws. In November 2016, a similar class action complaint was filed in the same court on behalf of direct purchasers of *Gleevec*. The claims are being vigorously contested.

ENOXAPARIN

In October 2015, Sandoz and Momenta Pharmaceuticals were sued in a putative antitrust class action in federal court in Tennessee alleging that Momenta and Sandoz engaged in anticompetitive conduct with regard to sales of enoxaparin, and the same allegations were made by Amphastar in a lawsuit filed in federal court in California and subsequently moved to federal court in Mass. (Sandoz, Momenta Pharmaceuticals and Amphastar are currently engaged in patent litigation concerning enoxaparin in federal court in Mass.). The claims are being vigorously contested.

Other matters

AVERAGE WHOLESALE PRICE (AWP) LITIGATION

Lawsuits have been brought, the latest in February 2016, by various US state governmental entities and private parties against various pharmaceutical companies, including certain Sandoz entities and NPC, alleging that they fraudulently overstated the AWP that is or has been used by payors, including state Medicaid agencies, to calculate reimbursements to healthcare providers. In 2016, the Mississippi Supreme Court denied Sandoz' motion for reconsideration of its decision which had upheld the USD 30 million Chancery Court verdict against Sandoz. NPC remains a defendant in an action brought by the state of Illinois and in a putative class action brought by private payors in New Jersey, and Sandoz is a defendant in an individual and a putative class action in Pennsylvania. The claims are being vigorously contested.

RECLAST/ACLASTA PRODUCT LIABILITY LITIGATION

NPC is a defendant in 22 US product liability actions involving *Reclast* and alleging atypical femur fracture injuries and osteonecrosis of the jaw, most of which are in New Jersey state or federal court coordinated with claims against other bisphosphonate manufacturers. After the Saskatchewan and Alberta putative class actions were discontinued by plaintiffs in 2016 and 2017, one Canadian putative class action brought against numerous bisphosphonate manufacturers including NPC, Novartis Pharmaceuticals Canada Inc. and NIAG remains pending in Quebec. All claims are being vigorously contested.

ORIEL LITIGATION

In October 2013, Shareholder Representative Services LLC filed a complaint in New York State Court against Sandoz Inc., two affiliates and two former officers of Sandoz AG asserting various common law and statutory contract, fraud and negligent misrepresentation claims arising out of Sandoz Inc.'s purchase of Oriel Therapeutics, Inc. In March 2015, the court dismissed all parties and claims but for a breach of contract claim against Sandoz Inc. Sandoz Inc. continues to vigorously contest the claim.

EYE DROP PRODUCTS CONSUMER CLASS ACTIONS

Since November 2012, six putative consumer fraud class action litigations were commenced against Alcon (and in four of those cases, Sandoz) in federal courts in the Southern Districts of Illinois and Florida and the Districts of Missouri, Mass. and New Jersey (D.N.J.). They claim that Alcon's, Sandoz's and many other manufacturer defendants' eye drop products for glaucoma were deceptively designed so that the drop dosage is more than necessary to be absorbed in the eye or there is too much solution in each bottle for the course of one-month's treatment, leading to wastage and higher costs to patient consumers. Three cases remain pending against Alcon (and two against Sandoz) at the US Court of Appeals for the Third and Sixth Circuits and in the D. Mass. and D.N.J. Novartis is vigorously contesting the claims.

Concluded legal matters

NORTHERN DISTRICT OF TEXAS (NDTX) INVESTIGATION

In 2016, Alcon achieved civil settlements with the US Office of Foreign Assets Control (OFAC) and with the US Department of Commerce's Bureau of Industry and Security to pay a total of USD 9.4 million in civil monetary penalties. The settlements relate to the sale and export of medical end-use surgical and pharmaceutical products that were licensable and in fact had been previously and subsequently licensed by OFAC for Alcon. The USAO for the NDTX has advised Alcon that it has closed its investigation without taking action.

CHINA INVESTIGATIONS

After reports of Chinese government investigations of other pharmaceutical companies for alleged improper use of certain China-based travel agencies to reward healthcare providers, Novartis commenced an internal

investigation in 2013 concerning its local affiliates' relationships with China-based travel agencies (and other vendors). In March 2016, NAG achieved a civil settlement with the SEC to pay USD 25 million to settle charges that it violated the internal controls and books-and-records provisions of the Foreign Corrupt Practices Act, without admitting or denying the findings. Novartis also agreed for two years to report to the SEC on the status of its remediation and anti-corruption compliance.

ITALY *MF59* INVESTIGATION

In May 2014, the public prosecutor of Siena had initiated a criminal investigation with respect to allegations that the transfer price of the adjuvant *MF59* was unlawfully marked up. The investigation concerned whether the *Focetria* vaccine sold to the government was over-priced and whether the Italian Ministry of Health paid an inflated amount in a dispute settlement relating to the supply of *Focetria* during the 2009 pandemic. Having found no elements to sustain the charges at trial, in 2016 the Judicial Authority of Siena issued a decree of dismissal of the investigation.

METOCLOPRAMIDE PRODUCT LIABILITY LITIGATION

Sandoz is a defendant, along with numerous brand and generic manufacturers of Reglan® (metoclopramide), in 376 product liability actions in the state courts in Pennsylvania and California claiming that the use of metoclopramide caused personal injuries including tardive dyskinesia. All cases are in the process of being resolved through voluntary dismissal or settlement, the payment of which is not material to Novartis.

***TEKTURNA/RASILEZ/VALTURNA* PRODUCT LIABILITY LITIGATION**

NPC and certain other Novartis affiliates had been defendants in 12 individual lawsuits pending in the USDC for the D.N.J., and one in Alberta, Canada, claiming that treatment with *Tekturna*, *Rasilez* and/or *Valturna* caused renal failure, kidney disease or stroke. In 2016, the D.N.J. cases have been resolved through settlement, the payment of which was not material to Novartis. The remaining Alberta case is being vigorously contested, but is not material to Novartis.

***EQUA* ARBITRATION**

In 2013, Sanofi K.K. had commenced an arbitration against NPKK relating to the termination of a co-promotion agreement in Japan of *Equa* (*Galvus*), which is used to treat type 2 diabetes. The matter was concluded in 2016.

***QUI TAM* ACTIONS**

NPC was a defendant in a relator's *qui tam* action in the USDC for the E.D. Pa. asserting federal and state False Claims Act claims relating to certain alleged marketing practices involving Elidel®. The federal government and several states had declined to intervene in the relator's action. In 2016, NPC settled this matter with the relator, the federal government and eight states for an amount not material to Novartis.

In 2006, 2010 and 2012, *qui tam* complaints were filed in D. Mass. asserting various federal False Claims Act and state claims relating to certain alleged improper marketing practices involving *Xolair* against various Novartis, Genentech and Roche entities. In 2011, the US and various state governments declined to intervene in the relators' actions, and closed their investigations. In June 2014, the relator in the 2010 action voluntarily dismissed his complaint with prejudice; the US and various states subsequently consented to the dismissal. In the second quarter of 2016, the Court of Appeals affirmed a decision by the USDC for the D. Mass. which had dismissed with prejudice all federal claims in connection with alleged improper marketing practices asserted by the relators; the Court of Appeals remanded relators' state claims to the district court for dismissal without prejudice. Two similar complaints were filed in October 2016 in state courts in New York and Mass. Novartis continues to vigorously contest the claims, but they are not material to Novartis.

EMPLOYMENT ACTION

In March 2015, ALI and NC had been sued in an individual and collective action filed in the S.D.N.Y. The claims had asserted inter alia gender discrimination, pay discrimination and retaliation at Alcon. In 2016, the parties have finalized a class settlement and settlements for the individual plaintiffs for amounts that were not material to Novartis.

Summary of product liability, governmental investigations and other legal matters provision movements

(USD millions)	**2016**	2015	2014
January 1	**1 194**	**849**	**924**
Provisions related to discontinued operations			– 37
Cash payments	– 811	– 256	– 454
Releases of provisions	– 239	– 223	– 135
Additions to provisions	243	832	549
Currency translation effects	8	– 8	2
December 31	**395**	**1 194**	**849**
Less current portion	– 131	– 743	– 328
Non-current product liabilities, governmental investigations and other legal matters provisions at December 31	**264**	**451**	**521**

Novartis believes that its total provisions for investigations, product liability, arbitration and other legal matters are adequate based upon currently available information. However, given the inherent difficulties in estimating liabilities, there can be no assurance that additional liabilities and costs will not be incurred beyond the amounts provided.

21. Current financial debt and derivative financial instruments

(USD millions)	2016	2015
Interest-bearing accounts of associates payable on demand	1 601	1 645
Bank and other financial debt	836	1 185
Commercial paper	3 174	1 085
Current portion of non-current financial debt	178	1 659
Fair value of derivative financial instruments	116	30
Total current financial debt and derivative financial instruments	**5 905**	**5 604**

The consolidated balance sheet amounts of current financial debt, other than the current portion of non-current financial debt, approximate the estimated fair value due to the short-term nature of these instruments.

The weighted average interest rate on the bank and other current financial debt (including employee deposits from the compensation of associates employed by Swiss entities) was 3.0% in 2016 and 2.7% in 2015.

Details on commercial papers are provided in Note 29 – Liquidity risk.

22. Provisions and other current liabilities

(USD millions)	2016	2015
Taxes other than income taxes	547	551
Restructuring provisions	222	260
Accrued expenses for goods and services received but not invoiced	880	1 124
Accruals for royalties	550	550
Provisions for deductions from revenue	4 183	3 790
Accruals for compensation and benefits including social security	1 993	1 932
Environmental remediation liabilities	65	80
Deferred income	287	385
Provisions for product liabilities, governmental investigations and other legal matters [1]	131	743
Accrued share-based payments	199	209
Contingent considerations [2]	49	78
Other payables	722	1 017
Total provisions and other current liabilities	**9 828**	**10 719**

[1] Note 20 provides additional disclosures related to legal provisions
[2] Note 29 provides additional disclosures related to contingent consideration

Provisions are based upon management's best estimate and adjusted for actual experience. Such adjustments to the historic estimates have not been material.

Provisions for deductions from revenue

The following table shows the movement of the provisions for deductions from revenue:

(USD millions)	**2016**	2015	2014
January 1	**3 790**	**3 533**	**4 182**
Provisions related to discontinued operations			– 234
Impact of business combinations		3	
Additions	16 622	15 603	14 119
Payments/utilizations	– 16 189	– 15 218	– 13 907
Changes in offset against gross trade receivables	10	50	– 420
Currency translation effects	– 50	– 181	– 207
December 31	**4 183**	**3 790**	**3 533**

Restructuring provisions movements

(USD millions)	**2016**	2015	2014
January 1	**260**	**333**	**174**
Provisions related to discontinued operations			– 4
Additions	343	399	504
Cash payments	– 260	– 435	– 295
Releases	– 66	– 36	– 52
Transfers	– 76		
Currency translation effects	21	– 1	6
December 31	**222**	**260**	**333**

In 2016, additions to provisions of USD 343 million were mainly related to the following reorganizations:

— The Innovative Medicines division Pharmaceuticals business unit, realigned its operations to improve its operating agility, to focus resources on key growth drivers. Furthermore, research is realigning and focusing its operations resulting in redundancies from the consolidation of certain research teams and the outsourcing of certain activities to qualified third party vendors.
— Alcon division launched several initiatives to improve its efficiencies resulting in redundancies, as it realigns its operations to focus on its surgical and vision care business franchises after the transfer of its ophthalmic pharmaceuticals business to Innovative Medicines division.
— Sandoz division launched an initiative to reallocate resources to priority, high growth and higher profitability countries.
— Various groupwide initiatives to simplify organizational structure, including consolidation of manufacturing sites and support services.

In 2015, additions to provisions of USD 399 million were mainly related to the following reorganizations:

— Innovative Medicines division implemented a restructuring program targeted at efficiency gains in the business franchises, other than in Oncology. It also initiated initiatives related to the integration of the oncology business acquired from GSK.
— Alcon division extended its initiative started in the prior year to realize productivity opportunities.
— Various groupwide initiatives to simplify the organizational structure, mainly related to the manufacturing footprint and support services.

In 2014, additions to provisions of USD 504 million were mainly related to the following reorganizations:

— Innovative Medicines division initiatives in drug development targeted at establishing an organizational model for its activities that allows for greater focus on high priority programs in specialty medicines, more flexibility to adapt to changes in the portfolio, and which strengthens operational excellence. Furthermore Innovative Medicines implemented a program targeted at increasing operational leverage.
— Alcon division established an initiative to realize productivity opportunities.
— Various groupwide initiatives to simplify organizational structure, including consolidation of manufacturing sites and support services.

23. Details to the consolidated cash flow statements

23.1) Adjustments for non-cash items from continuing operations

(USD millions)	2016	2015	2014
Taxes	1 119	1 106	1 545
Depreciation, amortization and impairments on:			
Property, plant & equipment	1 591	1 550	1 630
Intangible assets	4 452	3 921	3 052
Financial assets [1]	132	104	69
Income from associated companies	– 703	– 266	– 1 918
Gains on disposal of property, plant & equipment, intangible, financial and other non-current assets, net	– 935	– 869	– 622
Equity-settled compensation expense	671	773	744
Change in provisions and other non-current liabilities	956	1 642	1 490
Net financial expense	1 154	1 109	735
Total	**8 437**	**9 070**	**6 725**

[1] Including unrealized fair value gains

23.2) Cash flows from changes in working capital and other operating items included in operating cash flow from continuing operations

(USD millions)	2016	2015	2014
(Increase) in inventories	– 235	– 482	– 506
(Increase) in trade receivables	– 229	– 513	– 367
(Decrease)/Increase in trade payables	– 587	378	142
Change in other net current assets and other operating cash flow items	974	– 246	106
Total	**– 77**	**– 863**	**– 625**

23.3) Cash flows arising from acquisitions and divestments of businesses

The following is a summary of the cash flow impact of acquisitions and divestments. The most significant transactions are described in Note 2.

(USD millions)	**2016 Acquisitions**	**2016 Divestments**	2015 Acquisitions	2015 Divestments	2014 Acquisitions	2014 Divestments
Property, plant & equipment				1 000		145
Currently marketed products	– 451		– 12 970	646	– 234	91
(Acquired)/divested research & development	– 690		– 730	13	– 248	
Technologies				113		
Other intangible assets			– 15	86		
Financial and other assets including deferred tax assets [1]	– 39		– 555	40	– 53	7
Inventories	– 4			893	– 1	87
Trade receivables and other current assets	– 1		– 3	529	– 3	159
Cash and cash equivalents	– 1		– 25	311	– 2	
Current and non-current financial debts				– 601		
Trade payables and other liabilities including deferred tax liabilities	372		212	– 841	186	– 50
Net identifiable assets (acquired) or divested	**– 814**		**– 14 086**	**2 189**	**– 355**	**439**
Currency translation effects				98		– 3
Acquired/(divested) liquidity	1		25	– 479	2	
Fair value of previously held equity interests	64					
Subtotal	**– 749**		**– 14 061**	**1 808**	**– 353**	**436**
Refinancing of intercompany financial debt, net				578		
Goodwill [1]	– 56		– 2 438	1 042	– 131	267
Divestment gain				7 401		876
Taxes paid and other portfolio transformation related cash flows		– 748		– 1 337		– 566
Receivables and payables contingent consideration, net [2]	84		– 8	– 519	153	
Other payments and deferred consideration, net	– 44					
(Deferred)/prepaid portion of sales price [3]				– 49		47
Net cash flows	**– 765**	**– 748**	**– 16 507**	**8 924**	**– 331**	**1 060**
Of which:						
Net cash flows used in/from discontinued operations		– 748		8 924		1 060
Net cash flows used in continuing operations	– 765		– 16 507		– 331	

[1] 2014 Acquisitions include an adjustment regarding a previous acquisition to deferred tax assets of USD 21 million and goodwill of USD 135 million.
[2] The contingent consideration of the 2016 Transcend Medical, Inc. acquisition amounted to USD 92 million. Of this amount, USD 60 million has been paid in 2016.
[3] Divestments include USD 49 million proceeds for the divestment of the Animal Health business received in 2014.

Notes 2 and 24 provide further information regarding acquisitions and divestments of businesses. All acquisitions were for cash.

23.4) Cash flows from discontinued operations

(USD millions)	**2016**	2015	2014
Cash flows used in operating activities		**– 188**	**– 1**
Purchase of property, plant & equipment		– 41	– 223
Proceeds from sales of property, plant & equipment		1	4
Purchase of intangible assets			– 18
Proceeds from sales of intangible assets			79
Purchase of financial and other non-current assets, net		– 2	– 13
Divestments of businesses [1]	– 748	8 924	1 060
Cash flows used in/from investing activities	**– 748**	**8 882**	**889**
Total net cash flows used in/from discontinued operations	**– 748**	**8 694**	**888**

[1] 2016 includes mainly payments for capital gains taxes and other payments related to the portfolio transformation transaction. 2015 includes proceeds of USD 10 925 million reduced by USD 2 001 million, for payments of capital gains taxes, transaction-related costs and purchase price adjustments. 2014 includes the net proceeds related to the divestment of the blood transfusion diagnostics unit.

24. Acquisitions of businesses

Fair value of assets and liabilities arising from acquisitions

(USD millions)	**2016**	2015	2014
Currently marketed products	451	12 970	234
Acquired research & development	690	730	248
Other intangible assets		15	
Deferred tax assets [1]	39	555	53
Inventories	4		1
Trade receivables and other current assets	1	3	3
Cash and cash equivalents	1	25	2
Payables and other liabilities including deferred tax liabilities	– 372	– 212	– 186
Net identifiable assets acquired	**814**	**14 086**	**355**
Acquired liquidity	– 1	– 25	– 2
Goodwill [1]	56	2 438	131
Net assets recognized as a result of business combinations	**869**	**16 499**	**484**

[1] 2014 Acquisitions include an adjustment regarding a previous acquisition to deferred tax assets of USD 21 million and goodwill of USD 135 million.

Note 2 details significant acquisition of businesses, which in 2016 were Transcend and Selexys, in 2015, were the GSK Oncology products, Spinifex and Admune and in 2014 CoStim and WaveTech. The goodwill arising out of these acquisitions is attributable to buyer specific synergies, assembled workforce and to the accounting for deferred tax liabilities on the acquired assets. Goodwill of USD 18 million from 2016 and of USD 2.4 billion from 2015 is tax deductible.

25. Post-employment benefits for associates

Defined benefit plans

In addition to the legally required social security schemes, the Group has numerous independent pension and other post-employment benefit plans. In most cases, these plans are externally funded in entities that are legally separate from the Group. For certain Group companies, however, no independent plan assets exist for the pension and other post-employment benefit obligations of associates. In these cases the related unfunded liability is included in the balance sheet. The defined benefit obligations (DBOs) of all major pension and other post-employment benefit plans are reappraised annually by independent actuaries. Plan assets are recognized at fair value. The major plans are based in Switzerland, the United States, the United Kingdom, Germany and Japan, which represent 95% of the Group's total DBO for pension plans. Details of the plans in the two most significant countries of Switzerland and the US are provided below.

Swiss-based pension plans represent the most significant portion of the Group's total DBO and plan assets. For the active insured members born on or after January 1, 1956, or having joined the plans after December 31, 2010, the benefits are partially linked to the contributions paid into the plan. Certain features of Swiss pension plans required by law preclude the plans being categorized as defined contribution plans. These factors include a minimum interest guarantee on retirement savings accounts, a pre-determined factor for converting the accumulated savings account balance into a pension and embedded death and disability benefits.

All benefits granted under Swiss-based pension plans are vested, and Swiss legislation prescribes that the employer has to contribute a fixed percentage of an associate's pay to an external pension fund. Additional employer contributions may be required whenever the plan's statutory funding ratio falls below a certain level. The associate also contributes to the plan. The pension plans are run by separate legal entities, each governed by a Board of Trustees, which, for the principal plans, consists of representatives nominated by Novartis and the active insured associates. The Boards of Trustees are responsible for the plan design and asset investment strategy.

In June 2015, the Board of Trustees of the Novartis Swiss Pension Fund agreed to adjust the annuity conversion rate at retirement with effect from January 1, 2016. This amendment did not have an impact on existing members receiving benefits or on plan members born before January 1, 1956. This amendment resulted in a net pre-tax curtailment gain of USD 110 million (CHF 103 million) recognized in the 2015 financial statements.

The US pension plans represent the second largest component of the Group's total DBO and plan assets. The principal plans (Qualified Plans) are funded, whereas plans providing additional benefits for executives (Restoration Plans) are unfunded. Employer contributions are required for Qualified Plans whenever the statutory funding ratio falls below a certain level. Furthermore, associates in the US are covered under other post-employment benefit plans and post-retirement medical plans.

The following tables are a summary of the funded and unfunded defined benefit obligation for pension and other post-employment benefit plans of associates at December 31, 2016 and 2015:

	Pension plans		Other post-employment benefit plans	
(USD millions)	**2016**	2015	**2016**	2015
Benefit obligation at January 1	**23 402**	**24 178**	**1 132**	**1 253**
Current service cost	437	451	35	32
Interest cost	390	399	48	46
Past service costs and settlements	– 73	– 138		
Administrative expenses	29	23		
Remeasurement losses/(gains) arising from changes in financial assumptions	1 299	– 16	46	– 34
Remeasurement (gains) arising from changes in demographic assumptions	– 7	– 41	– 26	– 30
Experience-related remeasurement losses/(gains)	117	56	– 33	– 110
Currency translation effects	– 896	– 358	7	– 14
Benefit payments	– 1 250	– 1 406	– 51	– 50
Contributions of associates	207	223		
Effect of acquisitions, divestments or transfers	– 41	31		39
Benefit obligation at December 31	**23 614**	**23 402**	**1 158**	**1 132**
Fair value of plan assets at January 1	**19 536**	**20 434**	**172**	**199**
Interest income	293	300	6	6
Return on plan assets excluding interest income	742	– 286	– 1	– 6
Currency translation effects	– 757	– 223		
Novartis Group contributions	542	494	27	23
Contributions of associates	207	223		
Settlements	– 77	– 3		
Benefit payments	– 1 250	– 1 406	– 51	– 50
Effect of acquisitions, divestments or transfers	– 11	3		
Fair value of plan assets at December 31	**19 225**	**19 536**	**153**	**172**
Funded status	**– 4 389**	**– 3 866**	**– 1 005**	**– 960**
Limitation on recognition of fund surplus at January 1	**– 50**	**– 58**		
Change in limitation on recognition of fund surplus (incl. exchange rate differences)		12		
Interest income on limitation of fund surplus	– 4	– 4		
Limitation on recognition of fund surplus at December 31	**– 54**	**– 50**		
Net liability in the balance sheet at December 31	**– 4 443**	**– 3 916**	**– 1 005**	**– 960**

The reconciliation of the net liability from January 1 to December 31 is as follows:

	Pension plans		Other post-employment benefit plans	
(USD millions)	**2016**	2015	**2016**	2015
Net liability at January 1	**– 3 916**	**– 3 802**	**– 960**	**– 1 054**
Current service cost	– 437	– 451	– 35	– 32
Net interest expense	– 101	– 103	– 42	– 40
Administrative expenses	– 29	– 23		
Past service costs and settlements	– 4	135		
Remeasurements	– 667	– 285	12	168
Currency translation effects	139	135	– 7	14
Novartis Group contributions	542	494	27	23
Effect of acquisitions, divestments or transfers	30	– 28		– 39
Change in limitation on recognition of fund surplus		12		
Net liability at December 31	**– 4 443**	**– 3 916**	**– 1 005**	**– 960**

Amounts recognized in the consolidated balance sheet				
Prepaid benefit cost	47	36		
Accrued benefit liability	– 4 490	– 3 952	– 1 005	– 960

The following table shows a breakdown of the DBO for pension plans by geography and type of member and the breakdown of plan assets into the geographical locations in which they are held:

	2016				2015			
(USD millions)	Switzerland	United States	Rest of the world	Total	Switzerland	United States	Rest of the world	Total
Benefit obligation at December 31	**15 436**	**3 783**	**4 395**	**23 614**	**15 453**	**3 783**	**4 166**	**23 402**
Thereof unfunded		*739*	*497*	*1 236*		*736*	*466*	*1 202*
By type of member								
Active	6 426	891	1 460	8 777	6 196	990	1 392	8 578
Deferred pensioners		831	1 515	2 346		909	1 489	2 398
Pensioners	9 010	2 061	1 420	12 491	9 257	1 884	1 285	12 426
Fair value of plan assets at December 31	**13 958**	**2 282**	**2 985**	**19 225**	**14 347**	**2 358**	**2 831**	**19 536**
Funded status	**– 1 478**	**– 1 501**	**– 1 410**	**– 4 389**	**– 1 106**	**– 1 425**	**– 1 335**	**– 3 866**

The following table shows the principal weighted average actuarial assumptions used for calculating defined benefit plans and other post-employment benefits of associates:

	Pension plans			Other post-employment benefit plans		
	2016	2015	2014	**2016**	2015	2014
Weighted average assumptions used to determine benefit obligations at December 31						
Discount rate	1.4%	1.8%	1.8%	4.2%	4.4%	3.8%
Expected rate of pension increase	0.4%	0.4%	0.4%			
Expected rate of salary increase	2.2%	2.9%	3.2%			
Interest on savings account	0.5%	0.8%	0.9%			
Current average life expectancy for a 65-year-old male/female	22/24 years	21/24 years	21/24 years	21/23 years	21/23 years	22/24 years

Changes in the aforementioned actuarial assumptions can result in significant volatility in the accounting for the Group's pension plans in the consolidated financial statements. This can result in substantial changes in the Group's other comprehensive income, long-term liabilities and prepaid pension assets.

The DBO is significantly impacted by assumptions regarding the rate that is used to discount the actuarially determined post-employment benefit liability. This rate is based on yields of high-quality corporate bonds in the country of the plan. Decreasing corporate bond yields decrease the discount rate, so that the DBO increases and the funded status decreases.

In Switzerland, an increase in the DBO due to lower discount rates is slightly offset by lower future benefits expected to be paid on the associate's savings account where the assumption on interest accrued changes in line with the discount rate.

The impact of decreasing interest rates on a plan's assets is more difficult to predict. A significant part of the plan assets is invested in bonds. Bond values usually rise when interest rates decrease and may therefore partially compensate for the decrease in the funded status. Furthermore, pension assets also include significant holdings of equity instruments. Share prices tend to rise when interest rates decrease and therefore often counteract the negative impact of the rising defined benefit obligation on the funded status (although the correlation of interest rates with equities is not as strong as with bonds, especially in the short term).

The expected rate for pension increases significantly affects the DBO of most plans in Switzerland, Germany and the United Kingdom. Such pension increases also decrease the funded status, although there is no strong correlation between the value of the plan assets and pension/inflation increases.

Assumptions regarding life expectancy significantly impact the DBO. An increase in longevity increases the DBO. There is no offsetting impact from the plan assets, as no longevity bonds or swaps are held by the pension funds. Generational mortality tables are used where this data is available.

The following table shows the sensitivity of the defined benefit pension obligation to the principal actuarial assumptions for the major plans in Switzerland, the United States, the United Kingdom, Germany and Japan on an aggregated basis:

(USD millions)	Change in 2016 year-end defined benefit pension obligation
25 basis point increase in discount rate	– 767
25 basis point decrease in discount rate	814
1 year increase in life expectancy	830
25 basis point increase in rate of pension increase	524
25 basis point decrease in rate of pension increase	– 130
25 basis point increase of interest on savings account	65
25 basis point decrease of interest on savings account	– 64
25 basis point increase in rate of salary increase	69
25 basis point decrease in rate of salary increase	– 72

The healthcare cost trend rate assumptions used for other post-employment benefits are as follows:

	2016	2015	2014
Healthcare cost trend rate assumed for next year	7.0%	7.5%	7.0%
Rate to which the cost trend rate is assumed to decline	5.0%	5.0%	5.0%
Year that the rate reaches the ultimate trend rate	2022	2022	2021

The following table shows the weighted average plan asset allocation of funded defined benefit pension plans at December 31, 2016 and 2015:

	Pension plans		
(as a percentage)	Long-term target	2016	2015
Equity securities	15–40	31	34
Debt securities	20–60	35	35
Real estate	5–20	15	14
Alternative investments	0–20	15	14
Cash and other investments	0–15	4	3
Total		**100**	**100**

Cash and most of the equity and debt securities have a quoted market price in an active market. Real estate and alternative investments, which include hedge fund and private equity investments, usually do not have a quoted market price.

The strategic allocation of assets of the different pension plans is determined with the objective of achieving an investment return that, together with the contributions paid by the Group and its associates, is sufficient to maintain reasonable control over the various funding risks of the plans. Based upon the market and economic environments, actual asset allocations may temporarily be permitted to deviate from policy targets. The asset allocation currently includes investments in shares of Novartis AG, which, at December 31, 2016 totaled 11 million shares with a market value of USD 0.8 billion (2015: 11 million shares with a market value of USD 1.0 billion). The weighted average duration of the defined benefit obligation is 14.5 years (2015: 14.1 years).

The Group's ordinary contribution to the various pension plans is based on the rules of each plan. Additional contributions are made whenever this is required by statute or law (i.e., usually when statutory funding levels fall below pre-determined thresholds). The only significant plans that are foreseen to require additional funding are those in the United Kingdom.

The expected future cash flows in respect of pension and other post-employment benefit plans at December 31, 2016, were as follows:

(USD millions)	Pension plans	Other post-employment benefit plans
Novartis Group contributions		
2017 (estimated)	434	62
Expected future benefit payments		
2017	1 262	63
2018	1 209	65
2019	1 208	67
2020	1 208	69
2021	1 198	70
2022–2026	5 882	361

Defined contribution plans

In many subsidiaries associates are covered by defined contribution plans. Contributions charged to the 2016 consolidated income statement for the defined contribution plans were USD 338 million (2015: USD 359 million; 2014: USD 348 million). The 2015 and 2014 amount excludes USD 1 million and USD 14 million, respectively, related to discontinued operations.

26. Equity-based participation plans for associates

The expense related to all equity-based participation plans in the 2016 consolidated income statement was USD 846 million (2015: USD 968 million; 2014: USD 1.1 billion), resulting in total liabilities arising from equity-based payment transactions of USD 199 million (2015: USD 209 million; 2014: USD 277 million, of which USD 248 million was recognized in continuing operations). In 2015 and 2014, out of the total expense an amount of USD 903 million and USD 1.0 billion was recognized in continuing operations and USD 65 million and USD 124 million was recognized in discontinued operations.

Equity-based participation plans can be separated into the following plans:

Annual Incentive

The Annual Incentive of the Novartis Group CEO and the other Executive Committee members is paid 50% in cash in February or March of the year following the performance period, and 50% in Novartis restricted shares or Restricted Share Units (RSUs) that are granted in January of the year following the performance period, deferred and restricted for three years. In 2016, this Annual Incentive was extended to Novartis Top Leaders (NTLs). The payout will be 70% in cash and 30% in Novartis restricted shares or RSUs. Each restricted share is entitled to voting rights and payment of dividends

during the vesting period. Each RSU is equivalent to one Novartis share and is converted into one share at the vesting date. RSUs do not carry any dividend, dividend equivalent or voting rights. The executives may elect to also receive their cash incentive partially or fully in shares or share units that will not be subject to vesting conditions. In 2016, 396 executives participate in the plan.

Share savings plans

A number of associates in certain countries as well as certain key executives worldwide are encouraged to invest their Annual Incentive, and in the United Kingdom also their salary, in a share savings plan. Under the share savings plan, participants may elect to receive their Annual Incentive fully or partially in Novartis shares in lieu of cash. As a reward for their participation in the share savings plan, at no additional cost to the participant, Novartis matches their investments in shares after a holding period of three or five years.

Novartis currently has three share savings plans:

- Worldwide, 35 key executives were invited to participate in the Leveraged Share Savings Plan (LSSP) based on their performance in 2015. At the participant's election, the Annual Incentive is awarded partly or entirely in shares. The elected number of shares was delivered in 2016 and is subject to a holding period of five years. At the end of the holding period, Novartis will match the invested shares at a ratio of 1-to-1 (i.e. one share awarded for each invested share). In the US both the LSSP award and the corresponding match are cash settled.
- In Switzerland, the Employee Share Ownership Plan (ESOP) was available to 12 253 associates in 2015. ESOP participants may choose to receive their Annual Incentive (i) 100% in shares, (ii) 50% in shares and 50% in cash or (iii) 100% in cash. After expiration of a three-year holding period for Novartis shares invested under the ESOP, each participant will receive one matching share for every two Novartis shares invested. A total of 6 173 associates chose to receive shares under the ESOP for their performance in 2015 and the invested shares were delivered in 2016.
- In the United Kingdom, 1 540 associates can invest up to 5% of their monthly salary in shares (up to a maximum of GBP 125) and also may be invited to invest all or part of their net Annual Incentive in shares. Two invested shares are matched with one share with a holding period of three years. During 2016, 1 227 participants elected to participate in this plan.

Following the introduction of the new compensation programs in 2014, the Novartis Group CEO and the other Executive Committee members are no longer eligible to participate in the share savings plans. From the 2016 performance period onwards, the NTLs are also no longer eligible to participate in these share savings plans.

Associates may only participate in one of these plans in any given year.

Novartis Equity Plan "Select"

The Equity Plan "Select" is a global equity incentive plan under which eligible associates, including Executive Committee members up to performance year 2013 and NTLs up to performance year 2015, may annually be awarded a grant subject to a three year vesting period. No awards are granted for performance ratings below a certain threshold.

The Equity Plan "Select" currently allows its participants in Switzerland to choose the form of their equity compensation in restricted shares or restricted share units (RSUs). In all other jurisdictions, RSUs are typically granted. Until 2013, participants could also choose to receive part or the entire grant in the form of tradable share options.

Tradable share options expire on their 10th anniversary from the grant date. Each tradable share option entitles the holder to purchase after vesting (and before the 10th anniversary from the grant date) one Novartis share at a stated exercise price that equals the closing market price of the underlying share at the grant date.

Options under Novartis Equity Plan "Select" outside North America

The following table shows the activity associated with the share options during the period. The weighted average prices in the table below are translated from Swiss Francs into USD at historical rates.

	2016		2015	
	Options (millions)	Weighted average exercise price (USD)	Options (millions)	Weighted average exercise price (USD)
Options outstanding at January 1	**11.7**	**59.9**	**16.1**	**59.2**
Sold or exercised	– 2.2	61.8	– 4.1	56.7
Forfeited or expired			– 0.3	66.0
Outstanding at December 31	**9.5**	**59.4**	**11.7**	**59.9**
Exercisable at December 31	**9.5**	**59.4**	**7.4**	**56.4**

All share options were granted at an exercise price which was equal to the closing market price of the Group's shares at the grant date. The weighted average share price at the dates of sale was USD 75.2.

The following table summarizes information about share options outstanding at December 31, 2016:

	Options outstanding		
Range of exercise prices (USD)	Number outstanding (millions)	Average remaining contractual life (years)	Weighted average exercise price (USD)
45–49	0.7	2.0	46.7
50–54	1.2	3.0	54.4
55–59	4.2	3.2	57.7
65–70	3.4	6.0	66.0
Total	**9.5**	**4.1**	**59.4**

Options under Novartis equity plan "Select" for North America

The following table shows the activity associated with the American Depositary Receipts (ADR) options during the period:

	2016		2015	
	ADR options (millions)	Weighted average exercise price (USD)	ADR options (millions)	Weighted average exercise price (USD)
Options outstanding at January 1	**31.9**	**60.2**	**44.4**	**59.6**
Sold or exercised	– 6.0	61.7	– 11.8	57.8
Forfeited or expired			– 0.7	63.3
Outstanding at December 31	**25.9**	**59.9**	**31.9**	**60.2**
Exercisable at December 31	**25.9**	**59.9**	**19.2**	**56.3**

All ADR options were granted at an exercise price which was equal to the closing market price of the ADRs at the grant date. The weighted average ADR price at the dates of sale or exercise was USD 77.7.

The following table summarizes information about ADR options outstanding at December 31, 2016:

	ADR options outstanding		
Range of exercise prices (USD)	Number outstanding (millions)	Average remaining contractual life (years)	Weighted average exercise price (USD)
45–49	2.1	2.0	46.4
50–54	2.5	3.0	53.7
55–59	11.0	4.0	58.0
65–69	10.3	6.0	66.1
Total	**25.9**	**4.5**	**59.9**

Long-Term Performance Plans

In 2014, a new Long-Term Performance Plan (LTPP) was introduced for the Novartis Group CEO and other key executives designed to not only drive long-term shareholder value, but also innovation. From 2015 onwards, this LTPP was extended to all NTLs.

The rewards of the LTPP are based on three-year performance objectives focused on financial and innovation measures. The financial measure is Novartis Cash Value Added (NCVA). The weighting of this measure is 75%. The NCVA target is approved by the Board of Directors.

The innovation measure is based on an holistic approach under which divisional innovation targets are set at the beginning of the cycle, comprised of up to ten target milestones that represent the most important research and development project milestones for each division. At the end of the performance period, the Research & Development Committee assists the Board of Directors and the Compensation Committee in evaluating performance against the innovation targets at the end of the cycle. The weighting of this measure is 25%.

Until 2014 (2013 for the Novartis Group CEO and other key executives), the OLTPP was available. The rewards are based on rolling three year performance objectives focused on the Novartis Economic Value Added (NVA). The NVA is calculated based on Group operating income and income from associated companies adjusted for interest, taxes and cost of capital charge. The performance realization of a plan cycle is obtained right after the end of the third plan year by adding together the annual NVA realizations of all plan years of the plan cycle. The performance ratio for a plan cycle is obtained by dividing the performance realization for the plan cycle with the performance target for the plan cycle, expressing the result as a percentage. The OLTPP only allows a payout if the actual NVA exceeds predetermined target thresholds. The payout is capped at 200% of target.

Under the LTPP and OLTPP, participants are granted a target number of Performance Share Units (PSUs) at the beginning of every performance period, which are converted into Novartis shares after the performance period. PSUs granted under the LTPP do not carry voting rights, but do carry dividend equivalents that are reinvested in additional PSUs and paid at vesting to the extent that performance conditions have been met. PSUs granted under the OLTPP do not carry any dividend, dividend equivalent or voting rights.

At the end of the three-year performance period, the Compensation Committee adjusts the target number of PSUs earned based on actual performance. PSUs are converted into unrestricted Novartis shares without an additional vesting period.

In 2016, 375 key executives received PSU grants under LTPP. No PSUs were granted in 2016 and 2015 under the OLTPP.

Long-Term Relative Performance Plan

The Long-Term Relative Performance Plan (LTRPP) was introduced in 2014, and is an equity plan for the Novartis Group CEO and other key executives. From 2016 onwards, NTLs are also participating in this plan. For the 2016 grant the target incentive is 125% of base compensation for the Novartis Group CEO and ranges from 30% to 80% for other Executive Committee members. It is capped at 200% of target. LTRPP is based on the achievement of long-term Group Total Shareholder Return (TSR) versus our peer group of 12 companies in the healthcare industry over rolling three-year performance periods. TSR is calculated in USD as share price growth plus dividends over the three-year performance period. The calculation will be based on Bloomberg standard published TSR data, which is publicly available. The position in the peer group determines the payout range.

In 2016, 366 executives received PSU grants under the LTRPP.

Other share awards

Selected associates, excluding the Executive Committee members, may exceptionally receive Special Share Awards of restricted shares or RSUs. These Special Share Awards provide an opportunity to reward outstanding achievements or exceptional performance and aim at retaining key contributors. They are based on a formal internal selection process, in which the individual performance of each candidate is thoroughly assessed at several management levels. Special Share Awards generally have a five-year vesting period. In exceptional circumstances, Special Share Awards may be rewarded to attract special expertise and new talents into the organization. These grants are consistent with market practice and Novartis' philosophy to attract, retain and motivate best-in-class talents around the world.

Worldwide, 532 associates at different levels in the organization were awarded restricted shares and RSUs in 2016.

In addition, in 2016, Board members received unrestricted shares as part of their regular compensation.

Summary of non-vested share movements

The table below provides a summary of non-vested share movements (restricted shares, RSUs and PSUs) for all plans:

	2016			2015		
	Number of shares in millions	Weighted average fair value at grante date in USD	Fair value at grante date in USD millions	Number of shares in millions	Weighted average fair value at grante date in USD	Fair value at grante date in USD millions
Non-vested shares at January 1	**20.1**	**87.1**	**1 751**	**24.2**	**70.4**	**1 703**
Granted						
– Annual incentive	0.1	73.8	7	0.1	96.6	10
– Share savings plans	4.4	78.1	344	5.0	89.6	448
– Select North America	4.8	72.4	348	3.9	98.8	385
– Select outside North America	1.6	74.4	119	1.7	96.7	165
– Long-Term Performance Plan	1.2	79.2	95	0.7	81.0	57
– Long-Term Relative Performance Plan	0.3	58.5	18	0.1	55.8	6
– Other share awards	0.7	65.8	46	0.9	95.1	86
Vested	– 10.4	68.8	– 716	– 14.4	67.3	– 969
Forfeited	– 1.8	73.1	– 132	– 2.1	66.7	– 140
Non-vested shares at December 31	**21.0**	**89.5**	**1 880**	**20.1**	**87.1**	**1 751**

Alcon, Inc., equity plans granted to associates prior to the merger

At the completion of the merger of Alcon, Inc., into Novartis on April 8, 2011, all awards outstanding under the Alcon equity plans were converted into awards based upon Novartis shares with a conversion factor of 3.0727 as defined in the Merger Agreement. The plans are fully vested.

Share options entitle the recipient to purchase Novartis shares at the closing market price of the former Alcon, Inc., share on the day of grant divided by the conversion factor.

Share-settled appreciation rights (SSAR) entitle the participant to receive, in the form of Novartis shares, the difference between the values of the former Alcon, Inc., share at the date of grant, converted into Novartis shares using the conversion factor, and the Novartis share price at the date of exercise.

The following table shows the activity associated with the converted Novartis share options and SSARs during 2016 and 2015:

	Number of options (millions)	Weighted average exercise price (USD)	Number of SSARs (millions)	Weighted average exercise price (USD)
Outstanding at January 1, 2015	**0.7**	**30.1**	**2.4**	**35.6**
Exercised	– 0.5	27.4	– 0.6	32.5
Outstanding at December 31, 2015	**0.2**	**36.8**	**1.8**	**36.6**
Exercisable at December 31, 2015	**0.2**	**36.8**	**1.8**	**36.6**
Outstanding at January 1, 2016	**0.2**	**36.8**	**1.8**	**36.6**
Exercised	– 0.1	37.6	– 0.4	38.9
Outstanding at December 31, 2016	**0.1**	**36.0**	**1.4**	**35.9**
Exercisable at December 31, 2016	**0.1**	**36.0**	**1.4**	**35.9**

27. Transactions with related parties

Genentech/Roche

Novartis has two agreements with Genentech, Inc., USA, a subsidiary of Roche Holding AG which is indirectly included in the consolidated financial statements using equity accounting since Novartis holds 33.3% of the outstanding voting shares of Roche.

LUCENTIS

Novartis has licensed the exclusive rights to develop and market *Lucentis* outside the United States for indications related to diseases of the eye. As part of this agreement, Novartis paid Genentech/Roche an initial milestone and shared the cost for the subsequent development by making additional milestone payments upon the achievement of certain clinical development points and product approval. Novartis also pays royalties on the net sales of *Lucentis* products outside the United States. In 2016, *Lucentis* sales of USD 1.8 billion (2015: USD 2.1 billion, 2014: USD 2.4 billion) have been recognized by Novartis.

XOLAIR

In February 2004, Novartis Pharma AG, Genentech, Inc., and Tanox, Inc., finalized a three-party collaboration to govern the development and commercialization of certain anti-IgE antibodies including *Xolair* and TNX-901. Under this agreement, all three parties co-developed *Xolair*. On August 2, 2007, Genentech, Inc. completed the acquisition of Tanox, Inc. and has taken over its rights and obligations. Novartis and Genentech/Roche are co-promoting *Xolair* in the United States where Genentech/Roche records all sales. Novartis records sales outside of the United States.

Novartis markets *Xolair* and records all sales and related costs outside the United States as well as co-promotion costs in the United States. Genentech/Roche and Novartis share the resulting profits from sales in the United States, Europe and other countries, according to agreed profit-sharing percentages. In 2016, Novartis recognized total sales of *Xolair* of USD 835 million (2015: USD 755 million, 2014: USD 777 million) including sales to them for the United States market.

The net expense for royalties, cost sharing and profit sharing arising out of the *Lucentis* and *Xolair* agreements with Genentech/Roche totaled USD 217 million in 2016 (2015: USD 309 million, 2014: USD 536 million).

Furthermore, Novartis has several patent license, supply and distribution agreements with Roche.

Executive Officers and Non-Executive Directors Compensation

During 2016, there were 14 Executive Committee members ("Executive Officers"), including those who stepped down during the year (11 members in 2015 and 14 members in 2014 also including those who stepped down).

The total compensation for members of the Executive Committee and the 13 Non-Executive Directors (12 in 2015, 14 in 2014) using the Group's accounting policies for equity-based compensation and pension benefits was as follows:

	Executive Officers			Non-Executive Directors			Total		
(USD millions)	**2016**	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Benefits other than equity-based compensation	20.8	17.1	18.3	4.0	4.7	6.2	24.8	21.8	24.5
Post-employment benefits	2.2	1.9	2.1			0.1	2.2	1.9	2.2
Equity-based compensation	46.2	52.9	81.7	4.6	4.4	4.9	50.8	57.3	86.6
Total	**69.2**	**71.9**	**102.1**	**8.6**	**9.1**	**11.2**	**77.8**	**81.0**	**113.3**

During 2016, there was a decrease in the IFRS compensation expense for Executive Officers compared to 2015. This was mainly due to lower equity-based compensation expense attributable to lower performance factors, which was partially offset by higher benefits other than equity-based compensation resulting from the increase in the number of Executive Officers.

During 2015, there was a decrease in the IFRS compensation expense for Executive Officers compared to 2014 mainly due to the decrease in number of Executive Officers.

The annual incentive award, which is fully included in equity-based compensation even when paid out in cash, is granted in January in the year following the reporting period.

The disclosures required by the Swiss Code of Obligations and in accordance with the Swiss Ordinance against Excessive Compensation in Stock Exchange Listed Companies on Board and Executive compensation are shown in the Compensation Report.

Transactions with former members of the Board of Directors

During 2016, 2015 and 2014, the following payments (or waivers of claims) were made to former Board members or to "persons closely" linked to them:

Prof. Dr. William R. Brody and Prof. Dr. Rolf M. Zinkernagel, who stepped down from the Board of Directors at the 2014 AGM, received delegated Board membership fees for their work on the Boards of the Novartis Institute for Tropical Diseases (Prof. Dr. Zinkernagel) and the Genomics Institute of the Novartis Research Foundation (Prof. Dr. Brody and Prof. Dr. Zinkernagel). During 2016, an amount of CHF 25 000 (2015: CHF 100 000) and CHF 50 000 (2015: CHF 200 000) was paid to Prof. Dr. Brody and Prof. Dr. Zinkernagel, respectively, for their work on these Boards. No further payments related to these Board memberships will be made, as their respective mandates have ended.

Dr. Alex Krauer, Honorary Chairman, is entitled to an amount of CHF 60 000 for annual periods from one AGM to the next. This amount was fixed in 1998 upon his departure from the Board in 1999, and has not been revised since that date. An amount of CHF 60 000 was paid to Dr. Krauer during 2016 and 2015. Due to a change in the timing of payments, an amount of CHF 45 000 was paid to Dr. Krauer, during 2014.

In 2016, Dr. Daniel Vasella, Honorary Chairman, received the contractual minimum compensation of USD 250 000 (2015: USD 250 000, 2014: USD 363 552) under an agreement which became effective on November 1, 2013 and ended in 2016. Under this agreement, Dr. Vasella is compensated at a rate of USD 25 000 per day, with an annual guaranteed minimum fee of USD 250 000. This amount is in line with compensation practices at other large companies when retired Chairmen or CEOs were retained in consulting agreements after leaving the board of directors.

In 2014, Dr. Vasella acquired an asset from a consolidated entity at fair value and exercised an option to acquire, at a future date, real estate in Risch, Zug, Switzerland. The real estate transaction closed in 2015 and Dr. Vasella acquired the Group assets from a consolidated entity for an arm's length transaction price determined on the basis of two independent external assessments.

Transactions with an Executive Officer prior to start of employment

As announced on September 24, 2015, Dr. James E. Bradner succeeded Dr. Mark Fishman as President of the Novartis Institutes for BioMedical Research (NIBR) and member of the ECN with effect from March 1, 2016. In 2015, a subsidiary acquired Dr. Bradner's 10 million shares (7% interest) in a non-material entity for USD 10 million. The arm's length transaction price was determined based on the most recent round of financing of this entity.

The above disclosures related to Dr. Vasella and Dr. Bradner are made on a voluntary basis.

28. Commitments and contingencies

Leasing commitments

The Group has entered into various fixed term operational leases, mainly for cars and real estate. As of December 31, 2016 the Group's commitments with respect to these leases, including estimated payment dates, were as follows:

(USD millions)	2016
2017	262
2018	192
2019	132
2020	104
2021	82
Thereafter	2 125
Total	**2 897**
Expense of current year	**335**

Research & Development commitments

The Group has entered into long-term research agreements with various institutions which provide for potential milestone payments by Novartis that may be capitalized. As of December 31, 2016 the Group's commitments to make payments under those agreements, and their estimated timing, were as follows:

(USD millions)	2016
2017	385
2018	465
2019	389
2020	771
2021	1 512
Thereafter	653
Total	**4 175**

Other commitments

The Novartis Group entered into various purchase commitments for services and materials as well as for equipment in the ordinary course of business. These commitments are generally entered into at current market prices and reflect normal business operations.

Contingencies

Group companies have to observe the laws, government orders and regulations of the country in which they operate.

A number of Novartis companies are, and will likely continue to be, subject to various legal proceedings and investigations that arise from time to time, including proceedings regarding product liability, sales and marketing practices, commercial disputes, employment, and wrongful discharge, antitrust, securities, health and safety, environmental, tax, international trade, privacy, and intellectual property matters. As a result, the Group may become subject to substantial liabilities that may not be covered by insurance and could affect our business, financial position and reputation. While Novartis does not believe that any of these legal proceedings will have a material adverse effect on its financial position, litigation is inherently unpredictable and large judgments sometimes occur. As a consequence, Novartis may in the future incur judgments or enter into settlements of claims that could have a material adverse effect on its results of operations or cash flow.

Governments and regulatory authorities around the world have been stepping up their compliance and law enforcement activities in recent years in key areas, including marketing practices, pricing, corruption, trade restrictions, embargo legislation, insider trading, antitrust, cyber security and data privacy. Further, when one government or regulatory authority undertakes an investigation, it is not uncommon for other governments or regulators to undertake investigations regarding the same or similar matters. Responding to such investigations is costly and requires an increasing amount of management's time and attention. In addition, such investigations may affect our reputation, create a risk of potential exclusion from government reimbursement programs in the US and other countries, and may lead to (or arise from) litigation. These factors have contributed to decisions by Novartis and other companies in the healthcare industry, when deemed in their interest, to enter into settlement agreements with governmental authorities around the world prior to any formal decision by the authorities or a court. Those government settlements have involved and may continue to involve, in current government investigations and proceedings, large cash payments, sometimes in the hundreds of millions of dollars or more, including the potential repayment of amounts allegedly obtained improperly and other penalties, including treble damages. In addition, settlements of government healthcare fraud cases often require companies to enter into corporate integrity agreements, which are intended to regulate company behavior for a period of years. Our affiliate Novartis Pharmaceuticals Corporation is a party to such an agreement, which will expire in 2020. Also, matters underlying governmental investigations and settlements may be the subject of separate private litigation.

While provisions have been made for probable losses, which management deems to be reasonable or appropriate, there are uncertainties connected with these estimates.

Note 20 contains additional information on these matters.

A number of Group companies are involved in legal proceedings concerning intellectual property rights. The inherent unpredictability of such proceedings means that there can be no assurances as to their ultimate outcome. A negative result in any such proceeding could potentially adversely affect the ability of certain Novartis companies to sell their products or require the payment of substantial damages or royalties.

In the opinion of management, however, the outcome of these actions will not materially affect the Group's financial position but could be material to the results of operations or cash flow in a given period.

The Group's potential environmental remediation liability is assessed based on a risk assessment and investigation of the various sites identified by the Group as at risk for environmental remediation exposure. The Group's future remediation expenses are affected by a number of uncertainties. These uncertainties include, but are not limited to, the method and extent of remediation, the percentage of material attributable to the Group at the remediation sites relative to that attributable to other parties, and the financial capabilities of the other potentially responsible parties.

Note 20 contains additional information on environmental liabilities.

29. Financial instruments – additional disclosures

(USD millions)	Note	**2016**[1]	2015[1]
Cash and cash equivalents	16	**7 007**	**4 674**
Financial assets – measured at fair value through other comprehensive income			
Available-for-sale marketable securities			
Debt securities	16	306	339
Equity securities	16		6
Fund investments	16	31	33
Total available-for-sale marketable securities		**337**	**378**
Available-for-sale long-term financial investments			
Equity securities	13	989	1 173
Fund investments	13	107	90
Contingent consideration receivables	13	586	550
Total available-for-sale long-term financial investments		**1 682**	**1 813**
Total financial assets – measured at fair value through other comprehensive income		**2 019**	**2 191**
Financial assets – measured at amortized costs			
Trade receivables and other current assets (excluding pre-payments)	15/17	10 202	10 551
Accrued interest on debt securities and time deposits	16	1	2
Time deposits with original maturity more than 90 days	16	108	164
Long-term loans and receivables from customers and finance lease, advances, security deposits	13	514	653
Total financial assets – measured at amortized costs		**10 825**	**11 370**
Financial assets – measured at fair value through the consolidated income statement			
Associated companies at fair value through profit and loss		188	181
Derivative financial instruments	16	230	143
Total financial assets – measured at fair value through the consolidated income statement		**418**	**324**
Total financial assets		**20 269**	**18 559**
Financial liabilities – measured at amortized costs			
Current financial debt			
Interest-bearing accounts of associates payable on demand	21	1 601	1 645
Bank and other financial debt	21	836	1 185
Commercial paper	21	3 174	1 085
Current portion of non-current debt	21	178	1 659
Total current financial debt		**5 789**	**5 574**
Non-current financial debt			
Straight bonds	19	17 285	17 193
Liabilities to banks and other financial institutions	19	708	706
Finance lease obligations	19	82	87
Current portion of non-current debt	19	– 178	– 1 659
Total non-current financial debt		**17 897**	**16 327**
Trade payables		**4 873**	**5 668**
Total financial liabilities – measured at amortized costs		**28 559**	**27 569**
Financial liabilities – measured at fair value through the consolidated income statement			
Contingent consideration (see Note 20/22) and other financial liabilities		1 018	1 105
Derivative financial instruments	21	116	30
Total financial liabilities – measured at fair value through the consolidated income statement		**1 134**	**1 135**
Total financial liabilities		**29 693**	**28 704**

[1] Except for straight bonds (see Note 19), the carrying amount is a reasonable approximation of fair value.

Derivative financial instruments

The following tables show the contract or underlying principal amounts and fair values of derivative financial instruments analyzed by type of contract at December 31, 2016 and 2015. Contract or underlying principal amounts indicate the gross volume of business outstanding at the consolidated balance sheet date and do not represent amounts at risk. The fair values are determined by reference to market prices or standard pricing models that use observable market inputs at December 31, 2016 and 2015.

	Contract or underlying principal amount		Positive fair values		Negative fair values	
(USD millions)	**2016**	2015	**2016**	2015	**2016**	2015
Currency-related instruments						
Forward foreign exchange rate contracts	8 220	8 795	230	142	– 116	– 30
Over-the-Counter currency options		459		1		
Total of currency-related instruments	**8 220**	**9 254**	**230**	**143**	**– 116**	**– 30**
Total derivative financial instruments included in marketable securities and in current financial debts	**8 220**	**9 254**	**230**	**143**	**– 116**	**– 30**

The following table shows by currency contract or underlying principal amount the derivative financial instruments at December 31, 2016 and 2015:

	2016				
(USD millions)	EUR	USD	JPY	Other	Total
Currency-related instruments					
Forward foreign exchange rate contracts	3 623	3 427	43	1 127	8 220
Total derivative financial instruments	**3 623**	**3 427**	**43**	**1 127**	**8 220**

	2015				
(USD millions)	EUR	USD	JPY	Other	Total
Currency-related instruments					
Forward foreign exchange rate contracts	2 828	4 713	42	1 212	8 795
Over-the-Counter currency options	459				459
Total of currency-related instruments	**3 287**	**4 713**	**42**	**1 212**	**9 254**
Total derivative financial instruments	**3 287**	**4 713**	**42**	**1 212**	**9 254**

Derivative financial instruments effective for hedge accounting purposes

At the end of 2016 and 2015, there were no open hedging instruments for anticipated transactions.

Fair value by hierarchy

As required by IFRS, financial assets and liabilities recorded at fair value in the consolidated financial statements are categorized based upon the level of judgment associated with the inputs used to measure their fair value. There are three hierarchical levels, based on an increasing amount of subjectivity associated with the inputs to derive fair valuation for these assets and liabilities, which are as follows:

The assets carried at Level 1 fair value are equity and debt securities listed in active markets.

The assets generally included in Level 2 fair value hierarchy are foreign exchange and interest rate derivatives and certain debt securities. Foreign exchange and interest rate derivatives are valued using corroborated market data. The liabilities generally included in this fair value hierarchy consist of foreign exchange and interest rate derivatives.

Level 3 inputs are unobservable for the asset or liability. The assets generally included in Level 3 fair value hierarchy are various investments in hedge funds and unquoted equity security investments. Contingent consideration carried at fair value is included in this category.

	2016				
(USD millions)	Level 1	Level 2	Level 3	Valued at amortized cost	Total
Financial assets					
Debt securities	284	22			306
Fund investments	31				31
Total available-for-sale marketable securities	**315**	**22**			**337**
Time deposits with original maturity more than 90 days				108	108
Derivative financial instruments		230			230
Accrued interest on debt securities				1	1
Total marketable securities, time deposits and derivative financial instruments	**315**	**252**		**109**	**676**
Available-for-sale financial investments	513		476		989
Fund investments			107		107
Contingent consideration receivables			586		586
Long-term loans and receivables from customers and finance lease, advances, security deposits				514	514
Financial investments and long-term loans	**513**		**1 169**	**514**	**2 196**
Associated companies at fair value through profit and loss			**188**		**188**
Financial liabilities					
Contingent consideration payables			– 889		– 889
Other financial liabilities			– 129		– 129
Derivative financial instruments		– 116			– 116
Total financial liabilities at fair value		**– 116**	**– 1 018**		**– 1 134**

	2015				
(USD millions)	Level 1	Level 2	Level 3	Valued at amortized cost	Total
Financial assets					
Debt securities	316	23			339
Equity securities	6				6
Fund investments	29		4		33
Total available-for-sale marketable securities	**351**	**23**	**4**		**378**
Time deposits with original maturity more than 90 days				164	164
Derivative financial instruments		143			143
Accrued interest on debt securities				2	2
Total marketable securities, time deposits and derivative financial instruments	**351**	**166**	**4**	**166**	**687**
Available-for-sale financial investments	700		473		1 173
Fund investments			90		90
Contingent consideration receivables			550		550
Long-term loans and receivables from customers and finance lease, advances, security deposits				653	653
Financial investments and long-term loans	**700**		**1 113**	**653**	**2 466**
Associated companies at fair value through profit and loss			**181**		**181**
Financial liabilities					
Contingent consideration payables			– 790		– 790
Other financial liabilities			– 315		– 315
Derivative financial instruments		– 30			– 30
Total financial liabilities at fair value		**– 30**	**– 1 105**		**– 1 135**

The analysis above includes all financial instruments including those measured at amortized cost or at cost.

The change in carrying values associated with Level 3 financial instruments using significant unobservable inputs during the year ended December 31 are set forth below:

	2016					
(USD millions)	Associated companies at fair value through profit and loss	Fund investments	Available-for-sale financial investments	Contingent consideration receivables	Contingent consideration payables	Other financial liabilities
January 1	**181**	**94**	**473**	**550**	**– 790**	**– 315**
Fair value gains and other adjustments, including from divestments recognized in the consolidated income statement	26		1	51		3
Fair value losses (including impairments and amortizations) and other adjustments recognized in the consolidated income statement	– 28	– 1	– 24		– 156	
Fair value adjustments recognized in the consolidated statement of comprehensive income		14	– 8			
Purchases	41	5	122		– 172	
Cash receipts and payments				– 15	229	183
Disposals	– 3	– 5	– 18			
Reclassification	– 29		– 70			
December 31	**188**	**107**	**476**	**586**	**– 889**	**– 129**
Total of fair value gains and losses recognized in the consolidated income statement for assets and liabilities held at December 31, 2016	– 2	– 1	– 23	51	– 156	3

	2015					
(USD millions)	Associated companies at fair value through profit and loss	Fund investments	Available-for-sale financial investments	Contingent consideration receivables	Contingent consideration payables	Other financial liabilities
January 1	**168**	**77**	**332**		**– 756**	
Impact of business combinations				75		
Fair value gains and other adjustments, including from divestments recognized in the consolidated income statement	9	7	41	1 000		
Fair value losses (including impairments and amortizations) and other adjustments recognized in the consolidated income statement	– 25	– 1	– 35	– 75	– 57	– 587
Fair value adjustments recognized in the consolidated statement of comprehensive income		17	22			
Purchases	62	24	142		– 255	
Cash receipts and payments				– 450	278	272
Disposals		– 15	– 56			
At equity investments reclassified due to loss of significant influence			18			
Reclassification	– 33	– 15	9			
December 31	**181**	**94**	**473**	**550**	**– 790**	**– 315**
Total of fair value gains and losses recognized in the consolidated income statement for assets and liabilities held at December 31, 2015	– 16	6	6	925	– 57	– 587

During 2016, there were several individually non-significant transfers of available-for-sale financial investments from level 3 to level 1 for USD 75 million mainly due to Initial Public Offerings of the invested companies. No significant transfers from one level to the other occurred during the 2015 reporting period.

Realized gains and losses associated with Level 3 available-for-sale marketable securities are recorded in the consolidated income statement under "Other financial income and expense" and realized gains and losses associated with Level 3 available-for-sale financial investments are recorded in the consolidated income statement under "Other income" or "Other expense", respectively.

If the pricing parameters for the Level 3 input were to change for associated companies at fair value through profit and loss, equity securities, fund investments and for available-for-sale financial investments by 10% positively or negatively, this would change the amounts recorded in the consolidated statement of comprehensive income by USD 77 million.

For the determination of the fair value of a contingent consideration various unobservable inputs are used. A change in these inputs might result in a significantly higher or lower fair value measurement. The significance and usage of these inputs may vary among the existing contingent considerations due to differences in the triggering events for payments or in the nature of the asset the contingent consideration relates to. Among others, the inputs used are the probability of success, sales forecast and assumptions regarding the discount rate, timing and different scenarios of triggering events. The inputs are interrelated. If the most significant parameters for the Level 3 input were to change by 10% positively or negatively, or where the probability of success (POS) is the most significant input parameter 10% were added or deducted from the applied probability of success, for contingent consideration payables, other financial liabilities and contingent consideration receivables, this would change the amounts recorded in the consolidated income statement by USD 207 million and USD 182 million, respectively.

Nature and extent of risks arising from financial instruments

Market risk

Novartis is exposed to market risk, primarily related to foreign currency exchange rates, interest rates and the market value of the investments of liquid funds. The Group actively monitors and seeks to reduce, where it deems it appropriate to do so, fluctuations in these exposures. It is the Group's policy and practice to enter into a variety of derivative financial instruments to manage the volatility of these exposures and to enhance the yield on the investment of liquid funds. It does not enter into any financial transactions containing a risk that cannot be quantified at the time the transaction is concluded. In addition, it does not sell short assets it does not have, or does not know it will have, in the future. The Group only sells existing assets or enters into transactions and future transactions (in the case of anticipatory hedges) that it confidently expects it will have in the future, based on past experience. In the case of liquid funds, the Group writes call options on assets it has, or writes put options on positions it wants to acquire and has the liquidity to acquire. The Group expects that any loss in value for these instruments generally would be offset by increases in the value of the underlying transactions.

Foreign currency exchange rate risk

The Group uses the USD as its reporting currency. As a result, the Group is exposed to foreign currency exchange movements, primarily in European, Japanese and emerging market currencies. Fluctuations in the exchange rates between the US dollar and other currencies can have a significant effect on both the Group's results of operations, including reported sales and earnings, as well as on the reported value of our assets, liabilities and cash flows. This, in turn, may significantly affect the comparability of period-to-period results of operations.

Because our expenditures in Swiss francs are significantly higher than our revenues in Swiss francs, volatility in the value of the Swiss franc can have a significant impact on the reported value of our earnings, assets and liabilities, and the timing and extent of such volatility can be difficult to predict. In addition, there is a risk that certain countries could take other steps which could significantly impact the value of their currencies.

The Group is exposed to a potential adverse devaluation risk on its intercompany funding and total investment in certain subsidiaries operating in countries with exchange controls. The most significant country in this respect is Venezuela, where the Group is exposed to potential devaluation losses in the income statement on its total intercompany balances with its subsidiaries in Venezuela.

The Group's subsidiaries in Venezuela are experiencing a significant reduction in approvals for remittance of US dollars outside the country at the exchange rate available for imports of specific goods and services of national priority, including medicines and medical supplies. As a result, in November 2016, the Group changed the exchange rate applied to translate the financial statements of its Venezuelan subsidiaries from VEF 11 per USD to the floating rate of DICOM (Sistema de Divisa Complementaria) which was VEF 658 per USD as of November 1, 2016. A corresponding USD 0.3 billion revaluation loss on the outstanding intercompany balances was recognized in the fourth quarter of 2016. Due to the reserves against the intercompany balances, the net outstanding intercompany payable balance of Venezuela subsidiaries was reduced to an insignificant amount as per December 31, 2016.

The Group has an equivalent of approximately USD 2 million of cash in Venezuela local currency (VEF), which is subject to loss of purchase power due to high inflation in the country.

The Group manages its currency exposure by engaging in hedging transactions where management deems appropriate. Novartis may enter into various contracts

that reflect the changes in the value of foreign currency exchange rates to preserve the value of assets, commitments and anticipated transactions. Novartis also uses forward contracts and foreign currency option contracts to hedge.

Net investments in subsidiaries in foreign countries are long-term investments. Their fair value changes through movements of foreign currency exchange rates. The Group only hedges the net investments in foreign subsidiaries in exceptional cases.

Commodity price risk

The Group has only a very limited exposure to price risk related to anticipated purchases of certain commodities used as raw materials by the Group's businesses. A change in those prices may alter the gross margin of a specific business, but generally by not more than 10% of the margin and thus below the Group's risk management tolerance levels. Accordingly, the Group does not enter into significant commodity futures, forward and option contracts to manage fluctuations in prices of anticipated purchases.

Interest rate risk

The Group addresses its net exposure to interest rate risk mainly through the ratio of its fixed rate financial debt to variable rate financial debt contained in its total financial debt portfolio. To manage this mix, Novartis may enter into interest rate swap agreements, in which it exchanges periodic payments based on a notional amount and agreed upon fixed and variable interest rates.

Equity risk

The Group may purchase equities as investments of its liquid funds. As a policy, it limits its holdings in an unrelated company to less than 5% of its liquid funds. Potential investments are thoroughly analyzed. Call options are written on equities that the Group owns, and put options are written on equities which the Group wants to buy and for which cash is available.

Credit risk

Credit risks arise from the possibility that customers may not be able to settle their obligations as agreed. To manage this risk, the Group periodically assesses the financial reliability of customers, taking into account their financial position, past experience and other factors. Individual risk limits are set accordingly.

The Group's largest customer accounted for approximately 16% of net sales, and the second and third largest customers accounted for 12% and 6% of net sales, respectively (2015: 14%, 11% and 5%, respectively). No other customer accounted for 5% or more of net sales in either year.

The highest amounts of trade receivables outstanding were for these same three customers. They amounted to 14%, 9% and 6%, respectively, of the Group's trade receivables at December 31, 2016 (2015: 13%, 9% and 6% respectively). There is no other significant concentration of credit risk.

Counterparty risk

Counterparty risk encompasses issuer risk on marketable securities and money market instruments, credit risk on cash, time deposits and derivatives as well as settlement risk for different instruments. Issuer risk is reduced by only buying securities which are at least A-rated. Counterparty credit risk and settlement risk are reduced by a policy of entering into transactions with counterparties (banks or financial institutions) that feature a strong credit rating. Exposure to these risks is closely monitored and kept within predetermined parameters. The limits are regularly assessed and determined based upon credit analysis including financial statement and capital adequacy ratio reviews. In addition, reverse repurchasing agreements are contracted and Novartis has entered into credit support agreements with various banks for derivative transactions.

The Group's cash and cash equivalents are held with major regulated financial institutions, the three largest ones hold approximately 16.5%, 6.9% and 6.7%, respectively (2015: 21.8%, 9.6% and 8.6%, respectively).

The Group does not expect any losses from non-performance by these counterparties and does not have any significant grouping of exposures to financial sector or country risk.

Liquidity risk

Liquidity risk is defined as the risk that the Group could not be able to settle or meet its obligations on time or at a reasonable price. Group Treasury is responsible for liquidity, funding and settlement management. In addition, liquidity and funding risks, and related processes and policies, are overseen by management. Novartis manages its liquidity risk on a consolidated basis according to business needs, tax, capital or regulatory considerations, if applicable, through numerous sources of financing in order to maintain flexibility. Management monitors the Group's net debt or liquidity position through rolling forecasts on the basis of expected cash flows.

Novartis has two US commercial paper programs under which it can issue up to USD 9.0 billion in the aggregate of unsecured commercial paper notes. Novartis also has a Japanese commercial paper program under which it can issue up to JPY 150 billion (approximately USD 1.3 billion) of unsecured commercial paper notes. Commercial paper notes totaling USD 3.2 billion under these three programs were outstanding as per December 31, 2016 (2015: USD 1.1 billion). Novartis further has a committed credit facility of USD 6.0 billion, entered into on September 23, 2015. This credit facility is provided by a syndicate of banks and is intended to be used as a backstop for the US commercial paper programs. It matures in September 2020 and was undrawn as per December 31, 2016 and December 31, 2015.

The following table sets forth how management monitors net debt or liquidity based on details of the remaining contractual maturities of current financial assets and liabilities excluding trade receivables and payables as well as contingent considerations at December 31, 2016 and December 31, 2015:

	2016					
(USD millions)	Due within one month	Due later than one month but less than three months	Due later than three months but less than one year	Due later than one year but less than five years	Due after five years	Total
Current assets						
Marketable securities and time deposits	32	126	110	124	53	445
Commodities					94	94
Derivative financial instruments and accrued interest	38	102	91			231
Cash and cash equivalents	5 907	1 100				7 007
Total current financial assets	**5 977**	**1 328**	**201**	**124**	**147**	**7 777**
Non-current liabilities						
Financial debt				– 5 141	– 12 756	– 17 897
Financial debt – undiscounted				*– 5 155*	*– 12 901*	*– 18 056*
Total non-current financial debt				**– 5 141**	**– 12 756**	**– 17 897**
Current liabilities						
Financial debt	– 5 099	– 250	– 440			– 5 789
Financial debt – undiscounted	*– 5 099*	*– 250*	*– 440*			*– 5 789*
Derivative financial instruments	– 15	– 72	– 29			– 116
Total current financial debt	**– 5 114**	**– 322**	**– 469**			**– 5 905**
Net debt	**863**	**1 006**	**– 268**	**– 5 017**	**– 12 609**	**– 16 025**

	2015					
(USD millions)	Due within one month	Due later than one month but less than three months	Due later than three months but less than one year	Due later than one year but less than five years	Due after five years	Total
Current assets						
Marketable securities and time deposits	22	11	200	247	62	542
Commodities					86	86
Derivative financial instruments and accrued interest	40	67	38			145
Cash and cash equivalents	4 674					4 674
Total current financial assets	**4 736**	**78**	**238**	**247**	**148**	**5 447**
Non-current liabilities						
Financial debt				– 4 664	– 11 663	– 16 327
Financial debt – undiscounted				*– 4 676*	*– 11 797*	*– 16 473*
Total non-current financial debt				**– 4 664**	**– 11 663**	**– 16 327**
Current liabilities						
Financial debt	– 3 258	– 289	– 2 027			– 5 574
Financial debt – undiscounted	*– 3 258*	*– 289*	*– 2 028*			*– 5 575*
Derivative financial instruments	– 8	– 20	– 2			– 30
Total current financial debt	**– 3 266**	**– 309**	**– 2 029**			**– 5 604**
Net debt	**1 470**	**– 231**	**– 1 791**	**– 4 417**	**– 11 515**	**– 16 484**

The consolidated balance sheet amounts of financial liabilities included in the above analysis are not materially different to the contractual amounts due on maturity. The positive and negative fair values on derivative financial instruments represent the net contractual amounts to be exchanged at maturity.

The Group's contractual undiscounted potential cash flows from derivative financial instruments to be settled on a gross basis are as follows:

	2016			
(USD millions)	Due within one month	Due later than one month but less than three months	Due later than three months but less than one year	Total
Derivative financial instruments and accrued interest on derivative financial instruments				
Potential outflows in various currencies – from financial derivative liabilities	– 1 087	– 1 246	– 2 027	– 4 360
Potential inflows in various currencies – from financial derivative assets	1 109	1 287	2 051	4 447

	2015			
(USD millions)	Due within one month	Due later than one month but less than three months	Due later than three months but less than one year	Total
Derivative financial instruments and accrued interest on derivative financial instruments				
Potential outflows in various currencies – from financial derivative liabilities	– 1 418	– 2 800	– 1 602	– 5 820
Potential inflows in various currencies – from financial derivative assets	1 448	2 819	1 601	5 868

Other contractual liabilities which are not part of management's monitoring of the net debt or liquidity consist of the following items:

	2016				
(USD millions)	Due later than one month but less than three months	Due later than three months but less than one year	Due later than one year but less than five years	Due after five years	Total
Contractual interest on non-current liabilities	– 104	– 433	– 1 694	– 4 015	– 6 246
Trade payables	– 4 873				– 4 873

	2015				
(USD millions)	Due later than one month but less than three months	Due later than three months but less than one year	Due later than one year but less than five years	Due after five years	Total
Contractual interest on non-current liabilities	– 104	– 499	– 1 878	– 4 332	– 6 813
Trade payables and commitment for repurchase of own shares (see Note 22)	– 5 668				– 5 668

Capital risk management

Novartis strives to maintain a strong credit rating. In managing its capital, Novartis focuses on maintaining a strong balance sheet. Moody's rated the Group as Aa3 for long-term maturities and as P-1 for short-term maturities and Standard & Poor's had a rating of AA- for long-term and A-1+ for short-term maturities. Fitch had a long-term rating of AA and a short-term rating of F1+.

The debt/equity ratio increased to 0.32:1 at December 31, 2016, compared to 0.28:1 at the beginning of the year.

Value at risk

The Group uses a value at risk (VAR) computation to estimate the potential ten-day loss in the fair value of its financial instruments.

A ten-day period is used because of an assumption that not all positions could be undone in one day given the size of the positions. Apart from contingent consideration, finance lease obligations, and long-term loans and receivables, advances and security deposits the VAR computation includes all financial assets and financial liabilities as set forth above in this Note. Trade payables and receivables are considered only to the extent they comprise a foreign currency exposure. In addition, commodities are included in the computation.

The VAR estimates are made assuming normal market conditions, using a 95% confidence interval. The Group uses a "Delta Normal" model to determine the observed inter-relationships between movements in interest rates, stock markets and various currencies. These inter-relationships are determined by observing interest rate, stock market movements and forward foreign currency rate movements over a sixty-day period for the calculation of VAR amounts.

The estimated potential ten-day loss in pre-tax income from the Group's foreign currency instruments, the estimated potential ten-day loss of its equity holdings, and the estimated potential ten-day loss in fair value of its interest rate sensitive instruments (primarily financial debt and investments of liquid funds under normal market conditions) as calculated in the VAR model are the following:

(USD millions)	**2016**	2015
All financial instruments	541	387
Analyzed by components:		
Instruments sensitive to foreign currency exchange rates	222	224
Instruments sensitive to equity market movements	26	50
Instruments sensitive to interest rates	328	353

The average, high, and low VAR amounts are as follows:

	2016		
(USD millions)	Average	High	Low
All financial instruments	402	541	316
Analyzed by components:			
Instruments sensitive to foreign currency exchange rates	203	245	147
Instruments sensitive to equity market movements	50	99	26
Instruments sensitive to interest rates	308	407	234

	2015		
(USD millions)	Average	High	Low
All financial instruments	337	387	237
Analyzed by components:			
Instruments sensitive to foreign currency exchange rates	313	418	173
Instruments sensitive to equity market movements	55	111	33
Instruments sensitive to interest rates	294	380	251

The VAR computation is a risk analysis tool designed to statistically estimate the maximum potential ten day loss from adverse movements in foreign currency exchange rates, equity prices and interest rates under normal market conditions. The computation does not purport to represent actual losses in fair value on earnings to be incurred by the Group, nor does it consider the effect of favorable changes in market rates. The Group cannot predict actual future movements in such market rates and it does not claim that these VAR results are indicative of future movements in such market rates or are representative of any actual impact that future changes in market rates may have on the Group's future results of operations or financial position.

In addition to these VAR analyses, the Group uses stress testing techniques that aim to reflect a worst case scenario on the marketable securities which are monitored by Group Treasury. For these calculations, the Group uses the six-month period with the worst performance observed over the past twenty years in each category. For 2016 and 2015, the worst case loss scenario was calculated as follows:

(USD millions)	**2016**	2015
All financial instruments	6	12
Analyzed by components:		
Instruments sensitive to foreign currency exchange rates		1
Instruments sensitive to equity market movements		4
Instruments sensitive to interest rates	6	7

In the Group's risk analysis, Novartis considered this worst case scenario acceptable as it could reduce income, but would not endanger the solvency or investment grade credit standing of the Group.

30. Discontinued operations

Discontinued operations consolidated income statement segmentation

	Vaccines		Consumer Health[1]		Corporate (including eliminations)		Total discontinued operations	
(USD millions)	2015	2014	2015	2014	2015	2014	2015	2014
Net sales to third parties of discontinued operations	**145**	**1 537**	**456**	**4 279**			**601**	**5 816**
Sales to continuing segments	18	65	1	13			19	78
Net sales of discontinued operations	**163**	**1 602**	**457**	**4 292**			**620**	**5 894**
Other revenues	18	32	5	33			23	65
Cost of goods sold	– 192	– 1 336	– 184	– 1 737			– 376	– 3 073
Gross profit of discontinued operations	**– 11**	**298**	**278**	**2 588**			**267**	**2 886**
Marketing & Sales	– 57	– 280	– 187	– 1 532			– 244	– 1 812
Research & Development	– 151	– 545	– 30	– 312			– 181	– 857
General & Administration	– 26	– 118	– 32	– 313			– 58	– 431
Other income	2 870	905	10 558	99	– 8	3	13 420	1 007
Other expense	– 57	– 812	– 14	– 60	– 656	– 274	– 727	– 1 146
Operating income/loss of discontinued operations	**2 568**	**– 552**	**10 573**	**470**	**– 664**	**– 271**	**12 477**	**– 353**
Income from associated companies	2	2					2	2
Income/loss before taxes of discontinued operations							**12 479**	**– 351**
Taxes							– 1 713	– 96
Net income/loss of discontinued operations							**10 766**	**– 447**

[1] Consumer Health is the aggregation of the OTC and Animal Health divisions.

The following are included in net income from discontinued operations:

(USD millions)	2015	2014
Depreciation of property, plant & equipment		– 66
Amortization of intangible assets		– 77
Impairment charges on property, plant & equipment, net	83	– 736
Impairment charges on intangible assets, net		– 405
Additions to restructuring provisions	– 1	– 14
Equity-based compensation of Novartis equity plans	– 65	– 124

31. Events subsequent to the December 31, 2016 consolidated balance sheet date

Significant transactions closed in January 2017
For significant transactions entered into in 2016 and closed in January 2017, see Note 2.

Dividend proposal for 2016 and approval of the Group's 2016 consolidated financial statements
On January 24, 2017, the Novartis AG Board of Directors proposed the acceptance of the 2016 consolidated financial statements of the Novartis Group for approval by the Annual General Meeting on February 28, 2017. Furthermore, also on January 24, 2017, the Board proposed a dividend of CHF 2.75 per share to be approved at the Annual General Meeting on February 28, 2017. If approved, total dividend payments would amount to approximately USD 6.4 billion (2015: USD 6.6 billion) using the CHF/USD December 31, 2016 exchange rate.

32. Principal Group subsidiaries and associated companies

The following table lists the principal subsidiaries controlled by Novartis and associated companies in which Novartis is deemed to have significant influence. The equity interest percentage shown in the table also represents the share in voting rights in those entities, except where explicitly noted.

As at December 31, 2016	Share/paid-in capital [1]	Equity interest %
Algeria		
Société par actions SANDOZ, Algiers	DZD 650.0 m	100
Argentina		
Novartis Argentina S.A., Buenos Aires	ARS 906.1 m	100
Alcon Laboratorios S.A., Buenos Aires	ARS 83.9 m	100
Australia		
Novartis Australia Pty Ltd, North Ryde, NSW	AUD 2.2	100
Novartis Pharmaceuticals Australia Pty Ltd, North Ryde, NSW	AUD 3.8 m	100
Alcon Laboratories (Australia) Pty Ltd, Frenchs Forest, NSW	AUD 2.6 m	100
Sandoz Pty Ltd, North Ryde, NSW	AUD 11.6 m	100
Austria		
Novartis Austria GmbH, Vienna	EUR 1.0 m	100
Novartis Pharma GmbH, Vienna	EUR 1.1 m	100
Alcon Ophthalmika GmbH, Vienna	EUR 36 336	100
Sandoz GmbH, Kundl	EUR 32.7 m	100
EBEWE Pharma Ges.m.b.H Nfg. KG, Unterach am Attersee	EUR 1.0 m	100
Bangladesh		
Novartis (Bangladesh) Limited, Gazipur	BDT 162.5 m	60
Belgium		
N.V. Novartis Pharma S.A., Vilvoorde	EUR 7.1 m	100
S.A. Alcon-Couvreur N.V., Puurs	EUR 360.6 m	100
N.V. Alcon S.A., Vilvoorde	EUR 141 856	100
N.V. Sandoz S.A., Vilvoorde	EUR 19.2 m	100
Bermuda		
Triangle International Reinsurance Limited, Hamilton	CHF 1.0 m	100
Novartis Securities Investment Limited, Hamilton	CHF 30 000	100
Novartis BioVentures Ltd., Hamilton	USD 12 000	100
Trinity River Insurance Co Limited, Hamilton	USD 370 000	100
Novartis Investment Limited, Hamilton	USD 30 000	100
Novartis Pharmaceutical Proprietary Ltd., Hamilton	CHF 100 000	100
Brazil		
Novartis Biociências S.A., São Paulo	BRL 265.0 m	100
Sandoz do Brasil Indústria Farmacêutica Ltda., Cambé, PR	BRL 190.0 m	100
Canada		
Novartis Pharmaceuticals Canada Inc., Dorval, Quebec	CAD 0 [2]	100
Alcon Canada Inc., Mississauga, Ontario	CAD 0 [2]	100
CIBA Vision Canada Inc., Mississauga, Ontario	CAD 1	100
Sandoz Canada Inc., Boucherville, Quebec	CAD 76.8 m	100
Chile		
Novartis Chile S.A., Santiago de Chile	CLP 2.0 bn	100
Alcon Laboratorios Chile Ltd., Santiago de Chile	CLP 2.0 bn	100
China		
Beijing Novartis Pharma Co., Ltd., Beijing	USD 30.0 m	100
Novartis Pharmaceuticals (HK) Limited, Hong Kong	HKD 200	100
China Novartis Institutes for BioMedical Research Co., Ltd., Shanghai	USD 320.0 m	100
Suzhou Novartis Pharma Technology Co., Ltd., Changshu	USD 103.4 m	100
Shanghai Novartis Trading Ltd., Shanghai	USD 3.2 m	100
Alcon Hong Kong Limited, Hong Kong	HKD 77 000	100
Alcon (China) Ophthalmic Product Co., Ltd., Beijing	USD 2.2 m	100
Sandoz (China) Pharmaceutical Co., Ltd., Zhongshan	USD 36.5 m	100
Colombia		
Novartis de Colombia S.A., Santafé de Bogotá	COP 7.9 bn	100
Laboratorios Alcon de Colombia S.A., Santafé de Bogotá	COP 20.9 m	100
Croatia		
Sandoz d.o.o., Zagreb	HRK 25.6 m	100
Czech Republic		
Novartis s.r.o., Prague	CZK 51.5 m	100
Alcon Pharmaceuticals (Czech Republic) s.r.o., Prague	CZK 31.0 m	100
Sandoz s.r.o., Prague	CZK 44.7 m	100
Denmark		
Novartis Healthcare A/S, Copenhagen	DKK 14.0 m	100
Alcon Nordic A/S, Copenhagen	DKK 0.5 m	100
Sandoz A/S, Copenhagen	DKK 10.0 m	100
Ecuador		
Novartis Ecuador S.A., Quito	USD 4.0 m	100
Egypt		
Novartis Pharma S.A.E., Cairo	EGP 193.8 m	99.77
Sandoz Egypt Pharma S.A.E., New Cairo City	EGP 250 000	100
Finland		
Novartis Finland Oy, Espoo	EUR 459 000	100
France		
Novartis Groupe France S.A., Rueil-Malmaison	EUR 103.0 m	100
Novartis Pharma S.A.S., Rueil-Malmaison	EUR 43.4 m	100
Laboratoires Alcon S.A.S., Rueil-Malmaison	EUR 12.9 m	100
Sandoz S.A.S., Levallois-Perret	EUR 5.4 m	100
Germany		
Novartis Deutschland GmbH, Wehr	EUR 155.5 m	100
Novartis Pharma GmbH, Nuremberg	EUR 25.6 m	100
Novartis Pharma Produktions GmbH, Wehr	EUR 2.0 m	100
Alcon Pharma GmbH, Freiburg im Breisgau	EUR 512 000	100
WaveLight GmbH, Erlangen	EUR 6.6 m	100
CIBA Vision GmbH, Grosswallstadt	EUR 15.4 m	100
Sandoz International GmbH, Holzkirchen	EUR 100 000	100
1 A Pharma GmbH, Oberhaching	EUR 26 000	100
Salutas Pharma GmbH, Barleben	EUR 42.1 m	100
HEXAL AG, Holzkirchen	EUR 93.7 m	100
Aeropharm GmbH, Rudolstadt	EUR 26 000	100
Novartis Business Services GmbH, Wehr	EUR 25 000	100
Gibraltar		
Novista Insurance Limited, Gibraltar City	CHF 130.0 m	100
Greece		
Novartis (Hellas) S.A.C.I., Metamorphosis / Athens	EUR 23.4 m	100
Alcon Laboratories Hellas-Commercial and Industrial S.A., Maroussi, Athens	EUR 5.7 m	100
Hungary		
Novartis Hungary Healthcare Limited Liability Company, Budapest	HUF 545.6 m	100
Sandoz Hungary Limited Liability Company, Budapest	HUF 883.0 m	100
India		
Novartis India Limited, Mumbai	INR 140.7 m	73.4
Novartis Healthcare Private Limited, Mumbai	INR 60.0 m	100
Alcon Laboratories (India) Private Limited, Bangalore	INR 1.1 bn	100
Sandoz Private Limited, Mumbai	INR 32.0 m	100
Indonesia		
PT. Novartis Indonesia, Jakarta	IDR 7.7 bn	100
PT. CIBA Vision Batam, Batam	IDR 11.9 bn	100
Ireland		
Novartis Ireland Limited, Dublin	EUR 25 000	100
Novartis Ringaskiddy Limited, Ringaskiddy, County Cork	EUR 2.0 m	100
Alcon Laboratories Ireland Limited, Cork City	EUR 541 251	100
Israel		
Novartis Israel Ltd., Petach Tikva	ILS 1 000	100
Optonol Ltd., Neve-Ilan	ILS 454 252	100
Italy		
Novartis Farma S.p.A., Origgio	EUR 18.2 m	100
Alcon Italia S.p.A., Milan	EUR 3.7 m	100
Sandoz S.p.A., Origgio	EUR 1.7 m	100
Sandoz Industrial Products S.p.A., Rovereto	EUR 2.6 m	100
Japan		
Novartis Holding Japan K.K., Tokyo	JPY 10.0 m	100
Novartis Pharma K.K., Tokyo	JPY 6.0 bn	100
Alcon Japan Ltd., Tokyo	JPY 500.0 m	100
Sandoz K.K., Tokyo	JPY 100.0 m	100
Luxembourg		
Novartis Investments S.à r.l., Luxembourg-Ville	USD 100.0 m	100
Novartis Finance S.A., Luxembourg-Ville	USD 100 000	100
Malaysia		
Novartis Corporation (Malaysia) Sdn. Bhd., Kuala Lumpur	MYR 3.3 m	100
Alcon Laboratories (Malaysia) Sdn. Bhd., Petaling Jaya	MYR 1.0 m	100
CIBA Vision Johor Sdn. Bhd., Kuala Lumpur	MYR 10.0 m	100

As at December 31, 2016	Share/paid-in capital [1]	Equity interest %
Mexico		
Novartis Farmacéutica, S.A. de C.V., Mexico City	MXN 205.0 m	100
Alcon Laboratorios, S.A. de C.V., Mexico City	MXN 5.9 m	100
Sandoz, S.A. de C.V., Mexico City	MXN 468.2 m	100
Morocco		
Novartis Pharma Maroc SA, Casablanca	MAD 80.0 m	100
Netherlands		
Novartis Netherlands B.V., Arnhem	EUR 1.4 m	100
Novartis Pharma B.V., Arnhem	EUR 4.5 m	100
Alcon Nederland B.V., Arnhem	EUR 18 151	100
Sandoz B.V., Almere	EUR 907 560	100
New Zealand		
Novartis New Zealand Ltd, Auckland	NZD 820 000	100
Norway		
Novartis Norge AS, Oslo	NOK 1.5 m	100
Pakistan		
Novartis Pharma (Pakistan) Limited, Karachi	PKR 3.9 bn	99.99
Panama		
Novartis Pharma (Logistics), Inc., Panama City	USD 10 000	100
Alcon Centroamerica S.A., Panama City	PAB 1 000	100
Philippines		
Novartis Healthcare Philippines, Inc., Manila	PHP 298.8 m	100
Alcon Laboratories (Philippines), Inc., Manila	PHP 16.5 m	100
Sandoz Philippines Corporation, Manila	PHP 30.0 m	100
Poland		
Novartis Poland Sp. z o.o., Warszawa	PLN 44.2 m	100
Alcon Polska Sp. z o.o., Warszawa	PLN 750 000	100
Sandoz Polska Sp. z o.o., Warszawa	PLN 25.6 m	100
Lek S.A., Strykow	PLN 11.4 m	100
Portugal		
Novartis Portugal SGPS Lda., Porto Salvo	EUR 500 000	100
Novartis Farma – Produtos Farmacêuticos S.A, Porto Salvo	EUR 2.4 m	100
Alcon Portugal-Produtos e Equipamentos Oftalmológicos Lda., Porto Salvo	EUR 4.5 m	100
Sandoz Farmacêutica Lda., Porto Salvo	EUR 499 900	100
Romania		
Novartis Pharma Services Romania S.R.L., Bucharest	RON 3.0 m	100
Alcon Romania S.R.L., Bucharest	RON 10.8 m	100
Sandoz S.R.L., Targu-Mures	RON 105.2 m	100
Russian Federation		
Novartis Pharma LLC, Moscow	RUB 20.0 m	100
Alcon Farmacevtika LLC, Moscow	RUB 44.1 m	100
ZAO Sandoz, Moscow	RUB 57.4 m	100
Novartis Neva LLC, St. Petersburg	RUB 1.3 bn	100
Saudi Arabia		
Saudi Pharmaceutical Distribution Co. Ltd., Riyadh	SAR 26.8 m	75
Singapore		
Novartis (Singapore) Pte Ltd., Singapore Country	SGD 100 000	100
Novartis Singapore Pharmaceutical Manufacturing Pte Ltd, Singapore Country	SGD 45.0 m	100
Novartis Asia Pacific Pharmaceuticals Pte Ltd, Singapore Country	SGD 39.0 m	100
Novartis Institute for Tropical Diseases Pte Ltd, Singapore Country	SGD 2 004	100
Alcon Singapore Manufacturing Pte Ltd, Singapore Country	SGD 101 000	100
CIBA Vision Asian Manufacturing and Logistics Pte Ltd., Singapore Country	SGD 1.0 m	100
Alcon Pte Ltd, Singapore Country	SGD 164 000	100
Slovakia		
Novartis Slovakia s.r.o., Bratislava	EUR 2.0 m	100
Slovenia		
Lek Pharmaceuticals d.d., Ljubljana	EUR 48.4 m	100
Sandoz Pharmaceuticals d.d., Ljubljana	EUR 1.5 m	100
South Africa		
Novartis South Africa (Pty) Ltd, Midrand	ZAR 86.3 m	100
Alcon Laboratories (South Africa) (Pty) Ltd., Midrand	ZAR 201 820	100
Sandoz South Africa (Pty) Ltd, Kempton Park	ZAR 3.0 m	100
South Korea		
Novartis Korea Ltd., Seoul	KRW 24.5 bn	98.55
Alcon Korea Ltd., Seoul	KRW 33.8 bn	100
Sandoz Korea Ltd., Seoul	KRW 17.8 bn	100
Spain		
Novartis Farmacéutica S.A., Barcelona	EUR 63.0 m	100
Alcon Cusi S.A., El Masnou / Barcelona	EUR 11.6 m	100
Sandoz Farmacéutica S.A., Aravaca / Madrid	EUR 270 450	100
Sandoz Industrial Products S.A., Les Franqueses del Vallés / Barcelona	EUR 9.3 m	100
Abadia Retuerta S.A., Sardón de Duero / Valladolid	EUR 6.0 m	100
Sweden		
Novartis Sverige AB, Täby / Stockholm	SEK 5.0 m	100
Switzerland		
Novartis International AG, Basel	CHF 10.0 m	100
Novartis Holding AG, Basel	CHF 100.2 m	100
Novartis International Pharmaceutical AG, Basel	CHF 100 000	100
Novartis Research Foundation, Basel	CHF 29.3 m	100
Novartis Foundation for Management Development, Basel	CHF 100 000	100
Novartis Foundation for Employee Participation, Basel	CHF 100 000	100
Novartis Sanierungsstiftung, Basel	CHF 2.0 m	100
Novartis Pharma AG, Basel	CHF 350.0 m	100
Novartis Pharma Services AG, Basel	CHF 20.0 m	100
Novartis Pharma Schweizerhalle AG, Muttenz	CHF 18.9 m	100
Novartis Pharma Stein AG, Stein	CHF 251 000	100
Novartis Pharma Schweiz AG, Risch	CHF 5.0 m	100
Alcon Switzerland SA, Risch	CHF 100 000	100
Alcon Pharmaceuticals Ltd., Fribourg	CHF 200 000	100
ESBATech, a Novartis company GmbH, Schlieren	CHF 14.0 m	100
Sandoz AG, Basel	CHF 5.0 m	100
Sandoz Pharmaceuticals AG, Risch	CHF 100 000	100
Roche Holding AG, Basel	CHF 160.0 m	33/6 [3]
Taiwan		
Novartis (Taiwan) Co., Ltd., Taipei	TWD 170.0 m	100
Thailand		
Novartis (Thailand) Limited, Bangkok	THB 302.0 m	100
Alcon Laboratories (Thailand) Limited, Bangkok	THB 228.1 m	100
Turkey		
Novartis Saglik, Gida ve Tarim Ürünleri Sanayi ve Ticaret A.S., Istanbul	TRY 98.0 m	100
Alcon Laboratuvarlari Ticaret A.S., Istanbul	TRY 25.2 m	100
Sandoz Ilaç Sanayi ve Ticaret A.S., Istanbul	TRY 165.2 m	99.99
Sandoz Syntek Ilaç Hammaddeleri Sanayi ve Ticaret A.S., Tuzla – Istanbul	TRY 46.0 m	100
Sandoz Grup Saglik Ürünleri Ilaçlari Sanayi ve Ticaret A.S., Gebze – Kocaeli	TRY 50.0 m	100
United Arab Emirates		
Novartis Middle East FZE, Dubai	AED 7.0 m	100
United Kingdom		
Novartis UK Limited, Frimley/Camberley	GBP 25.5 m	100
Novartis Pharmaceuticals UK Limited, Frimley/Camberley	GBP 5.4 m	100
Novartis Grimsby Limited, Frimley/Camberley	GBP 250.0 m	100
Alcon Eye Care UK Limited, Frimley/Camberley	GBP 550 000	100
Sandoz Limited, Frimley/Camberley	GBP 2.0 m	100
Glaxosmithkline Consumer Healthcare Holdings Limited, Brentford, Middlesex	GBP 100 000	36.5
United States of America		
Novartis Corporation, East Hanover, NJ	USD 72.2 m	100
Novartis Finance Corporation, New York, NY	USD 1 000	100
Novartis Capital Corporation, New York, NY	USD 1	100
Novartis Pharmaceuticals Corporation, East Hanover, NJ	USD 5.2 m	100
Novartis Institutes for BioMedical Research, Inc., Cambridge, MA	USD 1	100
Novartis Institute for Functional Genomics, Inc., San Diego, CA	USD 21 000	100
Genoptix, Inc., Carlsbad, CA	USD 1	100
Alcon Laboratories Holding Corporation, Fort Worth, TX	USD 10	100
Alcon Laboratories, Inc., Fort Worth, TX	USD 1 000	100
Alcon Refractivehorizons, LLC, Fort Worth, TX	USD 10	100
Alcon Research, Ltd., Fort Worth, TX	USD 12.5	100
Alcon Lensx, Inc., Aliso Viejo, CA	USD 100	100
Sandoz Inc., Princeton, NJ	USD 25 000	100
Fougera Pharmaceuticals Inc., Melville, NY	USD 1	100
Eon Labs, Inc., Princeton, NJ	USD 1	100
Novartis Vaccines and Diagnostics, Inc., Cambridge, MA	USD 3	100
Novartis Services, Inc., East Hanover, NJ	USD 1	100
Venezuela		
Novartis de Venezuela, S.A., Caracas	VEF 1.4 m	100
Alcon Pharmaceutical, C.A., Caracas	VEF 5.5 m	100

In addition, the Group is represented by subsidiaries and associated companies in the following countries: Bosnia/Herzegovina, Bulgaria, Dominican Republic, Guatemala, the Former Yugoslav Republic of Macedonia, Nigeria, Peru, Puerto Rico, Ukraine and Uruguay.

[1] Share/paid-in capital may not reflect the taxable share/paid-in capital amount and does not include any paid-in surplus.

[2] Shares without par value

[3] Approximately 33% of voting shares; approximately 6% of total net income and equity attributable to Novartis

m = million; bn = billion


NOVARTIS