NOVARTIS

US Securities & Exchange Commission Form 20-F

2017

As filed with the Securities and Exchange Commission on January 24, 2018

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, 2017

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)

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(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:

2,317,456,499 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** ☒

Note—Checking the box above will not relieve any registrant required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 from their obligations under those Sections.

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 has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

Yes ☒ **No** ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or an emerging growth company. See definition of "large accelerated filer," "accelerated filer," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Emerging growth company ☐

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards† provided pursuant to Section 13(a) of the Exchange Act. ☐

† The term "new or revised financial accounting standard" refers to any update issued by the Financial Accounting Standards Board to its Accounting Standards Codification after April 5, 2012.

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 2017" included as Exhibit 99.1 to Form 6-K furnished to the SEC on January 24, 2018 (the Annual Report Excerpts). Therefore the information in this Form 20-F should be read in conjunction with the Annual Report Excerpts. References to content not contained within the Annual Report Excerpts 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. 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," "USD" 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 and are the property of their respective owners.

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; or regarding the potential outcome, or financial or other impact on Novartis, of the strategic review 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 acquisitions and reorganizations of recent years; 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 potential shareholder returns; 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. Neither can there be any guarantee that the strategic review being undertaken to maximize shareholder value of the Alcon Division will reach any particular results, or at any particular time, or that the result of the strategic review will in fact maximize shareholder value. Nor 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 acquisitions and reorganizations of recent years. 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, our expectations could be affected by, among other things:

- global trends toward health care cost containment, including ongoing government, payor and general public pricing and reimbursement pressures, such as from increased publicity on pharmaceuticals pricing, and requirements for increased pricing transparency;
- regulatory actions or delays or government regulation generally;
- the potential that the strategic benefits, synergies or opportunities expected from the significant acquisitions and reorganizations of recent years may not be realized or may take longer to realize than expected;
- the inherent uncertainties involved in predicting shareholder returns;
- 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;
- 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;
- uncertainties involved in the development or adoption of potentially transformational technologies and business models;
- general political and economic conditions, including uncertainties regarding the effects of ongoing instability in various parts of the world;
- 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, 2017, 2016 and 2015, are included under "Novartis Group consolidated financial statements" on pages 186 to 254 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, 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,				
	2017	**2016**	**2015**	**2014**	**2013**
	($ millions, except per share information)				
INCOME STATEMENT DATA					
Net sales to third parties from continuing operations	**49,109**	**48,518**	**49,414**	**52,180**	**51,869**
Operating income from continuing operations	**8,629**	**8,268**	**8,977**	**11,089**	**10,983**
Income from associated companies	1,108	703	266	1,918	599
Interest expense	(777)	(707)	(655)	(704)	(683)
Other financial income and expense	39	(447)	(454)	(31)	(92)
Income before taxes from continuing operations	**8,999**	**7,817**	**8,134**	**12,272**	**10,807**
Taxes	(1,296)	(1,119)	(1,106)	(1,545)	(1,498)
Net income from continuing operations	**7,703**	**6,698**	**7,028**	**10,727**	**9,309**
Net income/(loss) from discontinued operations			10,766	(447)	(17)
Group net income	**7,703**	**6,698**	**17,794**	**10,280**	**9,292**
Attributable to:					
Shareholders of Novartis AG	7,703	6,712	17,783	10,210	9,175
Non-controlling interests	0	(14)	11	70	117
Basic earnings per share ($)					
Continuing operations	3.28	2.82	2.92	4.39	3.76
Discontinued operations			4.48	(0.18)	0.00
Total	3.28	2.82	7.40	4.21	3.76
Diluted earnings per share ($)					
Continuing operations	3.25	2.80	2.88	4.31	3.70
Discontinued operations			4.41	(0.18)	0.00
Total	3.25	2.80	7.29	4.13	3.70
Cash dividends[1]	6,495	6,475	6,643	6,810	6,100
Cash dividends per share in CHF[2]	2.80	2.75	2.70	2.60	2.45

(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 2013 through 2016 were approved at the respective AGMs and dividends for 2017 will be proposed to the Annual General Meeting on March 2, 2018 for approval.

	Year Ended December 31,				
	2017	2016	2015	2014	2013
			($ millions)		
BALANCE SHEET DATA					
Cash, cash equivalents and marketable securities & derivative financial instruments	9,485	7,777	5,447	13,862	9,222
Inventories	6,867	6,255	6,226	6,093	7,267
Other current assets	11,856	10,899	11,172	10,805	13,294
Non-current assets	104,871	105,193	108,711	87,826	95,712
Assets related to discontinued operations				6,801	759
Total assets	**133,079**	**130,124**	**131,556**	**125,387**	**126,254**
Trade accounts payable	5,169	4,873	5,668	5,419	6,148
Other current liabilities	18,234	17,336	18,040	19,136	20,170
Non-current liabilities	35,449	33,024	30,726	27,570	25,414
Liabilities related to discontinued operations				2,418	50
Total liabilities	**58,852**	**55,233**	**54,434**	**54,543**	**51,782**
Issued share capital and reserves attributable to shareholders of Novartis AG	74,168	74,832	77,046	70,766	74,343
Non-controlling interests	59	59	76	78	129
Total equity	**74,227**	**74,891**	**77,122**	**70,844**	**74,472**
Total liabilities and equity	**133,079**	**130,124**	**131,556**	**125,387**	**126,254**
Net assets	74,227	74,891	77,122	70,844	74,472
Outstanding share capital	869	896	890	898	912
Total outstanding shares (millions)	2,317	2,374	2,374	2,399	2,426

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 ($)
2013	March 2014	2.45	2.76
2014	March 2015	2.60	2.67
2015	March 2016	2.70	2.70
2016	March 2017	2.75	2.72
2017[1]	March 2018	2.80	2.87[2]

(1) Dividend to be proposed at the Annual General Meeting on March 2, 2018, and to be distributed March 8, 2018.

(2) Translated into US dollars at the December 31, 2017 rate of $1.024 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 18, 2018, as found on Bloomberg Market System, was CHF 1.00 = $1.04.

Year ended December 31, ($ per CHF)	Period End	Average[1]	Low[2]	High[2]
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
2017	1.02	1.02	0.99	1.04
Month				
August 2017			1.03	1.05
September 2017			1.03	1.06
October 2017			1.00	1.03
November 2017			1.00	1.02
December 2017			1.00	1.02
January 2018 (through January 18, 2018)			1.02	1.04

(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 Division, as well as certain products of our Sandoz and Alcon Divisions, 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, and they may be successfully challenged by

third parties or regulatory authorities. 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 branded medicine typically results in a significant and rapid reduction in net sales and operating income for the branded 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 intellectual property rights, including conducting so-called "launches at risk" of products that are still under legal challenge for 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 or our other protective measures should fail, then 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.

- Our formerly best-selling product *Gleevec*/*Glivec* faces continued and increasing generic competition in the US, EU and Japan.
- Patent protection for the marketed forms of our *Sandostatin* products has expired. Generic versions of *Sandostatin* SC are available in the US, EU and Japan. While 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, such generic competition may arise in the future.
- *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, EU and Japan. *Exforge HCT*, which is not marketed in Japan, has generic competition in the US and may face additional generic competition in the future.
- Intellectual property protecting a number of additional major products is either being challenged or will expire at various times in the coming years, raising the possibility of generic competition. Among these products that may begin to face generic competition in one or more major markets during the next three years are *Gilenya*, our everolimus products (*Afinitor*/*Votubia* and *Certican*/*Zortress*), *Exjade*/*Jadenu* and *Lucentis*.

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 2018, we expect an impact on our net sales of about $1.5 billion as a result of the loss of intellectual property protection for our products. 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 2018 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 the

generic competitor is launched; 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 our products. If any of our 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. See also "—Our business is affected by pressures on pricing and reimbursement for our products," below, with regard to the impact of pricing and reimbursement issues on the commercial success of our products.

All of our businesses are broadly faced with intense competition from new products and technological advances from competitors, and 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 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, including *Cosentyx, Lucentis, Gilenya, Sandostatin, Tasigna* and *Afinitor,* are on the market, and others are in development. In addition, numerous companies are seeking to enter the healthcare field to take advantage of their expertise in digital and other new technologies. See "—We may fail to develop or take advantage of transformational technologies and business models," below. We may also face new competitors from different regions of the world, including China, which is moving aggressively to expand its role in the sciences and in many industries. Such new competitors may successfully develop products or technologies which could make products of ours uncompetitive or obsolete.

Such competitive products could significantly affect the revenue from our products and our results of operations. This impact could also be compounded to the extent such competition results in us making significant additional investments in marketing and sales, or in research and development.

In particular, our Alcon Division and our US Sandoz business each has suffered declines in sales and profits in recent years due at least in part to increased competition for its products, although Alcon's results improved in 2017, returning to growth. There can be no certainty either that Sandoz US sales will recover, or that Alcon's improved results will be repeated in the coming years. In any event, such competition and the costs of our efforts to improve these businesses' performance, as well as other factors, can be expected to affect the business, financial condition or results of operations of these organizations, at least in the near term. In addition, despite the devotion of significant resources to our efforts to improve the performance of Alcon and Sandoz US, those efforts may ultimately 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 "—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," and "—Intense competition from patented and generic pharmaceuticals companies, as well as failure to obtain marketing exclusivity periods for new generic products, or to successfully develop biosimilars and other differentiated products, may have a material 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, are reimbursed by payors, and are commercially successful. 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. However, developing new healthcare products and bringing them to market 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 successful 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 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 may 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 the "Brexit" vote in the UK, the EU has decided to move the headquarters of the EU's health authority, the EMA, from the UK to the Netherlands by March 2019. It is expected that a significant percentage of the current employees of the EMA will decide not to make the move to the Netherlands. This raises the possibility that new drug approvals in the EU could be delayed as a result.

Further, in recent years, in order to achieve approvals of and reimbursement for new products and new indications, governmental authorities and payors around the world have increasingly required more clinical trial data than they had in the past, the inclusion of significantly higher numbers of patients in clinical trials, and more detailed analyses of the trials. As a result, despite significant efforts by health authorities such as the FDA to accelerate the development of new drugs, the already lengthy and expensive process of obtaining regulatory approvals and reimbursement for pharmaceutical products has in many cases become even more challenging.

Similarly, 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.

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.

Our Alcon Division faces similar challenges in bringing new products to market, including both the products and components that have been developed in house, as well as those that have been acquired from third parties. Alcon's Surgical and Vision Care products face medical device development and approval processes that are often similarly as difficult as those faced by our Innovative Medicines Division. For example, the new EU Medical Devices Regulation could bring substantial changes to the way medical device manufacturers bring new products to the European market, including with respect to labelling, technical documentation and quality management systems. Alcon has taken steps to increase its innovation power and the success of its research and development efforts. But these efforts are costly and 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.

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, including those 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, 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 "—Intense competition from patented and generic pharmaceuticals companies, as well as failure to obtain marketing exclusivity periods for new generic products, or to successfully develop biosimilars and other differentiated products, may have a material 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, data privacy, 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 increasing demand for healthcare resulting from the aging of the global population and associated increases in non-communicable diseases, and the resulting impact on healthcare budgets. 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, particularly with respect to our generic drugs. In addition, these pressures are augmented by significant controversies and intense publicity about prices for pharmaceuticals that some consider excessive, as well as government investigations and legal proceedings regarding pharmaceutical pricing practices.

As a result, 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, growing pressure on physicians to reduce the prescribing of patented prescription medicines, the imposition or threat of imposition of compulsory licensing or Declarations of Public Interest, and requirements for increased transparency on pricing. 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 "—Political and economic instability may have a material adverse effect on our results," below, with regard to the impact of economic conditions on our pricing. These factors may materially affect our ability to achieve an acceptable return on our investments in the development of our products, and may impact our ability to invest in the research and development of new products.

We expect these challenges to continue—and potentially to increase in 2018 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 with regard to the prices for our products.

In addition, we have significant activities in a number of developing countries around the world, both through our own employees, and through third parties retained to assist us. In some of these countries, a culture of compliance with law may not be as fully developed as in other countries.

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, and can retroactively challenge practices previously considered to be legal. 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. For information on significant legal matters pending against us see "Note 19. Provisions and other non-current liabilities" and "Note 27. Commitments and contingencies" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018. See also "—Our reliance on outsourcing key business functions to third parties heightens the risks faced by our businesses," below.

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 without bringing them to final legal adjudication by courts or other such bodies, despite having potentially significant defenses against them, in order to 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 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 increase our cost of goods and lead to extended supply disruptions and significant liability.

The manufacture of our products is complex and heavily regulated by governmental health authorities around the world, including the FDA. Whether our products and the related raw materials 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.

Any significant failure by us or our third-party suppliers to comply with these requirements or the health authorities' expectations, may cause us to shut down the production facilities or production lines. Alternately, we may be forced to shut them down by a government health authority, 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 addition to these regulatory requirements, the technically complex manufacturing processes required to manufacture many of our products increase the risk of production failures, and can increase the cost of producing our goods. For example, we manufacture and sell a number of sterile products, including oncology products, which require sophisticated environmental controls. In addition, a significant number of our products 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 that 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 involves living plant or animal micro-organisms, the process could be affected by contaminants that could impact those micro-organisms. Further, for our new oncology product *Kymriah,* each dose must be separately produced, using the individual patient's own cells as a basis, without contingencies for production failures. As a result, because the production process for many of our products is so complex and sensitive, the cost of production and the chance of production failures and lengthy supply interruptions is increased.

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 and third party suppliers around the world. However, there can be no guarantee as to the outcome of these efforts, or that we or our third parties suppliers will not face significant manufacturing issues, or that we will successfully manage such issues when they arise. For example, our Sandoz Division has been unable to launch its *Glatopa* 40mg product due to a Warning Letter received from the FDA by our third party supplier with respect to its manufacturing facility.

In addition, many of our products require a supply of highly specialized raw materials. For some of our products and raw materials, we may rely on a single source of supply. As a result, we are required to plan our production activities well in advance. If we should suffer from product shortages, including as a result of a natural disaster at a production facility, or 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 produce sufficient product 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 not only in the loss of the product, but also the resources spent to produce it.

Further, 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.

Thus, complex production processes and compliance with regulatory requirements can increase our cost of producing our products, and any significant disruption in the supply of our products could impact our sales, either of which 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 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, countries facing local financial difficulties, including countries experiencing high inflation rates and highly indebted countries facing large capital outflows, may impose controls on the exchange of foreign currency. Such exchange controls could limit our ability to distribute retained earnings from our local affiliates, or to pay intercompany payables due from those countries.. See "—Political and economic instability may have a material adverse effect on our results," below.

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 28. Financial instruments—additional disclosures" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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

As part of our strategy, from time to time we acquire and divest products or entire businesses, in order to expand or complement our existing businesses, or to enable us to focus more sharply on our strategic businesses. For example, we recently completed the acquisition of Advanced Accelerator Applications, a radiopharmaceutical company that develops, produces and commercializes molecular nuclear medicines including *Lutathera*, a first-in-class radioligand therapy product for neuroendocrine tumors.

Despite expending significant efforts and resources in this area, we cannot ensure that we will identify products or businesses that are suitable for acquisition. In addition, 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 develop and market acquired products, including products acquired by Alcon, or to integrate the acquired business may not meet expectations, or may otherwise not be successful, as a result of difficulties in retaining key personnel, customers and suppliers, difference in corporate culture, 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. For example, in early 2017, we announced a strategic review of the Alcon Division in order to explore all options to maximize value for our shareholders. Key criteria for a final decision and timing remain continued Alcon sales growth and margin improvement which need to be demonstrated for multiple quarters leading to potential action not likely before the first half of 2019. But there can be no certainty that the strategic review will reach any particular results, or at any particular time, or that it will in fact maximize shareholder value.

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 October 2017, we announced that certain over-the-counter and diagnostic ophthalmic products would be moved from the Innovative Medicines Division to the Alcon Division effective January 1, 2018, where we believe the products will create the most value. We expect this and other similar actions, including our prior move of prescription ophthalmic pharmaceutical products from our Alcon Division to our Innovative Medicines Division, to help 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 such reorganizations may never be fully realized or may take longer to realize than expected. There can be no certainty that the 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 expose people's personal information.

We are heavily dependent on critical, complex and interdependent information technology systems, including Internet-based systems, to support our 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, which can include people's personal information. We are also increasingly seeking to develop technology-based products such as mobile applications and other digital health products that go "beyond the pill" to improve patient welfare in a variety of ways, which could also result in us gathering personal 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 incidents, breakdowns, malicious intrusions, cybercrimes, including State-sponsored cybercrimes, 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 cybersecurity and to business continuity efforts, like many companies, we have experienced certain of these events and expect to continue to experience them in the future, as the external cyber-attack threat only keeps growing. We believe that the information security incidents we have experienced to date have not resulted in significant disruptions to our operations, and have not had a significant adverse effect on our results of operations, or on third parties. However, we may not be able to prevent future breakdowns or breaches in our systems and we may not be able to prevent such events from having a material adverse effect on our business, financial condition, results of operation or reputation.

Any such event 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, including our employees' ability to communicate with one another and with third parties. Such potential information technology issues could also 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 in devices that make significant use of information technology, including our Alcon surgical equipment, could lead to a risk of harm to patients.

In addition, our routine business operations, including through the use of information technologies such as the Internet, social media, mobile technologies, and technology-based medical devices, increasingly involve our gathering personal information (including sensitive personal information) about patients, vendors, customers, employees, collaborators and others. Breaches of our systems or those of our third-party contractors, or other failures to protect such information, could expose such people's personal information to unauthorized persons. Any such event could give rise to significant potential liability and reputational harm, including potentially substantial monetary penalties. We also make significant efforts to ensure that any international transfers of personal data are done in compliance with applicable law. Any additional restraints 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.

We also use Internet, social media and mobile tools as a means to communicate with the public, including about our products or about the diseases our products are intended to treat. However, such uses create risks, such as the loss of trade secrets or other intellectual property. In addition, there continues 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 government fines, claims for damages, and shareholders' litigation. Any such events could require us to expend significant resources beyond those we already invest to further modify or enhance our protective measures, to remediate any damage, and to enable the continuity of our business. Such events could have a material adverse effect on our business, financial condition, results of operations and reputation.

We may fail to develop or take advantage of transformational technologies and business models.

Rapid progress in digital technologies and in the development of sometimes radical new business models is substantially transforming numerous industries around the world, creating new businesses and new opportunities for revenue and profit, while sometimes quickly rendering established businesses uncompetitive or obsolete. The potential exists for such transformations, both positive and negative, to impact the pharmaceutical industry, and numerous companies from the digital technology and other industries are seeking to enter the healthcare field.

To take advantage of these opportunities, Novartis has embarked upon a digital transformation strategy, with the goal of making Novartis an industry leader in leveraging advanced analytics and other new technologies. As part of this effort, we have created a new role of Chief Digital Officer, reporting directly to the CEO, charged with creating and executing a company-wide digital strategy, to be led by the Executive Committee of Novartis.

In order to reach our goal, we expect to invest substantial resources into efforts to improve the way we use data in drug discovery and development, to improve the ways we engage with patients, doctors and other stakeholders, and to automate business processes. With our commitment to using science-based innovation to deliver better outcomes for patients, together with our expertise and the valuable data we have and continue to amass, we believe that we have an opportunity to transform our business model using digital technologies.

There is no guarantee that our efforts toward a digital transformation will succeed, or that we will successfully transform our business model, or that we will be able to do so at any particular cost or any particular time. In order to succeed, we will be required to encourage a cultural change amongst our employees, attract and retain employees with appropriate skills and mindset, and successfully innovate across a variety of technology fields, while other companies, including both specialized start-up organizations and established technology companies such as IBM, with its Watson project, and Alphabet, with its subsidiary Verily, aggressively move forward in this field.

At the same time, there is a risk that other companies with specialized expertise or business models may enter the healthcare field, potentially disrupting our relationships with patients, healthcare professionals, customers, distributors and suppliers, with unknown potential consequences for us. For example, new entrants may seek to enter the pharmaceutical distribution field.

If we should fail to succeed in our efforts at a digital transformation of our company, then there is a risk that we may fail to create the innovative new products, tools or techniques that such technologies may make possible, or may fail to create them as quickly and efficiently as such technologies may enable. We may also lose opportunities to engage with our stakeholders and to profit from improved business processes, and may lose the resources devoted to these efforts to transform our business. At the same time, should third parties successfully enter the healthcare field with disruptive new technologies or business models, then we potentially may see our business supplanted in whole or in part by these new

entrants. Any such events could have a material adverse effect on our business, financial condition or results of operations.

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 fair value of the intangible assets and the 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, including identifiable intangible assets, investments in associated companies and goodwill, for impairment. Goodwill, intangible assets with an indefinite useful life, acquired research projects not ready for use, 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 2017, for example, we recorded intangible asset impairment charges of $0.7 billion. 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 10. Goodwill and intangible assets" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

Political and economic instability may have a material adverse effect on our results.

Unpredictable political conditions currently exist in various parts of the world, including a backlash in certain areas against free trade, anti-immigrant sentiment, social unrest, the refugee crisis, fears of terrorism and the risk of direct conflicts between nations. In the US, the current presidential administration's opposition to free trade agreements could cause barriers to be raised to international trade, and the elimination of the Affordable Care Act's individual mandate could have a negative impact on individuals' ability to afford health insurance. Similarly, there is a risk that barriers to free trade and the free movement of people may rise in Europe following the UK's "Brexit" vote and the rise of nationalist, separatist and populist sentiment in various countries. And significant conflicts continue in parts of the Middle East, including conflicts involving Saudi Arabia and Iran, and with respect to places such as North Korea. Collectively, such difficult conditions could, among other things, disturb the international flow of goods and increase the costs and difficulties of international transactions.

In addition, local economic conditions may adversely affect the ability of payors, as well as our distributors, customers, suppliers and service providers, to pay for our products, or otherwise to buy necessary inventory or raw materials, and to perform their obligations under agreements with us. 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 fiscally-challenged government payors, or with third parties with substantial exposure to such payors. See also "—Our reliance on outsourcing key business functions to third parties heightens the risks faced by our businesses," below.

Financial market issues 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, increasing our costs of raising capital. Uncertainties around future central bank and other economic

policies in the US and EU, as well as high debt levels in certain other countries, could also impact world trade. Sudden increases in economic, currency or financial market volatility in different countries have also 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," above, 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 the amount we pay toward pension-related expenses in the future," below. See also "—Our business is affected by pressures on pricing and reimbursement for our products," above, and "Item 5. Operating and Financial Review and Prospects—Item 5.B Liquidity and Capital Resources—Effects of Currency Fluctuations."

There is also a risk that countries facing local financial difficulties, including countries experiencing high inflation rates and highly indebted countries facing large capital outflows, may impose controls on the exchange of foreign currency. Such exchange controls could limit our ability to distribute retained earnings from our local affiliates, or to pay intercompany payables due from those countries. See also "Item 5. Operating and Financial Review and Prospects—Item 5.B Liquidity and Capital Resources—Condensed Consolidated Balance Sheets," and "Note 14. Trade receivables" and "Note 28. Financial instruments—additional disclosures" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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 operations" and "—An inability to attract and retain qualified personnel could adversely affect our business" below.

To the extent that 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 requirements in certain countries that patients directly pay an increasingly large 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.

At the same time, significant changes and potential future 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.

Separately and collectively, such factors 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.

Our indebtedness could adversely affect our operations.

As of December 31, 2017 we had $23.2 billion of non-current financial debt and $5.3 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 outsource the performance of certain key business functions to third parties, and invest a significant amount of effort and resources into doing so. Such outsourced functions can include research and development collaborations, manufacturing operations, warehousing and distribution activities, certain finance functions, marketing activities, data management and others. In particular, in many developing countries, we rely heavily on third party distributors and other agents for the sales, marketing and distribution of our products. Similarly, we often obtain the intermediate and raw materials used in the manufacture of our products from third parties located in developing countries.

Our reliance on outsourcing and third parties for certain functions, such as the research and development or manufacturing of our products, may reduce the potential profitability of such products.

In addition, governments and the public are increasingly placing pressure on major corporations, including Novartis, to take responsibility for compliance with human rights and appropriate environmental practices, as well as other actions, of their third party contractors around the world. Examples of this include the Conflict Minerals rule in the US, and the UK Modern Slavery Act.

We place strict contractual requirements on such contractors to comply with law and with our high standards. We also expend significant resources on efforts to screen out inappropriate contractors, to monitor the activities of those we have retained, and to seek their compliance with the law and our expectations. Nonetheless, many of these companies have limited resources, and, in particular, do not have internal compliance resources comparable to those within our organization.

Ultimately, if the third parties fail to meet their obligations to us, 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 or should they act inappropriately in the course of their performance of services for us, there is a risk that we could be held responsible for their acts, that our reputation may suffer, and that penalties may be imposed upon us. Any such failures by third parties could have a material adverse effect on our business, financial condition, results of operations or reputation.

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

Our Sandoz Division faces intense competition 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. At the same time, Sandoz faces strong competition from other generic pharmaceutical companies, which aggressively compete for exclusivity periods and for market share of generic products that may be identical to our generic products, including through significant price competition. In the US in 2017, industry-wide price competition among generic pharmaceutical companies significantly hurt Sandoz sales. More generally, such competitive actions by other patented and generic pharmaceutical manufacturers may increase the costs and risks associated with our efforts to introduce generic products, and may delay or entirely prevent their introduction and marketing. Such activities may further limit the prices at which we are able to sell these products and impact our results of operations.

In addition, the 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.

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 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 in a cost-efficient manner, 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, and "—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.

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, higher or lower withdrawal rates, or longer or shorter life spans of participants, among other variables. For example, in 2017, 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 nearly 94% of the Group total defined benefit pension obligation, by $0.8 billion. Any differences between our assumptions and estimates and our actual experience could require us to make additional contributions to our pension funds. Further, additional employer contributions might be required if plan funding falls below the levels required by local rules. Either such event could have a material effect on our results of operations and financial condition. 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 24. Post-employment benefits for associates" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018. See also "—Political and economic 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 the laws of the jurisdictions in which we operate. However, the integrated nature of our worldwide operations can produce conflicting claims from revenue authorities in different countries as to the profits to be taxed in the individual countries, including disputes relating to transfer pricing. The majority of the jurisdictions in which we operate have double tax treaties with other foreign jurisdictions, which provide a framework for mitigating the impact of double taxation on our revenues and capital gains. However, mechanisms developed to resolve such conflicting claims are largely untried, and can be expected to be very lengthy.

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 its Anti Tax Avoidance Directive, which seeks to prevent tax avoidance by companies and to ensure that companies pay appropriate taxes in the markets where profits are effectively made and business is effectively performed. The European Commission also continues to extend the application of its policies seeking to limit fiscal aid by Member States to particular companies, and the related investigation of the Member States' practices regarding the issuance of rulings on tax matters relating to individual companies.

These OECD and EU tax reform initiatives also need local country implementation, including in our home country of Switzerland, which may result in significant changes to established tax principles. Although we have taken steps to be in compliance with the evolving OECD and EU tax initiatives, and will continue to do so, significant uncertainties remain as to the outcome of these efforts.

In addition, in the United States, the president on December 22, 2017, signed into law the Tax Cuts and Jobs Act of 2017, which includes substantial changes to the US taxation of individuals and businesses. Although the new law substantially decreased tax rates applicable to corporations in the US, we do not yet know what all of the consequences of this new statute will be, including whether the law will have any unintended consequences. In particular, significant uncertainties remain as to how the US government will implement the new law, including with respect to the tax qualification of interest deductions, the concept of a territorial tax regime, royalty payments and cost of goods sold.

In general, such tax reform 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, will require us to continually assess our organizational structure against tax policy trends, and could lead to an increased risk of international tax disputes and an increase in our effective tax rate, and could 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 product ineffectiveness or 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 17%, 12% and 7%, respectively, of Group net sales in 2017. The largest trade receivables outstanding were for these three customers, amounting to 14%, 9% and 5%, respectively, of the Group's trade receivables at December 31, 2017. 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. Such events 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, including significant efforts to enhance the diversity of our workforce. 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 developing countries—could delay or prevent the achievement of major business objectives.

Our future growth will demand talented associates and leaders, yet the market for talent has become increasingly competitive. In particular, emerging growth markets are expected to continue to be an important source of growth, but in many of these countries 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 developing 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. See "—Political and economic instability may have a material adverse effect on our results" above.

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. Information on the Company—Item 4.D Property, Plants and Equipment—Environmental Matters" and "Note 19. Provisions and other non-current liabilities" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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 increase our cost of goods and 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 31. Principal Group subsidiaries and associated companies" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

Important Corporate Developments 2015-January 2018

2018

January — Novartis announces that it had successfully completed its previously-announced tender offer for all of the then outstanding ordinary shares, including ordinary shares represented by American Depositary Shares (ADSs), of Advanced Accelerator Applications S.A. (AAA). As of the expiration of the offer on January 19, 2018, approximately 97% of the then outstanding fully diluted ordinary shares, including ordinary shares represented by ADSs, were validly tendered. In addition, on January 22, 2018, we commenced a subsequent offering period which will expire on January 31, 2018, unless extended. AAA is a NASDAQ-listed radiopharmaceutical company that develops, produces and commercializes molecular nuclear medicines including *Lutathera* (lutetium (^{177}Lu) oxodotreotide), a first-in-class radioligand therapy product for neuroendocrine tumors.

We announce an exclusive global collaboration between Sandoz and Biocon to develop, manufacture and commercialize multiple biosimilars in immunology and oncology.

Novartis announces that Elizabeth (Liz) Barrett has been appointed CEO Novartis Oncology and a member of the Executive Committee of Novartis (ECN), effective February 1, 2018. Mrs. Barrett succeeds Bruno Strigini who decided to retire from Novartis for personal reasons.

2017

November — Novartis announces an expanded collaboration with Amgen and the Banner Alzheimer's Institute to collaborate on a new Generation Study 2 to assess whether investigational BACE1 inhibitor CNP520 can prevent or delay the symptoms of Alzheimer's disease in a high-risk population.

October — Novartis announces that it has made significant progress in its ongoing strategic review of the Alcon Division and has examined all options, ranging from retaining the business to a capital markets solution (e.g., an IPO or a spin-off). As part of this, we updated Alcon's strategic plan which confirms that it has the potential to grow sales at or above market while delivering profitability at least in line with the industry. Key criteria for a final decision and timing remain continued Alcon sales growth and margin improvement which need to be demonstrated for multiple quarters leading to potential action not likely before the first half of 2019.

Novartis announces that its over-the-counter ophthalmic products and certain surgical diagnostic products will transfer from the Innovative Medicines Division to the Alcon Division effective January 1, 2018.

September — Novartis announces a collaboration with UC Berkeley to establish the Novartis-Berkeley Center for Proteomics and Chemistry Technologies.

Novartis announces that, effective February 1, 2018, Vasant (Vas) Narasimhan, M.D., will succeed Joseph Jimenez as CEO of Novartis, who had indicated his desire to retire after eight years. Robert Kowalski, Pharm.D., Head of Global Regulatory Affairs, will assume ad-interim leadership of our Global Drug Development organization, effective February 1, 2018.

August — Novartis announces that, effective January 1, 2018, Bertrand Bodson has been appointed to the new role of Chief Digital Officer, reporting to the CEO of Novartis. Mr. Bodson is responsible for creating and executing a company-wide digital strategy. As part of this strategy, we plan to improve the ways we use data in drug discovery and development, engage with patients, doctors and other stakeholders, as well as to automate business processes.

June — Novartis announces that it has entered into a clinical research collaboration in which Bristol-Myers Squibb is to investigate the safety, tolerability, and efficacy of *Mekinist* (trametinib) in combination with Opdivo® (nivolumab) and Opdivo® + Yervoy® (ipilimumab) regimen as a potential treatment option for metastatic colorectal cancer in patients with microsatellite stable tumors where the tumors are proficient in mismatch repair (MSS mCRC pMMR).

Novartis announces a collaboration with IBM Watson Health to explore development of a cognitive solution that uses real-world data and advanced analytical techniques with the aim to provide better insights on the expected outcomes of breast cancer treatment options.

May — Novartis announces the launch of Better Hearts Better Cities, an innovative initiative to address the high rates of high blood pressure in low-income urban communities.

April — Novartis announces an expanded collaboration agreement with Amgen to co-commercialize erenumab (AMG 334) in the US, currently being investigated for the prevention of migraine. This agreement builds on the previously-announced 2015 global collaboration between Novartis and Amgen.

Novartis announces that it has entered into a clinical trial agreement with Allergan plc to conduct a Phase IIb study, involving the combination of a Novartis FXR agonist and Allergan's cenicriviroc for the treatment of non-alcoholic steatohepatitis (NASH).

Novartis announces that is has exercised an option to in-license ECF843, a recombinant form of human lubricin from Lubris, LLC, for ophthalmic indications worldwide (outside Europe). This transaction closed and Novartis received its exclusive license on April 21, 2017.

March — Novartis completes euro-denominated bond offerings in an amount equivalent to approximately $2 billion.

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

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.

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 was completed on February 14, 2017.

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. Novartis exercised the option on May 4, 2017. Novartis obtained an exclusive, worldwide license to develop and commercialize products containing emricasan on July 5, 2017.

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 Reprixys Pharmaceuticals Corporation and SEG101 (crizanlizumab) 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 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.

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."

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, 2015 to CSL and our Animal Health Division was sold on January 1, 2015 to Lilly.

Continuing Operations:

- Innovative Medicines: 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.

In January 2018, we announced that Elizabeth (Liz) Barrett has been appointed CEO Novartis Oncology and a member of the ECN, effective February 1, 2018. Mrs. Barrett succeeds Bruno Strigini who decided to retire from Novartis for personal reasons.

In September 2017, we announced that Joseph Jimenez, CEO of Novartis, informed the Board of Directors of his desire to step down as CEO in 2018, after eight years in the position. The Board of Directors has appointed Vasant (Vas) Narasimhan, M.D., Global Head of Drug Development and Chief Medical Officer, as CEO of Novartis, effective February 1, 2018. Dr. Narasimhan is a member of the ECN and joined Novartis in 2005.

In August 2017, we announced that, effective January 1, 2018, Bertrand Bodson has been appointed to the new role of Chief Digital Officer, reporting to the CEO of Novartis. Mr. Bodson is responsible for creating and executing a company-wide digital strategy. As part of this strategy, we plan to improve the ways we use data in drug discovery and development, engage with patients, doctors and other stakeholders, as well as to automate business processes.

In early 2017, we announced a strategic review of our Alcon Division in order to explore all options to maximize value for our shareholders. We have made significant progress in our ongoing strategic review and have examined all options, ranging from retaining the business to a capital markets solution (e.g., an IPO or a spin-off). As part of this, we have updated Alcon's strategic plan which confirms that it has the potential to grow sales at or above market while delivering profitability at least in line with the industry. We have also made significant progress on developing a potential capital markets solution, including financial carve-outs, tax and legal entity structuring, and identifying listing and incorporation locations. Key criteria for a final decision and timing remain continued Alcon sales growth and margin improvement which need to be demonstrated for multiple quarters leading to potential action not likely before first half of 2019.

In addition, we transferred our over-the-counter ophthalmic products and certain surgical diagnostic products (2017 sales of approximately $0.8 billion) from the Innovative Medicines Division to the Alcon Division effective January 1, 2018. Our prescription Ophthalmic medicines business remains with the Innovative Medicines Division. In compliance with IFRS, beginning with our first quarter 2018 results, Novartis will update its segment financial information to reflect this transfer, both for the current and prior years, to aid comparability of year-on-year results.

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, Novartis Business Services and Novartis Corporate Affairs.

The Novartis Institutes for BioMedical Research (NIBR) is the innovation engine of Novartis, which conducts drug discovery research and early clinical development trials for our Innovative Medicines Division and also collaborates with our Sandoz Division. Approximately 6,000 full-time equivalent scientists and associates at NIBR are working to discover new medicines for various diseases at sites located in the US, Switzerland and China. For more information about NIBR, see "—Innovative Medicines—Research and Development—Research program," below.

Our Global Drug Development (GDD) organization oversees 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. GDD includes approximately 10,000 full-time equivalent associates worldwide.

Novartis Technical Operations (NTO) was established 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 26,900 full-time equivalent associates and 68 manufacturing sites across our Innovative Medicines and Sandoz Divisions.

Novartis Business Services (NBS), our shared service organization, 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 10,870 full-time equivalent 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 2017, our Public Affairs and Group Country Management organizations were combined to form Novartis Corporate Affairs to better enable close collaboration among country presidents, unit heads and Public Affairs.

In 2017, Novartis continuing operations achieved net sales of $49.1 billion, while net income from continuing operations amounted to $7.7 billion. Of total net sales from continuing operations, $12.4 billion, or 25%, came from Emerging Growth Markets, and $36.7 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 2017 amounted to $9.0 billion.

Headquartered in Basel, Switzerland, our Group companies employed 121,597 full-time equivalent associates as of December 31, 2017. Our products are sold in approximately 155 countries around the world.

Innovative Medicines Division

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

In 2017, the Innovative Medicines Division accounted for $33.0 billion, or 67%, of Group net sales, and for $7.8 billion, or 87%, 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 cardiovascular, central nervous system, dermatology, gastrointestinal and hormonal therapies, metabolism, oncology, ophthalmics, pain, and respiratory, 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 2017, Sandoz accounted for $10.1 billion, or 21%, of Group net sales, and for $1.4 billion, or 15%, 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 2017, Alcon accounted for $6.0 billion, or 12%, of Group net sales, and for $ − 0.2 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 areas of oncology and rare diseases. The Novartis Pharmaceuticals business unit is organized into the following global business franchises responsible for the commercialization of various products in their respective

therapeutic areas: Ophthalmology, Immunology and Dermatology, Neuroscience, 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 addition, we transferred our over-the-counter ophthalmic products and certain surgical diagnostic products (2017 sales of approximately $0.8 billion) from the Innovative Medicines Division to the Alcon Division effective January 1, 2018. Our prescription Ophthalmic medicines business remains with the Innovative Medicines Division. In compliance with IFRS, beginning with our first quarter 2018 results, Novartis will update its segment financial information to reflect this transfer, both for the current and prior years, to aid comparability of year-on-year results.

The Innovative Medicines Division is the largest contributor among the divisions of Novartis and reported consolidated net sales of $33.0 billion in 2017, 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 typically seek to sell our marketed products throughout the world, not all products and indications are currently available in every country. In addition, a product may be available under different brand names depending on country and indication. 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	Postmenopausal women with advanced hormone receptor-positive, HER2-negative breast cancer in combination with exemestane after failure of treatment with letrozole or anastrozole	Tablet Dispersible tablet for oral suspension
			Advanced renal cell carcinoma after failure of treatment with VEGF-targeted therapy	
			Advanced neuroendocrine tumors of gastrointestinal, lung or pancreatic origin	
			Renal angiomyolipoma associated with tuberous sclerosis complex (TSC) in patients not requiring immediate surgery Subependymal giant cell astrocytoma associated with TSC in patients not requiring immediate surgery	

Business franchise	Product	Common name	Indications (vary by country and/or formulation)	Formulation
			Adjunctive treatment of patients aged 2 years and older with TSC and refractory seizures	
	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 Granules
	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	
	Kisqali	ribociclib	Postmenopausal women with hormone receptor positive, human epidermal growth factor receptor-2 negative locally advanced or metastatic breast cancer as initial endocrine-	Tablet

Business franchise	Product	Common name	Indications (vary by country and/or formulation)	Formulation
			based therapy in combination with an aromatase inhibitor	
	Kymriah	tisagenlecleucel	Patients up to 25 years of age with B-cell precursor acute lymphoblastic leukemia that is refractory or in second or later relapse	Suspension for intravenous 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 or immunoglobulins Thrombocytopenia in patients with chronic hepatitis C to allow initiation and maintenance of interferon-based therapy Severe aplastic anemia in patients as first-line therapy (in Japan) and second-line in patients who have had an insufficient response to immunosuppressive therapy (rest of world)	Film-coated tablet
	Rydapt	midostaurin	In combination with standard cytarabine and daunorubicin induction and cytarabine consolidation chemotherapy, for the treatment of adult patients with newly diagnosed acute myeloid leukemia (AML) who are FLT3 mutation-positive, as detected by an FDA approved test. *Rydapt* is not indicated as a single-agent induction therapy for the treatment of patients with AML. For the treatment of adult patients with aggressive systemic mastocytosis, systemic mastocytosis with associated hematological neoplasm or mast cell leukemia	Capsule
	Sandostatin LAR and *Sandostatin* SC	octreotide acetate	Acromegaly Symptom control for certain forms of neuroendocrine tumors Treatment of advanced neuroendocrine tumors of the midgut or of unknown primary origin	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	Unresectable or metastatic melanoma with BRAF V600E or V600K mutations as detected by a validated test Metastatic non-small cell lung cancer with BRAF V600E mutation 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

Business franchise	Product	Common name	Indications (vary by country and/or formulation)	Formulation
	Tykerb/*Tyverb*	lapatinib	In combination with capacitabine for the treatment of patients with HER2+ advanced or metastatic breast cancer who have progressed on prior trastuzumab therapy	Tablet
			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	
	Votrient	pazopanib	Advanced renal cell carcinoma	Tablet
			Certain types of advanced soft tissue sarcoma after prior chemotherapy	
	Zometa	zoledronic acid	Skeletal-related events from bone metastases	Vial/4mg Ready-to-use
			Hypercalcemia of malignancy	
	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
	Ciprodex	ciprofloxacin and dexamethasone	Treatment of bacterial ear infections	Ear 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	

Business franchise	Product	Common name	Indications (vary by country and/or formulation)	Formulation
	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
	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
Immunology and Dermatology	*Cosentyx*	secukinumab	Active ankylosing spondylitis Active psoriatic arthritis Moderate-to-severe plaque psoriasis Pustular psoriasis	Auto-injector Lyophilized, pre-filled syringe
	Ilaris	canakinumab	Cryopyrin-associated periodic syndromes 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	Solution for injection Lyophilized powder for reconstitution for subcutaneous injection
	Myfortic	mycophenolic acid (as mycophenolate sodium)	Prophylaxis of organ rejection in patients receiving allogeneic renal transplants	Gastro-resistant tablet
	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"	Liquid formulation in pre-filled syringe Lyophilized powder in vial
	Zortress/*Certican*	everolimus	Prevention of organ rejection (heart, liver and kidney)	Tablet Dispersible tablet
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
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	Moderate to 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

Business franchise	Product	Common name	Indications (vary by country and/or formulation)	Formulation
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
	Eucreas	vildagliptin and metformin	Type 2 diabetes	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
	Galvus	vildagliptin	Type 2 diabetes	Tablet
	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

Business franchise	Product	Common name	Indications (vary by country and/or formulation)	Formulation
	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 Post-traumatic inflammation of the tendons, ligaments, muscles, and joints Localized forms of soft-tissue and degenerative rheumatism	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 approximately 125 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. In June 2017, the European Commission approved the inclusion of treatment-free remission data in the "Tasigna Summary of Product Characteristics." Treatment-free remission is the ability to maintain molecular response after stopping tyrosine kinase inhibitor therapy in Ph+ CML patients in chronic phase. In December 2017, the FDA also approved the inclusion of treatment-free remission data in the US label for *Tasigna*.

- *Sandostatin* SC (octreotide acetate for injection) and *Sandostatin* LAR (octreotide acetate for injectable suspension) are somatostatin analogs indicated for the treatment of patients with acromegaly, a chronic disease caused by over-secretion of 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 whose disease has progressed on or after treatment with vascular endothelial growth factor-targeted therapy (in the EU) or after failure of treatment with sunitinib or sorafenib (in the US). *Afinitor* has been 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. It 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 45 countries worldwide. In addition, *Afinitor* is approved in 117 countries for postmenopausal women with advanced hormone receptor-positive, HER2-negative breast cancer in combination with exemestane after recurrence or progression following a non-steroidal aromatase inhibitor (in the EU) or failure of treatment with letrozole or anastrozole (in the US). All oncology indications are approved under the trade name *Afinitor,* in the tablet formulation. Everolimus, under the trade name *Afinitor* in the US and *Votubia* in the EU, is also approved in more than 100 countries to treat patients with tuberous sclerosis complex (TSC) who have subependymal giant cell astrocytoma (SEGA) not requiring immediate surgery, and in more than 95 countries to treat patients with TSC who have renal angiomyolipoma not requiring immediate surgery. The dispersible tablets 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*). Dispersible tablets also are approved in more than 30 countries, including EU member states (under the trade name *Votubia*), as adjunctive treatment for patients aged 2 years and older whose refractory partial-onset seizures, with or without secondary generalization, are associated with TSC. An application is currently under review in the US in support of an indication in select patients with TSC-associated refractory seizures. Everolimus, the active ingredient in *Afinitor*/*Votubia*, 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 in the EU and Switzerland under the tradename of *Exjade*. Regulatory applications have been submitted in several other countries. In addition to the film-coated tablet formulation, an additional formulation has also been developed as granules for patients who cannot swallow tablets, using the same composition as the film-coated tablet formulation. *Jadenu* Sprinkle granules were approved in the US, and *Jadenu* granules were approved in Japan in 2017.

- *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* + *Mekinist* is also approved for the treatment of patients with BRAF V600 mutation positive advanced non-small cell lung cancer, 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 insufficient response to other treatments. *Promacta*/*Revolade* is approved in Japan for aplastic anemia as first-line therapy and for patients who are refractory to other treatments. It 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 January 2018, the FDA granted a Breakthrough Therapy designation to *Promacta* for the first line treatment of severe aplastic anemia. 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.
- *Votrient* (pazopanib) is a small molecule tyrosine kinase inhibitor that targets a number of growth factors to limit new blood vessel and tumor growth and cell survival. *Votrient* is approved in the US for the treatment of patients with advanced renal cell carcinoma (RCC), and in the EU for first-line treatment of adult patients with advanced RCC 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 advanced RCC 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), and in the EU for the treatment of adult patients with selective subtypes of advanced STS who have received prior chemotherapy for metastatic disease or who have progressed within 12 months after (neo)adjuvant therapy. 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 advanced RCC and in more than 90 countries for advanced STS. *Votrient* 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 101 countries for patients with myelofibrosis and in more than 75 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 a reduced risk of death 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.
- *Kisqali* (ribociclib, formerly LEE011) is a cyclin-dependent kinase inhibitor, a class of drugs that help slow the progression of cancer by inhibiting two proteins called cyclin-dependent kinase 4 and 6 (CDK4/6), approved for the treatment of postmenopausal women with hormone receptor positive, human epidermal growth factor receptor-2 negative locally advanced or metastatic breast cancer as initial endocrine-based therapy in combination with an aromatase inhibitor. *Kisqali* has been approved in approximately 45 countries, including in the US in March 2017 and in the EU member states in August 2017. In May 2017, the FDA also approved the *Kisqali Femara* Co-Pack (ribociclib tablets; letrozole tablets). *Kisqali* was developed by the Novartis Institutes for BioMedical Research under a research collaboration with Astex Pharmaceuticals.
- *Rydapt* (midostaurin, formerly PKC412) is an oral, multi-targeted therapy, a type of treatment that interferes with certain pathways that are involved in the growth, progression and spread of cancer. In April 2017, the FDA approved *Rydapt* in combination with standard cytarabine and daunorubicin induction and cytarabine consolidation chemotherapy, for the treatment of adult patients with newly diagnosed acute myeloid leukemia (AML) who are FLT3 mutation-positive, as detected by an FDA approved test. *Rydapt* is not indicated as a single-agent induction therapy for the treatment of patients with AML. *Rydapt* is also approved in the US for the treatment of adult patients with aggressive systemic mastocytosis (ASM), systemic mastocytosis with associated hematological neoplasm (SM-AHN) or mast cell leukemia. In September 2017, the EMA approved *Rydapt* in combination with standard daunorubicin and cytarabine induction and high-dose cytarabine consolidation chemotherapy, and for adults in complete response followed by *Rydapt* single agent maintenance therapy, for adults with newly diagnosed AML who are FLT3 mutation-positive. It is also approved in the EU for use as monotherapy for the treatment of adults with ASM, SM-AHN or mast cell leukemia. Indications vary by country and not all indications are available in every country. *Rydapt* is the first targeted treatment for newly diagnosed FLT3-mutated AML and the first approved treatment for advanced systemic mastocytosis.
- *Kymriah* (tisagenlecleucel, formerly CTL019) suspension for intravenous infusion is a CD19-directed genetically modified autologous chimeric antigen receptor T (CAR-T) cell therapy. *Kymriah* is approved in the US for the treatment of patients up to 25 years of age with B-cell precursor acute lymphoblastic leukemia that is refractory or in second or later relapse.

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 specifically designed for the eye, minimizing systemic exposure. *Lucentis* is approved for six indications: neovascular (wet) 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) associated with causes other than nAMD or secondary to pathologic myopia (PM). EC approval in visual impairment due to CNV associated with causes other than nAMD or secondary to PM was received in 2016, and this indication is now approved in 86 countries including the countries of the EU and Switzerland. Further submissions for this indication have been filed in 29 countries. The *Lucentis* pre-filled syringe has now launched in 33 countries. *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. For further information see "Note 26. Transactions with related parties—Genentech/Roche" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.
- *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 analog 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 analogs. *Duotrav* is currently marketed in more than 140 countries, including countries of the EU, Canada and China.

Immunology and Dermatology

- *Cosentyx* (secukinumab) is a fully human monoclonal antibody that selectively neutralizes circulating interleukin 17A (IL-17A). IL-17A is a cytokine involved in the pathogenesis of psoriasis, ankylosing spondylitis and psoriatic arthritis. *Cosentyx* has been approved in over 75 markets, including the US, Japan and the countries of the EU, for the treatment of moderate-to-severe plaque psoriasis. *Cosentyx* is also approved in more than 65 countries for the treatment of adults with ankylosing spondylitis and psoriatic arthritis, including the US and the countries of the EU. *Cosentyx* is also approved in Japan for the treatment of pustular psoriasis, and both psoriasis vulgaris and psoriatic arthritis in adults who are not adequately responding to systemic therapies (except for biologics). Phase III 5-year data presented at a European medical congress in September 2017 showed high and long-lasting skin clearance in patients with moderate-to-severe plaque psoriasis with a continued favorable safety profile of *Cosentyx* sustained over the 5-year treatment period. *Cosentyx* in ankylosing spondylitis and psoriatic arthritis showed sustained improvements in signs and symptoms of both conditions in up to 80% of patients at three and four years respectively, as well as pain relief being rapid and sustained out to two years in both psoriatic arthritis and ankylosing spondylitis patients. Data presented at a US medical congress in November 2017 showed that almost 80% of ankylosing spondylitis patients have no radiographic progression of the spine at four years. In 2017, a label update for *Cosentyx* was also approved in the EU based on data showing long-term superiority over Stelara® (ustekinumab) in moderate-to-severe plaque psoriasis, along with efficacy in the treatment of moderate-to-severe scalp psoriasis, one of the most difficult to treat forms of the disease.

- *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.
- *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), also known as chronic idiopathic urticaria (CIU). CSU is a skin condition that appears spontaneously and causes persistent hives and/or painful deeper swelling of the skin for six weeks or more. The approval for CSU in the EU includes use 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. In 2017, new data demonstrated retreatment efficacy with *Xolair* in CSU patients after a treatment pause. 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 26. Transactions with related parties—Genentech/Roche" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.
- *Ilaris* (canakinumab) is a selective, high-affinity fully human monoclonal antibody that inhibits interleukin-1β (IL-1β), a key cytokine in the inflammatory pathway, by blocking the action of IL-1β for a sustained period of time. *Ilaris* is approved in more than 70 countries as a treatment for various inflammatory conditions, especially for adults and children with cryopyrin-associated periodic syndrome, systemic juvenile idiopathic arthritis, and the symptomatic treatment of refractory acute gouty arthritis. In 2016, *Ilaris* received approval for patients with adult-onset Still's disease in Europe, and for three rare and distinct types of Periodic Fever Syndromes, also known as Hereditary Periodic Fevers, in the US and Japan. *Ilaris* was approved in the EU in February 2017 for the same three Periodic Fever Syndromes.

Neuroscience

- *Gilenya* (fingolimod) is an oral disease-modifying therapy approved to treat relapsing forms of multiple sclerosis. *Gilenya* has a reversible lymphocyte redistribution effect targeting both focal and diffuse central nervous system damage caused by multiple sclerosis (MS). 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. *Gilenya* is currently approved in more than 80 countries around the world. *Gilenya* is licensed from Mitsubishi Tanabe Pharma Corporation.

Respiratory

- *Xolair* (omalizumab) is approved for the treatment of moderate-to-severe, or severe, persistent allergic asthma for children (age 6 and older) and adults 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 26. Transactions with related parties—Genentech/Roche" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

Cardio-Metabolic

- *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 in the US and in the EU in 2015. *Entresto* is now approved in more than 95 countries, and launched in more than 50 countries. Both European Society of Cardiology heart failure guidelines and US heart failure guidelines have given a class I recommendation, the strongest class of recommendation, for the use of sacubitril/valsartan in patients with HFrEF.

Established Medicines

- *Galvus* (vildagliptin), an oral DPP-4 inhibitor, and *Eucreas*, a single-pill combination of vildagliptin and metformin, 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 EU approved the use of *Galvus* 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 use of vildagliptin in triple combination with metformin and a sulphonylurea is also approved in the EU for the treatment of type 2 diabetes when diet and exercise plus dual therapy with vildagliptin and metformin do not provide adequate glycemic control. *Galvus* monotherapy indication was approved in China in 2015. *Eucreas* was approved in Japan in 2015 under the name *Equmet* as the first single-pill combination metformin/DPP-4 inhibitor approved in that country.
- *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.
- *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 80 countries for heart failure and for heart attack survivors. First launched in 1997, *Diovan HCT*/*Co-Diovan* is approved in more than 100 countries worldwide.
- *Voltaren*/*Cataflam* (diclofenac sodium/potassium/resinate/free acid/diethylamine) 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, capsules, 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 the topical and low dose oral forms of *Voltaren* as over-the-counter products.

- *Exelon* capsules/oral solution (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 80 countries. In 2006, *Exelon* capsules 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 90 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 ($15cm^2$) 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 of *Exelon* Patch ($15cm^2$) has been approved in more than 70 countries. The severe indication has now been approved in more than 10 countries.

Compounds in Development

The following table and paragraph summaries provide an overview of the key Innovative Medicines Division projects currently in the Confirmatory Development stage, including projects seeking to develop potential uses of new molecular entities as well as potential additional indications or new formulations for already marketed products. Changes to the "Selected Development Projects" table are highlighted in the table below entitled "Projects Added to and Subtracted from the Development Table Since 2016."

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.

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	2017	2020/III
			Chronic myeloid leukemia, 1st line	Oncology	Oral	2017	≥2022/II
ACZ885	canakinumab	Anti-interleukin-1β monoclonal antibody	Secondary prevention of cardiovascular events	Cardio-Metabolic	Subcutaneous injection	2017	US/EU (registration)[(1)]
			2nd line non-small cell lung cancer	Oncology	Subcutaneous injection	2017	2021/III
			1st line non-small cell lung cancer	Oncology	Subcutaneous injection	2017	≥2022/III
			Adjuvant non-small cell lung cancer	Oncology	Subcutaneous injection	2017	≥2022/III

(1) Submissions pending acceptance by FDA and EMA.

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
Afinitor/Votubia	everolimus	mTOR inhibitor	Tuberous sclerosis complex seizures	Oncology	Oral	2017	EU (approved) US (registration)
AMG 334	erenumab	Selective CGRP receptor antagonist	Prophylaxis of migraine	Neuroscience	Subcutaneous injection	2017	US/EU (registration)
Arzerra	ofatumumab	Anti-CD20 monoclonal antibody	Refractory indolent non-Hodgkin's lymphoma	Oncology	Intravenous infusion	2010	2020/III
BAF312	siponimod	Sphingosine-1-phosphate receptor modulator	Secondary progressive multiple sclerosis	Neuroscience	Oral	2012	2018/III
BYL719	alpelisib	PI3Kα inhibitor	Hormone receptor-positive, HER2-negative advanced breast cancer (postmenopausal women), 2nd line (+ fulvestrant)	Oncology	Oral	2015	2018/III
BYM338	bimagrumab	Inhibitor of activin receptor Type 2	Hip fracture recovery	Neuroscience	Intravenous infusion	2012	≥2022/II
			Sarcopenia	Neuroscience	Intravenous infusion	2014	≥2022/II
CAD106	amilomotide	Beta-amyloid-protein therapy	Alzheimer's disease	Neuroscience	Intramuscular injection	2009	≥2022/II/III
CFZ533	TBD	Blocking, non-depleting, anti-CD40 monoclonal antibody	Solid organ transplantation	Immunology and Dermatology	Intravenous infusion	2017	≥2022/II
CNP520	TBD	BACE inhibitor	Alzheimer's disease	Neuroscience	Oral	2016	≥2022/II/III
Cosentyx	secukinumab	Anti-interleukin-17 monoclonal antibody	Non-radiographic axial spondyloarthritis	Immunology and Dermatology	Subcutaneous injection	2015	2019/III
			Psoriatic arthritis head-to-head study vs. Humira® (adalimumab)	Immunology and Dermatology	Subcutaneous injection	2015	2020/III
			Ankylosing spondylitis head-to-head study vs. proposed Sandoz biosimilar adalimumab	Immunology and Dermatology	Subcutaneous injection	2015	≥2022/III
CTL019 (approved in the US as *Kymriah*)	tisagenlecleucel	CD19-targeted chimeric antigen receptor T-cell immunotherapy	Pediatric/young adult acute lymphoblastic leukemia	Oncology	Intravenous infusion	2017	US (approved) EU (registration)
			Relapsed/refractory diffuse large B-cell lymphoma	Oncology	Intravenous infusion	2017	US/EU (registration)
			Relapsed/refractory follicular lymphoma	Oncology	Intravenous infusion	2017	2020/II
			Chronic lymphocytic leukemia	Oncology	Intravenous infusion	2017	2021/III
			Relapsed/refractory diffuse large B-cell lymphoma in 1st relapse	Oncology	Intravenous infusion	2017	≥2022/II
			Relapsed/refractory diffuse large B-cell lymphoma (+ pembrolizumab)	Oncology	Intravenous infusion	2017	≥2022/III
ECF843	TBD	Boundary lubricant	Dry eye	Ophthalmology	Eye drops	2017	≥2022/II
EGF816	TBD	EGFR mutation modulation	Non-small cell lung cancer	Oncology	Oral	2017	2020/III
EMA401	olodanrigan	Angiotensin II type 2 receptor antagonist	Peripheral neuropathic pain	Neuroscience	Oral	2015	2021/II
Entresto	valsartan and sacubitril (as sodium salt complex)	Angiotensin receptor/ neprilysin inhibitor	Chronic heart failure with preserved ejection fraction	Cardio-Metabolic	Oral	2012	2019/III
			Post-acute myocardial infarction	Cardio-Metabolic	Oral	2015	2020/III
Gilenya	fingolimod	Sphingosine-1-phosphate receptor modulator	Pediatric multiple sclerosis	Neuroscience	Oral	2017	US/EU (registration)

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
HDM201	TBD	p53-HDM2 inhibitor	Acute myeloid lymphoma	Oncology	Oral	2017	≥2022/II
INC280	capmatinib	c-MET inhibitor	Non-small cell lung cancer	Oncology	Oral	2014	2019/III
			Non-small cell lung cancer EGFR mutation	Oncology	Oral	2016	≥2022/II
Jakavi	ruxolitinib	JAK1/JAK2 inhibitor	Acute graft-versus-host disease	Oncology	Oral	2016	2020/III
			Chronic graft-versus-host disease	Oncology	Oral	2016	2020/III
KAE609	cipargamin	PfATP4 inhibitor	Malaria	Established Medicines	Oral	2012	≥2022/II
KAF156	TBD	Imidazolopiperazines derivative	Malaria	Established Medicines	Oral	2014	≥2022/II
Kisqali	ribociclib	CDK4/6 inhibitor	Hormone receptor-positive, HER2-negative advanced breast cancer (postmenopausal women), 1st/2nd line (+ fulvestrant)	Oncology	Oral	2014	2018/III
			Hormone receptor-positive, HER2-negative advanced breast cancer (premenopausal women), 1st line, (+ tamoxifen + goserelin or NSAI + goserelin)	Oncology	Oral	2015	2018/III
			Hormone receptor-positive, HER2-negative breast cancer (adjuvant)	Oncology	Oral	2016	≥2022/III
LAM320	clofazimine	Mycobacterial DNA binding	Multi-drug resistant tuberculosis	Established Medicines	Oral	2016	2018/III
LCI699	osilodrostat	Cortisol synthesis inhibitor	Cushing's disease	Oncology	Oral	2014	2018/III
LHW090	TBD	Neprilysin inhibitor	Resistant hypertension	Cardio-Metabolic	Oral	2017	≥2022/II
LIK066	TBD	SGLT 1/2 inhibitor	Weight loss	Cardio-Metabolic	Oral	2016	≥2022/II
LJN452	tropifexor	FXR agonist	Non-alcoholic steatohepatitis	Immunology and Dermatology	Oral	2015	≥2022/II
LMI070	branaplam	SMN2 RNA splicing modulator	Spinal muscular atrophy	Neuroscience	Oral	2017	2021/III
LOU064	TBD	BTK inhibitor	Chronic spontaneous urticaria	Immunology and Dermatology	Oral	2017	≥2022/II
Lucentis	ranibizumab	Anti-VEGF monoclonal antibody fragment	Retinopathy of prematurity	Ophthalmology	Intravitreal injection	2014	2018/III
MAA868	TBD	Factor XI inhibitor	Stroke prevention in atrial fibrillation	Cardio-Metabolic	Subcutaneous injection	2017	≥2022/II
MTV273	TBD	BCMA-targeted chimeric antigen receptor T-cell immunotherapy	Multiple myeloma	Oncology	Intravenous infusion	2017	2021/I
OMB157	ofatumumab	Anti-CD20 monoclonal antibody	Relapsing multiple sclerosis	Neuroscience	Subcutaneous injection	2015	2019/III
PDR001	spartalizumab	Anti PD-1 monoclonal antibody	Malignant melanoma (w/ *Tafinlar* + *Mekinist*)	Oncology	Intravenous infusion	2017	2019/III
			Endocrine neoplasm	Oncology	Intravenous infusion	2017	2019/III
			Malignant melanoma	Oncology	Intravenous infusion	2017	2021/II
Promacta/ *Revolade*	eltrombopag	Thrombopoietin receptor agonist	Severe aplastic anemia, 1st line	Oncology	Oral	2016	2018/III
QAW039	fevipiprant	DP2 antagonist (CRTH2 antagonist)	Asthma	Respiratory	Oral	2015	2020/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
QBW251	TBD	CFTR potentiator	Chronic obstructive pulmonary disease	Respiratory	Oral	2017	≥2022/II
QGE031	ligelizumab	High affinity anti-IgE monoclonal antibody	Chronic spontaneous urticaria/ chronic idiopathic urticaria	Immunology and Dermatology	Subcutaneous injection	2014	2021/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
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	2017	2020/III
Rydapt	midostaurin	Signal transduction inhibitor	Acute myeloid leukemia (FLT3 wild type)	Oncology	Oral	2016	≥2022/III
SEG101	crizanlizumab	P-selectin inhibitor	Sickle cell disease	Oncology	Intravenous infusion	2016	2019/III
Signifor LAR	pasireotide	Somatostatin analogue	Cushing's disease	Oncology	Long-acting release/ intramuscular injection	2017	EU (approved) US (registration)
Tafinlar + *Mekinist*	dabrafenib + trametinib	BRAF inhibitor + MEK inhibitor	BRAF V600+ melanoma (adjuvant)	Oncology	Oral	2017	US (approved) EU (registration)
UNR844	TBD	Reduction of disulfide bonds	Presbyopia	Ophthalmology	Eye drops	2017	2021/II
VAY736	TBD	Anti-BAFF (B-cell activating factor) monoclonal antibody	Autoimmune hepatitis	Immunology and Dermatology	Subcutaneous injection	2016	2021/II
			Primary Sjogren's syndrome	Immunology and Dermatology	Subcutaneous injection	2015	≥2022/II
VAY785	emricasan	Pan-caspase inhibitor	Nonalcoholic steatohepatitis	Immunology and Dermatology	Oral	2017	≥2022/II
Xolair	omalizumab	Anti-IgE monoclonal antibody	Nasal polyps	Respiratory	Subcutaneous injection	2017	2020/III
ZPL389	TBD	Histamine H_4 receptor antagonist	Atopic dermatitis	Immunology and Dermatology	Oral	2017	2021/II

Key Development Projects

- ABL001 (asciminib) is a potent and specific inhibitor of the protein BCR-ABL. It binds to a distinct region of the protein, resulting in a mechanism of action that is different compared to tyrosine kinase inhibitors (TKIs) approved to treat Philadelphia chromosome-positive chronic myelogenous leukemia (Ph+ CML). Because of its unique receptor binding site, the compound may have the potential to be prescribed in combination with TKIs approved to treat Ph+ CML. Clinical trials investigating ABL001 are ongoing. A Phase III clinical study was initiated in October 2017 comparing the efficacy of ABL001 versus bosutinib in patients with CML-CP who are either resistant or intolerant to two prior TKIs.

- ACZ885 (canakinumab) was first approved in 2009 for cryopyrin-associated periodic syndromes as *Ilaris*. In 2017 data from CANTOS, a Phase III study evaluating quarterly injections of ACZ885 in people with a prior heart attack and inflammatory atherosclerosis, was presented at the European Society of Cardiology Congress and published simultaneously in The New England Journal of Medicine and The Lancet. CANTOS met its primary endpoint with a statistically significant 15% reduction of major adverse cardiovascular events (MACE) in people with a prior heart attack and inflammatory atherosclerosis who were treated with 150mg of ACZ885 in addition to standard of care including lipid-lowering therapy. This effect was driven by 24% relative reduction in risk of heart attack. A non-significant 10% reduction in risk of cardiovascular death was also observed. A sub-group of study participants, in the 150 mg arm, whose inflammation was reduced below the median high-sensitivity C-reactive protein level, measured at three months after one dose of treatment, saw a 27% relative risk reduction on the primary MACE endpoint. A review of a blinded, pre-planned oncology safety analysis revealed a 77% reduction in lung cancer mortality and 67% reduction in lung cancer cases in patients treated with 300 mg of ACZ885. Novartis is discussing the CANTOS study findings with health authorities and plans to submit the cardiovascular data for regulatory approval, as well as evaluate the lung cancer findings in additional Phase III confirmatory studies.
- 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. Data from a pivotal Phase II study of erenumab presented in September 2017 at the Congress of the International Headache Society showed reduced monthly migraine days in patients with chronic migraine for whom previous preventive treatments have failed. In these patients, erenumab cut the average number of migraine days by at least five days and up to a week per month, depending on treatment dose. New data was also presented at the September 2017 Congress of the International Headache Society assessing the safety of erenumab 140 mg intravenous in a cardiovascular population with stable angina who are at increased risk for myocardial ischemia. Results of this study showed that inhibition of the CGRP receptor with erenumab had no impact on exercise capacity as measured by an exercise stress test. In January 2018, Novartis announced topline results from the Phase IIIb LIBERTY study of erenumab. The study met its primary endpoint with significantly more patients taking erenumab experiencing at least a 50% reduction from baseline in their monthly migraine days as compared to placebo. The trial assessed patients who tried and failed two to four previous preventive medications due to lack of efficacy or intolerable side effects. LIBERTY is the first migraine prevention trial of its kind conducted specifically in patients who have tried multiple therapies without success, and are in need of additional treatment options. In 2017 Novartis submitted AMG 334 to the EMA for migraine prophylaxis. Amgen Inc.'s filing for the same indication was also accepted by the FDA in July 2017. If approved, Novartis and Amgen plan to co-commercialize erenumab in the US. Amgen has exclusive commercialization rights in Japan, and Novartis has exclusive commercialization rights in the rest of the world. The companies plan to continue global co-development.
- *Arzerra* (ofatumumab) is a fully 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. *Arzerra* is approved in more than 60 countries worldwide as monotherapy for the treatment of patients with CLL who are refractory after prior treatment with fludarabine and alemtuzumab, and is also approved for other indications in CLL in the US and EU. A Phase III trial is underway to investigate ofatumumab in refractory indolent non-Hodgkin's lymphoma. Novartis is also investigating ofatumumab (disclosed as OMB157) in two Phase III studies for relapsing multiple sclerosis. *Arzerra* is marketed under a license agreement between Genmab A/S and Novartis.
- BAF312 (siponimod) is an oral, second-generation sphingosine 1-phosphate receptor modulator under development for the treatment of secondary progressive multiple sclerosis (SPMS). BAF312

binds selectively to the sphingosine 1-phosphate receptor subtypes 1 and 5, and distributes effectively to the brain where it may impact central nervous system inflammation and repair mechanisms. Results from the EXPAND Phase III study, evaluating efficacy and safety for SPMS, demonstrated that BAF312 reduced three- and six-month confirmed disability progression against placebo, with a safety profile similar to fingolimod. New data from the Phase III EXPAND study presented at the October 2017 joint meeting of the European and American Committees for Treatment and Research in Multiple Sclerosis demonstrated the effects of BAF312 on magnetic resonance imaging lesions and brain shrinkage in SPMS. Effects of BAF312 on disability progression in patients without on-study relapses were also presented. Results from EXPAND have been submitted for peer review publication. Novartis is planning to file BAF312 in the US and EU in 2018 for SPMS. If approved, label content will be subject to negotiation with regulatory authorities, but is expected to reflect the unique SPMS population studied in the EXPAND trial.

- 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 BYL719 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 IL-17A. *Cosentyx* is in Phase III development in non-radiographic axial spondyloarthritis. We expect results from this trial in 2019. *Cosentyx* is also in a Phase III head-to-head clinical trial in psoriatic arthritis against Humira® (adalimumab) and a Phase III head-to-head clinical trial in ankylosing spondylitis against the proposed biosimilar adalimumab in development by Sandoz.
- CTL019 (tisagenlecleucel, approved in the US as *Kymriah*) is a CD19-directed genetically modified autologous chimeric antigen receptor T (CAR-T) cell therapy that uses the patient's own immune system to fight certain types of cancer. CARs are engineered proteins that enable a patient's own T cells to seek out specific 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. In August 2017, the FDA approved CTL019 as *Kymriah* for the treatment of patients up to 25 years of age with B-cell precursor acute lymphoblastic leukemia (ALL) that is refractory or in second or later relapse. *Kymriah* is also currently under regulatory review in the US for the treatment of adult patients with relapsed/refractory diffuse large B-cell lymphoma (DLBCL), the most common type of non-Hodgkin lymphoma. In the EU, the EMA is reviewing the CTL019 Marketing Authorization Application for the treatment of adult patients with relapsed/refractory DLBCL ineligible for autologous stem cell transplantation and for pediatric and young adult patients with relapsed/refractory ALL. At the American Society of Hematology Annual Meeting in December 2017, Novartis presented data from the primary analysis of the pivotal, Phase II JULIET trial that CTL019 sustained complete responses at six months in adults with relapsed/refractory DLBCL. CTL019 is also expected to enter Phase II development for adult patients with relapsed/refractory follicular lymphoma who have failed at least two prior systemic therapies. A Phase III study in second-line use in adult patients with DLBCL after first relapse is also being planned. Clinical trials in these patient populations are anticipated to begin in 2018. In January 2018, the FDA granted Priority Review for *Kymriah* for the treatment of adults with relapsed or refractory DLBCL who are ineligible for or relapse after autologous stem cell transplant (ASCT). Also in January 2018, the EMA granted accelerated assessment for CTL019 for the treatment of children and young adults with relapsed or refractory B-cell acute lymphoblastic

leukemia, and for adult patients with relapsed or refractory DLBCL who are ineligible for ASCT. Novartis and the University of Pennsylvania's Perelman School of Medicine, which developed this CD19-directed CAR T cell therapy, have a global collaboration to research, develop and commercialize CAR-T therapies for the investigational treatment of cancers.

- EMA401 (olodanrigan) is a novel angiotensin II type 2 receptor (AT_2R) antagonist. Targeting AT_2R is an emerging approach to neuropathic pain treatment. AT_2R antagonists block the pain signaling pathways in the peripheral nervous system. The first Phase II study to assess the potential of EMA401 in peripheral neuropathic pain was initiated in 2017, with the second Phase II study planned to start in 2018.
- *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. 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 continues 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.
- *Gilenya* (fingolimod, formerly FTY720) is a sphingosine 1-phosphate receptor modulator approved for the treatment of relapsing forms of multiple sclerosis in adults as *Gilenya*. Results from the Phase III PARADIGMS study, investigating the safety and efficacy of oral once-daily *Gilenya* in children and adolescents (ages 10 to 17) with multiple sclerosis showed that oral fingolimod resulted in an 82% reduction in the number of relapses in the patient population over a period of up to two years, compared to interferon beta-1a intramuscular injections. In December 2017, the FDA granted *Gilenya* Breakthrough Therapy designation for relapsing forms of multiple sclerosis in pediatric patients (ages 10 to 17). *Gilenya* is not currently approved for pediatric use.
- INC280 (capmatinib) is a highly selective MET inhibitor. In June 2016, Novartis initiated ongoing Phase II studies to prospectively explore the predictive value of different mechanisms of MET dysregulation (including MET amplification and MET leading to exon 14 deletion mutation) in advanced non-small cell lung cancer. INC280 is licensed by Novartis from Incyte Corporation.
- *Jakavi* (ruxolitinib) is an oral inhibitor of the JAK 1 and JAK 2 tyrosine kinases. *Jakavi* is currently in Phase III development in acute graft versus host disease and chronic graft versus host disease. 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.
- KAF156 belongs to a novel class of antimalarial compounds called imidazolopiperazines. It has the potential to clear malaria infection, including resistant strains, as well as to block the transmission of the malaria parasite. As demonstrated in a Phase IIa proof-of-concept trial, the compound is fast-acting and potent across multiple stages of the parasite's lifecycle, rapidly clearing both *P. falciparum* and *P. vivax* parasites. In August 2017 Novartis began a Phase IIb study to test multiple dosing combinations and dosing schedules of KAF156 and lumefantrine, including the feasibility of a single dose therapy in adults, adolescents and children.
- *Kisqali* (ribociclib; formerly LEE011) is a selective cyclin-dependent kinase inhibitor that inhibits two proteins called cyclin-dependent kinase 4 and 6 (CDK4/6). In March 2017 the FDA approved *Kisqali* in combination with an aromatase inhibitor as initial endocrine-based therapy for treatment of postmenopausal women with hormone receptor positive, human epidermal growth factor receptor-2 negative (HR+/HER2-) advanced or metastatic breast cancer. In August 2017 the EC

approved *Kisqali* in combination with an aromatase inhibitor as initial endocrine-based therapy for treatment of postmenopausal women with HR+/HER2- locally advanced or metastatic breast cancer. Results from the pivotal Phase III MONALEESA 2 study showed *Kisqali* plus letrozole significantly extended progression free survival (PFS) compared to a standard of care, letrozole, as a first line treatment in postmenopausal women with HR+/HER2- advanced breast cancer. *Kisqali* plus letrozole reduced the risk of disease progression or death by 44% over letrozole alone, significantly extending PFS across all patient subgroups. Novartis is continuing to assess *Kisqali* through the MONALEESA clinical trial program, which includes MONALEESA 2, MONALEESA 3 and MONALEESA 7. These trials are evaluating *Kisqali* in multiple endocrine therapy combinations across a broad range of patients, including men and premenopausal women. In December 2017, *Kisqali* was granted Breakthrough Therapy designation by the FDA for initial endocrine-based treatment of pre- or peri-menopausal women with HR+/HER2- advanced or metastatic breast cancer in combination with tamoxifen or an aromatase inhibitor. *Kisqali* 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 biomarkers. We initiated Phase II dose ranging studies for weight loss in the first half of 2017.
- LJN452 (tropifexor) 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. The program is on track, and we expect to complete the Phase III program in MS in 2019. Ofatumumab is marketed by Novartis for oncology indications as an intravenous infusion under the brand name *Arzerra*.
- PDR001 (spartalizumab) is a PD-1 antagonist that may restore the ability of immune cells to induce cell death and fight cancer. PDR001 is being evaluated in a Phase III trial in combination with *Tafinlar* + *Mekinist* for metastatic BRAF V600+ melanoma, in a Phase II trial for neuroendocrine tumors and in Phase I trials in other tumor types.
- QAW039 (fevipiprant) is being investigated in the reduction of asthma attacks in patients with severe asthma and in the improvement of lung function in patients with moderate asthma. This compound is designed to block the activity of the DP2 receptor, an upstream driver of allergen- and non-allergen dependent inflammation in asthma, resulting in reduction in IL-4, IL-5, and IL-13, inhibition of eosinophil migration, and inhibition of smooth muscle cells growth in the airway. Phase II clinical data shows a positive effect on symptoms (asthma control questionnaire) and lung function, and reduction in sputum eosinophils.
- QMF149 (indacaterol acetate/mometasone furoate) is a once daily fixed-dose combination being investigated in asthmatic patients who are uncontrolled on an inhaled corticosteroid. QMF149 combines indacaterol acetate (an inhaled long-acting $beta_2$-adrenergic agonist with 24 hour duration of action) and mometasone furoate (an inhaled corticosteroid with 24 hour duration of action) delivered via the *Breezhaler* device, a single dose dry powder inhaler. QMF149 is currently being evaluated in two Phase III clinical trials to support registration outside the US.

- QVM149 (indacaterol acetate, glycopyrronium bromide, mometasone furoate) is a fixed-dose combination of indacaterol acetate (an inhaled long-acting beta$_2$-adrenergic agonist with 24 hour duration of action), glycopyrronium bromide (an inhaled long-acting muscarinic antagonist with 24 hour duration of action), and mometasone furoate (an inhaled corticosteroid with 24 hour duration of action) in development for once-daily maintenance treatment of poorly controlled asthmatic patients to be delivered via the *Breezhaler* device, a single dose dry powder inhaler. All three mono-components have previously been developed as individual drugs for either chronic obstructive pulmonary disease or asthma. QVM149 is currently in Phase III clinical trials to support registration outside the US.
- 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. In 2017 Novartis announced the global Phase III RELAX-AHF-2 study investigating the efficacy, safety and tolerability of RLX030 in patients with acute heart failure (AHF) did not meet its primary endpoints of reduction in cardiovascular death through day 180 or reduced worsening heart failure through day five when added to standard therapy in patients with AHF.
- RTH258 (brolucizumab) is a single-chain antibody fragment that acts as an anti-vascular endothelial growth factor (anti-VEGF) agent. RTH258 is currently in development for neovascular age related macular degeneration (nAMD) and diabetic macular edema. RTH258 met its primary endpoint of non-inferiority to aflibercept in mean change in best-corrected visual acuity in two Phase III clinical trials, HAWK and HARRIER. Additionally, superiority was shown in three secondary endpoints that are considered key markers of nAMD disease, central subfield retinal thickness, retinal fluid and disease activity. Additionally, a majority of patients were on a 12-week treatment schedule immediately following the loading phase, also assessed by secondary endpoints in the HAWK and HARRIER trials. Beginning in 2018, we expect to make regulatory filings for nAMD in the US, EU and Japan. RTH258 is also currently in development for diabetic macular edema, with Phase III trials in this indication scheduled to start in 2018.
- SEG101 (crizanlizumab) 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 Reprixys Pharmaceuticals Corporation following receipt of results of the Phase II SUSTAIN study. Results from the Phase II SUSTAIN study demonstrated 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 approved in the EU in September 2017 as a long-acting release formulation for patients with Cushing's disease. An application for this indication has also been accepted by the FDA.
- *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* (dabrafenib + trametinib) is the first combination of BRAF and MEK inhibitors to report three years of follow-up survival data in two Phase III studies in BRAF V600+ 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. Data presented at a major European conference in the third quarter showed reduced risk of disease recurrence by 53% in patients with resected BRAF V600 mutation-positive melanoma and meaningful improvements in secondary endpoints, including overall survival, distant metastasis-free survival and freedom from relapse. In October 2017, the FDA granted Breakthrough Therapy designation for *Tafinlar* + *Mekinist* for the adjuvant

treatment of patients with stage III melanoma with a BRAF V600 mutation following complete resection. In December 2017, the FDA granted Priority Review to *Tafinlar + Mekinist* for adjuvant treatment of this patient population. *Tafinlar + Mekinist* is being evaluated in a Phase III trial in combination with PDR001 for metastatic BRAF V600+ melanoma, in a Phase II trial for neuroendocrine tumors and in Phase I trials in other tumor types.

- UNR844 is a potential first-in-class topical treatment in development for presbyopia. UNR844 is believed to work through reduction of disulfide bonds, softening the crystalline lens. 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 (BAFF-R) with enhanced antibody-dependent cell-mediated cytotoxicity against BAFF-R positive B cells. VAY736 is in Phase II development for the treatment of primary Sjogren'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. VAY736 is also being tested for patients with autoimmune hepatitis, a chronic autoimmune disorder, characterized by hepatocyte injury and destruction of the liver architecture leading to fibrosis/cirrhosis, and ultimately to end stage liver disease requiring liver transplantation.
- VAY785 (emricasan) is an investigational, first-in-class, oral, pan-caspase inhibitor being investigated for the treatment of chronic liver diseases including nonalcoholic steatohepatitis (NASH) with advanced fibrosis (scarring) and cirrhosis. In multiple Phase II clinical trials, VAY785 has demonstrated significant, rapid and sustained reductions in elevated levels of key biomarkers of inflammation and cell death, which play a role in the severity and progression of liver disease. VAY785 is being developed in collaboration with Conatus Pharmaceuticals Inc. As part of this collaboration, Conatus is conducting several Phase IIb clinical trials with VAY785, including the ENCORE-PH trial in primarily compensated NASH cirrhosis, the POLT-HCV-SVR trial in post-transplant hepatitis C virus fibrosis and cirrhosis, and the ENCORE-NF in NASH fibrosis. Top-line results of these trials are expected to be available starting in 2018 and continuing thereafter. In May 2017, Conatus also initiated the Phase IIb ENCORE-LF trial in patients with decompensated liver cirrhosis caused by NASH, with results expected in the second half of 2019.
- 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. In May 2017, the FDA approved the expanded use of *Zykadia* to include the first-line treatment of patients with metastatic non-small cell lung cancer whose tumors are ALK+, as detected by an FDA-approved test. In June 2017 the European Commission approved expanding the use of *Zykadia* to the first-line treatment of patients with advanced non-small cell lung cancer whose tumors are ALK+.

Projects Added to and Subtracted from the Development Table Since 2016

Project/Product	Potential indication/ Disease area	Change	Reason
ABL001	Chronic myeloid leukemia, 1st line	Added	Entered confirmatory development
ACZ885	2nd line non-small cell lung cancer	Added	Entered confirmatory development
	1st line non-small cell lung cancer	Added	Entered confirmatory development
	Adjuvant non-small cell lung cancer	Added	Entered confirmatory development
Arzerra	Refractory non-Hodgkin's lymphoma	Now disclosed as refractory indolent non-Hodgkin's lymphoma; and Route of administration corrected	
CFZ533	Solid organ transplantation	Added	Entered confirmatory development
CJM112	Immune disorders	Removed	Development discontinued
Cosentyx	Psoriatic arthritis head to head study vs. adalimumab	Now disclosed as psoriatic arthritis head to head study vs. Humira® (adalimumab)	
	Ankylosing spondylitis head to head study vs. adalimumab	Now disclosed as ankylosing spondylitis head to head study vs. proposed Sandoz biosimilar adalimumab	
CTL019 (approved in the US as *Kymriah*)	Pediatric acute lymphoblastic leukemia	Now disclosed as pediatric/young adult acute lymphoblastic leukemia	
	Diffuse large B-cell lymphoma	Now disclosed as 3rd line diffuse large B-cell lymphoma	
	Relapsed/refractory follicular lymphoma	Added	Entered confirmatory development

Project/Product	Potential indication/ Disease area	Change	Reason
	Chronic lymphocytic leukemia	Added	Entered confirmatory development
	Relapsed/refractory diffuse large B-cell lymphoma in 1st relapse	Added	Entered confirmatory development
	Relapsed/refractory diffuse large B-cell lymphoma (+pembrolizumab)	Added	Entered confirmatory development
ECF843	Dry eye	Added	Entered confirmatory development
EGF816	Non-small cell lung cancer	Added	Entered confirmatory development
EMA401	Neuropathic pain	Now disclosed as peripheral neuropathic pain	
HDM201	Acute myeloid lymphoma	Added	Entered confirmatory development
Ilaris	Periodic fever syndromes	Commercialized	
Jakavi	Early myelofibrosis	Removed	Development discontinued
	Graft-versus-host disease	Now disclosed as acute graft-versus-host disease	
	Chronic graft-versus-host disease	Added	Entered confirmatory development
Kisqali (LEE011)	Hormone receptor-positive, HER2-negative advanced breast cancer (postmenopausal women), 1st line (+ letrozole)	Commercialized as *Kisqali*	
LHW090	Resistant hypertension	Added	Entered confirmatory development
LMI070	Spinal muscular atrophy	Added	Entered confirmatory development
LOU064	Chronic spontaneous urticaria	Added	Entered confirmatory development
MAA868	Stroke prevention in atrial fibrillation	Added	Entered confirmatory development

Project/Product	Potential indication/ Disease area	Change	Reason
MTV273	Multiple myeloma	Added	Entered confirmatory development
PDR001	Endocrine neoplasm	Added	Entered confirmatory development
	Malignant melanoma (w/ *Tafinlar* + *Mekinist*)	Added	Entered confirmatory development
	Neuroendocrine tumors	Added	Entered confirmatory development
PIM447	Hematologic tumors	Removed	In exploratory development
PKC412 *(Rydapt)*	Acute myeloid leukemia	Commercialized as *Rydapt*	
	Advanced systemic mastocytosis	Commercialized as *Rydapt*	
QAW039	Atopic dermatitis	Removed	Development discontinued
QBW251	Chronic obstructive pulmonary disease	Added	Entered confirmatory development
	Cystic fibrosis	Removed	In exploratory development
RLX030	Acute heart failure	Removed	Development discontinued
Tafinlar + *Mekinist*	BRAF V600+ non-small cell lung cancer	Commercialized	
	BRAF V600+ colorectal cancer	Removed	Development discontinued
Tasigna	Chronic myeloid leukemia treatment-free remission	Commercialized	
VAY736	Autoimmune hepatitis	Added	Entered confirmatory development
VAY785	Nonalcoholic steatohepatitis	Added	Entered confirmatory development
Xolair	Nasal polyps	Added	Entered confirmatory development
Zykadia	ALK + advanced non-small cell lung cancer (1st line, treatment naïve)	Commercialized	

Project/Product	Potential indication/ Disease area	Change	Reason
	ALK + advanced non-small cell lung cancer (brain metastases)	Removed	Development discontinued

Principal Markets

The Innovative Medicines Division sells products in approximately 155 countries worldwide. Net sales are generally concentrated in the US, Europe and Japan. The following table sets forth the aggregate 2017 net sales of the Innovative Medicines Division by region:

Innovative Medicines	2017 Net sales to third parties	
	$ millions	%
Europe	11,289	34
United States	11,116	34
Asia, Africa, Australasia	7,875	24
Canada and Latin America	2,745	8
Total	**33,025**	**100**
Of which in Established Markets*	24,633	75
Of which in Emerging Growth Markets*	8,392	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.

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 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, and review and adapt our manufacturing network to meet the needs of our Innovative Medicines Division.

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 3,360 field force representatives in the US, and an additional 22,161 in the rest of the world, as of December 31, 2017, 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 the largest single payor for healthcare services in the US. In addition, both commercial and government sponsored managed care organizations continue to be among the largest groups of payors for healthcare services in the US. In other countries, 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.

Recent trends have been toward continued consolidation among distributors and retailers of Innovative Medicines Division products, both in the US and internationally. This has increased our customers' purchasing leverage and resulted in increased pricing pressure on our products. Moreover, we are exposed to increased concentration of credit risk as a result of the consolidation among our customers.

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 may 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—2017 Compared to 2016—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—2016 Compared to 2015—Innovative Medicines—Research and development of Innovative Medicines Division."

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, three other US locations, and Shanghai, China, approximately 6,000 full-time equivalent 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. In addition, the Novartis Institute for Tropical Diseases (NITD), the Friedrich Miescher Institute, and the Genomics Institute of the Novartis Research Foundation focus on basic genetic and genomic research. NITD is currently focused on parasitic pathogens, including malaria and cryptosporidiosis.

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 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) moved its research programs and operations from Singapore to Emeryville, California, where, as of June 2017, it is co-located with our infectious diseases research team. The creation of the two centers of excellence in bio-therapeutics resulted in the closure of a biologics group in Shanghai, China and the closure of ESBATech, a biologics group in Schlieren, Switzerland in 2017. In 2017 we also completed the exit of all internal non-human primate research resulting in the closure of operations focused on non-human primate research in Fort Worth, Texas.

Development program

Our Global Drug Development (GDD) organization oversees 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 and portfolio management. The 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 full-time equivalent 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 with expertise spanning multiple 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 and other 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.

On January 19, 2018, we successfully completed our previously-announced tender offer for all of the then outstanding ordinary shares, including ordinary shares represented by American Depositary Shares (ADSs), of Advanced Accelerator Applications S.A. (AAA). As of the expiration of the offer on January 19, 2018, approximately 97% of the then outstanding fully diluted ordinary shares, including

ordinary shares represented by ADSs, were validly tendered. In addition, on January 22, 2018, we commenced a subsequent offering period which will expire on January 31, 2018, unless extended. AAA is a NASDAQ-listed radiopharmaceutical company headquartered in Saint-Genis-Pouilly, France, that develops, produces and commercializes molecular nuclear medicines including *Lutathera* (lutetium (^{177}Lu) oxodotreotide), a first-in-class radioligand therapy product for neuroendocrine tumors and a portfolio of diagnostic products. For additional information, see "Note 2. Significant transactions—Significant transaction entered into in 2017 and closed in January 2018" on page 199 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

In November 2017, we announced an expanded collaboration with Amgen Inc., and the Banner Alzheimer's Institute to collaborate on a new Generation Study 2 to assess whether investigational BACE1 inhibitor CNP520 can prevent or delay the symptoms of Alzheimer's disease in a high-risk population.

In September 2017, we announced a collaboration agreement with the University of California, Berkeley, (UCB) in the field of covalent chemoproteomics to establish the Novartis-Berkeley Center for Proteomics and Chemistry Technologies, based at Berkeley. The collaboration will focus on discovery of drug targets on proteins inaccessible to conventional therapeutic molecules.

In June 2017, we announced a clinical research collaboration in which Bristol-Myers Squibb is to investigate the safety, tolerability, and efficacy of *Mekinist* (trametinib) in combination with Opdivo® (nivolumab) and Opdivo® + Yervoy® (ipilimumab) regimen as a potential treatment option for metastatic colorectal cancer in patients with microsatellite stable tumors where the tumors are proficient in mismatch repair (MSS mCRC pMMR).

In April 2017, Novartis announced an expanded collaboration agreement with Amgen to co-commercialize AMG 334 (erenumab) in the US, currently being investigated for the prevention of migraine. Novartis retains exclusive rights to commercialize AMG 334 in the rest of the world and gains commercialization rights in Canada. This agreement builds on the previously-announced 2015 global collaboration between Novartis and Amgen.

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 was completed on February 14, 2017.

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 VAY785 (emricasan), an investigational, first-in-class, oral, pan-caspase inhibitor for the treatment of non-alcoholic steatohepatitis with advanced fibrosis and cirrhosis of the liver. Novartis exercised the option on May 4, 2017. Novartis obtained an exclusive, worldwide license to develop and commercialize products containing emricasan on July 5, 2017.

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 Reprixys Pharmaceuticals Corporation and SEG101 (crizanlizumab), 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 are 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 received 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.

As part of our previously-announced exclusive global research and development collaboration with the University of Pennsylvania (Penn) to develop and commercialize targeted chimeric antigen receptor (CAR) immunotherapies for the treatment of cancer, in February 2016 Penn opened the Center for Advanced Cellular Therapeutics (CACT) at the Perelman School of Medicine campus in Philadelphia, Pennsylvania. The CACT 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, including experts 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 specified conditions.

Throughout the life cycle of a product, the FDA requires compliance with standards relating to good laboratory, clinical and manufacturing practices. The FDA also requires compliance with rules pertaining to the manner in which we may promote our products.

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. The holder of the Marketing Authorization must actively apply for its renewal after this first five year period. As part of the renewal procedure, the competent authority will perform a full benefit-risk review of the product. Should

the authority conclude that the benefit-risk balance is no longer positive, the Marketing Authorization can be suspended or revoked. Once renewed the Marketing Authorization is valid for an unlimited period. If the holder does not apply for renewal, the Marketing Authorization automatically lapses. 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 specified 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 governmental 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 2017 predicted that the projected 5-year average growth in per capita Medicare program spending is not likely to exceed a specified target level until 2022. 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 the following year based on a savings target set by the Chief Actuary, to be implemented in the second following year. In October 2017, a bill to repeal the IPAB was passed by the House of Representatives and currently awaits consideration by the Senate. There is also a strong 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. In 2017, several states passed legislation impacting pricing or requiring price transparency reporting, including California, Louisiana, Nevada and Maryland. The California law will require 60 day advance notification of price increases for products exceeding a specific threshold over the past two years, as well as additional quarterly reporting requirements.

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 patients. 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, further impacting individual EU Member State pricing. As an additional control for healthcare budgets, some EU countries have passed legislation to impose further mandatory rebates for pharmaceutical products and/or financial claw-backs on the pharmaceutical industry. The calculation of these rebates and claw-backs can be difficult to predict.

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 continuing deliberations of 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. In December 2016, the Japanese government also announced basic reform principles for fundamental reforms of the drug pricing system to be implemented in 2018. Based on these principles, which include an increase in the frequency of price cuts from every other year to annually, a revision to the premium system which basically maintains the price of patented drugs for unmet medical needs, and the introduction of a cost effectiveness

assessment, the government is deliberating and undertaking fundamental reforms of the drug pricing system in 2017 which will be introduced at the next regular price revision scheduled for April 2018.

Rest of World. Many other countries around the world are also taking steps to control prescription drug prices. For example, in 2017, China, one of our most important emerging growth markets, organized national price negotiations for certain products directly linked to national drug reimbursement, which will apply nationwide both in public and military hospitals, with drug price reductions of more than 60% 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. Canada has proposed amendments to its Patented Medicines Regulations in 2017 that could reduce prices for specialty medicines, such as biologics and medicines for rare diseases, by as much as 30% to 40%. In addition, in 2016, the Colombian government took 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, we continue to contest its appropriateness with respect to *Glivec* in Colombia, as 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, most governments and private medical care providers 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 crafting 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, certain members of the US Congress and select state legislators 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 or ingredients 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 can 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, including pediatric extensions and orphan drug exclusivity, 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 intellectual property right protections for pharmaceutical products, or on the extent to which such protections may be enforced. For example, a review of several intellectual property rights is currently ongoing in the EU (orphan drug

exclusivity, pediatric extensions, SPCs and regulatory data protection), which could lead to legislative changes in the scope and/or term of protection under those rights. 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, identification of a patent, patent term extension, marketing exclusivity or data protection means grant, authorization and maintenance in at least one country and possibly pending or found invalid 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, including IPRs if instituted by the USPTO. 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 and EU Novartis has resolved patent litigation with certain generic manufacturers. Novartis is taking steps in some EU countries to enforce the polymorphic compound form patent, the tablet formulation 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. The EU tablet formulation patent is being challenged in the EPO and in the patent office of one EU country.

- *Tasigna.* US: Patent on compound (2023), pending PE (2024); patents on salt forms (2026, 2027, 2028), pending PE (2027, 2028, 2029); patent on polymorph compound form (2026), pending PE (2027); patents on capsule form (2026, 2027), pending PE (2027, 2028) and patent on method of treatment (2032), pending PE (2033). EU: Patent on compound (2023); patent on polymorph compound form (2026); patent on capsule form (2027); method of treatment (2030); ODE (2017), PE (2019). Japan: Patent on compound (2023), PTE (2024); patent on salt form (2026); patent on polymorph compound form (2026); patent on capsule form (2027).

  There is currently no generic competition in the US, EU or Japan. In the US, generic manufacturers have filed ANDAs challenging the salt form patents, the polymorph patent, the capsule form patent and the method of treatment patent. The EU method of treatment patent, the capsule form patent, and the polymorph compound 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); two patents on antioxidant (2019), PE on one patent on antioxidant (2020); patent on tuberous sclerosis complex (TSC)/subependymal giant cell astrocytoma (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 renal cell carcinoma use (2022); patent on TSC/SEGA use (2022); ODE (*Votubia*) (2021). Japan: Patent on compound (2013), PTEs for certain indications/dosages (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); patent on gastrointestinal and lung neuroendocrine tumor use (2026), PTE (2027); patent on TSC/SEGA and TSC/AML use (2027); ODE (tuberous sclerosis) (2022); ODE (dispersible tablet) (2022). There is currently no generic competition in the US, EU or Japan. In the US, generic manufacturers have filed ANDAs challenging the compound patent and the patents on breast

cancer use, pancreatic neuroendocrine tumor use, renal cell carcinoma use and RSC/SEGA use. The US compound, renal cell carcinoma use and pancreatic neuroendocrine tumor use patents are being challenged in IPR proceedings in the USPTO. In the US, Novartis has resolved patent litigation with a generic manufacturer. The EU breast cancer use patent, the EU TSC/SEGA use patent and the EU renal cell carcinoma use patent are being opposed in the EPO. The Japanese breast cancer use patent is being challenged in the Japanese Patent Office.

- *Exjade* and *Jadenu.*

  Exjade: US: Patent on compound (2017), PTE (2019), ODE for non-transfusion iron overload (2020). EU: Patent on compound (2017), SPC (2021); patent on dispersible tablet formulation (2023). Japan: Patent on compound (2017), PTE (2021); patent on dispersible tablet formulation (2023). 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 (marketed as *Exjade* FCT in EU and Japan): The compound patents for *Exjade* also protect *Jadenu* (US), and *Exjade* FCT (EU/Japan). US: Formulation patent for film coated tablets (2034), ODE for non-transfusion iron overload (2020). EU: Formulation patent for film coated tablets (2034). There is currently no generic competition in the US, EU or Japan. In the US, generic manufacturers have filed ANDAs challenging the formulation patent.

- *Tafinlar* and *Mekinist.*

  Tafinlar: US: Two patents on compound (2030; 2030); patent on method of use (2029); RDP (2018); ODE (2020). EU: Patent on compound (2029); RDP (2023). Japan: Patent on compound (2031). There is currently no generic competition in the US, EU or Japan. The EU compound patent is being opposed in the EPO.

  Mekinist: US: Patent on compound (2025), pending PTE (2027); patent on method of use (2025); three patents on formulation (2032; 2032; 2032); RDP (2018); ODE (2020). EU: Patent on compound (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 *Tafinlar* or *Tafinlar* with *Mekinist*: US: Patent on combination (2030) ; patent on method of use of combination (2030); RDP on melanoma indication (2018), RDP on non-small cell lung cancer indication (2020); ODE on melanoma with certain mutations (2021), ODE on non-small cell lung cancer (2024). EU: RDP (2025). Japan: Patent on method of use of combination (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 compound (2018), PE (2019); two patents on compound (2021), PE (2021); patent on method of treating thrombocytopenia (2021), PE (2021); patent on method of enhancing platelet production (2021), PE (2021); patent on method of enhancing platelet production (2023), PE (2023); patent on salt form (2025); PE (2026); five patents on formulation of different dose strengths (all 2027), PE (2028); ODE (2021), PE (2022, 2022). EU: Two patents on compound (2021; 2021), SPC for one compound patent (2025); patent on salt form (2023); patent on formulation (2027); RDP (2020). Japan: Patent on compound (2021), PTE (2025); patent on salt form (2023); PTE (2023), patent on formulation (2027); RDP (2020). There is currently no generic competition in the US, EU or Japan. In the US, a generic manufacturer has filed an ANDA challenging certain patents other than the compound patents. The EU formulation patent is being opposed in the EPO.

- *Votrient.* US: Patent on compound (2021), PTE (2023), 2 patents on compound (2021, 2021), ODE (2019). EU: Patent on compound (2021), SPC (2025); RDP (2020). Japan: patent on compound (2021), PTEs (2025, 2026); RDP (2020). There is currently no generic competition in the US, EU or Japan.

- *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 method of use (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.
- *Kisqali* (formerly LEE011). US: Three patents on compound (2028, 2030, 2031), pending PTE (2031); two patents on methods of use (2029, 2029); patent on salt (2031); RDP (2022). EU: Two patents on compound (2027, 2029), pending SPC (2032); patent on methods of use (2029); RDP (2027). Japan: Two patents on compound (2027, 2029). *Kisqali* is currently not marketed in Japan. There is currently no generic competition in the US or EU.
- *Rydapt* (formerly PKC412). US: Three patents on methods of use (2022, 2024, 2030); RDP (2022), ODE (2024). EU: Two patents on methods of use (2022, 2024); patent on formulation (2020); RDP (2027). Japan: Two patents on methods of use (2022, 2024); patent on formulation (2020). *Rydapt* is currently not marketed in Japan. There is currently no generic competition in the US or EU.
- *Kymriah* (formerly CTL019). US: Seven patents on cells and/or pharmaceutical compositions comprising the cells (all 2031); four patents on methods of use (all 2031); RDP (2029), PE (2030); ODE (2024), PE (2025). EU: Patent on cells and methods of use (2031). Japan: patent on pharmaceutical compositions (2031). *Kymriah* is currently not marketed in the EU or Japan. There is currently no generic competition in the US.

Novartis Pharmaceuticals Business Unit

Ophthalmology

- *Lucentis.* EU: Two patents on compound (2018; 2018), one SPC (2022), RDP (2018). Japan: Patent on compound (2018), PTE for age-related macular degeneration (2019), PTE for pathologic myopia (2021), PTE for retinal vein occlusion (2023). There is currently no generic competition in the EU or Japan.
- *Duotrav, Travatan* and *Travatan Z.*

  Duotrav. EU: Six 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 generic competition in some EU countries. There is currently no generic competition in Japan. In the EU, two formulation patents are being opposed in the EPO.

  Travatan. EU: Six patents on formulations (2029). *Travatan* is not marketed in the US or Japan. There is generic competition in the EU. In the EU, two formulation patents are being opposed in the EPO.

  Travatan Z. US: Three patents on formulations (2027; 2027; 2029). Japan: Three patents 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. In the US one formulation patent (2029) is being challenged in an IPR proceeding in the USPTO.

Immunology and Dermatology

- *Cosentyx.* US: Patent on compound (2027), pending PTE (2029); patent on method of use (psoriasis) (2032); patent on method of use (ankylosing spondylitis) (2031); RDP (2027). EU: Patent on compound (2025), SPC (2030); patent on method of use (psoriasis) (2031); RDP (2026). Japan: Patent on compound (2025), PTE (2026, 2028, 2029); patent on method of use (2031), PTE (2032, 2033); 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.
- *Xolair.* US: Patent on compound (2018); patents on syringe formulation (2021, 2024). EU: Patents on syringe formulation (2021, 2024). Japan: Patents on syringe formulation (2021, 2024). There is currently no generic competition in the US, EU or Japan.
- *Ilaris.* US: Patent on compound (2024); patent on method of use in cryopyrin-associated periodic syndromes (CAPS) (2026), patent on method of use in familial Mediterranean fever (FMF) (2026), patent on method of use in systemic onset juvenile idiopathic arthritis (SJIA) (2027), patent on method of use in hyperimmunoglobulin D syndrome (HIDS) and tumour necrosis factor receptor associated periodic syndrome (TRAPS) (2028); patent on formulation (2029); RDP (2021). EU: Patent on compound (2021), SPC (2024), PE (2025); patent on method of use in SJIA (2026), patent on method of use in FMF (2026), patent on formulation (2029); RDP (2020). Japan: Patent on compound (2021), PTE for CAPS (2024), PTE for FMF, HIDS and TRAPS (2026); patent on method of use in familial cold urticaria, neonatal onset multisystem inflammatory disease and FMF (2026), patent on formulation (2029); ODE for CAPS (2021); ODE for FMF, HIDS and TRAPS (2026).

Neuroscience

- *Gilenya.* US: Patent on compound (2014), PTE (2019), pending PE (2019); patent on dose (2027). EU: Patent on compound (2013), SPC (2018); RDP (2021); patent on formulation (2024), SPC (2026). Japan: Patent on compound (2013), PTE (2018); RDP (2021); two patents on formulation (2024; 2024). There is currently no generic competition in the US, EU or Japan. In the US, generic manufacturers have filed ANDAs challenging the compound patent. The US dose patent is being challenged in an IPR proceeding in the USPTO.

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.

Cardio-Metabolic

- *Entresto.* US: Four patents on combination (2023; 2023; 2023; 2023); two patents on complex (2026; 2027); RDP (2020). EU: Patent on combination (2023), SPC (2028); patent on complex (2026), SPC (2030); 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 is being opposed in the EPO.

Established Medicines

- *Galvus* and *Eucreas*. EU: Patent on compound (2019), SPC (2022); patent on combination (2021), SPC (2022); patent on *Eucreas* formulation (2026). Japan: Patent on compound (2019), PTE on mono therapy and combinations with sulfonyureas (2024), PTE on mono therapy and combinations with other antidiabetics (2022) PTE on *Eucreas* combination (2024); patent on combination (2021); patent on *Galvus* formulation (2025), PTE (2025); patent on *Eucreas* formulation (2026), 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.
- *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); patent on formulation (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.

- *Diovan* and *Co-Diovan*/*Diovan HCT. Diovan*: There is generic competition in the US, EU and Japan. *Co-Diovan*/*Diovan HCT*: There is generic competition in the US, EU and Japan.
- *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 or EU. There is generic competition in the US and EU.

  Exelon Patch: US: Patent on formulation (2019). EU: Patent on formulation (2019). Japan: Patent on formulation (2019), PTE (2023); RDP (2019). There is generic competition in the US and in most EU countries. There is currently no generic competition in Japan. In the US Novartis has resolved patent litigation with certain generic manufacturers.

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.

- AMG 334. US (to be co-commercialized with Amgen): Patent on compound (2031). EU: Patent on compound (2029).

SANDOZ

Our Sandoz Division is a global leader in generic pharmaceuticals and biosimilars and sells products in more than 150 countries. In 2017, 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 cardiovascular, central nervous system, dermatology, gastrointestinal and hormonal therapies, metabolism, oncology, ophthalmics, pain, and respiratory, 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 were estimated to reach more than 500 million patients worldwide in 2017 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.

Top marketed products in the Sandoz generic medicines portfolio include broad-spectrum antibiotic amoxicillin/clavulanic acid, multiple sclerosis treatment *Glatopa* (glatiramer acetate injection) 20mg/mL, osteoporosis treatment zoledronic acid, hypokalemia treatment potassium, hyperthyroidism treatment levothyroxine sodium, oncology therapy cyclophosphamide, 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 80 countries. Sandoz is the market leader in biosimilars and now markets a total of five biosimilars. These biosimilars are: *Omnitrope*, a human growth hormone; *Binocrit,* an erythropoiesis-stimulating agent used to treat anemia; filgrastim for neutropenia under the brand names *Zarzio* outside the US and *Zarxio* in the US; *Rixathon* (biosimilar rituximab), approved in Europe in 2017 to treat blood cancers and immunological diseases (also approved in the EU as *Riximyo* under a duplicate marketing authorization); and *Erelzi* (biosimilar etanercept), approved in Europe in 2017 to treat multiple inflammatory diseases. Availability of these biosimilars varies by country.

The FDA approved biosimilar *Erelzi* (etanercept-szzs) in 2016 to treat multiple inflammatory diseases. A confirmatory clinical safety and efficacy study demonstrated that *Erelzi* is equivalent to reference medicine Enbrel®. The biosimilar launch in the US is pending litigation with Amgen, which markets Enbrel®.

Filings were accepted in the EU in 2017 for our biosimilar adalimumab, infliximab and pegfilgrastim, and in the US for our biosimilar rituximab in 2017 and adalimumab in 2018.

We plan to submit additional data for pegfilgrastim to the FDA in 2019 to address a complete response letter received from the FDA in June 2016.

According to IMS Health, as of November 2017, Sandoz holds the global number one position in sales of biosimilars and of generic anti-infectives, oncology and ophthalmic medicines. In addition, Sandoz holds leading global positions in key therapeutic areas including generic cardiovascular, central nervous system, gastrointestinal, metabolism, pain and respiratory medicines.

In 2017, product launches in the US included olopatadine hydrochloride 0.2% ophthalmic solution, an authorized generic version of *Pataday* (olopatadine hydrochloride ophthalmic solution) and sevoflurane (Ultane®).

An Abbreviated New Drug Application (ANDA) for *Glatopa* (glatiramer acetate injection) 40mg/mL was filed with the FDA in February 2014. However, the FDA approval and commercial launch of *Glatopa* 40mg/mL has been delayed in connection with an FDA Warning Letter received by Pfizer in February 2017 related to the Pfizer manufacturing plant at McPherson, Kansas. Pfizer is the contract manufacturer for the fill and finish stage of *Glatopa* 40mg/mL production at its McPherson site. The FDA re-inspected the Pfizer McPherson site in the fourth quarter of 2017 and issued Form 483 observations. In response, Pfizer proposed corrective and preventive actions to the FDA. The FDA is reviewing Pfizer's response and we await the conclusion of the FDA's assessment. Under FDA policy, approval of the Abbreviated New Drug Application for *Glatopa* 40mg/mL is dependent in part on the satisfactory resolution of the FDA's observations for the Pfizer facility where the final product is made. Therefore, the date of commercial availability of *Glatopa* 40mg/mL is not yet known.

In 2017, product launches in various European countries included tenofovir disoproxil fumarate (Gilead's Viread®), emtricitabine/tenofovir disoproxil fumarate (Gilead's Truvada®) and etoricoxib (MSD's Arcoxia®).

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 Sandoz.

Sandoz also holds operational responsibility for the Novartis Access program. Novartis Access offers a portfolio of medicines to treat chronic diseases in low- and lower-middle income countries. The portfolio addresses cardiovascular diseases, type 2 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. Effective as of April 1, 2016, operational control for the Novartis Malaria Initiative, our largest access-to-medicine program, was transferred from our Innovative Medicines Division to Sandoz. As of the end of 2016, these two programs were integrated in the Novartis Social Business unit, which also comprises the Novartis Healthy Family programs, Sandoz NGO Supply and SMS for Life.

New Products

Sandoz launched a number of products in various countries in 2017, including:

- Emtricitabine/tenofovir disoproxil fumarate (Gilead's Truvada®)
- Etoricoxib (MSD's Arcoxia®)
- Olopatadine hydrochloride 0.2% ophthalmic solution (*Pataday*)
- Sevoflurane (AbbVie's Ultane®)
- Tenofovir disoproxil fumarate (Gilead's Viread®)

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
Levothyroxine sodium	Synthroid®; Levoxyl®	Hypothyroidism treatment
Cyclophosphamide	Endoxan®	Breast, ovarian and non-small cell cancer treatment
Fentanyl	various	Pain 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
Omnitrope	Genotropin®	Recombinant human growth hormone
Binocrit and Epoetin alfa *Hexal*	Eprex®/Erypo®	Recombinant protein used for anemia
Zarzio, *Zarxio* and Filgrastim *Hexal*	Neupogen®	Recombinant protein used in oncology
Glatopa	Copaxone® 20 mg/mL	Multiple sclerosis treatment
Erelzi	Enbrel®	Treatment for multiple inflammatory diseases
Rixathon	MabThera®	Treatment for blood cancers and immunological diseases

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[1]	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: Registration
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: Approved US: Registration
GP2017	adalimumab	TNF-α inhibitor	Arthritides (rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis), plaque psoriasis and others (same as originator)	Immunology	Subcutaneous	EU: Registration US: Registration
LA-EP2006	pegfilgrastim	Pegylated granulocyte colony-stimulating factor	Chemotherapy-induced neutropenia and others (same as originator)	Oncology	Subcutaneous	EU: Registration US: III[2]

(1) HX575 epoetin alfa project retired in US due to change in prioritization.

(2) Resubmission planned for 2019 to address FDA complete response letter received June 2016.

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 2017 net sales of Sandoz by region:

Sandoz	2017 Net Sales to third parties	
	$ millions	%
Europe	4,633	46
United States	3,278	33
Asia, Africa, Australasia	1,391	14
Canada and Latin America	758	7
Total	**10,060**	**100**
Of which in Established Markets*	7,383	73
Of which in Emerging Growth Markets*	2,677	27

* 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, as well 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, and to review and adapt our manufacturing network to meet the needs of our Sandoz Division.

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.

Please refer to "—Item 4.B Business Overview—Sandoz" above for more detailed information regarding the manufacture of *Glatopa* 40mg/mL.

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 were 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. In July 2017, the FDA confirmed that it closed out the October 2015 Warning Letter with respect to our Kalwe and Turbhe sites.

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.

Marketing and Sales

Sandoz sells a broad portfolio of 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 versions of originator pharmaceutical products, such as those sold by our Retail Generics franchise. 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.

Recent trends have been toward continued consolidation among distributors and retailers of Sandoz products, both in the US and internationally, which has increased our customers' purchasing leverage. In addition, Sandoz faces increased competition from other manufacturers of generic medicines in the US. These factors have resulted in increased industry-wide pressure on prices for generic products, particularly in the US, which contributed to a decline in US sales in 2017. Moreover, we are exposed to increased concentration of credit risk as a result of the consolidation among our customers.

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 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. As a result, in many of these

markets our biosimilar products are marketed as branded competitors to the originator products. However, a June 2017 US Supreme Court ruling has clarified certain aspects of the US biosimilar approval pathway under the Biologics Price Competition and Innovation Act (see "—Regulation—Biosimilars" for additional information).

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 encouraged more generic product launches, resulting in increased competition among the companies selling generic pharmaceutical products, leading to ongoing price pressure. In particular, Sandoz faces increased industry-wide pressure on prices for generic products, particularly in the US, driven by factors including customer consolidation and growing competition from other manufacturers of generic medicines. These factors contributed to a decline in US sales in 2017.

In addition, research-based pharmaceutical companies are participating directly in the generic conversion process by licensing their patented products to generic companies (so-called "authorized generics"). Consequently, generic companies that were not otherwise in a position to launch a specific product may enter the generic market using the innovator's product. In the US, the authorized generic is not subject to the Hatch-Waxman Act rules regarding exclusivity (see "—Regulation"), which means that 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. Authorized generics can also reduce the ability of the generic exclusivity holder to recoup its investment in creating the first generic medicine to compete with the originator product.

Development and Registration

Development of Sandoz Biopharmaceuticals products is jointly overseen by Sandoz and by 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, generic pharmaceutical products can be offered for sale at prices often much lower than those of products protected by patents and data exclusivity, which must recoup substantial 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 biological reference medicine. Due to the inherent variability and complexity of biologic products, including batch-to-batch differences and variations following manufacturing changes, the development and the regulatory pathway of biosimilars differ significantly from that of generics.

The development of a biosimilar product is much more technically challenging than the development of a typical generic pharmaceutical. While generic pharmaceuticals normally do not require clinical studies in patients, regulators worldwide do require such targeted studies for biosimilar products. Biosimilars are engineered to match the reference medicine in quality, safety and efficacy. This is achieved by systematically defining the target range of the reference medicine and then comparing the biosimilar to

the reference medicine 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 a reference biologic. Therefore, the cost of development for a biosimilar is usually less than that of a reference 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 2017, Sandoz expensed $0.8 billion in product development, which amounted to 8% of the division's net sales. Sandoz expensed $0.8 billion in 2016 and $0.8 billion in 2015. For additional information, see "Item 5. Operating and Financial Review and Prospects—5.A Operating Results—Non-IFRS Measures as Defined by Novartis."

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 reference products, so long as the generic version could be shown in bioequivalence 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 holder of the marketing authorization for the reference product, 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 patents on the reference product. 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 innovator company for the reference product, 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 company 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 company that show a significant clinical benefit in comparison to the existing therapies.

Biosimilars

The regulatory pathways for approval of biosimilar medicines are still 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 the US, while the WHO has issued guidance. Sandoz has successfully registered and launched the first biosimilar (or biosimilar type) medicine in Europe, the US, Canada, Japan, Taiwan, Australia and many countries in Latin America and Asia. Sandoz was the first company to secure approval for and launch a biosimilar under the US biosimilar pathway that 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 reference medicine 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 medicine and the biosimilar.

In the US, under the BPCIA, a biosimilar must be highly similar with no clinically meaningful differences compared to the reference medicine. 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. A ruling by the US Supreme Court in June 2017 clarified several key issues regarding the patent dispute resolution mechanisms in the BPCIA, including that the biosimilar medicine applicant can provide notice of its intention to commercially market its biosimilar (called the Notice of Commercial Marketing or NCM) to the originator company for the reference medicine at any time, including before FDA approval of the biosimilar medicine. The Court also clarified that a biosimilar applicant cannot be compelled by federal injunction to either provide the NCM or to participate in the patent dispute resolution procedures under the BPCIA (also known as the "patent dance"). The Court remanded this matter to the US Federal Circuit, which in December 2017 determined that such an injunction also is not available under state laws, as the federal BPCIA preempts state laws on this issue.

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.

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 140 countries. In 2017, the Alcon Division had consolidated net sales of $6.0 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 early 2017, we announced a strategic review of the Alcon Division in order to explore all options to maximize value for our shareholders. We have made significant progress in our ongoing strategic review and have examined all options, ranging from retaining the business to a capital markets solution (e.g., an IPO or a spin-off). As part of this, we have updated Alcon's strategic plan which confirms that it has the potential to grow sales at or above market while delivering profitability at least in line with the industry. We have also made significant progress on developing a potential capital markets solution, including financial carve-outs, tax and legal entity structuring, and identifying listing and incorporation locations. Key criteria for a final decision and timing remain continued Alcon sales growth and margin improvement which need to be demonstrated for multiple quarters leading to potential action not likely before the first half of 2019.

In addition, we transferred our over-the-counter ophthalmic products and certain surgical diagnostic products (2017 sales of approximately $0.8 billion) from the Innovative Medicines Division to the Alcon Division effective January 1, 2018. Our prescription Ophthalmic medicines business remains with the Innovative Medicines Division. In compliance with IFRS, beginning with our first quarter 2018 results, Novartis will update its segment financial information to reflect this transfer, both for the current and prior years, to aid comparability of year-on-year results.

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*, 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 to help improve visualization of the delicate tissues in the back of the eye.

Alcon Division Products

Surgical

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

The Alcon Surgical portfolio includes intraocular lenses (IOLs) and equipment for use in cataract procedures, devices for use in vitreoretinal surgeries, surgical equipment and diagnostic devices used in refractive surgical procedures, and devices for use in treating patients with glaucoma. Our IOLs include the *AcrySof* family of IOLs, with options ranging from monofocal IOLs for basic cataract surgery to specialized IOLs for the correction of presbyopia and astigmatism at the time of cataract surgery; the recently launched *Clareon* monofocal IOL, made of a new material with an advanced design that enables sharp, crisp vision, low edge glare, and outstanding optic clarity; and the *UltraSert* and *AutonoMe*

innovative IOL delivery systems. The Cataract Refractive Suite by Alcon features the *Centurion* vision system for phacoemulsification and cataract removal; the *Infiniti* vision system for phacoemulsification and cataract removal; the *LenSx* femtosecond laser used for specific steps in the cataract surgical procedure; the *LuxOR* ophthalmic microscope; the *ORA SYSTEM* for cataract surgery planning and intra-operative guidance during surgery; and the *Verion* imaged guided system for use during cataract surgery. The Alcon vitreoretinal portfolio includes the *NGENUITY* 3D visualization system, designed to enhance visualization of the back of the eye, and the *Constellation* vision system. Our *WaveLight* devices are used for LASIK and other vision-correcting refractive procedures, including topography-guided procedures marketed under the *Contoura* brand. The Alcon glaucoma device portfolio includes the *CyPass* micro-stent, a micro invasive glaucoma surgery device, and the *EX-PRESS* glaucoma filtration device. In addition, Alcon provides advanced viscoelastics, irrigating solutions, diagnostic ophthalmic products, 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 and over-the-counter ophthalmic 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. Over-the-counter ophthalmic products that have moved from our Innovative Medicines Division to the Alcon Vision Care franchise include artificial tear and related dry eye products marketed under the *Systane*, *Tears Naturale*, and *Genteal* brands; *Naphcon A* and *Zaditor* eye drops for the temporary relief of ocular itching due to allergies; and vitamins for ocular health marketed under the *ICAPS* and *Vitalux* brands.

New Products

We received a number of approvals and launched a number of products in 2017, including:

- *CyPass* micro-stent, a micro invasive glaucoma surgery device, received a CE Mark and was launched in the EU for the treatment of patients with mild to moderate primary open-angle glaucoma in conjunction with cataract surgery. In addition, the *CyPass* micro-stent has a CE Mark for use as a standalone procedure in patients with primary open-angle glaucoma who have failed previous medical treatments.
- *AcrySof* IQ *ReSTOR* +2.5D Toric IOL, was approved by the FDA and launched in the US to address presbyopia and astigmatism at the time of cataract surgery. This IOL features the *ACTIVEFOCUS* optical design, to delivers crisp, clear distance vision as well as a range of vision for patients who desire less dependence on glasses.
- The *Clareon* monofocal IOL received a CE Mark and was launched in the EU. This IOL utilizes a new material and features an advanced design that enables sharp, crisp vision, low edge glare, and outstanding optic clarity. The *Clareon* monofocal IOL was launched with the new automated, disposable *AutonoMe* pre-loaded IOL delivery system.
- *Systane* Complete lubricant eye drops received a CE Mark. This addition to the *Systane* product line offers fast hydration and long-lasting relief, with nano-droplet technology for enhanced coverage. We expect to launch *Systane* Complete in the EU in 2018.

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 IOLs, including:
	AcrySof IQ monofocal IOLs
	AcrySof IQ Toric astigmatism-correcting IOLs
	AcrySof IQ *ReSTOR* presbyopia-correcting IOLs
	AcrySof IQ *ReSTOR* Toric presbyopia- and astigmatism-correcting IOLs
	AcrySof IQ *PanOptix* presbyopia-correcting IOLs
	AcrySof IQ *PanOptix* Toric presbyopia- and astigmatism-correcting IOLs
	Cataract Refractive Suite by Alcon, including:
	Centurion vision system for phacoemulsification and cataract removal
	Infiniti vision system for phacoemulsification and cataract removal
	LenSx femtosecond laser used for specific steps in the cataract surgical procedure
	LuxOR ophthalmic microscope
	ORA SYSTEM for cataract surgery planning and intra-operative guidance during surgery
	Verion imaged-guided system for use during cataract surgery
	Clareon monofocal IOL with the automated, disposable *AutonoMe* pre-loaded IOL delivery system
	UltraSert pre-loaded IOL delivery system
Vitreoretinal	*Constellation* vision system for vitreoretinal operations
	Grieshaber surgical instruments
	NGENUITY 3D visualization system
	Purepoint laser system and probes
	Ultravit vitrectomy probes
Refractive	*WaveLight EX500* excimer laser for LASIK and other refractive correction procedures
	WaveLight FS200 femtosecond laser for refractive surgery
Glaucoma	*CyPass* micro-stent for the treatment of mild to moderate primary open angle glaucoma
	EX-PRESS glaucoma filtration device

In addition, Alcon provides advanced viscoelastics, irrigating solutions, surgical packs, diagnostic ophthalmics, 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
Dry Eye	*Genteal* family of artificial tears
	Systane family of artificial tears and related dry eye products
	Tears Naturale lubricant eye drops
Allergy	*Naphcon A* for the temporary relief of ocular redness and itching due to allergies
	Zaditor for the temporary relief of ocular itching due allergies
Vitamins	*ICAPS* family of eye vitamin products
	Vitalux family of eye vitamin products

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. The planned submission dates in the tables below refer to the primary regulatory filings for each of the development projects listed. Full commercialization may be affected by other factors, including the potential need for additional regulatory filings, reimbursement status, and time to build product inventory. The term "Advanced" under the Current Phase in the tables below refers to a project for which a positive proof of concept has been established, and clinical and non-clinical studies are being conducted to establish the device's safety, efficacy or performance, which are needed to address regulatory requirements for obtaining marketing authorization.

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	Presbyopia-correcting trifocal IOL	Cataract Implant	US 2019	Advanced
AcrySof IQ *PanOptix* Toric IOL	Presbyopia-correcting trifocal IOL for astigmatism	Cataract Implant	US 2019	Advanced

Project/Product	Description	Product Category	Planned Submission	Current Phase
Clareon IOL with the *AutonoMe* pre-loaded delivery device	Next-generation IOL in automated pre-loaded delivery system	Cataract Implant	US 2019	Advanced
A02062	Extended depth of focus IOL	Cataract Implant	US 2019 EU 2019	Advanced Advanced
A02972	Digital visualization system connected with *Constellation* vision system	Vitreoretinal Equipment	US 2018 EU 2018	Advanced Advanced

Vision Care

Project/Product	Description	Product Category	Planned Submission	Current Phase
Systane Complete	Lubricant eye drop with nano-droplet technology	Dry Eye	US 2018	Advanced
A00717	Daily disposable line extension	Contact Lens	EU 2018 US 2018	Advanced Advanced
A01660	New daily disposable lens	Contact Lens	EU 2018 US 2018	Advanced Advanced
A02491	New monthly disposable lens	Contact Lens	EU 2020 US 2020	Advanced Advanced
A02931	New weekly disposable lens	Contact Lens	EU 2020 US 2020	Advanced 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 2017 net sales of the Alcon Division by region:

Alcon	2017 Net Sales to third parties	
	$ millions	%
Europe	1,570	26
United States	2,541	42
Asia, Africa, Australasia	1,452	24
Canada and Latin America	461	8
Total	**6,024**	**100**
Of which in Established Markets*	4,694	78
Of which in Emerging Growth Markets*	1,330	22

* 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 vast majority of our Alcon Division products are not subject to material changes in seasonal demand. However, sales of certain of our Vision Care products, including those for allergies and dry eye, are subject to seasonal variation.

Research and Development

In 2017, our Alcon Division expensed $0.6 billion in research and development, which amounted to 9% of the Division's net sales. Alcon expensed $0.5 billion in research and development in each of 2016 and 2015. For additional information, see "Item 5. Operating and Financial Review and Prospects—5.A Operating Results—Non-IFRS Measures as Defined by Novartis."

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 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, on lens care solutions that provide the safety, disinfecting and cleaning power needed to help maintain ocular health, and on products to address dry eye symptoms.

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 our Alcon Surgical franchise are manufactured at facilities located in the US, Belgium, Switzerland, Ireland, Germany and Israel. The products of our Alcon Vision Care franchise are manufactured at facilities located in the US, Germany, Singapore, Malaysia, Indonesia, Belgium, and Spain. Manufacturing for most Alcon products is overseen directly by the Alcon Division. Alcon coordinates with Novartis Technical Operations where appropriate. 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 combination of these factors means that supply is never guaranteed.

Like some of our competitors, our Alcon Division faces manufacturing issues from time to time. 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 if and when they arise.

Marketing and Sales

Our Alcon Division conducts sales and marketing activities around the world organized under five operating regions (Europe (including Russia)/Middle East/Africa, North America, Latin America/ Caribbean, Asia, 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. We also rely on direct-to-consumer marketing campaigns to promote selected products.

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. Over-the-counter lens care, dry eye, allergy and ocular vitamin 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 competes with a number of 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 comprise 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.

Regulation

Most of our Surgical products and many of our 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 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, CE marking is required for all medical devices sold. By affixing the CE Mark, 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 ISO 13485.

Many of our Vision Care dry eye and allergy products are regulated as over-the-counter pharmaceuticals in the US, and several Surgical diagnostic ophthalmic products are regulated as prescription pharmaceuticals in the US and the EU. In the US, over-the-counter pharmaceuticals that comply with the FDA over-the-counter monograph regulations may be marketed without prior FDA approval. Alcon's prescription pharmaceutical products are subject to the same regulatory approval procedures as the prescription pharmaceutical products of our Innovative Medicines Division. See "—Innovative Medicines—Regulation."

Price Controls

The prices of our Surgical devices are subject to reimbursement programs and price control mechanisms that vary from country to country. Due to increasing political pressure and governmental budget constraints, we expect these programs and mechanisms to remain robust—and to potentially even be strengthened. As a result, such programs and mechanisms could have a negative influence on the prices we are able to charge for our Surgical products, particularly those used in cataract, glaucoma, and vitreoretinal surgeries.

For example, in India, the National Pharmaceutical Pricing Authority (NPPA) recently began imposing 75% to 85% price reductions on coronary stents (implantable medical devices intended to ensure an adequate flow of blood to the heart). The NPPA has begun to evaluate prices on other categories of medical devices, including IOLs used in cataract surgeries. If the Indian NPPA chooses to impose similar price reductions on IOLs from Alcon, this could have a negative impact on our Surgical franchise sales in India. It is also possible that regulatory agencies in other countries will consider applying similar price controls on IOLs and other Surgical products sold by Alcon.

Intellectual Property

We attach great importance to intellectual property including patents, regulatory exclusivities, 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 our intellectual property extends for varying periods depending on its legal life in the various countries. The protection afforded, which may also vary from country to country, depends upon the type of intellectual property and its scope of coverage. We monitor infringements of our intellectual property and typically challenge such infringements. 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 to 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—Item 4.A History and Development of Novartis," and "Item 4. Information on the Company—Item 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.

Novartis Technical Operations manages the production and supply chains of our Innovative Medicines and Sandoz Division products through a network of 68 manufacturing sites, as well as through external suppliers, and warehouse and distribution centers. Our 15 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
Basel, Switzerland—St. Johann	724,000*	Global Group headquarters, global Innovative Medicines Division headquarters, research and development, production of drug substances and drug intermediates
Kundl and Schaftenau, Austria	480,000	Production of biotechnological products, anti-infectives, active drug substances, product development
East Hanover, New Jersey	391,000	Innovative Medicines Division US headquarters, research and development
Barleben, Germany	340,000	Production of broad range of finished dosage forms
Fort Worth, Texas	325,000	Alcon Division headquarters, production, research and development for Alcon Vision Care, Surgical franchises

Location	Size of Site (in square meters)	Major Activity
Changshu (Suzhou), China	230,000	Technical research, development and manufacturing of drug substances and drug intermediates
Cambridge, Massachusetts	205,000	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	General administrative and development global service center
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
Holzkirchen, Germany	64,200*	Sandoz Division headquarters, production of oral films, transdermal delivery systems, matrix patches, product development
Grimsby, UK	64,000	Production of drug substances and drug intermediates
Puurs, Belgium	55,000	Production for ophthalmic medicines and Alcon Surgical franchise
Stryków, Poland	45,000	Production of broad range of bulk oral solid forms
Cork, Ireland	44,800	Production for Alcon Surgical franchise

Location	Size of Site (in square meters)	Major Activity
Rudolstadt, Germany	44,000	Development and production of respiratory technologies and ophthalmics
Rueil-Malmaison, France	43,700*	Administrative offices for Innovative Medicines and Alcon
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	27,500	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
Morris Plains, New Jersey	15,600	Production for Innovative Medicines Division cell & gene therapies
Princeton, New Jersey	14,300	Sandoz Division US headquarters

* Change in reported size of site from 2016 Annual Report on Form 20-F primarily due to updates to internal real estate databases.

To support the objectives of Novartis Technical Operations, we are progressing with our network transformation project, under which we are reviewing our manufacturing network to ensure it can appropriately meet the future needs of the Group. As part of our initial plans under this project, we previously announced the exit of our Sandoz Division plant in Hicksville, New York. This planned exit is currently on hold pending an assessment of our strategy for the site as part of the wider network review. We now expect the previously announced exit of our Sandoz Division site in Turbhe, India to be completed in 2018. In May 2017, we announced the planned closure of one manufacturing building at each of our Basel, Switzerland and Schweizerhalle, Switzerland sites by 2019. In October 2017, we announced our plan to close commercial production operations at our Broomfield, Colorado site over a two year period with production anticipated to conclude by the fourth quarter of 2019. In November 2017, we announced our plan to exit our packaging operations in Wehr, Germany by 2022.

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. The project included 17 new buildings, eight of them laboratory buildings. As of the end of 2017, the Campus project is substantially complete. Through December 31, 2017, the total amount paid on the Campus project is equivalent to $2.3 billion. These expenditures were funded from internally generated resources.

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 $660 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, 2017, the total amount paid and committed to be paid on this project is equivalent to $617 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 $750 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 2018 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, 2017, the total amount paid and committed to be paid on this project is equivalent to $723 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. This project is now complete. Through December 31, 2017, the total amount paid on this project is $254 million.

The Alcon Division began an expansion of its Singapore facility in 2014 for contact lens manufacturing. The expansion has added 16,000 square meters of space for additional production lines. In 2017, Alcon began installation of a new contact lens manufacturing platform for certain products currently in development. Through December 31, 2017, the total amount paid and committed to be paid on this project is equivalent to $161 million.

Environmental Matters

We integrate core values of environmental protection into our business strategy to protect the environment, 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 19. Provisions and other non-current liabilities" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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, 2015 to CSL and our Animal Health Division was sold on January 1, 2015 to Lilly.

Continuing Operations:

- Innovative Medicines: 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.

In January 2018, we announced that Elizabeth (Liz) Barrett has been appointed CEO Novartis Oncology and a member of the ECN, effective February 1, 2018. Mrs. Barrett succeeds Bruno Strigini who decided to retire from Novartis for personal reasons.

In September 2017, we announced that Joseph Jimenez, CEO of Novartis, informed the Board of Directors of his desire to step down as CEO in 2018, after eight years in the position. The Board of Directors has appointed Vasant (Vas) Narasimhan, M.D., Global Head of Drug Development and Chief Medical Officer, as CEO of Novartis, effective February 1, 2018. Dr. Narasimhan is a member of the ECN and joined Novartis in 2005.

In August 2017, we announced that, effective January 1, 2018, Bertrand Bodson has been appointed to the new role of Chief Digital Officer, reporting to the CEO of Novartis. Mr. Bodson is responsible for creating and executing a company-wide digital strategy. As part of this strategy, we plan to improve the ways we use data in drug discovery and development, engage with patients, doctors and other stakeholders, as well as to automate business processes.

In early 2017, we announced a strategic review of our Alcon Division in order to explore all options to maximize value for our shareholders. We have made significant progress in our ongoing strategic review and have examined all options, ranging from retaining the business to a capital markets solution (e.g., an IPO or a spin-off). As part of this, we have updated Alcon's strategic plan which confirms that it has the potential to grow sales at or above market while delivering profitability at least in line with the industry. We have also made significant progress on developing a potential capital markets solution, including financial carve-outs, tax and legal entity structuring, and identifying listing and incorporation locations. Key criteria for a final decision and timing remain continued Alcon sales growth and margin improvement which need to be demonstrated for multiple quarters leading to potential action not likely before first half of 2019.

In addition, we transferred our over-the-counter ophthalmic products and certain surgical diagnostic products (2017 sales of approximately $0.8 billion) from the Innovative Medicines Division to the Alcon Division effective January 1, 2018. Our prescription Ophthalmic medicines business remains with the Innovative Medicines Division. In compliance with IFRS, beginning with our first quarter 2018 results, Novartis will update its segment financial information to reflect this transfer, both for the current and prior years, to aid comparability of year-on-year results.

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, Novartis Business Services and Novartis Corporate Affairs.

The Novartis Institutes for BioMedical Research (NIBR) is the innovation engine of Novartis, which conducts drug discovery research and early clinical development trials for our Innovative Medicines Division and also collaborates with our Sandoz Division. Approximately 6,000 full-time equivalent scientists and associates at NIBR are working to discover new medicines for various diseases at sites located in the US, Switzerland and China. For more information about NIBR, see "Item 4. Information on the Company—Item 4.B Business Overview—Innovative Medicines—Research and Development—Research program".

Our Global Drug Development (GDD) organization oversees 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. GDD includes approximately 10,000 full-time equivalent associates worldwide.

Novartis Technical Operations (NTO) was established 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 26,900 full-time equivalent associates and 68 manufacturing sites across our Innovative Medicines and Sandoz Divisions.

Novartis Business Services (NBS), our shared service organization, 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 10,870 full-time equivalent 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 2017, our Public Affairs and Group Country Management organizations were combined to form Novartis Corporate Affairs to better enable close collaboration among country presidents, unit heads and Public Affairs.

In 2017, Novartis continuing operations achieved net sales of $49.1 billion, while net income from continuing operations amounted to $7.7 billion. Of total net sales from continuing operations, $12.4 billion, or 25%, came from Emerging Growth Markets, and $36.7 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 2017 amounted to $9.0 billion.

Headquartered in Basel, Switzerland, our Group companies employed 121,597 full-time equivalent associates as of December 31, 2017. Our products are sold in approximately 155 countries around the world.

Innovative Medicines Division

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

In 2017, the Innovative Medicines Division accounted for $33.0 billion, or 67%, of Group net sales, and for $7.8 billion, or 87%, 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 cardiovascular, central nervous system, dermatology, gastrointestinal and hormonal therapies, metabolism, oncology, ophthalmics, pain, and respiratory, 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 2017, Sandoz accounted for $10.1 billion, or 21%, of Group net sales, and for $1.4 billion, or 15%, 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 2017, Alcon accounted for $6.0 billion, or 12%, of Group net sales, and for $ −0.2 billion, or −2%, of Group operating income (excluding Corporate income and expense, net).

OPPORTUNITY AND RISK SUMMARY

The healthcare industry is entering a phase of exhilarating progress and change. Over the next two decades, we believe biomedical innovation will continue to accelerate—spawning new treatments that will have unparalleled impact on humanity, with the potential to tame scourges like cancer and heart disease.

The digital revolution that is now gaining momentum in healthcare is likely to transform everything from drug research and development to how doctors diagnose and treat diseases. These trends promise to help society address the changing healthcare needs of aging populations and produce better health outcomes for patients.

Our financial results are affected to varying degrees by external factors. Loss of market exclusivity and the introduction of branded and generic competitors could significantly erode sales of our innovative products. Our ability to grow depends on the success of our research and development efforts to replenish our pipeline, as well as on the commercial acceptance of our products in the markets. Increased pricing pressure could impact our ability to generate returns and invest for the future.

We have a significant global compliance program in place, but any failure to comply with local laws could lead to substantial liabilities. There are strict regulatory requirements surrounding our manufacturing processes, which introduce a greater chance for disruptions and liabilities. With products sold in approximately 155 countries, our ability to hedge against foreign exchange fluctuations could have a significant effect on our reported results. We carry a significant amount of goodwill and other intangible assets on our consolidated balance sheet, and may incur significant impairment charges in the future. We pay taxes in numerous countries, and tax authorities around the world have increased their scrutiny of company tax filings. In addition, tax reform initiatives by the OECD, EU, Switzerland and the US, will require us to continually assess our organizational structure against tax policy trends, and could lead to an increased risk of international tax disputes and an increase in our effective tax rate, and could adversely affect our financial results. We may also fail to take advantage of rapid progress in digital technologies and in the development of new business models, and third parties may enter the healthcare field and could supplant our business.

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

RESULTS OF OPERATIONS

Novartis had solid performance in 2017 as strong sales of our growth drivers, including *Cosentyx* (secukinumab), *Entresto* (sacubitril/valsartan) and other recently launched products, continued to offset the impact of generic competition for our cancer treatment *Gleevec*/*Glivec*, which lost patent protection in the US and Europe during 2016. Our results underscore the breadth and strength of our product portfolio and highlight our success at steering through the patent expiration of one of our biggest-selling drugs.

Our divisions had varied results. Sales increased in the Innovative Medicines Division, and the Alcon eye care division returned to growth in 2017. Sandoz Division sales declined, as the effects of increased price competition in the US more than offset growth in the rest of the world.

Net sales for Novartis were $49.1 billion, up 1% in reported terms and up 2% measured in constant currencies (cc) to remove the impact of exchange rate movements. Sales volumes increased 7% as growth drivers, such as *Cosentyx* ($2.1 billion; +84%, +82% cc), *Entresto* ($507 million; +198%, +195% cc), *Promacta*/*Revolade* ($867 million; +37%, +37% cc), and *Tafinlar + Mekinist* ($873 million; +30%, +29% cc), more than offset the impact of patent expirations for *Gleevec*/*Glivec* ($1.9 billion;—42%,—41% cc).

The impact of currency exchange headwinds eased in 2017 compared to what 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 continue to also indicate growth rates in constant currencies.

Operating income in 2017 was $8.6 billion (+4%, +7% cc), mainly driven by higher sales, productivity improvements and lower amortization, which were partly offset by generic competition and higher marketing investments to support product launches. Net income was $7.7 billion (+15%, +12% cc), benefiting from growth in operating income and higher income from our stake in GSK Consumer

Healthcare Holdings Ltd.Earnings per share were $3.28 (+16%, +14% cc), benefiting from higher net income and our share buyback program.

Free cash flow rose 10% to $10.4 billion, driven mainly by improved cash flow from operating activities.

We also present our core results, which exclude the impact of amortization, impairments, disposals, acquisitions, restructurings and other significant items, to help investors understand our underlying performance.

Core operating income was $12.9 billion (—1%, 0% cc). Core operating income margin in constant currencies decreased 0.3 percentage points, mainly due to generic competition for *Gleevec*/*Glivec*, and higher launch investments, which were partially offset by expanded gross margins and productivity improvements. Movements in exchange rates had an additional negative impact of 0.3 percentage points, yielding a net decrease of 0.6 percentage points to 26.2% of net sales.

Core net income was $11.4 billion (+1%, +2% cc), benefiting from higher core income from associated companies. Core earnings per share were $4.86 (+2%, +3% cc), reflecting the benefit of our share buyback program.

Our global functional organizations in manufacturing, quality and business services made progress in improving our operations. Novartis Technical Operations (NTO) and Novartis Business Services (NBS) continued to provide high-quality manufacturing and support services while making sustained productivity improvements through consolidation of our production network and suppliers, and process standardization. In 2017, these actions delivered productivity improvements of more than $0.3 billion across NTO and NBS. We remain on track to deliver our 2020 annual cost-savings goal of $1 billion, mainly driven by NTO.

In 2017, NTO completed its first full year as an integrated global manufacturing organization, delivering synergies across 67 pharmaceutical production facilities worldwide and improving capabilities through the sharing of skills and excellence across the manufacturing network.

Several new product launches in 2017 illustrated the benefits. For example, the launch of our new cancer drug *Kisqali* (ribociclib, formerly LEE011) involved contributions from team members from different technology platforms at several sites, as well as a joint effort from a global supply team supporting product launches. Close collaboration and joint program management helped us deliver products to patients and customers within six hours of approval from health authorities. That compares with four to six days in the best cases in past launches.

For recent launches—including *Kisqali* and *Rydapt* (midostaurin) in the US, and the biosimilars *Erelzi* (etanercept) and *Rixathon* (rituximab) in the EU—we were able to deliver products to patients and customers within 24 hours of approval. We aspire to that timing for future launches, as well.

We continued to perform well on quality, underscoring the success of our sustained focus on this area in recent years. Of 217 inspections of our facilities worldwide by health regulators in 2017, all but two—or 99.1%—were deemed acceptable, up from 98.1% the previous year. Additionally, in June we successfully closed out a warning letter from the US Food and Drug Administration (FDA) received by our site in Kalwe, India.

NBS continues to take steps to improve efficiency through such measures as simplifying and standardizing processes across the company, making the most of our global scale. Working with colleagues in our Global Drug Development (GDD) organization, for instance, NBS has upgraded our information technology platforms, streamlined hundreds of processes, and launched six new systems in 2017 with the aim of better equipping colleagues to focus on drug development activities. These include the planning, data management, statistical analysis, reporting, funding and management of clinical trials. These changes

are expected to simplify work for more than 10,000 Novartis employees and facilitate more effective interactions with 145,000 external clinicians supporting our studies.

2017 Compared to 2016

Key figures

	Year ended Dec 31, 2017	Year ended Dec 31, 2016	Change in $	Change in constant currencies
	$ m	$ m	%	%
Net sales to third parties	**49,109**	**48,518**	**1**	**2**
Other revenues	1,026	918	12	11
Cost of goods sold	(17,175)	(17,520)	2	2
Gross profit	**32,960**	**31,916**	**3**	**4**
Marketing & Sales	(12,861)	(11,998)	(7)	(7)
Research & Development	(8,972)	(9,039)	1	1
General & Administration	(2,136)	(2,194)	3	2
Other income	1,969	1,927	2	1
Other expense	(2,331)	(2,344)	1	0
Operating income	**8,629**	**8,268**	**4**	**7**
Return on net sales (%)	17.6	17.0		
Income from associated companies	1,108	703	58	58
Interest expense	(777)	(707)	(10)	(12)
Other financial income and expense	39	(447)	nm	nm
Income before taxes	**8,999**	**7,817**	**15**	**12**
Taxes	(1,296)	(1,119)	(16)	(13)
Net income	**7,703**	**6,698**	**15**	**12**
Attributable to:				
Shareholders of Novartis AG	*7,703*	*6,712*	*15*	*12*
Non-controlling interests	*0*	*(14)*	*nm*	*nm*
Basic earnings per share ($)	**3.28**	**2.82**	**16**	**14**
Free cash flow	**10,428**	**9,455**	**10**	

nm = not meaningful

Group Overview

Novartis had solid performance in 2017 as strong sales of our growth drivers, including *Cosentyx* (secukinumab), *Entresto* (sacubitril/valsartan) and other recently launched products, continued to offset the impact of generic competition for our cancer treatment *Gleevec*/*Glivec*, which lost patent protection in the US and Europe during 2016. Our results underscore the breadth and strength of our product portfolio and highlight our success at steering through the patent expiration of one of our biggest-selling drugs.

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Free cash flow rose 10% to $10.4 billion, driven mainly by improved cash flow from operating activities.

Net Sales by Segment

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

	Year ended Dec 31, 2017	Year ended Dec 31, 2016	Change in $	Change in constant currencies
	$ m	$ m	%	%
Innovative Medicines	**33,025**	**32,562**	**1**	**2**
Sandoz	**10,060**	**10,144**	**(1)**	**(2)**
Alcon	**6,024**	**5,812**	**4**	**4**
Net sales to third parties	**49,109**	**48,518**	**1**	**2**

Innovative Medicines

Innovative Medicines Division sales were $33.0 billion, up 1% in reported terms. In constant currencies (cc), sales grew 2%. An 8% increase in volume more than offset the impact of generic competition (−5 percentage points) and price declines (−1 percentage point). Products contributing to sales growth included *Cosentyx, Entresto, Promacta*/*Revolade, Tafinlar + Mekinist,* and *Jakavi.*

Regionally, sales performance was mixed. In the US, sales rose 2% (cc) to $11.1 billion, overcoming the impact of generic competition, mainly for *Gleevec*. Sales in Europe were $11.3 billion, in line with the prior year in constant currencies as growth drivers offset the impact of patent loss for *Gleevec*/*Glivec*. Sales rose 7% (cc) in emerging growth markets to $8.4 billion. Sales in Japan were $2.4 billion, in line with the prior year in constant currencies.

Novartis Oncology Business Unit

Oncology sales were $12.3 billion (−4%, −3% cc), as strong performance of existing products and the launch of new products, including *Kisqali*, *Rydapt* and *Kymriah*, helped to partially offset the effects of generic competition on *Gleevec*/*Glivec* (−42%, −41% cc). Significant gains on key hematology products such as *Tasigna* (1.8 billion; +6%, +9% cc), *Promacta*/*Revolade* ($867 million; +37%, +37% cc) and *Jakavi* ($777 million; +34%, +32% cc) were complemented by *Tafinlar + Mekinist* ($873 million; +30%, +29% cc), which was approved for advanced non-small cell lung cancer in addition to the existing use in melanoma.

Novartis Pharmaceuticals Business Unit

Ophthalmology

Sales in the Ophthalmology franchise were $5.4 billion (−2%, −1% cc), with increased sales of *Lucentis* (+3%, +4% cc) and *Systane* helping to partially offset the impact of generic competition.

Immunology and Dermatology

Sales in the Immunology and Dermatology franchise reached $4.0 billion (+34%, +35% cc). *Cosentyx* saw continued strong growth, particularly in the US and Europe, reaching $2.1 billion (+84%, +82% cc). *Ilaris* also continued strong gains (+42%, +42% cc), helping offset declines in other products mainly due to generic competition.

Neuroscience

Neuroscience franchise sales were $3.3 billion (+2%, +2% cc), driven by increases for *Gilenya* (+2%, +2% cc).

Respiratory

Respiratory franchise sales were $1.6 billion (+6%, +8% cc). Our chronic obstructive pulmonary disease (COPD) portfolio—including *Onbrez Breezhaler*, *Seebri Breezhaler* and *Ultibro Breezhaler*—achieved sales of $674 million (+3%, +5% cc). Sales of *Xolair,* for moderate-to-severe or severe persistent asthma, as well as for chronic hives, reached $920 million (+10%, +11% cc).

Cardio-Metabolic

Sales for the franchise were $524 million (+185%, +182% cc). *Entresto*, which has been launched in nearly 60 countries and used to treat more than 420,000 heart failure patients worldwide, continued to grow and sales reached $507 million (+198%, +195% cc).

Established Medicines

The Established Medicines franchise had sales of $5.9 billion (−7%, −5% cc). Increased sales of *Galvus* ($1.2 billion; +3%, +5% cc) and *Exforge* ($960 million; +4%, +4% cc) were more than offset by declines for products such as *Diovan* ($957 million; −11%, −9% cc) and *Exelon*/*Exelon* Patch (−14%, −14% cc) due to generic competition.

TOP 20 INNOVATIVE MEDICINES DIVISION PRODUCT NET SALES—2017

Brands	Business Franchise	Indication	US		Rest of world		Total		
			$ m	% change in constant currencies	$ m	% change in constant currencies	$ m	% change in $	% change in constant currencies
Gilenya	Neuroscience	Relapsing multiple sclerosis	1,709	2	1,476	3	**3,185**	**2**	**2**
Cosentyx	Immunology and Dermatology	Psoriasis, ankylosing spondylitis and psoriatic arthritis	1,275	67	796	115	**2,071**	**84**	**82**
Gleevec/Glivec	Oncology	Chronic myeloid leukemia and GIST	627	(48)	1,316	(37)	**1,943**	**(42)**	**(41)**
Lucentis	Ophthalmology	Age-related macular degeneration			1,888	4	**1,888**	**3**	**4**
Tasigna	Oncology	Chronic myeloid leukemia	810	12	1,031	6	**1,841**	**6**	**9**
Sandostatin	Oncology	Carcinoid tumors and Acromegaly	832	(2)	780	1	**1,612**	**(2)**	**(1)**
Afinitor/Votubia	Oncology	Breast cancer / TSC	819	6	706	(3)	**1,525**	**1**	**2**
Galvus	Established Medicines	Diabetes			1,233	5	**1,233**	**3**	**5**
Exjade/Jadenu	Oncology	Chronic iron overload	515	15	544	8	**1,059**	**11**	**11**
Exforge	Established Medicines	Hypertension	28	180	932	2	**960**	**4**	**4**
Diovan/Co-Diovan	Established Medicines	Hypertension	87	(41)	870	(4)	**957**	**(11)**	**(9)**
Xolair[(1)]	Respiratory	Asthma			920	11	**920**	**10**	**11**
Tafinlar + Mekinist	Oncology	Melanoma	339	14	534	41	**873**	**30**	**29**
Promacta/Revolade	Oncology	Immune thrombocytopenic purpura	446	44	421	31	**867**	**37**	**37**
Votrient	Oncology	Renal cell carcinoma	407	14	401	7	**808**	**11**	**10**
Jakavi	Oncology	Myelofibrosis			777	32	**777**	**34**	**32**
Travoprost Group	Ophthalmology	Reduction of elevated intraocular pressure	216	2	373	(9)	**589**	**(5)**	**(5)**
Entresto	Cardio-Metabolic	Chronic Heart Failure	297	161	210	262	**507**	**198**	**195**
Neoral/Sandimmun(e)	Immunology and Dermatology	Transplantation	38	(7)	450	(4)	**488**	**(5)**	**(4)**
Voltaren/Cataflam	Established Medicines	Inflammation/pain			465	(4)	**465**	**(11)**	**(4)**
Top 20 products total			**8,445**	**6**	**16,123**	**3**	**24,568**	**4**	**4**
Rest of portfolio			2,671	(9)	5,786	0	**8,457**	**(4)**	**(3)**
Total Division sales			**11,116**	**2**	**21,909**	**2**	**33,025**	**1**	**2**

(1) 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).

For information about the approved indications for the products described below, see "Item 4. Information on the Company—Item 4.B Business Overview—Innovative Medicines—Key Marketed Products".

Gilenya ($3.2 billion, +2% cc) sales continued to grow across regions, mainly driven by volume.

Cosentyx ($2.1 billion, +82% cc) showed strong growth across all indications.

Gleevec/Glivec ($1.9 billion, −41% cc) continued to decline this year driven by generic competition primarily across Europe and the US.

Lucentis ($1.9 billion, +4% cc) sales continued to grow driven by market expansion in Europe, Japan and Emerging Growth Markets, and reimbursement listing in China for neovascular age-related macular degeneration.

Tasigna ($1.8 billion, +9% cc) continued to grow this year primarily in the US and Emerging Growth Markets despite some impact of generic imatinib in Europe for patients with previously untreated Philadelphia chromosome-positive (Ph+) chronic myeloid leukemia.

Sandostatin ($1.6 billion, −1% cc) declined slightly this year driven by increased competitive pressure primarily in the US and Japan partially offset by growth in Latin America and Emerging Growth Markets.

Afinitor/*Votubia* ($1.5 billion, +2% cc) grew slightly this year as the neuroendocrine tumors and tuberous sclerosis complex indications compensated for competitive pressure in the breast cancer and renal cell carcinoma indications.

Galvus Group ($1.2 billion, +5% cc) continues to grow driven by solid performance in Japan and Emerging Growth Markets.

Exjade/*Jadenu* ($1.1 billion, +11% cc) sales growth was primarily driven by solid growth in the US in addition to continued uptake of the film-coated tablet formulation in Europe.

Exforge Group ($960 million, +4% cc) grew despite ongoing generic competition in the US and Japan, and new generic competition in Europe in 2017. Growth was driven by Emerging Growth Markets.

Diovan Group ($957 million, −9% cc) saw sales decline due to loss of exclusivity including in the US, EU and Japan, while sales continued to grow in China and some Emerging Growth Markets.

Xolair ($920 million, +11% cc) sales showed balanced growth across all regions.

Tafinlar + *Mekinist* ($873 million, +29% cc) sales growth was primarily driven by combination uptake across Europe in addition to launch uptake in the US for the non-small cell lung cancer indication.

Promacta/*Revolade* ($867 million, +37% cc) continued to deliver solid double-digit growth across all regions.

Votrient ($808 million, +10% cc) worldwide growth was driven primarily by the advanced renal cell carcinoma indication both in the US and in Emerging Growth Markets, specifically China and Asia-Pacific countries.

Jakavi ($777 million, +32% cc) delivered strong double-digit growth across all regions driven by continued momentum in the myelofibrosis indication in addition to reimbursement and launch uptake in the polycythemia vera indication across Europe.

Travoprost Group ($589 million, −5% cc) sales declined mainly due to loss of exclusivity in Europe.

Entresto ($507 million, +195% cc) performance was driven by growing adoption by physicians in the US and EU, and continued market access improvement.

Neoral/*Sandimmun(e)* ($488 million, −4% cc) sales declined slightly due to generic competition and mandatory price reductions, mainly in Europe and Japan.

Voltaren/*Cataflam* ($465 million, −4% cc) sales were impacted by increased generic competition.

Sandoz

Sandoz net sales in 2017 were $10.1 billion, down 1% in reported terms. In constant currencies, or cc, sales declined 2%. A 6 percentage-point increase in volume was more than offset by the negative 8 percentage-point effect of price erosion. Sales rose 4% (cc) in Europe to $4.6 billion. In the US, where we continue to see customer consolidation and greater competition, sales were $3.3 billion (−12% cc),

mainly due to increased industry-wide pressure on prices in generics. Sales in Asia, Africa and Australasia were $1.4 billion, up 1% in constant currencies.

	Year ended Dec 31, 2017	Year ended Dec 31, 2016	Change in $	Constant currencies change
	$ m	$ m	%	%
Retail Generics	8,409	8,623	(2)	(3)
Biopharmaceuticals	1,135	1,002	13	12
Anti-Infectives (Partner label/API)	516	519	(1)	(2)
Total	**10,060**	**10,144**	**(1)**	**(2)**

Retail Generics

Sandoz markets active ingredients, intermediates and finished dosage forms of pharmaceuticals. The Retail Generics franchise includes products in the therapeutic areas of cardiovascular, central nervous system, dermatology, gastrointestinal and hormonal therapies, metabolism, oncology, ophthalmics, pain and respiratory, plus finished dosage forms of anti-infectives sold under the Sandoz name. Franchise sales in 2017 were $8.4 billion (−3% cc). Declines in the US (−14% cc) more than offset increased sales in the rest of the world (+3% cc).

Biopharmaceuticals

The Biopharmaceuticals business comprises biosimilars; contract biologics supplied to third parties; and a generic version of Copaxone® 20 mg, *Glatopa*, which treats relapsing forms of multiple sclerosis and is marketed in the US. Global sales of Biopharmaceuticals grew 12% (cc) to $1.1 billion, driven by *Zarxio* (filgrastim), *Binocrit* (epoetin alfa), and the launch of *Rixathon* (rituximab) and *Erelzi* (etanercept) in several European countries.

Anti-Infectives

Sandoz sells pharmaceutical ingredients and intermediates (mainly antibiotics) to third-party customers, as well as finished dosage forms. Anti-infectives sold to third parties for sale under their own name were $516 million, down 2% (cc) due to the discontinuation of some low-margin products. Total Anti-Infectives sales were $1.4 billion, in line with the prior year in constant currencies, and included sales of finished dosage forms sold under the Sandoz name of $880 million, up 2% (cc).

Alcon

Alcon continued to implement its growth plan in 2017, with a focus on strengthening customer relationships, improving operations, and accelerating innovation and sales. In the US, Alcon launched the *AcrySof IQ ReSTOR* +2.5 D Multifocal Toric intraocular lens (IOL) with *ACTIVEFOCUS* optical design, which aims to improve distance vision in cataract patients with astigmatism. Other product launches in 2017 include the *CyPass* Micro-Stent in the EU to treat glaucoma. Alcon also received European approval for the *Clareon* IOL with *AutonoMe* pre-loaded delivery system, the first and only automated, disposable IOL delivery system for cataract surgery.

	Year ended Dec 31, 2017	Year ended Dec 31, 2016	Change in $	Constant currencies change
	$ m	$ m	%	%
Surgical				
Cataract products	2,749	2,695	2	3
of which Consumables	*1,443*	*1,390*	*4*	*5*
IOLs	*995*	*986*	*1*	*3*
Equipment	*311*	*319*	*(3)*	*(2)*
Vitreoretinal products	686	616	11	11
Refractive/other	225	207	9	8
Total	**3,660**	**3,518**	**4**	**5**
Vision Care				
Contact lenses	1,833	1,762	4	4
Contact lens care	531	532	0	0
Total	**2,364**	**2,294**	**3**	**3**
Total net sales	**6,024**	**5,812**	**4**	**4**

Surgical

Surgical sales grew 5% (cc) to $3.7 billion, mainly due to strong performance of products in the vitreoretinal portfolio (+11% cc) and growth in cataract disposable surgical supplies (+5% cc). Intraocular lenses for cataract surgery grew 3% (cc), as strong performance of new products—including the *UltraSert* pre-loaded IOL delivery device, the *PanOptix* trifocal IOL, and *AcrySof ReSTOR* Toric IOL with *ACTIVEFOCUS* optical design—was partly offset by competitive pressures.

Vision Care

Vision Care sales grew 3% (cc) to $2.4 billion. Contact lens sales grew 4% (cc) on the back of continued double-digit growth of *Dailies Total1*, the world's first and only water-gradient lens. Sales of contact lens care products were in line with the prior year in constant currencies.

Operating Income

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

	Year ended Dec 31, 2017	% of net sales	Year ended Dec 31, 2016	% of net sales	Change in $	Change in constant currencies
	$ m		$ m		%	%
Innovative Medicines	**7,782**	**23.6**	**7,426**	**22.8**	**5**	**7**
Sandoz	**1,368**	**13.6**	**1,445**	**14.2**	**(5)**	**(7)**
Alcon	**(190)**	**(3.2)**	**(132)**	**(2.3)**	**(44)**	**(14)**
Corporate	(331)		(471)		30	27
Operating income	**8,629**	**17.6**	**8,268**	**17.0**	**4**	**7**

Operating income was $8.6 billion (+4%, +7% cc) as growth drivers, productivity, lower amortization and a gain from achievement of a sales milestone related to the 2015 Vaccines divestment to GSK more than offset generic erosion. Operating income margin in constant currencies increased 0.8 percentage points compared to the prior year; currency had a negative impact of 0.2 percentage points resulting in an increase of 0.6 percentage points to 17.6% of net sales.

Core Operating Income key figures[1]

	Year ended Dec 31, 2017	Year ended Dec 31, 2016	Change in $	Change in constant currencies
	$ m	$ m	%	%
Core gross profit	**36,578**	**35,806**	**2**	**3**
Core Marketing & Sales	(12,865)	(11,991)	(7)	(7)
Core Research & Development	(8,313)	(8,402)	1	1
Core General & Administration	(2,135)	(2,120)	(1)	(2)
Core other income	778	753	3	2
Core other expense	(1,193)	(1,059)	(13)	(13)
Core operating income	**12,850**	**12,987**	**(1)**	**0**
As % of net sales	26.2	26.8		

(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 amounted to $4.2 billion (2016: $4.7 billion), less than in the prior year due to lower amortization and a gain from achievement of a sales milestone related to the 2015 Vaccines divestment to GSK.

Excluding these items, Core operating income was $12.9 billion (−1%, 0% cc). Core operating income margin in constant currencies decreased 0.3 percentage points, mainly due to generic competition for *Gleevec/Glivec*, and higher launch investments, which were partially offset by expanded gross margin and productivity improvements. Currency exchange rates had an additional negative impact of 0.3 percentage points, yielding a net decrease of 0.6 percentage points to 26.2% of net sales.

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

	Year ended Dec 31, 2017	% of net sales	Year ended Dec 31, 2016	% of net sales	Change in $	Change in constant currencies
	$ m		$ m		%	%
Innovative Medicines	**10,330**	**31.3**	**10,354**	**31.8**	**0**	**2**
Sandoz	**2,080**	**20.7**	**2,071**	**20.4**	**0**	**(1)**
Alcon	**857**	**14.2**	**850**	**14.6**	**1**	**5**
Corporate	(417)		(288)		(45)	(53)
Core operating income	**12,850**	**26.2**	**12,987**	**26.8**	**(1)**	**0**

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

Innovative Medicines

Operating income was $7.8 billion (+5%, +7% cc), mainly driven by higher sales, productivity improvements and lower amortization, which offset the impact of generic competition and investments in growth drivers.

Core operating income, which excludes certain items, was $10.3 billion (0%, +2% cc). Core operating income margin decreased 0.1 percentage points in constant currencies, and fluctuations in exchange rates had a further negative impact of 0.4 percentage points, resulting in a net decrease of 0.5 percentage points to 31.3% 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, 2017	Year ended Dec 31, 2016	Change in $	Change in constant currencies
	$ m	$ m	%	%
Research and Exploratory Development[1]	(2,749)	(2,739)	0	0
Confirmatory Development[1]	(4,881)	(4,970)	2	2
Total Innovative Medicines Division Research and Development expense	**(7,630)**	**(7,709)**	**1**	**1**
As % of Innovative Medicines net sales to third parties	*23.1*	*23.7*		
Core Research and Exploratory Development[1],[2]	(2,623)	(2,637)	1	1
Core Confirmatory Development[1],[2]	(4,426)	(4,475)	1	1
Total Core Innovative Medicines Division Research and Development expense	**(7,049)**	**(7,112)**	**1**	**1**
As % of Innovative Medicines net sales to third parties	*21.3*	*21.8*		

[1] Certain prior year amounts have been reclassified for comparative purposes. This reclassification has not been made in the 2015-2016 comparative table found in "—2016 Compared to 2015—Innovative Medicines—Research and development of Innovative Medicines Division".

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

Innovative Medicines Division Research and Exploratory Development expense amounted to $2.7 billion in 2017, in line with the prior year. Confirmatory Development expense decreased by 2% (+2% cc) to $4.9 billion compared to $5.0 billion in 2016, driven by resource allocation and continued productivity efforts, including the benefit of the creation of the Novartis Global Drug Development (GDD) organization.

Total Core Research and Development expense in the Innovative Medicines Division as a percentage of sales decreased by 0.7 percentage points in constant currencies mainly due to resource allocation and continued productivity efforts. Currency exchange rates had a negative impact of 0.2 percentage points, yielding a net decrease of 0.5 percentage points to 21.3% of net sales.

Sandoz

Operating income was $1.4 billion (−5%, −7% cc), down mainly due to pressure on prices in the US, investments in marketing and sales in key markets outside the US, and higher manufacturing restructuring charges. These negative impacts were partly offset by favorable changes in product mix.

Core operating income, which excludes certain items, was $2.1 billion (0%, −1% cc). Core operating income margin in constant currencies increased 0.1 percentage points, and an additional 0.2 percentage-point increase from exchange rates yielded a result of 20.7% of net sales.

Alcon

Operating loss was $190 million, compared to an operating loss of $132 million the year before, as higher sales were offset by continued investment in the division's growth plan and charges related to business development activities.

Core operating income, which excludes certain items, was $857 million (+1%, +5% cc). Core operating income margin in constant currencies increased by 0.2 percentage points, offset by negative currency impact of 0.6 percentage points, yielding a net decrease of 0.4 percentage points to 14.2% 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 $331 million (+30%, +27% cc) in 2017 compared to a net expense of $471 million in the prior year. The favorable decrease in expense was mainly due to a gain from achievement of a sales milestone related to the 2015 Vaccines divestment to GSK, partly offset by lower gains from divestment in real estate and lower contributions from the captive insurance companies.

Non-Operating Income and Expense

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

	Year ended Dec 31, 2017	Year ended Dec 31, 2016	Change in $	Change in constant currencies
	$ m	$ m	%	%
Operating income	**8,629**	**8,268**	**4**	**7**
Income from associated companies	1,108	703	58	58
Interest expense	(777)	(707)	(10)	(12)
Other financial income and expense	39	(447)	nm	nm
Income before taxes	**8,999**	**7,817**	**15**	**12**
Taxes	(1,296)	(1,119)	(16)	(13)
Net income	**7,703**	**6,698**	**15**	**12**
Basic EPS ($)	**3.28**	**2.82**	**16**	**14**

nm = not meaningful

Income from associated companies

Income from associated companies increased to $1.1 billion, compared to $703 million in the prior year. The increase was due to higher income recognized from our investment in GSK Consumer Health-care Holdings Ltd. (GSK Consumer Healthcare).

The estimated income from our investment in GSK Consumer Healthcare in 2017 amounted to $629 million compared to $234 million in 2016. The increase is due to improved operational results of $89 million, an estimate of a one-time deferred tax income of $237 million, arising from a change in a Swiss cantonal statutory tax rate, and a positive prior year adjustment of $47 million based on the actual audited results for 2016, compared to a negative prior year adjustment of $22 million recognized in 2016 for 2015.

The estimated income from our investment in Roche in 2017 amounted to $456 million (2016: $464 million), which reflected our estimated share of income for 2017 of $523 million (2016: $532 million) offset by the negative prior year adjustment of $67 million, based on actual 2016 results (2016: negative prior year adjustment of $68 million, based on actual 2015 results).

Interest Expense and other financial income and expense

Interest expense increased to $777 million from $707 million in the prior year due to higher outstanding debt.

Other financial income and expense amounted to an income of $39 million compared to an expense of $447 million in the prior-year, mainly on account of exceptional charges related to Venezuela of $305 million in 2016, as well as higher currency losses in 2016.

Taxes

The tax rate increased to 14.4% from 14.3% in the prior year. On December 22, 2017, the US enacted tax reform legislation (Tax Cuts and Jobs Act), which among other provisions, reduced the US corporate tax rate from 35% to 21%, effective January 1, 2018. This required a revaluation of the deferred tax assets and liabilities and a portion of current tax payables to the newly enacted tax rate at the date of enactment, which resulted in a net tax expense of $61 million (0.7%). In addition, a change in a Swiss cantonal statutory tax rate resulted in a one-time income from our share in GSK Consumer Healthcare the impact of which decreased the tax rate by 0.4%.

Excluding the impact of these rate changes the reported tax rate for 2017 would have been 14.1% compared to 14.3% in the prior year.

Net Income

Net income was $7.7 billion (+15%, +12% cc), benefiting from growth in operating income and higher income from our stake in GSK Consumer Healthcare Holdings Ltd. The prior year also included the exceptional charges related to Venezuela.

EPS

Basic earnings per share were $3.28 (+16%, +14% cc), up more than net income in constant currencies, benefiting from our share buyback program.

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

Core Non-Operating Income and Expense

	Year ended Dec 31, 2017	Year ended Dec 31, 2016	Change in $	Change in constant currencies
	$ m	$ m	%	%
Core operating income	**12,850**	**12,987**	**(1)**	**0**
Core income from associated companies	1,335	1,134	18	18
Core interest expense	(777)	(707)	(10)	(12)
Core other financial income and expense	39	(99)	nm	nm
Core income before taxes	**13,447**	**13,315**	**1**	**2**
Core taxes	(2,056)	(2,001)	(3)	(4)
Core net income	**11,391**	**11,314**	**1**	**2**
Core basic EPS ($)	**4.86**	**4.75**	**2**	**3**

nm = not meaningful

Core Income from associated companies

Core income from associated companies increased to $1.3 billion from $1.1 billion in the prior-year period. The core income contribution from GSK Consumer Healthcare Holdings Ltd., increased to $479 million in 2017 from $369 million in the prior-year period, and the core income contribution from Roche increased to $832 million from $760 million.

Core Interest Expense and other financial income and expense

Core other financial income and expense amounted to a net income of $39 million, compared to an expense of $99 million in 2016, mainly on account of lower currency losses. In the prior year, the exceptional charges of $0.3 billion related to Venezuela were excluded from the 2016 core other financial expense.

Core Taxes

The core tax rate (core taxes as a percentage of core pre-tax income) increased to 15.3% from 15.0% in the prior year.

Core Net Income

Core net income was $11.4 billion (+1%, +2% cc), benefiting from higher core income from associated companies.

Core EPS

Core earnings per share were $4.86 (+2%, +3% cc), reflecting the benefit of our share buyback program.

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 29. Discontinued operations" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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.

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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.

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.

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		Rest of world		Total		
			$ 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	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 franchise).

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(e)* ($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)**
Core income from associated companies	1,134	981	16	16
Core interest expense	(707)	(655)	(8)	(10)
Core other financial income and expense	(99)	(24)	nm	nm
Core income before taxes from continuing operations	**13,315**	**14,092**	**(6)**	**(2)**
Core 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 29. Discontinued operations" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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.

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 2017 and 2016 are mentioned below.

Significant transactions in 2017

Innovative Medicines—Acquisition of Ziarco Group Limited

On January 20, 2017, Novartis acquired Ziarco Group Limited (Ziarco), a privately held company in the United Kingdom, focused on the development of novel treatments in dermatology. This acquisition adds a once-daily oral H4 receptor antagonist in development for atopic dermatitis, commonly known as eczema, to complement the Novartis dermatology portfolio and pipeline. The fair value of the total purchase consideration was $420 million. The amount consisted of an initial cash payment of $325 million and the net present value of the contingent consideration of $95 million, due to Ziarco shareholders, which they are eligible to receive upon the achievement of specified development milestones. The purchase price allocation resulted in net identifiable assets of $395 million and goodwill of $25 million. Results of operations since the date of acquisition were not material.

Innovative Medicines—Acquisition of Encore Vision, Inc.

On January 20, 2017, Novartis acquired Encore Vision, Inc. (Encore), a privately-held company in Fort Worth, Texas, in the United States, focused on the development of a novel treatment in presbyopia. The fair value of the total purchase consideration was $456 million. The amount consisted of an initial cash payment of $366 million and the net present value of the contingent consideration of $90 million, due to Encore shareholders, 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 $389 million and goodwill of $67 million. Results of operations since the date of acquisition were not material.

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. The amount consisted of an initial cash payment of $240 million and the net present value of the contingent consideration of $92 million due to Transcend shareholders, 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 $294 million and goodwill of $38 million. The 2016 results of operations since the date of acquisition were not material.

Innovative Medicines—Acquisition of REPRIXYS PHARMACEUTICALS CORPORATION

On November 18, 2016, Novartis acquired Reprixys Pharmaceuticals Corporation (Reprixys), a privately held, US-based company specializing in the development of therapeutics in certain hematologic and inflammatory disorders, following receipt of results of the SUSTAIN study. The initial interest of 19% was adjusted to its fair value of $64 million through the consolidated income statement at acquisition date. This re-measurement resulted in a gain of $53 million.

The fair value of the total purchase consideration for acquiring the 81% stake Novartis did not already own amounted to $268 million. The amount consisted of an initial cash payment of $194 million and the net present value of the contingent consideration of $74 million due to Reprixys shareholders, 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 $332 million. No goodwill was recognized. The 2016 results of operations since the date of acquisition were not material.

For further details on significant transactions, see "Note 2. Significant transactions" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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 2017" furnished to the SEC on Form 6-K on January 24, 2018, 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 market share of our products, and to ensure patient access. 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.

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, and to ensure patient access to 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 2017, 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
2017							
US-specific healthcare plans and program rebates	1,461		(3,684)	(62)	3,875		1,590
Non-US-specific healthcare plans and program rebates	1,020	131	(1,954)	80	2,186	(107)	1,356
Non-healthcare plans and program-related rebates, returns and other deductions	1,702	65	(11,814)	(127)	12,045	(145)	1,726
Total continuing operations 2017	**4,183**	**196**	**(17,452)**	**(109)**	**18,106**	**(252)**	**4,672**
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**

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	
2017				
Innovative Medicines gross sales subject to deductions			**43,994**	**100.0**
US-specific healthcare plans and program rebates	(3,303)		(3,303)	(7.5)
Non-US-specific healthcare plans and program rebates	(1,722)	(956)	(2,678)	(6.1)
Non-healthcare plans and program-related rebates, returns and other deductions	(2,698)	(2,290)	(4,988)	(11.3)
Total Innovative Medicines gross to net sales adjustments	**(7,723)**	**(3,246)**	**(10,969)**	**(24.9)**
Innovative Medicines net sales 2017			**33,025**	**75.1**
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**

(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;

– behavior of competitors (launch of competing products, marketing initiatives, etc.);

– probability of obtaining regulatory approvals;

– future tax rates;

– appropriate royalty rate for the Alcon brand name;

– appropriate terminal growth rate; 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 2017" furnished to the SEC on Form 6-K on January 24, 2018, 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 10. Goodwill and intangible assets" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

In 2017, intangible asset impairment charges of $709 million were recognized, of which $591 million was recorded in the Innovative Medicines Division, $61 million in the Sandoz Division, and $57 million in the Alcon Division.

In 2016, intangible asset impairment charges for continuing operations of $591 million were recognized, of which $522 million was recorded in the Innovative Medicines Division, $65 million in the Sandoz Division, and $4 million in the Alcon Division.

In 2017 and in 2016, there were no reversals of prior-year impairment charges.

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 10. Goodwill and intangible assets" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

Additionally, net impairment charges for property, plant and equipment during 2017 amounted to $157 million (2016: $102 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, Brazil, Russia, Saudi Arabia, Turkey and other countries, and evaluates trade receivables in these countries for potential collection risks. Substantially all of the trade receivables overdue from Greece, Italy, Portugal, Spain and Saudi Arabia are due directly from local governments or from government-funded entities. Deteriorating credit and economic conditions as well as 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 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 financial 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, are 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 In-Process Research and Development (IPR&D). Changes in contingent consideration assets are recognized in "Other income" or "Other expense", depending on its nature.

The effect of unwinding the discount over time is recognized for contingent liabilities in "Interest expense" and for contingent assets in "other financial income and expense" in the consolidated income statement.

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".

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 2017, 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, United States, United Kingdom, Germany and Japan, which represent 94% of the Group total defined benefit pension obligation, by approximately $0.8 billion. Similarly, if the 2017 interest rate had been one quarter of one percentage point lower than actually assumed, the net periodic pension cost for pension plans in these countries, which represent about 82% of the Group's total net periodic pension cost for pension plans, would have increased by approximately $23 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 24. Post-employment benefits for associates" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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 19. Provisions and other non-current liabilities" and "Note 27. Commitments and contingencies" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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 United States, the European Union, 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".

In addition, effective 2013, the United States government implemented a medical device sales tax that is levied on the Alcon Division's United States sales of products which that 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. In December 2015, Congress enacted a law that included a two-year moratorium on applying the medical device excise tax, which expired on December 31, 2017. On January 22, 2018, the US Congress extended the moratorium for an additional two years.

Taxes

We prepare and file our tax returns based on an interpretation of tax laws and regulations, and we 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 and 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 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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, 2017.

FACTORS AFFECTING RESULTS OF OPERATIONS

Transformational Changes Fueling Demand

Accelerating biomedical innovation

We are seeing an explosion of innovation in medical science. Better understanding of the molecular mechanisms of disease, coupled with new types of therapies, promises to yield powerful new medicines for patients. The trend toward patient-specific precision treatments will likely accelerate.

Further advances in molecular biology, which has been a mainstay of research for decades, will continue to yield results. Scientists contributing to the Human Protein Atlas have identified about 1 800 proteins that they believe are possible targets for drugs. So far, only about 600 of them are actually targeted by currently approved therapies. In addition, new molecular techniques, such as gene editing, personalized cell therapies and harnessing the cell's own waste disposal system, could open new treatment opportunities—including ones that go beyond what has been possible using today's drugs.

The advent of digital technologies as therapeutic aids is also starting to alter the conventional notion of medical treatment. For instance, mobile applications that aim to treat substance abuse and help diabetics manage their disease have received clearance from the US Food and Drug Administration (FDA). Combining traditional medicines with digital technology that helps patients follow healthy behaviors holds great promise for improving the quality of care as well as treatment outcomes for patients.

Transforming how doctors diagnose and treat diseases

Although the digital revolution has been relatively slow to arrive in healthcare, it is gaining momentum and will likely bring radical change in the coming years.

A growing proliferation of sensor technology is helping researchers and doctors gather increasing amounts of information about patients' health and how they respond to treatment. Care providers are starting to mine healthcare data using a combination of statistical methods and artificial intelligence to flag emerging medical problems and help physicians diagnose and treat patients. In fact, a recent study found that computers already have an edge over doctors in their ability to predict the likelihood that a patient will have a heart attack over a 10-year period, based on an evaluation of risk factors.

Patients, armed with greater access to their own medical data, will likely play a more active role in preventing diseases and managing their own care when they become ill. The role of physicians and other care providers will likely also evolve as they help educate patients on treatment options and steer patients toward the most effective choices.

Transforming drug research and development

Digital technology may also increasingly improve the efficiency and effectiveness of researching and developing potential new therapies. The marriage of data and artificial intelligence will enable complex biological simulations that complement human scientific ingenuity. Such tools are already being considered by the FDA as replacements for preclinical animal studies to assess toxicity in potential new medicines. As digital tools become more widespread, they may be able to shorten research times and improve the likelihood that experimental drugs will prove safe and effective.

This surge in medical innovation will likely occur in an increasingly diverse and fragmented research environment, with new advances coming from a variety of sources—sometimes unexpected ones. Molecular biology may intersect with other disciplines, from engineering to computer science, to advance the practice of medicine. And we expect there will be greater diversity in funding for research. Already we see governments, companies and venture capitalists increasingly supporting academic researchers' efforts to advance promising experimental therapies.

All of these factors are contributing to greater competition at the forefront of innovation in medical science. One upshot is that medicines will likely be held to a higher standard of efficacy in the future.

Aging populations

While accelerating medical innovation could help tame some of the devastating diseases that still plague humanity, other trends in society pose significant challenges. Rapidly aging populations continue to put pressure on health systems around the world.

People are living longer and the worldwide elderly population continues to grow at a rapid pace. The number of people in the world over age 60 will reach about 1.4 billion by 2030, according to projections by the United Nations, up from less than 1 billion today. Aging populations, in addition to rapid urbanization and changing lifestyles in the developing world, are contributing to increased prevalence of chronic ailments such as heart disease and cancer.

At the same time, many countries are working to expand access to healthcare. For example, China recently expanded reimbursement of some medicines.

These factors are driving higher healthcare spending, which is expected to grow at an annual rate of 4.3% between 2015 and 2020, reaching a total of $8.7 trillion worldwide, projects the Economist Intelligence Unit. By 2020, about half of that spending is expected to go toward treating the three leading causes of death worldwide: cardiovascular disease, cancer and respiratory disease.

To keep costs in check, governments and health insurers are already employing a variety of tactics, including increasing the use of generics and biosimilars, imposing price cuts, and limiting access to some innovative therapies. The pharmaceutical industry is also playing a role, exploring new pricing models and delivering innovative new treatments that maximize benefits for patients.

Better health outcomes for patients

In pursuit of greater efficiency and effectiveness, some healthcare systems are also expediting the transition from a system based on fees for services toward one based on reimbursement for specific health outcomes in patients. In the US, for instance, a new law came into effect in 2017 that aims to tie reimbursement more closely to quality and health outcomes for some elderly patients.

As the transition accelerates, we expect health systems will increasingly find ways to discourage the use of medical treatments that bring little or no value for patients or healthcare systems. In parallel, they will likely place greater value on treatments that delay the progression of disease or that help avoid events requiring expensive acute care, such as heart attacks.

With people living longer and retirement ages rising, we also anticipate countries and health systems will put greater emphasis on keeping people fit and productive later in life. And we think there will be growing emphasis on maintaining quality of life as people age, with less focus on extending life by a few more months.

For more detailed discussion about the risks facing Novartis and what we're doing to mitigate them, see "—Increasingly Challenging Business Environment" below.

We think the trends driving changes in healthcare will bring new opportunities for Novartis, as well as new challenges. And we believe the changes now underway in our industry raise the importance of delivering true innovation that produces better health outcomes for patients and health systems, with greater efficiency.

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 Division, as well as certain products of our Alcon and Sandoz Divisions, 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 2017, the impact of generic competition on our net sales amounted to approximately $2.0 billion.

Some of our best-selling products face 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 United States, European Union and Japan throughout 2017, which will continue. Patent protection for our *Sandostatin* products has expired and generic versions of *Sandostatin* SC are available in the United States, European Union and Japan. Diovan and Co-Diovan/Diovan HCT, which had long been our best-selling products, have generic competitors in the United States, European Union and Japan. Looking forward, intellectual property protecting a number of our major products will expire at various times in the coming years, raising the likelihood of further generic competition. Among our products expected to begin losing intellectual property in key countries during the next three years are *Gilenya*, our everolimus products (*Afinitor*/*Votubia* and *Certican*/*Zortress*), *Exjade*/*Jadenu* and *Lucentis*.

To counter the impact of patent expirations, we continuously invest in R&D to rejuvenate our portfolio. For example, in 2017, we invested 18.3% of total net sales in R&D. One measure of the output of our efforts is the performance of our growth drivers, including *Cosentyx* and *Entresto*, the launches of *Kisqali*, *Kymriah* and *Rydapt* in 2017, and the newly launched Sandoz biosimilars. Novartis also has a number of late-stage product candidates in its pipeline with the potential to come to market in the next few years.

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 than has been required in the past, the inclusion of significantly higher numbers of patients in clinical trials, and more detailed analyses of the trials. As a result, despite significant efforts by health authorities such as the FDA to accelerate the development of new drugs, 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 United States 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 has taken steps to accelerate innovation. It has started to see the results of its efforts, with the approval and launch of intraocular lens innovations in 2016 and 2017, including *Clareon* and *PanOptix* IOLs, *AutonoMe* and *Ultrasert* IOL delivery systems, and, *ReSTOR* Toric IOL with *ACTIVEFOCUS* optical design, as well as *CyPass* micro-stent and 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 products

Our ability to grow depends not only on our pipeline delivery, but also on our commercial success, particularly with respect to our key growth drivers, 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, and loss of intellectual property protection. In addition, our revenue could be significantly impacted by the timing and rate of commercial acceptance of 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 particular, our Alcon Division and our US Sandoz business each has suffered declines in sales and profits in recent years due at least in part to increased competition for its products, although Alcon's results improved in 2017, returning to growth. There can be no certainty either that Sandoz US sales will recover, or that Alcon's improved results will be repeated in the coming years. In any event, such competition and the costs of our efforts to improve these businesses' performance, as well as other factors, can be expected to affect the business, financial condition or results of operations of these organizations, at least in the near term. In addition, despite the devotion of significant resources to our efforts to improve the performance of Alcon and Sandoz US, those efforts may ultimately prove insufficient.

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 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 our ability to establish satisfactory rates of reimbursement for our products by governments, insurers and other payors.

In our Sandoz Division, for example, sales declined in 2017 due to intense industry pricing pressure in the US. Sales growth outside the United States was unable to fully compensate.

We expect scrutiny to continue in 2018, and the 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 United States 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 we devote substantial time and resources to efforts to ensure that our business is conducted in a legal and publicly acceptable manner. Despite these 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 2017 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 United States and other countries, and potentially lead to large damage payments and agreements intended to regulate company behavior. This is why we continued to strengthen the Integrity & Compliance function in 2017. The function now has 473 employees and is headed by our Chief Ethics and Compliance Officer, who reports directly to the CEO of Novartis. The Chief Ethics and Compliance Officer is also Head of Litigation, reporting to the Group General Counsel of Novartis. By bringing the Integrity & Compliance and Legal functions closer together, we can evaluate facts that might be 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, in addition to our own high quality standards, introduce a greater chance for disruptions and liabilities. Any significant failure by us or our third party suppliers to comply with these requirements or the health authorities' expectations, may cause us to shut down the production facilities or production lines. Alternately, we may be forced to shut them down by a government health authority.

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 2017 were consistent with the year before. Out of a total of 217 inspections, all but two (99%) were without major findings.

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 facing local financial difficulties, including countries experiencing high inflation rates and highly indebted countries facing large capital outflows, may impose controls on the exchange of foreign currency. Such exchange controls could limit our ability to distribute retained earnings from our local affiliates, or to pay intercompany payables due from those countries.

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, including the acquisition of Alcon and the oncology assets acquired from GSK. As a result, we may incur significant impairment charges if the fair value of intangible assets and groupings of cash generating units containing goodwill are 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 2017, for example, we recorded intangible asset impairment charges of $709 million, including the cost of discontinuing the development of RLX030 (serelaxin). 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 the laws of the jurisdictions in which we operate. However, the integrated nature of our worldwide operations can produce conflicting claims from revenue authorities in different countries as to the profits to be taxed in the individual countries, including disputes relating to transfer pricing. The majority of the jurisdictions in which we operate have double tax treaties with other foreign jurisdictions, which provide a framework for mitigating the impact of double taxation on our revenues and capital gains. However, mechanisms developed to resolve such conflicting claims are largely untried, and can be expected to be very lengthy.

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 its Anti Tax Avoidance Directive, which seeks to prevent tax avoidance by companies and to ensure that companies pay appropriate taxes in the markets where profits are effectively made and business is effectively performed. The European Commission also continues to extend the application of its policies seeking to limit fiscal aid by Member States to particular companies, and the related investigation of the Member States' practices regarding the issuance of rulings on tax matters relating to individual companies.

These OECD and EU tax reform initiatives also need local country implementation, including in our home country of Switzerland, which may result in significant changes to established tax principles. Although we have taken steps to be in compliance with the evolving OECD and EU tax initiatives, and will continue to do so, significant uncertainties remain as to the outcome of these efforts.

In addition, in the United States, the president on December 22, 2017, signed into law the Tax Cuts and Jobs Act of 2017, which includes substantial changes to the US taxation of individuals and businesses. Although the new law substantially decreased tax rates applicable to corporations, we do not yet know what all of the consequences of this new statute will be, including whether the law will have any unintended consequences. In particular, significant uncertainties remain as to how the US government will implement the new law, including with respect to the tax qualification of interest deductions, the concept of a territorial tax regime, royalty payments and cost of goods sold.

In general, such tax reform 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, will require us to continually assess our organizational structure against tax policy trends, and could lead to an increased risk of international tax disputes and an increase in our effective tax rate, and could adversely affect our financial results.

IT security, data integrity and data privacy

We are 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 incidents, breakdowns, malicious intrusions, cybercrimes, including State-sponsored cybercrimes, 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 cybersecurity and to business continuity efforts, like many companies, we

have experienced certain of these events and expect to continue to experience them in the future, as the external cyber-attack threaat only keeps growing. We believe that the data security incidents we have experienced to date have not resulted in significant disruptions to our operations, and have not had a significant adverse effect on our results of operations, or on third parties. However, we may not be able to prevent breakdowns or breaches in our systems and we may not be able to prevent such events from having a material adverse effect on our business, financial condition, results of operation, or reputation.

In addition, our routine business operations, including through the use of information technologies such as the Internet, social media, mobile technologies, and technology-based medical devices, increasingly involve our gathering personal information (including sensitive personal information) about patients, vendors, customers, employees, collaborators and others. Breaches of our systems or those of our third-party contractors, or other failures to protect such information, could expose such people's personal information to unauthorized persons. Any such event could give rise to significant potential liability and reputational harm, including potentially substantial monetary penalties. We also make significant efforts to ensure that any international transfers of personal data are done in compliance with applicable law. Any additional restraints 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.

Transformational technologies and business models

Rapid progress in digital technologies and in the development of new business models is substantially transforming numerous industries around the world, while sometimes quickly rendering established businesses uncompetitive or obsolete. To take advantage of these opportunities, Novartis has embarked upon a digital transformation strategy, with the goal of making Novartis an industry leader in leveraging advanced analytics and other new technologies. At the same time, there is a risk that other companies with specialized expertise or business models may enter the healthcare field, potentially disrupting our relationships with patients, healthcare professionals, customers, distributors and suppliers, with unknown potential consequences for us.

If we should fail to succeed in our efforts at a digital transformation of our company, then there is a risk that we may fail to create the innovative new products, tools or techniques that such technologies may make possible, or may fail to create them as quickly and efficiently as such technologies may enable. We may also lose opportunities to engage with our stakeholders and to profit from improved business processes, and may lose the resources devoted to these efforts to transform our business. At the same time, should third parties successfully enter the healthcare field with disruptive new technologies or business models, then we potentially may see our business supplanted in whole or in part by these new entrants.

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 in 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 & Compliance and the Business Practices Office providing support and controlling the effectiveness of risk management in these areas.

Financial risk management is described in more detail in "Note 28. Financial instruments—additional disclosures" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

NON-IFRS MEASURES AS DEFINTED 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, except 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 and related items, 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 since 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/impairments 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 US dollars; 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 US dollars, using the average exchange rates from the prior year and comparing them to the prior year values in US dollars.

We use these constant currency measures in evaluating the Group's performance, since 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

Free cash flow is presented as additional information because management believes it is a useful supplemental 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 a non-IFRS measure, which means it should not be interpreted as a measure determined under IFRS. Free cash flow is not intended to be a substitute measure for cash flow from operating activities as determined under IFRS.

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, as well as intangible, other non-current and financial assets, excluding marketable securities. The definition of free cash flow used by Novartis does not include amounts related to changes in investments in associated companies or related acquisitions or divestments of subsidiaries.

Net Debt

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. Net debt is a non-IFRS measure, which means it should not be interpreted as a measure determined under IFRS.

Novartis defines net debt as current and non-current financial debt less cash and cash equivalents, current investments and derivative financial instruments.

Novartis Cash Value Added

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 Long-Term Performance Plan 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).

	2017	2016	Change
	$ m	$ m	$ m
Operating income	**8,629**	**8,268**	**361**
Depreciation of property, plant & equipment	1,520	1,489	31
Amortization of intangible assets	3,690	3,861	(171)
Impairments of property, plant & equipment, and intangible assets	866	693	173
EBITDA	**14,705**	**14,311**	**394**

Enterprise value

Enterprise value represents the total amount that shareholders and debt holders have invested in Novartis, less the Group's liquidity.

	Dec 31, 2017	Dec 31, 2016	Change
	$ m	$ m	$ m
Market capitalization	195,541	172,048	23,493
Non-controlling interests	59	59	0
Financial debts and derivatives	28,532	23,802	4,730
Liquidity	(9,485)	(7,777)	(1,708)
Enterprise value	**214,647**	**188,132**	**26,515**
Enterprise value/EBITDA	**15**	**13**	

2017 AND 2016 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS

	Innovative Medicines		Sandoz		Alcon		Corporate		Group	
	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016
	$ m	$ m	$ m	$ m	$ m	$ m	$ m	$ m	$ m	$ m
IFRS Operating income	**7,782**	**7,426**	**1,368**	**1,445**	**(190)**	**(132)**	**(331)**	**(471)**	**8,629**	**8,268**
Amortization of intangible assets	**2,243**	**2,440**	**454**	**460**	**901**	**901**			**3,598**	**3,801**
Impairments										
Intangible assets	591	522	61	65	57	4			709	591
Property, plant & equipment related to the Group-wide rationalization of manufacturing sites	7	1	60	(7)					67	(6)
Other property, plant & equipment	77	76	13	8					90	84
Financial assets		18			29		197	99	226	117
Total impairment charges	**675**	**617**	**134**	**66**	**86**	**4**	**197**	**99**	**1,092**	**786**
Acquisition or divestment of businesses and related items ..										
—Income	(2)	(68)					(115)	(229)	(117)	(297)
—Expense	32	41					130	223	162	264
Total acquisition or divestment of businesses and related items, net	**30**	**(27)**					**15**	**(6)**	**45**	**(33)**
Other items										
Divestment gains	(368)	(608)		(6)				(48)	(368)	(662)
Restructuring and related items										
—Income	(53)	(41)	(7)	(23)	(4)	(4)	(1)	(5)	(65)	(73)
—Expense	268	418	134	123	34	33	29	65	465	639
Legal-related items										
—Income	(21)	(99)							(21)	(99)
—Expense	35	205			61				96	205
Additional income	(534)	(61)	(3)		(51)	(13)	(372)	(22)	(960)	(96)
Additional expense	273	84		6	20	61	46	100	339	251
Total other items	**(400)**	**(102)**	**124**	**100**	**60**	**77**	**(298)**	**90**	**(514)**	**165**
Total adjustments	**2,548**	**2,928**	**712**	**626**	**1,047**	**982**	**(86)**	**183**	**4,221**	**4,719**
Core operating income	**10,330**	**10,354**	**2,080**	**2,071**	**857**	**850**	**(417)**	**(288)**	**12,850**	**12,987**
as % of net sales	*31.3%*	*31.8%*	*20.7%*	*20.4%*	*14.2%*	*14.6%*			*26.2%*	*26.8%*
Income from associated companies	(1)		23	6			1,086	697	1,108	703
Core adjustments to income from associated companies, net of tax	1						226	431	227	431
Interest expense									(777)	(707)
Other financial income and expense[1]									39	(99)
Taxes, adjusted for above items (core taxes)									(2,056)	(2,001)
Core net income									**11,391**	**11,314**
Core net income attributable to shareholders of Novartis AG									**11,391**	**11,307**
Core basic EPS ($)[2]									**4.86**	**4.75**

(1) Adjusted for charges of $0.3 billion in 2016 related mainly to devaluation losses in Venezuela.

(2) Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

2016 AND 2015 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS

	Innovative Medicines[1]		Sandoz		Alcon		Corporate		Group	
	2016	2015 restated[2]	2016	2015 restated[2]	2016	2015 restated[2]	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 of businesses and related items										
—Income	(68)	(22)		(1)			(229)	(260)	(297)	(283)
—Expense	41	214		1			223	250	264	465
Total acquisition or divestment of businesses and 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 (core taxes)									(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 of Novartis AG									**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 Reconciliation of IFRS Results to Core Results—Group Discontinued Operations".

(5) Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

2017, 2016 AND 2015 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS—GROUP

2017	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment of businesses and related items[3]	Other items[4]	Core results
	$ m	$ m	$ m	$ m	$ m	$ m
Gross profit	**32,960**	**3,401**	**92**		**125**	**36,578**
Operating income	**8,629**	**3,598**	**1,092**	**45**	**(514)**	**12,850**
Income before taxes	**8,999**	**3,974**	**1,093**	**45**	**(664)**	**13,447**
Taxes[5]	(1,296)					(2,056)
Net income	**7,703**					**11,391**
Basic EPS ($)[6]	**3.28**					**4.86**
The following are adjustments to arrive at Core Gross Profit						
Cost of goods sold	(17,175)	3,401	92		125	(13,557)
The following are adjustments to arrive at Core Operating Income						
Marketing & Sales	(12,861)				(4)	(12,865)
Research & Development	(8,972)	197	680		(218)	(8,313)
General & Administration	(2,136)				1	(2,135)
Other income	1,969		(9)	(117)	(1,065)	778
Other expense	(2,331)		329	162	647	(1,193)
The following are adjustments to arrive at Core Income before taxes						
Income from associated companies	1,108	376	1		(150)	1,335

(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 $376 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; Research & Development and Other expense include impairment charges related to financial assets; Research & Development, Other income and Other expense include reversals and charges related to the impairment of property, plant and equipment.

(3) Acquisition or divestment of businesses and 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.

(4) 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, Research & Development, General & Administration, Other income and Other expense include other restructuring income and charges and related items; Marketing & Sales includes an income from the release of a provision; Research & Development includes fair value adjustments to contingent consideration liabilities; Other income and Other expense include legal-related items; Other income also includes a gain from a Swiss pension plan amendment, product and financial asset divestment gains, a partial reversal of a prior period charge, an income from a settlement of a contract dispute and a fair value adjustment to contingent consideration sales milestone receivables; Other expense also includes a provision for contract termination costs, a charge for onerous contracts and an amendment to the Swiss Pension Plan; Income from associated companies includes an adjustment of $150 million for the Novartis share of the estimated GSK Consumer Healthcare Holdings Ltd. core items.

(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 of $4.4 billion to arrive at the core results before tax amounts to $760 million. The average tax rate on the adjustments is 17.1%.

(6) Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

2016	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment of businesses and related items[3]	Other items[4]	Core results
	$ m	$ m	$ m	$ m	$ m	$ m
Gross profit	**31,916**	**3,758**	**96**		**36**	**35,806**
Operating income	**8,268**	**3,801**	**786**	**(33)**	**165**	**12,987**
Income before taxes	**7,817**	**4,097**	**786**	**(33)**	**648**	**13,315**
Taxes[5]	(1,119)					(2,001)
Net income	**6,698**					**11,314**
Basic EPS ($)[6]	**2.82**					**4.75**
The following are adjustments to arrive at Core Gross Profit						
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						
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						
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 of businesses and 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 is 16.0%.

(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 of businesses and related items[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**
Basic EPS from continuing operations ($)[7]	**2.92**					**5.01**
Basic EPS from discontinued operations ($)[7]	4.48					(0.11)
Total basic 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 of businesses and 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 Reconciliation of IFRS Results to Core Results—Group Discontinued Operations".

(7) Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

2017, 2016 AND 2015 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS—INNOVATIVE MEDICINES

2017	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment of businesses and related items[3]	Other items[4]	Core results
	$ m	$ m	$ m	$ m	$ m	$ m
Gross profit	**25,584**	**2,056**	**31**		**56**	**27,727**
Operating income	**7,782**	**2,243**	**675**	**30**	**(400)**	**10,330**
The following are adjustments to arrive at Core Gross Profit						
Cost of goods sold	(9,007)	2,056	31		56	(6,864)
The following are adjustments to arrive at Core Operating Income						
Marketing & Sales	(9,089)				(4)	(9,093)
Research & Development	(7,630)	187	594		(200)	(7,049)
General & Administration	(986)				1	(985)
Other income	1,027		(9)	(2)	(665)	351
Other expense	(1,124)		59	32	412	(621)

(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; Research & Development, Other income and Other expense include reversals and charges related to the impairment of property, plant and equipment.

(3) Acquisition or divestment of businesses and related items, including restructuring and integration charges: Other income includes transitional service-fee income; Other expense includes items related to the portfolio transformation and costs related to an acquisition.

(4) 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; Costs of goods sold, Research & Development, General & Administration, Other income and Other expense include other restructuring income and charges and related items; Marketing & Sales includes an income from the release of a provision; Research & Development includes fair value adjustments to contingent consideration liabilities; Other income and Other expense include legal-related items; Other income also includes a gain from a Swiss pension plan amendment, an income from a settlement of a contract dispute, as well as product and financial asset divestment gains; Other expense also includes a provision for contract termination costs, an amendment to the Swiss Pension Plan, a charge for onerous contracts and other charges.

2016	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment of businesses and related items[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 of businesses and 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 of businesses and related items[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 of businesses and 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.

2017, 2016 AND 2015 RECONCILIATION FROM IFRS TO CORE RESULTS—SANDOZ

2017	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Other items[3]	Core results
	$ m	$ m	$ m	$ m	$ m
Gross profit	**4,415**	**454**	**61**	**69**	**4,999**
Operating income	**1,368**	**454**	**134**	**124**	**2,080**
The following are adjustments to arrive at Core Gross Profit					
Cost of goods sold	(5,800)	454	61	69	(5,216)
The following are adjustments to arrive at Core Operating Income					
Other income	204			(10)	194
Other expense	(351)		73	65	(213)

(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 includes impairment charges related to intangible assets; 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 and other restructuring income and charges and related items; Other income also includes a gain from a Swiss pension plan amendment.

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 of businesses and related items[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 of businesses and 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.

2017, 2016 AND 2015 RECONCILIATION OF IFRS RESULTS TO CORE RESULTS—ALCON

2017	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Other items[3]	Core results
	$ m	$ m	$ m	$ m	$ m
Gross profit	**2,799**	**891**			**3,690**
Operating loss/income	**(190)**	**901**	**86**	**60**	**857**
The following are adjustments to arrive at Core Gross Profit					
Cost of goods sold	(3,231)	891			(2,340)
The following are adjustments to arrive at Core Operating Income					
Research & Development	(568)	10	86	(18)	(490)
Other income	47			(17)	30
Other expense	(124)			95	(29)

(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 and financial assets.

(3) Other items: Research & Development includes fair value adjustments to contingent consideration liabilities; Other income and Other expense include restructuring income and charges and related items; Other income also includes a gain from a Swiss pension plan amendment and the partial reversal of a prior period charge; Other expense also includes legal-related items.

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.

2017, 2016 AND 2015 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS—CORPORATE

2017	IFRS results	Impairments[1]	Acquisition or divestment of businesses and related items[2]	Other items[3]	Core results
	$ m	$ m	$ m	$ m	$ m
Gross profit	**162**				**162**
Operating loss	**(331)**	**197**	**15**	**(298)**	**(417)**
The following are adjustments to arrive at Core Operating Loss					
Other income	691		(115)	(373)	203
Other expense	(732)	197	130	75	(330)

(1) Impairments: Other expense includes impairment charges related to financial assets.

(2) Acquisition or divestment of businesses and 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: Other income includes a fair value adjustment to contingent consideration sales milestone receivables, a Swiss pension plan amendment and other items; Other income and Other expense include restructuring income and charges and related items; Other expense also includes an amendment to the Swiss Pension Plan.

2016	IFRS results	Impairments[1]	Acquisition or divestment of businesses and related items[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 of businesses and 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 of businesses and related items[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 of businesses and 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.

2015 RECONCILIATION FROM IFRS RESULTS TO CORE RESULTS—GROUP DISCONTINUED OPERATIONS

2015	IFRS results	Impairments[1]	Acquisition or divestment of businesses and related items[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 of businesses and 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.

5.B Liquidity and Capital Resources

The following tables summarize the Group's cash flow and net debt.

	2017	2016	2015
	$ m	$ m	$ m
Cash flows from operating activities from continuing operations	12,621	11,475	12,085
Cash flows used in investing activities from continuing operations	(2,979)	(2,693)	(19,666)
Cash flows used in/from operating and investing activities from discontinued operations	(140)	(748)	8,694
Cash flows used in financing activities	(7,733)	(5,314)	(9,176)
Effect of exchange rate changes on cash and cash equivalents	84	(387)	(286)
Net change in cash and cash equivalents	**1,853**	**2,333**	**(8,349)**
Change in marketable securities, commodities, time deposits and derivative financial instruments	(145)	(3)	(66)
Change in current and non-current financial debts and derivative financial instruments	(4,730)	(1,871)	(1,520)
Change in net debt	**(3,022)**	**459**	**(9,935)**
Net debt at January 1	(16,025)	(16,484)	(6,549)
Net debt at December 31	**(19,047)**	**(16,025)**	**(16,484)**

CASH FLOW

Financial year 2017

Cash flows from operating activities amounted to $12.6 billion, compared to $11.5 billion in 2016. The increase of $1.1 billion was mainly driven by favorable working capital changes, lower legal settlement payments out of provisions and lower taxes paid, partly offset by the decrease in net income adjusted for noncash items.

Cash flows used in investing activities from continuing operations amounted to $3.0 billion in 2017. This amount included cash outflows for the purchase of property, plant and equipment of $1.7 billion, for intangible assets of $1.1 billion, for financial assets and other non-current assets of $0.5 billion and for acquisitions and divestments of businesses, net (mainly the Ziarco Group Limited and Encore Vision, Inc. acquisitions) of $0.8 billion. This was partly offset by cash inflows from the sale of property, plant and equipment, intangible assets and financial assets of $1.1 billion.

Cash flows used in investing activities from discontinued operations, which consists of payments out of provisions related to the portfolio transformation transactions, amounted to $0.1 billion, compared to $0.7 billion in 2016, which also included capital gains taxes.

The cash flows used in financing activities amounted to $7.7 billion, compared to $5.3 billion in 2016. The 2017 amount included cash outflows for the dividend payment of $6.5 billion and for net treasury share transactions of $5.2 billion. The net cash inflows from current and non-current financial debts of $4.0 billion were mainly from the issuance of bonds denominated in US dollar and euro for a notional amount of $3.0 billion and EUR 1.85 billion ($2.0 billion), respectively, partially offset by the repayment of current and non-current financial debt of $0.9 billion.

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 Reprixys 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.

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:

	2017	2016	Change
	$ m	$ m	$ m
Current financial debts and derivative financial instruments	(5,308)	(5,905)	597
Non-current financial debts	(23,224)	(17,897)	(5,327)
Total financial debt	**(28,532)**	**(23,802)**	**(4,730)**
Less liquidity			
Cash and cash equivalents	8,860	7,007	1,853
Marketable securities, commodities, time deposits and derivative financial instruments	625	770	(145)
Total liquidity	**9,485**	**7,777**	**1,708**
Net debt at December 31	**(19,047)**	**(16,025)**	**(3,022)**

Financial year 2017

Total financial debt increased by $4.7 billion to $28.5 billion at December 31, 2017, from $23.8 billion at December 31, 2016. Non-current financial debt increased by $5.3 billion to $23.2 billion at December 31, 2017 from $17.9 billion at December 2016, mainly due to the issuance of bonds in the first quarter that are denominated in US dollar and euro for a notional amount of $3.0 billion and EUR 1.85 billion ($2.0 billion), respectively. Group net debt increased to $19.0 billion at the end of 2017 from $16.0 billion at the end of 2016, mainly due to increased borrowings.

Current financial debt decreased by $0.6 billion to $5.3 billion at December 31, 2017, from $5.9 billion at December 31, 2016, mainly due to a reduction in short-term borrowings. Overall current financial debt consists of the current portion of non-current financial debt of $0.4 billion and other short-term borrowings of $4.9 billion, including derivatives and commercial paper.

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 $2.3 billion under these three programs were outstanding as per December 31, 2017. 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, 2017.

The long-term credit rating for the company continues to be double-A (Moody's Aa3; Standard & Poor's AA−; Fitch AA)

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).

The maturity schedule of our net debt is as follows:

	2017					
	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	71	72	105	181	58	487
Commodities					106	106
Derivative financial instruments and accrued interest	7	19	6			32
Cash and cash equivalents	4,260	4,600				8,860
Total current financial assets	**4,338**	**4,691**	**111**	**181**	**164**	**9,485**
Non-current liabilities						
Financial debt				(9,849)	(13,375)	(23,224)
Financial debt—undiscounted				*(9,893)*	*(13,519)*	*(23,412)*
Total non-current financial debt				**(9,849)**	**(13,375)**	**(23,224)**
Current liabilities						
Financial debt	(4,576)	(169)	(456)			(5,201)
Financial debt—undiscounted	*(4,576)*	*(169)*	*(456)*			*(5,201)*
Derivative financial instruments	(31)	(48)	(28)			(107)
Total current financial debt	**(4,607)**	**(217)**	**(484)**			**(5,308)**
Net debt	**(269)**	**4,474**	**(374)**	**(9,668)**	**(13,211)**	**(19,047)**

	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)**

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 % 2017[1]	Liquidity in % 2016[1]	Financial debt in % 2017[2]	Financial debt in % 2016[2]
US dollar ($)	77	77	63	66
Euro (EUR)	8	9	20	13
Swiss franc (CHF)	5	5	11	13
Japanese yen (JPY)	1		4	5
Other	9	9	2	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 operations based on IFRS values for 2017, 2016 and 2015 for currencies most important to the Group:

	2017		2016		2015	
Currency	Net sales	Operating expenses	Net sales	Operating expenses	Net sales	Operating expenses
	%	%	%	%	%	%
US dollar ($)	37	42	38	43	40	42
Euro (EUR)	26	22	26	23	24	23
Swiss franc (CHF)	2	15	2	15	2	13
Japanese yen (JPY)	6	4	7	5	6	4
Chinese yuan (CNY)	4	3	4	3	4	3
British pound (GBP)	2	2	3	2	3	3
Canadian dollar (CAD)	3	1	3	1	3	1
Brazilian real (BRL)	2	1	2	1	2	2
Australian dollar (AUD)	2	1	2	1	2	1
Russian ruble (RUB)	2	1	1	1	1	1
Other currencies	14	8	12	5	13	7

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, 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 was Venezuela, where the Group incurred significant foreign exchange losses in 2015 and 2016.

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. Since November 2016, the Group has applied the floating rate of DICOM (Sistema de Divisa Complementaria) to translate the financial statements of its Venezuelan subsidiaries. This change from the rate applicable for imports of specific goods and services of national priority to the floating rate of DICOM resulted in a $0.3 billion revaluation loss on the outstanding intercompany balances in 2016. The net outstanding intercompany payable balance of Venezuela subsidiaries was not significant at December 31, 2017 and at December 31, 2016, due to reserves against the intercompany balances.

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 2017, 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 14. Trade receivables" and "Note 27. Commitments and contingencies" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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		Change in %	Year-end		Change in %
	2017	2016		2017	2016	
AUD	0.766	0.744	3	0.779	0.722	8
BRL	0.313	0.288	9	0.302	0.307	(2)
CAD	0.771	0.755	2	0.797	0.741	8
CHF	1.016	1.015	0	1.024	0.978	5
CNY	0.148	0.151	(2)	0.154	0.144	7
EUR	1.129	1.107	2	1.195	1.051	14
GBP	1.288	1.355	(5)	1.347	1.227	10
JPY (100)	0.892	0.922	(3)	0.888	0.854	4
RUB (100)	1.715	1.498	14	1.734	1.648	5

$ per unit	Average for year		Change in %	Year-end		Change in %
	2016	2015		2016	2015	
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

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 % 2017	Change in $ % 2017	Percentage point currency impact 2017	Change in constant currencies % 2016	Change in $ % 2016	Percentage point currency impact 2016
Net sales	2	1	(1)	0	(2)	(2)
Operating income	7	4	(3)	(3)	(8)	(5)
Net income	12	15	3	1	(5)	(6)
Core operating income	0	(1)	(1)	(2)	(6)	(4)
Core net income	2	1	(1)	(3)	(6)	(3)

For additional information on the effects of currency fluctuations, see "Note 28. Financial instruments—additional disclosures" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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 assets, other non-current assets 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—Item 5.A Operating Results—Non-IFRS Measures Defined by Novartis—Free Cash Flow" above. The following is a summary of the free cash flow:

	2017	2016	2015
	$ m	$ m	$ m
Operating income from continuing operations	**8,629**	**8,268**	**8,977**
Reversal of non-cash items			
Depreciation, amortization and impairments	6,332	6,175	5,575
Change in provisions and other non-current liabilities	160	956	1,642
Other	(360)	(264)	(96)
Operating income adjusted for non-cash items	**14,761**	**15,135**	**16,098**
Interest and other financial receipts	1,084	942	1,180
Interest and other financial payments	(980)	(878)	(669)
Taxes paid	(1,611)	(2,111)	(2,454)
Payments out of provisions and other net cash movements in non-current liabilities	(877)	(1,536)	(1,207)
Change in inventory and trade receivables less trade payables	(393)	(1,051)	(617)
Change in other net current assets and other operating cash flow items	637	974	(246)
Cash flows from operating activities from continuing operations	**12,621**	**11,475**	**12,085**
Purchase of property, plant & equipment	(1,696)	(1,862)	(2,367)
Proceeds from sales of property, plant & equipment	92	161	237
Purchase of intangible assets	(1,050)	(1,017)	(1,138)
Proceeds from sales of intangible assets	640	847	621
Purchase of financial assets	(468)	(247)	(264)
Proceeds from sales of financial assets	330	247	166
Purchase of other non-current assets	(42)	(149)	(82)
Proceeds from sales of other non-current assets	1		1
Free cash flow from continuing operations	**10,428**	**9,455**	**9,259**
Free cash flow from discontinued operations			(230)
Free cash flow	**10,428**	**9,455**	**9,029**

Financial year 2017

Free cash flow amounted to $10.4 billion (+10% $) compared to $9.5 billion in 2016. The increase was mainly driven by favorable working capital changes, lower legal settlement payments out of provisions and lower taxes paid, partly offset by the decrease in operating income adjusted for non-cash items and higher net investments.

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.

CONDENSED CONSOLIDATED BALANCE SHEETS

	Dec 31, 2017	Dec 31, 2016	Change
	$ m	$ m	$ m
Assets			
Property, plant & equipment	16,464	15,641	823
Goodwill	31,750	30,980	770
Intangible assets other than goodwill	29,997	31,340	(1,343)
Financial and other non-current assets	26,660	27,232	(572)
Total non-current assets	**104,871**	**105,193**	**(322)**
Inventories	6,867	6,255	612
Trade receivables	8,600	8,202	398
Other current assets	3,256	2,697	559
Cash, marketable securities, commodities, time deposits and derivative financial instruments	9,485	7,777	1,708
Total current assets	**28,208**	**24,931**	**3,277**
Total assets	**133,079**	**130,124**	**2,955**
Equity and liabilities			
Total equity	**74,227**	**74,891**	**(664)**
Financial debts	23,224	17,897	5,327
Other non-current liabilities	12,225	15,127	(2,902)
Total non-current liabilities	**35,449**	**33,024**	**2,425**
Trade payables	5,169	4,873	296
Financial debts and derivatives	5,308	5,905	(597)
Other current liabilities	12,926	11,431	1,495
Total current liabilities	**23,403**	**22,209**	**1,194**
Total liabilities	**58,852**	**55,233**	**3,619**
Total equity and liabilities	**133,079**	**130,124**	**2,955**

Total non-current assets of $104.9 billion at December 31, 2017, decreased by $0.3 billion compared to December 31, 2016.

Property, plant and equipment increased by $0.8 billion to $16.5 billion, mainly due to the favorable currency translation adjustments, as net additions were offset by depreciation.

Goodwill increased by $0.8 billion to $31.8 billion, mainly due to $0.7 billion favorable currency translation adjustments.

Intangible assets other than goodwill decreased by $1.3 billion to $30.0 billion, as net additions of $2.4 billion and favorable currency translation adjustments of $0.7 billion were more than offset by amortization and impairment charges totaling $4.4 billion.

Financial and other non-current assets decreased by $0.6 billion to $26.7 billion, as a decrease in the deferred tax assets of $1.8 billion was partly offset by an increase of $1.1 billion in the investments in associated companies, mainly due to favorable currency translation adjustments.

Total current assets increased by $3.3 billion to $28.2 billion at December 31, 2017, due to an increase in cash and cash equivalents, marketable securities, commodities and derivatives of $1.7 billion. Inventories and other current assets increased by $0.6 billion each, and trade receivables by $0.4 billion.

Based on our current incurred loss provisioning approach, we consider that our provisions for doubtful trade receivables are adequate. We continue to monitor the level of trade receivables particularly in Greece, Italy, Portugal, Spain, Brazil, Russia, Saudi Arabia and Turkey. Should there be a substantial deterioration in our economic exposure with respect to those countries, we 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, Brazil and Turkey, which are due from private entities. The gross trade receivables from these countries at December 31, 2017 amount to $1.7 billion (2016: $1.7 billion), of which $124 million are past due for more than one year (2016: $82 million), and for which provisions of $95 million have been recorded (2016: $63 million). At December 31, 2017, amounts past due for more than one year are not significant in any of these countries.

The following table provides an overview of the aging analysis of total trade receivables and the total amount of the provision for doubtful trade receivables as of December 31, 2017 and 2016:

	2017	2016
	$ m	$ m
Not overdue	7,758	7,386
Past due for not more than one month	279	262
Past due for more than one month but less than three months	230	223
Past due for more than three months but less than six months	137	185
Past due for more than six months but less than one year	137	145
Past due for more than one year	249	163
Provisions for doubtful trade receivables	(190)	(162)
Total trade receivables, net	**8,600**	**8,202**

There is also a risk that certain countries could devalue their currency. Currency exposures are described in more detail, "—Effects of Currency Fluctuations" above.

Trade payables increased by $0.3 billion to $5.2 billion, and other current liabilities increased by $1.5 billion to $12.9 billion.

Current income tax liabilities increased by $0.1 billion to $1.7 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 amounts related to uncertain tax positions, are appropriate based on currently known facts and circumstances.

In our key countries, Switzerland and the United States, assessments have been agreed by the tax authorities up to 2014 in Switzerland and up to 2012 in the United States, with the exception of one open United States position related to the 2007 tax filing and one for the 2010 tax filing.

Other non-current liabilities which include deferred tax liabilities, provisions and other non-current liabilities decreased by $2.9 billion to $12.2 billion at December 31, 2017, mainly due to a reduction of the pension obligations of $1.3 billion resulting from actuarial gains and a change in the accounting for a component of the Swiss pension plan from defined benefit to defined contribution plan.

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 $0.7 billion to $74.2 billion at December 31, 2017, compared to $74.9 billion at December 31, 2016. The decrease was mainly on account of $6.5 billion for the dividend payment and net treasury share purchases of $5.3 billion. These amounts resulting from transactions with shareholders were partially offset by net income of $7.7 billion, favorable currency translation differences of $2.2 billion, net actuarial gains from defined benefit plans of $0.9 billion, and equity-based compensation of $0.6 billion.

The Group's liquidity amounted to $9.5 billion at December 31, 2017, compared to $7.8 billion at December 31, 2016, and net debt increased to $19.0 billion at December 31, 2017, compared to $16.0 billion at December 31, 2016. The debt/equity ratio increased to 0.38:1 at December 31, 2017, compared to 0.32:1 at December 31, 2016.

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		
	2017	2016	Change	2017	2016	Change
				$ m	$ m	$ m
Balance at beginning of year	**2,374.1**	**2,373.9**	**0.2**	**74,832**	**77,046**	**(2,214)**
Shares acquired to be canceled	(66.2)	(10.3)	(55.9)	(5,270)	(784)	(4,486)
Other share purchases	(3.8)	(2.6)	(1.2)	(304)	(208)	(96)
Exercise of options and employee transactions	4.6	4.1	0.5	255	214	41
Equity-based compensation	8.8	9.0	(0.2)	612	664	(52)
Dividends				(6,495)	(6,475)	(20)
Net income of the year attributable to shareholders of Novartis AG				7,703	6,712	991
Impact of change in ownership of consolidated entities					(7)	7
Other comprehensive income attributable to shareholders of Novartis AG				2,835	(2,330)	5,165
Balance at end of year	**2,317.5**	**2,374.1**	**(56.6)**	**74,168**	**74,832**	**(664)**

During 2017, 13.4 million treasury shares for $0.9 billion were delivered as a result of options being exercised and physical share deliveries related to equity-based participation plans (2016: 13.1 million shares for $0.9 billion). Novartis repurchased in total 66.2 million shares for $5.3 billion on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback authority approved at the 2016 Annual General Meeting (AGM) (2016: 10.3 million shares for $0.8 billion). This included 56.4 million shares bought for $4.5 billion under the up-to $5.0 billion share buyback announced in January 2017, and 9.8 million shares bought for $0.8 billion to offset the dilutive impact from equity-based participation plans (2016: 10.3 million shares for $0.8 billion). In addition, 3.8 million shares for $0.3 billion were acquired from employees, which were previously granted to them under the respective programs (2016: 2.6 million for $0.2 billion). No shares were repurchased on the SIX Swiss Exchange first trading line in 2017 and 2016. With these transactions, the total number of shares outstanding decreased by 56.6 million shares in 2017 (2016: increase of 0.2 million shares).

Treasury shares

At December 31, 2017, our holding of treasury shares amounted to 299.4 million shares or approximately 10% of the total number of issued shares. Approximately 131 million treasury shares are held in entities that limit their availability for use.

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.

Bonds

In February 2017, three US dollar bonds totaling $3.0 billion were issued; a 3-year bond of $1.0 billion with a coupon of 1.80%, a 5-year bond of $1.0 billion with a coupon of 2.40% and a 10-year bond of $1.0 billion with a coupon of 3.10%.

In March 2017, two EUR bonds totaling EUR 1.85 billion were issued; a 4-year bond of EUR 1.25 billion with a coupon of 0% and a 10-year bond of EUR 0.6 billion with a coupon of 1.125%.

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.

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 any significant demands to change the 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 2016 and 2017), 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.

The maturity schedule of our net debt can be found in "Note 28. Financial instruments—additional disclosures" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

5.C Research & Development, Patents and Licenses

Our R&D spending for continuing operations totaled $9.0 billion, $9.0 billion and $8.9 billion ($8.1 billion, $8.5 billion and $8.9 billion excluding impairments and amortization charges) for the years 2017, 2016 and 2015, 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—Item 4.B Business Overview."

5.D Trend Information

Please see "—Item 5.A Operating Results—Factors Affecting Results of Operations" and "Item 4. Information on the Company—Item 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 27. Commitments and contingencies" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, and matters described in "—Item 5.F Tabular Disclosure of 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	23,583	359	5,170	4,679	13,375
Interest on non-current financial debt, including current portion	6,244	620	977	788	3,859
Operating leases	3,169	309	384	255	2,221
Unfunded pensions and other post-employment benefit plans	2,179	121	249	257	1,552
Research & Development potential milestone commitments	4,306	780	1,535	1,154	837
Property, plant & equipment purchase commitments	318	247	71		
Acquisition of business and intangible asset commitments[1]	4,000	4,000			
Total contractual cash obligations	**43,799**	**6,436**	**8,386**	**7,133**	**21,844**

(1) For acquisition of business commitments, please refer to "Note 2. Significant transactions" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

The Group intends to fund the Research & Development, Property, plant & equipment and intangible asset purchase commitments with internally generated resources. The Group intends to fund the acquisition of business ($3.9 billion) mainly through external short- and long-term debt.

For other contingencies, see "Item 4. Information on the Company—Item 4.D Property, Plants and Equipment—Environmental Matters", "Item 8. Financial Information—Item 8.A Consolidated Statements and Other Financial Information" and "Note 19. Provisions and other non-current liabilities" and "Note 27. Commitments and contingencies" in the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

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 102 to 105, and "Corporate Governance—Our management—Executive Committee" on pages 108 to 110, in each case of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, is incorporated by reference.

6.B Compensation

The information set forth under "Compensation Report" on pages 118 to 152 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, is incorporated by reference.

6.C Board Practices

The information set forth under "Corporate governance" on pages 82 to 101, on pages 106 to 107, and on pages 111 to 115, in each case of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, 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, 2017 (full-time equivalents)	Marketing & Sales	Production & Supply	Research & Development	NBS[1]	General & Administration	Total
USA	6,563	7,095	6,803	1,680	726	22,867
Canada and Latin America	4,477	1,305	557	900	471	7,710
Europe	18,665	20,412	10,173	4,903	2,469	56,622
Asia/Africa/Australasia	19,005	6,970	3,883	3,386	1,154	34,398
Total	**48,710**	**35,782**	**21,416**	**10,869**	**4,820**	**121,597**

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**

(1) NBS relates to full-time equivalent employees from our Novartis Business Services organizational unit.

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 Directors and the members of our Executive Committee in 2017 (including persons closely linked to them) as of December 31, 2017 was 1,592,335 shares. This excludes certain unvested equity rights (such as Restricted Share Units, Performance Share Units and similar instruments) but includes unvested Restricted Shares because our unvested Restricted Shares can be voted. With respect to any Directors and members of our Executive Committee who stepped down during 2017 this information is reported as of the date they stepped down.

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 Directors, see the information set forth under "Compensation Report—2017 Executive Committee Compensation—Additional disclosures—Shares, ADRs and other equity rights owned by Executive Committee members at December 31, 2017" on page 141, and under "Compensation Report—2017 Board Compensation—Additional disclosures—Shares, ADRs and share options owned by Board members" on page 150, in each case of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, which is incorporated by reference. For more information on our equity based participation plans, see the information set forth under "Note 25. Equity-based participation plans for associates" on pages 237 to 239 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, 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, 2017, Novartis had approximately 167,000 shareholders listed in the Novartis AG share register, representing approximately 69.9% of issued shares. Based on the Novartis AG share register and excluding treasury shares, approximately 42.6% of the shares registered by name were held in Switzerland and approximately 25.8% were held in the US. Approximately 13.4% of the shares registered in our share register were held by individual investors, while approximately 86.6% were held by legal entities (excluding 6.4% of our share capital held as treasury shares by Novartis AG and its subsidiaries), 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.

2017

According to our share register, as of December 31, 2017, excluding 6.4% of our share capital held as treasury shares by Novartis AG and its subsidiaries, 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 all their Novartis shares based on an exemption granted by the Board of Directors:

- Shareholders: Novartis Foundation for Employee Participation, with its registered office in Basel, Switzerland, holding 2.5%; 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 2.0%;
- Nominees: Chase Nominees Ltd., London, England (holding 7.8%); Nortrust Nominees Ltd., London, England (holding 3.8%); and The Bank of New York Mellon, New York, NY (holding 4.3%) through its nominees, The Bank of New York Mellon, Everett, MA (holding 2.0%), and The Bank of New York Mellon, SA/NV, Brussels, Belgium (holding 2.3%); and
- ADS depositary: JPMorgan Chase Bank, N.A., New York, NY (holding 12.3%).

According to a disclosure notification filed with Novartis AG, Norges Bank (Central Bank of Norway), Oslo, Norway, held 2.1% of the share capital of Novartis AG as of December 31, 2017, with the right to vote all its Novartis shares, but was not registered in our share register as of December 31, 2017.

According to a disclosure notification filed with Novartis AG and the SIX Swiss Exchange, BlackRock, Inc., New York, NY, held between 3% and 5% of the share capital of Novartis AG but was registered with less than 2% of the share capital in our share register as of December 31, 2017.

As of December 31, 2017, no other shareholder was registered as owner of more than 2% of the registered share capital.

The Articles of Incorporation provide that no shareholder shall be registered with the right to vote shares comprising more than 2% of the registered share capital. The Board of Directors 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. Exemptions are in force for the registered major shareholders as described above. Novartis has not entered into any agreement with any shareholder regarding the voting or holding of Novartis shares.

2016

According to our share register, as of December 31, 2016, excluding 4.5% of our share capital held as treasury shares by Novartis AG and its subsidiaries, 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, with the right to vote all its Novartis shares, but was not registered in our share register 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 our share register, as of December 31, 2015, excluding 6.2% of our share capital held as treasury shares by Novartis AG and its subsidiaries, 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.

7.B Related Party Transactions

The information set forth under "Note 26. Transactions with related parties" on pages 240 to 241 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, 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 2.80 per share to the shareholders for approval at the Annual General Meeting to be held on March 2, 2018. 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—Item 3.A Selected Financial Data—Cash Dividends per Share." See also "Item 3. Key Information—Item 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 2017, 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 2017, 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				
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
2017	85.15	69.55	86.65	70.03
Quarterly information for the past two years				
2017				
First Quarter	78.75	69.55	78.17	70.03
Second Quarter	83.80	72.90	86.34	72.74
Third Quarter	83.85	78.80	86.23	81.97
Fourth Quarter	85.15	80.50	86.65	80.72
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
Monthly information for most recent six months				
August 2017	82.75	79.20	85.34	82.74
September 2017	83.85	80.05	86.23	83.80
October 2017	85.15	80.50	86.65	80.72
November 2017	84.20	81.65	85.80	82.38
December 2017	84.10	81.85	86.05	82.88
January 2018 (through January 18, 2018)	84.96	82.90	86.88	84.68

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 2017, 2016 and 2015 were 5,123,108, 6,102,338, and 5,870,874, 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 2017, 2016 and 2015 were 2,189,574, 2,264,606, and 1,787,735, respectively.

The Depositary has informed us that as of January 18, 2018, there were 320,485,732 ADRs outstanding, each representing one Novartis share (approximately 12% of total Novartis shares issued). On January 18, 2018, the closing sales price per share on the SIX was CHF 82.90 and $86.41 per ADR on the NYSE.

9.B Plan of Distribution

Not applicable.

9.C Markets

See "—Item 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—Item 3.A. Selected Financial Data—Cash Dividends per Share" and "Item 8. Financial Information—Item 8.A. Consolidated 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.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.

Except as noted in the paragraph immediately below, shareholders' resolutions 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 such resolutions. Some examples of shareholders' resolutions requiring a vote by such "absolute majority of the votes" are (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 are required 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, N.A., 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, N.A., 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 the 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. The definition of subsidiaries, and therefore, treasury shares, for purposes of the above described reserves requirement and voting restrictions differs from the definition of subsidiaries for purposes of consolidation in our consolidated financial statements. The definition in the consolidated financial statements requires consolidation for financial reporting purposes of special purpose entities 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. Therefore our consolidated financial statements include special purpose entities, mainly foundations, which do not qualify as subsidiaries subject to the reserve requirements and voting restrictions of the Swiss CO, because we do not hold a majority participation in these special purpose entities. Accordingly, no reserve requirements apply to shares held by such special purpose entities and such entities are not restricted from independently voting their shares.

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 "—Item 10.B.3(b) Shareholder Rights" and "—Item 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 two-thirds of the 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) Shareholder Rights" 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 SIX Swiss Exchange.

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

Not applicable.

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, 2018, 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	Serbia
Algeria	France	Liechtenstein	Singapore
Argentina	Germany	Lithuania	Slovak Republic
Armenia	Georgia	Luxembourg	Slovenia
Australia	Ghana	Macedonia	South Africa
Austria	Greece	Malaysia	Spain
Azerbaijan	Hong Kong	Malta	Sri Lanka
Bahrain	Hungary	Mexico	Sweden
Bangladesh	Iceland	Moldova	Taiwan
Belarus	India	Mongolia	Tajikistan
Belgium	Indonesia	Montenegro	Thailand
Bulgaria	Iran	Morocco	Trinidad and Tobago
Canada	Israel	Netherlands	Tunisia
Chile	Italy	New Zealand	Turkey
China	Ivory Coast	Norway	Turkmenistan
Colombia	Republic of Ireland	Oman	Ukraine
Croatia	Jamaica	Pakistan	United Arab Emirates
Cyprus	Japan	Peru	United Kingdom
Czech Republic	Kazakhstan	Philippines	United States of America
Denmark	Republic of Korea	Poland	Uruguay
Ecuador	(South Korea)	Portugal	Uzbekistan
Egypt	Kuwait	Qatar	Venezuela
Estonia	Kyrgyzstan	Romania	Vietnam
		Russia	

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, Ethiopia, Kosovo, Libya, North Korea, Saudi Arabia, Senegal, Syria, Zambia 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 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, but may be subject to other limitations and each US Holder is urged to consult its own tax advisor.

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% (or 20% in the case of taxpayers with annual income which exceeds certain thresholds) 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 the amount by which modified adjusted gross income exceeds a statutory threshold amount based on filing status. We currently believe that dividends paid with respect to our shares and ADRs will constitute qualified dividend income for US federal income tax purposes. 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 a non-corporate US Holder, any long term capital gain generally will be subject to US federal income tax at preferential rates, with a maximum rate of 15% (or 20% in the case of taxpayers with annual income which exceeds certain thresholds). 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 the amount by which modified adjusted gross income exceeds a statutory threshold amount based on filing status. 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 US Internal Revenue Service (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 28. Financial instruments—additional disclosures" on pages 243 to 251 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, 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, N.A. (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, 2017 (the "Agreement"), JPMorgan, as our ADS depositary, has agreed to make an annual contribution payment to Novartis at the end of each twelve month period beginning on the effective date of the Agreement and on each subsequent anniversary of the effective date of the Agreement (each such twelve month period is a "Contract Year"). This annual contribution payment will equal: (a)(1) $1.7 million less (a)(2) the custody costs, fees and expenses (including, without limitation any central securities depository fees, charges and expenses) incurred during the applicable Contract Year (the items in (a)(2) collectively are the "Custody Costs") plus (b) 70% of the gross issuance and cancellation fees collected by JPMorgan under the Deposit Agreement during such Contract Year minus (c) that portion (if any) of JPMorgan's legal fees, charges and out of pocket expenses in excess of $50,000 for such Contract Year. To the extent that the Custody Costs for a Contract Year exceed $1.7 million, these costs would be capped at $1.7 million.

JPMorgan has further agreed to waive the $0.05 per ADS issuance fees that would normally be owed by Novartis in connection with our deposits of shares as part of our employee stock ownership and employee participation plans. Novartis is responsible for reimbursing JPMorgan for all taxes and governmental charges required to have been withheld and/or paid, and not so withheld and/or paid, arising from such waived fees.

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, 2017. 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, 2017, 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 Ethical Conduct Requirements that impose 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

We recently added a provision to our Ethical Conduct Requirements requiring those subject to the Ethical Conduct Requirements to cause Novartis to achieve responsible use of, and control over, all assets and resources entrusted to them, and not use Novartis funds, assets or information to pursue personal opportunities or gain or for any unlawful purpose.

Item 16C. Principal Accountant Fees and Services

The information set forth under "Corporate governance—Our independent external auditors" on pages 111 to 112 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, 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

2017	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 $ (e)[3]
				(CHF millions)	($ millions)
Jan. 1–31	2,317,997	71.52	1,020,000	9,160	9,206
Feb. 1–28	8,422,133	75.11	8,250,000	8,539	8,481
Mar. 1–31	9,859,489	75.00	9,630,000	7,816	7,805
Apr. 1–30	8,841,706	74.39	8,730,000	7,166	7,211
May 1–31	7,509,734	79.72	7,260,000	6,595	6,762
Jun. 1–30	6,726,281	82.41	6,510,000	6,075	6,343
Jul. 1–31	5,898,273	83.54	5,760,000	5,613	5,805
Aug. 1–31	5,496,108	83.75	5,370,000	5,180	5,375
Sep. 1–30	4,504,136	85.16	4,260,000	4,831	4,980
Oct. 1–31	3,560,482	85.05	3,280,000	4,557	4,579
Nov. 1–30	3,626,865	83.78	3,300,000	4,283	4,347
Dec. 1–31	3,272,514	84.40	2,850,000	4,045	4,141
Total	**70,035,718**	**79.50**	**66,220,000**		

(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 25. Equity based participation plans for associates" on pages 237 to 239 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, 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 85 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, 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 113 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, 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 186;

"Consolidated statements of comprehensive income" on page 187;

"Consolidated balance sheets" on page 188;

"Consolidated statements of changes in equity" on page 189;

"Consolidated cash flow statements" on page 190; and

"Notes to the Novartis Group consolidated financial statements" on pages 191 to 254,

in each case of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018, is incorporated by reference.

Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors of Novartis AG, Basel

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Novartis AG and its consolidated subsidiaries (Group or Company) as of December 31, 2017 and December 31, 2016, and the related consolidated income statements, consolidated statements of comprehensive income, consolidated statements of changes in equity, and consolidated cash flow statements for each of the three years in the period ended December 31, 2017, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control—Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and December 31, 2016, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2017 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, 2017, based on criteria established in *Internal Control—Integrated Framework* (2013) issued by the COSO.

Basis for Opinions

The Novartis' Board of Directors and management of the Group are responsible for these consolidated 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 the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. 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.

Definition and Limitations of Internal Control over Financial Reporting

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/ MARTIN KENNARD	/s/ STEPHEN JOHNSON
Martin Kennard *Audit expert* *Auditor in charge*	Stephen Johnson *Global relationship partner*

Basel, January 23, 2018

PwC has served as the Company's auditor since 1996. PwC or its predecessors audited certain of the Company's predecessor entities since at least 1940.

Item 19. Exhibits

1.1 Articles of Incorporation of Novartis AG, as amended February 28, 2017 (English translation).

1.2 Regulations of the Board of Directors, its Committees and the Executive Committee of Novartis AG, as amended in relevant part January 1, 2014, March 1, 2015, and January 1, 2018.

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 3, 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 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 210 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.

8.1	A list of all of our principal Group subsidiaries and associated companies is incorporated by reference to "Note 31. Principal Group subsidiaries and associated companies" on pages 253 to 254 of the "Excerpts from Novartis Annual Report 2017" furnished to the SEC on Form 6-K on January 24, 2018.
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), on Post-Effective Amendment No. 1 to Form S-8 filed on March 15, 2017 (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 2017 (incorporated by reference to Exhibit 99.1 to Form 6-K as furnished to the SEC on January 24, 2018).
101.INS	XBRL Instance Document (incorporated by reference to Exhibit 101 to Form 6-K as furnished to the SEC on January 24, 2018).
101.SCH	XBRL Taxonomy Extension Schema Document (incorporated by reference to Exhibit 101 to Form 6-K as furnished to the SEC on January 24, 2018).
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document (incorporated by reference to Exhibit 101 to Form 6-K as furnished to the SEC on January 24, 2018).
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document (incorporated by reference to Exhibit 101 to Form 6-K as furnished to the SEC on January 24, 2018).
101.LAB	XBRL Taxonomy Extension Label Linkbase Document (incorporated by reference to Exhibit 101 to Form 6-K as furnished to the SEC on January 24, 2018).
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document (incorporated by reference to Exhibit 101 to Form 6-K as furnished to the SEC on January 24, 2018).

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 24, 2018

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 24, 2018
(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 2017
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

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 24, 2018

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 2017

NOVARTIS

Corporate governance

Contents

Dear shareholder,

2017 was an important and successful year for our company and our Board. We made good progress in pursuing our mission, managed the selection of the new CEO, reinforced the Board's membership, increased our strategic focus on digital technology, accelerated our corporate culture change, and further improved our corporate governance.

Progress in pursuing our mission

At a time of big geopolitical uncertainties and increasing regulatory, pricing and enforcement pressure, we achieved a solid business performance, launched important new products, and made further efficiency gains.

Strong and diverse Board

We have a strong, diverse and independent Board. A key to our achievements is the excellent collaboration between our Board and our CEO and his Executive Committee.

The diversity of our Board was further strengthened when Ton Buechner and Liz Doherty joined in February 2016, and Frans van Houten in February 2017, reinforcing our expertise in finance and accounting, in digital health solutions, as well as in leadership and management. With their arrival, we have substantially refreshed our Board. Two-thirds of our members have a tenure of less than six years, balancing the benefits of continuity and experience with new perspectives.

We appointed new members of the Audit and Compliance Committee; the Risk Committee; and the Governance, Nomination and Corporate Responsibilities Committee, benefiting from the experience and knowledge of new Board members.

At the 2018 Annual General Meeting (AGM), Pierre Landolt will leave our Board, having reached the statutory retirement age of 70. I would like to thank Pierre for his many contributions over the years, including his chairmanship of the Governance, Nomination and Corporate Responsibilities Committee. During his chairmanship, the committee extended its mandate to also cover corporate responsibility, and Pierre was instrumental in driving the Novartis corporate responsibility strategy as well as the Board's oversight of the many corporate responsibility programs at Novartis.

At the end of 2017, we initiated a performance and effectiveness evaluation of the Board's work by an independent expert. The outcome is encouraging. We have made significant progress over the last few years in our efforts to continuously improve our performance.

CEO succession

One of the most important tasks of a Board is selecting the right CEO. After Joe Jimenez informed us that he was considering stepping down, we conducted a thorough evaluation of internal and external candidates with the help of an executive search firm, building on our CEO succession plan. We concluded that Vas Narasimhan is the right choice to build on Joe's heritage and lead Novartis in our next growth phase. It is a phase that we expect will be characterized by new technologies that transform science, our business, and our interactions with people and societies. Vas will take the helm from Joe on February 1, 2018, completing a smooth transition facilitated by the strong leadership team that Joe built. I sincerely thank Joe for his dedication to our company and for his achievements, which span a period of 10 years.

Strategy and culture

Other key areas for our Board are the strategy and culture of Novartis. During our strategy retreat in August, one of the conclusions was that we should strengthen our strategic focus on digital technologies to improve how we use data in drug discovery and development; how we engage with patients, doctors and other stakeholders; and how we automate business processes. Our Chief Digital Officer, a newly created role, will lead the companywide implementation of our digital strategy.

In 2017, we also accelerated our corporate culture change. The Executive Committee took action to further improve collaboration, reduce bureaucracy, speed up decision-making, support smart risk-taking, increase empowerment and trust throughout the organization, and reinforce our interactions with the external world and society at large.

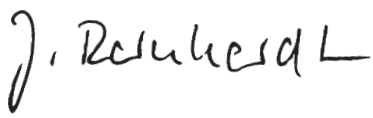
Auditor rotation

In 2017, we discussed the question of changing our long-standing auditor. While the Board is open to a change in the foreseeable future, we concluded that it is in the best interest of Novartis, our investors and other stakeholders to continue with our current auditor. We will, of course, continue with the yearly assessments of PricewaterhouseCoopers' effectiveness and independence, and with the regular rotation of the audit partner in charge. The matter remains high on our agenda and will be continuously reassessed.

Shareholder engagement

Let me end by addressing our engagement with you, our shareholders. As you know, shareholder engagement is an important aspect of our corporate governance framework. Although I believe our engagement program has in many instances aligned the views of the Board with those of our shareholders, we recognize that a significant number of you did not support at our 2017 AGM the advisory vote on the 2016 Compensation Report. As a result, we have intensified our engagement with you and we are confident that we can further align our views. I encourage you to actively participate and share your perspectives.

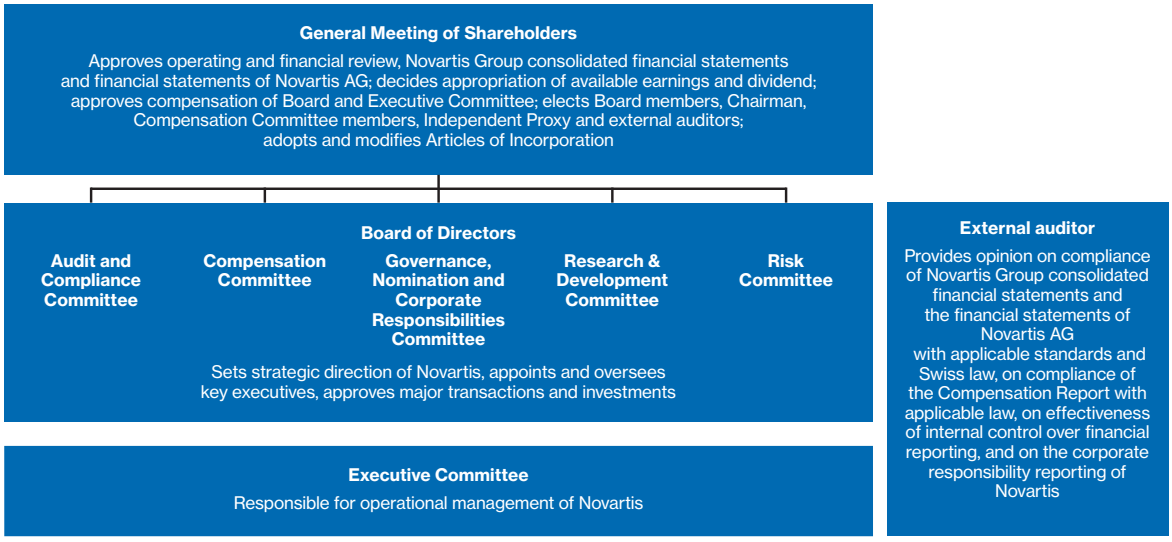
While we achieved quite a lot in 2017, I believe there is more work to be done. Our Board and our Executive Committee must continue to sharpen our strategy, strengthen our corporate culture, and accelerate the evolution of our business model. I am very confident that with your support, we will continue to make progress.



Joerg Reinhardt
Chairman of the Board of Directors

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 102) 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 118.

Our shares and our shareholders

Our shares

Share capital of Novartis AG

As of December 31, 2017, the share capital of Novartis AG is CHF 1 308 422 410 fully paid-in and divided into 2 616 844 820 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, N.A., New York – holds the Novartis shares underlying the ADRs and 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 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. In 2017, Novartis AG reduced its share capital by CHF 5.1 million (from CHF 1 313 557 410 to CHF 1 308 422 410) by canceling 10.3 million Novartis shares repurchased on the second trading line during 2016.

Capital changes

	Number of shares			
Year	As of Jan 1	Changes in shares	As of Dec 31	Changes in CHF
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
2017	2 627 114 820	– 10 270 000	2 616 844 820	– 5 135 000

A table with additional information on changes in the Novartis AG share capital can be found in Note 7 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 (or 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

In 2015, Novartis repurchased under the sixth share repurchase program 49 878 180 Novartis shares at an average price of CHF 93.24 per Novartis share, and canceled them in 2016. With those repurchases, the sixth share repurchase program was completed.

At the 2016 AGM, 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, and canceled in 2017. In 2017, a total of 66 220 000 Novartis shares were repurchased at an average price of CHF 78.34 per Novartis share. The Board will propose the cancellation of the Novartis shares repurchased in 2017 to its shareholders at the AGM 2018.

Share developments

SHARE DEVELOPMENTS IN 2017

- Swiss-listed Novartis shares increased 11.2% to CHF 82.40
- ADRs increased 15.3% to USD 83.96

Novartis shares finished at CHF 82.40, an increase of 11.2% from the 2016 year-end closing price of CHF 74.10. Novartis ADRs increased in 2017 by 15.3% to USD 83.96 from USD 72.84. The Swiss Market Index (SMI), in comparison, increased by 14.1% in 2017, whereas the world pharmaceutical index (MSCI) increased by 10.8% during the year. Total shareholder return for Novartis shares in 2017 was + 15.2% in CHF and + 20.4% in USD, including an increased dividend. Over a longer-term period, Novartis AG has consistently delivered a solid performance, providing a 9.2% compounded annual total shareholder return between January 1, 1996 and December 31, 2017, exceeding the 9.0% compounded returns of its large pharmaceutical peers, or the returns of 8.5% of the world pharmaceutical index (MSCI).

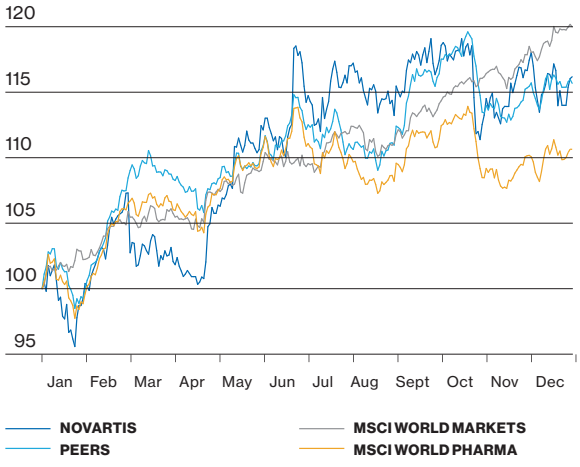
The market capitalization of Novartis AG based on the number of Novartis shares outstanding (excluding Novartis treasury shares) amounted to USD 195.5 billion as of December 31, 2017, compared to USD 172 billion as of December 31, 2016.

CONTINUOUSLY RISING DIVIDEND SINCE 1996

The Board proposes a 2% increase in the dividend payment for 2017 to CHF 2.80 per Novartis share (2016: CHF 2.75) for approval at the AGM on March 2, 2018. This represents the 21st consecutive increase in the dividend paid per share since the creation of Novartis AG in December 1996. If the 2017 dividend proposal is approved by shareholders, dividends to be paid out will total approximately USD 6.7 billion (2016: USD 6.5 billion). This will result in an expected payout ratio of 87% of net income attributable to shareholders of Novartis AG (2016: 97%). Based on the 2017 year-end share price of CHF 82.40, the dividend yield will be 3.4% (2016: 3.7%). The dividend payment date has been set for March 8, 2018.

Novartis 2017 share price movement

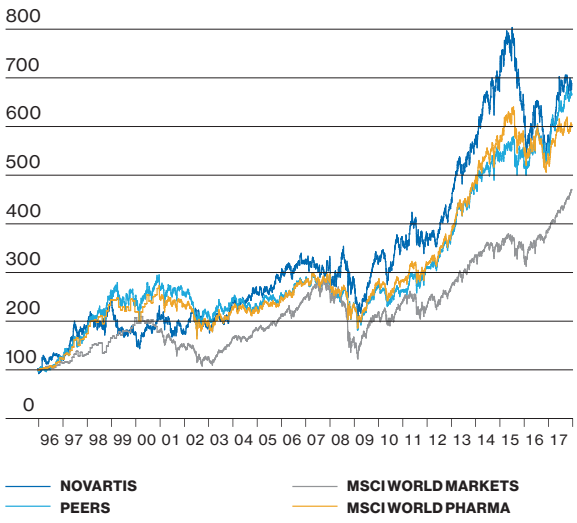
(based on USD amounts)



Source: Bloomberg; data are converted into US dollars and re-based to 100 at January 1, 2017. Currency fluctuations have an influence on the representation of the relative performance of Novartis vs. indices and peers. Peers include Abbott, AbbVie, Amgen, AstraZeneca, BMS, Eli Lilly, GSK, J&J, Merck&Co, Pfizer, Roche, Sanofi.

Novartis 1996–2017 total shareholder return

(based on USD amounts)



Source: Datastream, Bloomberg; 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. Peers include Abbott, AbbVie, Amgen, AstraZeneca, BMS, Eli Lilly, GSK, J&J, Merck&Co, Pfizer, Roche, Sanofi.

Key Novartis share data

	2017	2016	2015
Issued shares	**2 616 844 820**	**2 627 114 820**	**2 676 993 000**
Treasury shares [1]	299 388 321	253 055 807	303 098 183
Outstanding shares at December 31	**2 317 456 499**	**2 374 059 013**	**2 373 894 817**
Weighted average number of shares outstanding	**2 345 783 843**	**2 378 474 555**	**2 402 806 352**

[1] Approximately 131 million treasury shares (2016: 135 million; 2015: 137 million) are held in Novartis entities that restrict their availability for use.

Per-share information[1]

	2017	2016	2015
Basic earnings per share (USD) from continuing operations	3.28	2.82	2.92
Basic earnings per share (USD) from discontinued operations			4.48
Total basic earnings per share (USD)	3.28	2.82	7.40
Diluted earnings per share (USD) from continuing operations	3.25	2.80	2.88
Diluted earnings per share (USD) from discontinued operations			4.41
Total diluted earnings per share	3.25	2.80	7.29
Operating cash flow (USD) from continuing operations	5.38	4.82	5.03
Year-end equity for Novartis AG shareholders (USD)	32.00	31.52	32.46
Dividend (CHF) [2]	2.80	2.75	2.70

[1] Calculated on the weighted average number of shares outstanding, except year-end equity
[2] 2017: proposal to shareholders for approval at the Annual General Meeting on March 2, 2018

Key ratios – December 31

	2017	2016	2015
Price/earnings ratio [1]	25.7	25.7	11.9
Price/earnings ratio from continuing operations [1]	25.7	25.7	30.1
Enterprise value/EBITDA from continuing operations	15	13	16
Dividend yield (%) [1]	3.4	3.7	3.1

[1] Based on the Novartis share price at December 31 of each year

Key data on ADRs issued in the US

	2017	2016	2015
Year-end ADR price (USD)	83.96	72.84	86.04
High [1]	86.65	86.21	106.12
Low [1]	70.03	67.59	83.96
Number of ADRs outstanding [2]	320 833 039	315 349 314	299 578 398

[1] Based on the daily closing prices
[2] The depositary, JPMorgan Chase Bank, N.A., holds one Novartis AG share for every ADR issued.

Share price (CHF)

	2017	2016	2015
Year-end share price	82.40	74.10	86.80
High [1]	85.15	86.45	102.30
Low [1]	69.55	68.15	82.20
Year-end market capitalization (USD billions) [2]	**195.5**	**172.0**	**208.3**
Year-end market capitalization (CHF billions) [2]	**191.0**	**175.9**	**206.1**

[1] Based on the daily closing prices
[2] Market capitalization is calculated based on the number of shares outstanding (excluding treasury shares). Market capitalization in USD is based on the market capitalization in CHF converted at the year-end CHF/USD exchange rate.

Our shareholders

Significant shareholders

According to the Novartis Share Register, as of December 31, 2017, 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 their Novartis shares based on an exemption granted by the Board (see page 90):[1]

- Shareholders: Novartis Foundation for Employee Participation, with its registered office in Basel, holding 2.5%; Emasan AG, with its registered office in Basel, holding 3.4%; and UBS Fund Management (Switzerland) AG, with its registered office in Basel, holding 2.0%
- Nominees: Chase Nominees Ltd., London, holding 7.8%; Nortrust Nominees Ltd., London, holding 3.8%; and The Bank of New York Mellon, New York, holding 4.3% through its nominees, The Bank of New York Mellon, Everett, holding 2.0%, and The Bank of New York Mellon, SA/NV, Brussels, holding 2.3%
- ADS depositary: JPMorgan Chase Bank, N.A., New York, holding 12.3%

According to a disclosure notification filed with Novartis AG, Norges Bank (Central Bank of Norway), Oslo, held 2.1% of the share capital of Novartis AG but was not registered in the Novartis Share Register as of December 31, 2017. According to a disclosure notification filed with Novartis AG and the SIX Swiss Exchange, BlackRock, Inc., New York, held between 3% and 5% of the share capital of Novartis AG but was registered with less than 2% of the share capital as of December 31, 2017 in the Novartis Share Register.

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: https://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.

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 cannot be assumed to represent the entire Novartis AG investor base because nominees and JPMorgan Chase Bank, N.A., as ADS depositary, are registered as shareholders for a large number of beneficial owners.

As of December 31, 2017, Novartis AG had approximately 167 000 registered shareholders.

[1] Excluding 6.4% of the share capital held as treasury shares by Novartis AG and its subsidiaries

Number of shares held

As of December 31, 2017	Number of registered shareholders	% of registered share capital
1–100	24 970	0.06
101–1 000	101 722	1.62
1 001–10 000	36 938	3.93
10 001–100 000	3 244	3.21
100 001–1 000 000	463	5.25
1 000 001–5 000 000	72	5.58
5 000 001 or more [1]	32	50.24
Total registered shareholders/shares	167 441	69.89
Unregistered shares		30.11
Total		**100.00**

[1] Including significant registered shareholders as listed above

Registered shareholders by type

As of December 31, 2017	Shareholders in %	Shares in %
Individual shareholders	96.31	13.36
Legal entities [1]	3.63	35.25
Nominees, fiduciaries and ADS depositary	0.06	51.39
Total	**100.00**	**100.00**

[1] Excluding 6.4% of the share capital held as treasury shares by Novartis AG and its subsidiaries

Registered shareholders by country

As of December 31, 2017	Shareholders in %	Shares in %
Belgium	0.13	3.82
France	2.23	0.38
Germany	5.35	2.13
Japan	0.18	0.71
Switzerland [1]	88.42	42.56
United Kingdom	0.49	22.22
United States	0.34	25.82
Other countries	2.86	2.36
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 6.4% of the share capital held as treasury shares by Novartis AG and its subsidiaries

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 (see in particular articles 17 and 18 of the Articles of Incorporation: www.novartis.com/investors/company-overview/corporate-governance).

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 90).

ADR holders may vote by instructing JPMorgan Chase Bank, N.A., the ADS depositary, to exercise the voting rights attached to the registered Novartis shares underlying the ADRs. JPMorgan Chase Bank, N.A., 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 (e.g. advisory vote on the compensation report) 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 article 18 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), the approval of two-thirds of the votes represented at the meeting is required for:

- Alteration of the purpose of Novartis AG
- Creation of shares with increased voting powers
- Implementation of restrictions on the transfer of registered shares, and the removal of such restrictions
- Authorized or conditional increase of the share capital
- 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
- Restriction or suspension of rights or options to subscribe
- Change of location of the registered office of Novartis AG
- 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) following the recommendations 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 invitations to 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 article 5, paragraph 3 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), 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. Exemptions are in force for the registered significant shareholders listed on page 88 under Our Shareholders – Significant Shareholders, and for Norges Bank (Central Bank of Norway), Oslo, which as of December 31, 2017, was not registered in the share register but according to a disclosure notification filed with Novartis AG, held 2.1% of the share capital of Novartis AG. No further exemptions were requested in 2017.

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 88 under Our Shareholders – Significant Shareholders, and for the nominee Citibank, London, which in 2015 requested an exemption, but as of December 31, 2017, 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 (see article 18 lit. c of the Articles of Incorporation: www.novartis.com/investors/company-overview/corporate-governance).

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, N.A., 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 are either for a fixed term not exceeding one year or for an indefinite period of time with a notice period not exceeding 12 months, and do not contain 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 articles 29-35 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance) and the Compensation Report, beginning on page 118.

Our Board of Directors

Composition of the Board of Directors and its committees (as per December 31, 2017)

[1] P. Landolt will reach the statutory retirement age at the AGM 2018.
[2] D. Azar will step down as member of the Audit and Compliance Committee as per the AGM 2018 and will be replaced by T. Buechner, subject to his re-election.

Election and term of office

Board members, the Chairman, and Compensation Committee members are elected annually and individually as a matter of law by the 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 six 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, enabling the company to benefit from the insight and knowledge that long-serving Board members have developed about the company's operations and practices.

Name	Nationality	Year of birth	First election at AGM
Joerg Reinhardt, Ph.D.	D	1956	2013
Enrico Vanni, Ph.D.	CH	1951	2011
Nancy C. Andrews, M.D., Ph.D.	US	1958	2015
Dimitri Azar, M.D.	US	1959	2012
Ton Buechner	NLD	1965	2016
Srikant Datar, Ph.D.	US	1953	2003
Elizabeth Doherty	GB	1957	2016
Ann Fudge	US	1951	2008
Frans van Houten	NLD	1960	2017
Pierre Landolt, Ph.D.	CH	1947	1996
Andreas von Planta, Ph.D.	CH	1955	2006
Charles L. Sawyers, M.D.	US	1959	2013
William T. Winters	GB/US	1961	2013

Board profile

Board composition

The composition of the Board should align with our status as a listed company as well as our business portfolio, geographic reach and culture. The Board should be diverse in all aspects, as set-out below.

Profile of individual Board members

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 the Executive Committee

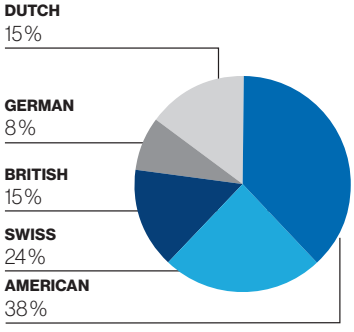
Board members' biographies (pages 102–105) highlight the specific qualifications that led the Board to conclude members are qualified to serve on the Board, which is diverse in terms of background, credentials, interests and skills.

Board diversity

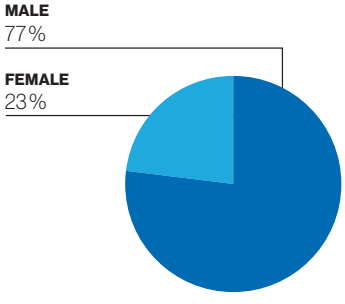
The diversity of a Board is critical to its effectiveness. When the Governance, Nomination and Corporate Responsibilities Committee (GNCRC) of Novartis identifies new Board member candidates to be proposed to shareholders for election, the maintenance and improvement of the Board's diversity is an important 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. Background and experience in the following fields should 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.

Diversity

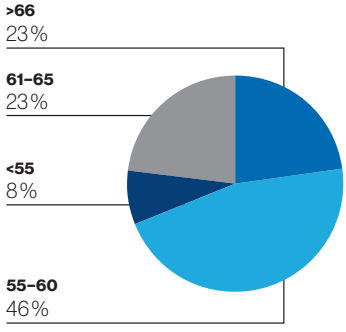
Nationality



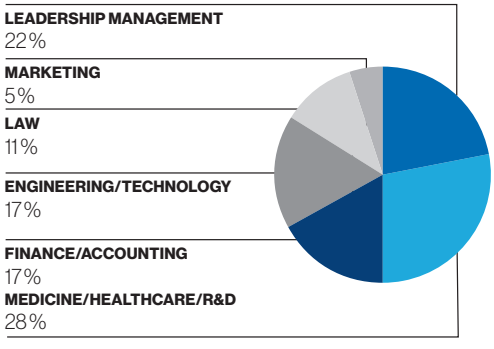
Gender



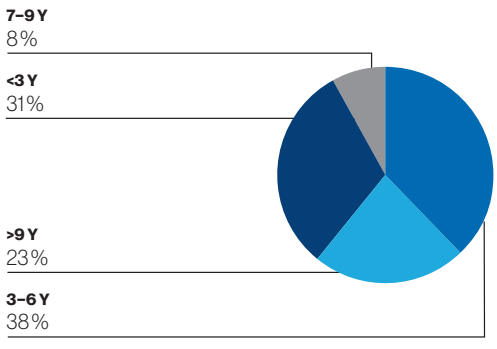
Age



Background/Experience



Tenure



Succession planning

The Chairman, supported by the GNCRC, ensures effective succession plans for the Board, the CEO and the Executive Committee. These plans are discussed by the Board in private meetings without management, and, in a meeting without the Chairman, the succession plan for the Chairman is discussed.

The GNCRC determines the target profile for a new Board member, with the aim of strengthening the overall Board composition to meet knowledge and experience requirements in all essential fields. Factors considered include skills and knowledge; diversity; professional background and expertise; business and other experience relevant to the business of Novartis; the ability and willingness to commit adequate time and effort to Board and committee responsibilities; the extent to which personality, background, expertise, knowledge and experience will help build an effective and complementary Board; and whether existing board memberships or other positions held by a candidate could lead to a potential conflict of interest or an independence issue.

The search for a new Board member is then launched – normally with the support of a professional executive search company – based on the target profile. Candidates are interviewed by the Chairman and other Board members, and evaluated by the GNCRC. The GNCRC then makes a recommendation to the entire Board, and the Board ultimately decides who should be proposed to shareholders for election at the upcoming AGM.

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 of its responsibilities to five committees, as set out on the next pages. In some cases, these responsibilities are of an advisory or preparatory nature (A/P). In other cases, they have been fully delegated to the committee (FD), or the committee has decision-making power that is subject to final Board approval (FBA). 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 2017/ approximate average duration (hrs) of each meeting/ attendance	Documents/ link
Board of Directors		**9/6:00**	
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 transactions and investments of fundamental importance to Novartis and all in excess of USD 500 Mio — 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]**	**9**	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/investors/company-overview/corporate-governance
	Enrico Vanni	9	
	Nancy C. Andrews	9	
	Dimitri Azar	9	
	Ton Buechner	8	
	Srikant Datar	9	
	Elizabeth Doherty	9	
	Ann Fudge	9	
	Frans van Houten[2]	5	
	Pierre Landolt	9	
	Andreas von Planta	9	
	Charles L. Sawyers	9	
	William T. Winters	8	
Audit and Compliance Committee		**7/3:00**	
The primary responsibilities of this committee include: — Supervising external auditors (FD)**, and selecting and nominating external auditors for election by the meeting of shareholders (FBA)*** — Overseeing internal auditors (FD)** — Overseeing accounting policies, financial controls, and compliance with accounting and internal control standards (FD)** — Approving quarterly financial statements and financial results releases (FBA)*** — Overseeing internal control and compliance processes and procedures (FD)** — Overseeing compliance with laws, and external and internal regulations (FD)** The Audit and Compliance Committee has the authority to retain external consultants and other advisors.	**Elizabeth Doherty[1,3]**	**7**	Charter of the Audit and Compliance Committee www.novartis.com/investors/company-overview/corporate-governance
	Dimitri Azar[4]	7	
	Srikant Datar[3]	7	
	Andreas von Planta	7	
	Enrico Vanni	7	
Compensation Committee		**6/2:30**	
The primary responsibilities of this committee include: — Designing, reviewing and recommending to the Board the compensation policies and programs (FBA)*** — Advising the Board on the compensation of Board members and the CEO (A/P)* — Deciding on the compensation of Executive Committee members (FD)** — Preparing the Compensation Report and submitting it to the Board for approval (FBA)*** 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/investors/company-overview/corporate-governance
	Srikant Datar	6	
	Ann Fudge	6	
	William T. Winters	6	

[1] Chairman
[2] Elected new Board member at AGM 2017; see also page 97.
[3] Audit Committee Financial Expert
[4] Will step down as per AGM 2018, replaced by T. Buechner, subject to his re-election.

* A/P = advisory or preparatory task
** FD = fully delegated task
***FBA = task subject to final Board approval

Responsibilities	Members	Number of meetings held in 2017/ approximate average duration (hrs) of each meeting/ attendance	Documents/ link
Governance, Nomination and Corporate Responsibilities Committee		**3/1:30**	
The primary responsibilities of this committee include: — Designing, reviewing and recommending to the Board corporate governance principles (FBA)*** — Identifying candidates for election as Board members (FBA)*** — Assessing existing Board members and recommending to the Board whether they should stand for re-election (FBA)*** — Preparing and reviewing the succession plan for the CEO (FBA)*** — Developing and reviewing an onboarding program for new Board members, and an ongoing education plan for existing Board members (FD)** — Reviewing on a regular basis the Articles of Incorporation, with a view to reinforcing shareholder rights (FD)** — Reviewing on a regular basis the composition and size of the Board and its committees (FBA)*** — Reviewing annually the independence status of each Board member (FBA)*** — Reviewing directorships and agreements of Board members for conflicts of interest, and dealing with conflicts of interest (FD)** — Overseeing the company's strategy and governance on corporate responsibility (FBA)*** The Governance, Nomination and Corporate Responsibilities Committee has the authority to retain external consultants and other advisors.	**Andreas von Planta**[1]	**3**	Charter of the Governance, Nomination and Corporate Responsibilities Committee www.novartis.com/ investors/ company-overview/ corporate-governance
	Ann Fudge	3	
	Pierre Landolt	3	
	Charles L. Sawyers	3	
	Enrico Vanni	3	
Research & Development Committee		**3/7:00**	
The primary responsibilities of this committee include: — Monitoring research and development, and bringing recommendations to the Board (FBA)*** — Assisting the Board with oversight and evaluation related to research and development (FD)** — 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 (A/P)* — Advising the Board on scientific, technological, and research and development matters (A/P)* — Providing counsel and know-how to management in the area of research and development (A/P)* — 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 (A/P)* The Research & Development Committee has the authority to retain external consultants and other advisors.	**Joerg Reinhardt**[1]	**3**	Charter of the Research & Development Committee www.novartis.com/ investors/ company-overview/ corporate-governance
	Nancy C. Andrews	3	
	Dimitri Azar	3	
	Charles L. Sawyers	3	
Risk Committee		**5/2:00**	
The primary responsibilities of this committee include: — Ensuring that Novartis has implemented an appropriate and effective risk management system and process (FBA)*** — Ensuring that all necessary steps are taken to foster a culture of risk-adjusted decision-making without constraining reasonable risk-taking and innovation (FBA)*** — Approving guidelines and reviewing policies and processes (FBA)*** — 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 (FBA)*** The Risk Committee has the authority to retain external consultants and other advisors.	**Srikant Datar**[1]	**5**	Charter of the Risk Committee www.novartis.com/ investors/ company-overview/ corporate-governance
	Nancy C. Andrews	5	
	Ton Buechner	3	
	Elizabeth Doherty	4	
	Ann Fudge	5	
	Andreas von Planta	5	

[1] Chairman

* A/P = advisory or preparatory task
** FD = fully delegated task
***FBA = task subject to final Board approval

All Board members except Frans van Houten attended more than 75% of all Board meetings and the meetings of their Board committees.

Mr. van Houten has an overall meeting attendance of 71% due to scheduling conflicts with Royal Philips board meetings, which he is required to attend as CEO of the company. In 2017, he could not resolve all of these conflicts following his election to the Novartis Board at the 2017 AGM. He informed the GNCRC about this issue prior to his election.

The Novartis corporate culture and role of the Board

The corporate culture of Novartis is 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 also reviews the 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 Chairmen 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. Because all Board members are independent, no separate meetings of the independent Board members were held in 2017. Subject to additional special meetings, the Board and Board committee meetings take place in January, April, June, August, October and December. Typically these meetings last two days, with the first day allocated to Board committee meetings, and the second day allocated to the meeting of the full Board.

Full Board meetings include separate sessions of the Board without the CEO and the other Executive Committee members, of the Board with the CEO, and of the Board with the CEO and the other Executive Committee members.

Occasionally, other members of management and/or external advisors are invited to attend and/or present a specific topic at a Board meeting. The independent advisor of the Compensation Committee is regularly invited to attend portions of the meetings of the Compensation Committee. For more information, see Information and Control Systems of the Board vis-à-vis Management, beginning on page 100, and our Compensation Report, beginning on page 118.

Key activities of our Board and committees in 2017

In 2017, 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; corporate governance; and 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 2017 our Board and its committees focused on a number of special topics, including:

Board of Directors:
CEO succession; strategic options for Alcon; the Novartis digital strategy; the results of the Global Engagement Survey 2017; and AGM analysis

Audit and Compliance Committee:
Accounting and compliance questions related to new reporting requirements and guidelines; matters of accounting judgement; tax strategy as well as questions; compensation disclosure; potential rotation of the external auditors; and satisfactory resolution of high rated internal audit observations

Compensation Committee:
Compensation decisions related to the CEO succession; review of the compensation system of the Executive Committee and potential changes to the Annual Incentive and Long-Term Relative Performance Plan; review of the Board and committee fees and related potential changes; review of shareholder feedback from the roadshows; and potential enhanced disclosures in the 2017 Compensation Report

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 Chairmen; CEO succession; reviews of our corporate responsibility activities; Novartis access-to-medicine portfolio; and the company's performance in Environmental, Social and Governance (ESG) ratings and indices

Research & Development Committee:
The Novartis portfolio of research and development projects in ophthalmology, translational medicine, chemical biology and therapeutics, hepatology, non-malignant hematology and immuno-oncology, as well as innovation-related incentives

Risk Committee:
Data privacy; management of people risk related to the changed operating model; main risks and mitigations at Alcon, Novartis Technical Operations and in IT; and oversight of medical and patient activities

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: https://www.novartis.com/sites/www.novartis.com/files/independence-criteria-board-of-directors-and-its-committees.pdf

- 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 14, 2017, 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, 2017. 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

According to article 34 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), 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 are granted to members of the Board.

Board performance and effectiveness evaluation

Process

The Board conducts an annual review to evaluate its performance, the performance of the committees and of Board 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. Any suggestion for improvement is recorded and actions are agreed upon.

Periodically, this process is conducted by an independent consultant. In 2017, an independent performance and effectiveness evaluation of the Board and its committees, including an assessment of individual Board members, was conducted by the independent expert company Egon Zehnder.

Content and results

The performance review examines the performance and effectiveness, 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 2018 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 and business unit 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, external 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 partly attend each Audit and Compliance Committee meeting. Additionally, the heads of Internal Audit, Financial Reporting & Accounting, Integrity and 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, business units, Novartis Operations, Novartis Technical Operations, Global Drug Development, 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 Chief Ethics and Compliance Officer, 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 (see page 179). 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 179-183 of the operating and financial review 2017.

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.

Prior to the release of each quarter's results, the Board receives the actual consolidated financial statement information and an outlook of the full-year results in accordance with IFRS and "core" results (as defined by Novartis), together with related commentary.

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 non-IFRS measures as defined by Novartis ("core results").

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 invites the Head of Internal Audit to its meetings to review the internal audit scope, audit plans and results. In 2017, the Head of Internal Audit attended four meetings of the Audit and Compliance Committee.

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 118).

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 | Nationality: German | Year of Birth: 1956

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.

From 2010 to mid-2013, Mr. Reinhardt 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. Since 2017, Mr. Reinhardt has been a non-executive board member of Swiss Re, Switzerland. Additionally, he was a member of the board of directors of Lonza Group AG in Switzerland from 2012 to 2013, Chairman of the Board of the Genomics Institute of the Novartis Research Foundation in the United States from 2000 to 2010, and a member of the supervisory board of MorphoSys AG in Germany from 2001 to 2004.

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 | Nationality: Swiss | Year of Birth: 1951

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.

Mr. Vanni retired as director of McKinsey & Company in 2007. 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, and Denzler & Partners SA – all based in Switzerland. He previously served on the boards of Eclosion2 in Switzerland from 2009 to 2017, of Alcon Inc. in Switzerland from 2010 to 2011, and of Actavis PLC in Ireland in 2010.

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. From 2008 to 2015, he was an independent consultant, supporting 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 | Nationality: American | Year of Birth: 1958

Nancy C. Andrews, M.D., Ph.D., has been a member of the Board of Directors since 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 emerita of the Duke University School of Medicine and vice chancellor emerita for academic affairs at Duke University in the United States. She served as dean and vice chancellor from 2007 to 2017. She is 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 chair of the board of directors of the American Academy of Arts and Sciences and of the Burroughs Wellcome Fund, a member of the Massachusetts Institute of Technology (MIT) Corporation, and former president of the American Society for Clinical Investigation. Additionally, she serves on the council of the National Academy of Medicine and on the Scientific Management Review Board of the US National Institutes of Health.

Dr. Andrews holds a doctorate in biology from MIT 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 | Nationality: American | Year of Birth: 1959

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 senior director of ophthalmological innovation at Verily Life Sciences. He has also served as dean of the University of Illinois at Chicago (UIC) College of Medicine in the United States since 2011, and as professor of ophthalmology, bioengineering and pharmacology at UIC since 2006. From 2006 to 2011, he was head of the Department of Ophthalmology and Visual Sciences at UIC. 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 Inc., and the scientific board of Verily – all based in the US.

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 a master's degree from Harvard and 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 | Nationality: Dutch | Year of Birth: 1965

Ton Buechner has been a member of the Board of Directors since February 2016. He qualifies as an independent Non-Executive Director and is a member of the Risk Committee.

Mr. Buechner most recently served as chairman and CEO of the executive board of Dutch multinational AkzoNobel from 2012 to 2017. 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 in Germany.

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 | Nationality: American | Year of Birth: 1953

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 Risk Committee, as well as a member of the Audit and Compliance Committee and the Compensation Committee. The Board of Directors has appointed him as Audit Committee Financial Expert.

Since 1996, Mr. Datar has been the Arthur Lowes Dickinson professor of business administration at Harvard Business School in the United States. Additionally, since 2015, he has been faculty chair of the Harvard Innovation Lab and senior associate dean for university affairs at Harvard Business School. He is a member of the boards of directors of ICF International Inc., Stryker Corp. and T-Mobile US, all in the US. He previously served on the boards of HCL Technologies Ltd. (2012 to 2014) and KPIT Cummins Infosystems Ltd (2007 to 2012), both based in India.

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 | Nationality: British | Year of Birth: 1957

Elizabeth (Liz) Doherty has been a member of the Board of Directors since February 2016. She qualifies as an independent Non-Executive Director and is the Chairman of the Audit and Compliance Committee and a member of the Risk 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; a non-executive board member of Her Majesty's Courts and Tribunals Service in the UK; and an advisor to GBfoods and Affinity Petcare SA, subsidiaries of Agrolimen SA. 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. Her previous positions also include interim chief financial officer (CFO) of Cognita Schools Ltd. from 2014 to 2015, CFO and board member of Reckitt Benckiser Group PLC from 2011 to 2013, interim CFO of City Inn in 2010, and CFO of Brambles Ltd. from 2007 to 2009.

Ann Fudge

Member of the Board of Directors | Nationality: American | Year of Birth: 1951

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; a trustee of Boston-based WGBH public media; and a member of the visiting committee of Harvard Business School in the US. She served on the board of General Electric Co. in the US from 1999 to 2015.

Ms. Fudge received her bachelor's degree from Simmons College in the US and her Master of Business Administration from Harvard Business School. 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.

Frans van Houten

Member of the Board of Directors | Nationality: Dutch | Year of Birth: 1960

Frans van Houten has been a member of the Board of Directors since February 28, 2017. He qualifies as an independent Non-Executive Director.

Mr. van Houten is CEO and chairman of the executive committee and the board of management of Royal Philips, a position he has held since 2011. Under his leadership, Philips has transformed itself into a focused health technology company. In May 2016, he also became vice chairman and a member of the supervisory board of Philips Lighting.

Mr. van Houten holds a master's degree in economics and business management from Erasmus University in Rotterdam, the Netherlands. He joined Philips in 1986 and has held multiple global senior leadership positions. From 2009 to 2010, he was a consultant to the boards of companies including ING Group NV and ASM International NV. Before that, he was CEO of NXP Semiconductors (a Philips spinoff) from 2004 to 2009.

Pierre Landolt, Ph.D.

Member of the Board of Directors | Nationality: Swiss | Year of Birth: 1947

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 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 | Nationality: Swiss | Year of Birth: 1955

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 Governance, Nomination and Corporate Responsibilities Committee. He is also a member of the Risk Committee and the Audit and Compliance Committee.

Mr. von Planta provides counsel to the law firm Lenz & Staehelin AG, where he was a partner from 1988 through 2017. He 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, 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, and specializes in corporate law, corporate governance, corporate finance, company reorganizations, and mergers and acquisitions. He previously served as chairman of Clinique Générale-Beaulieu SA from 2011 to 2016, and as a director there from 2008 to 2016. Additionally, he was chairman of Swiss National Insurance Company Ltd. (Nationale Suisse) from 2011 to 2015, a director at Nationale Suisse from 1997 to 2015, and a director at Holcim Ltd. from 2003 to 2014.

Charles L. Sawyers, M.D.

Member of the Board of Directors | Nationality: American | Year of Birth: 1959

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 the US 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 National Academy of Medicine, and the American Academy of Arts and Sciences. He serves as a science advisor for the following companies: Agios Pharmaceuticals Inc., Housey Pharmaceutical Research Laboratories, Nextech Invest Ltd., Blueprint Medicines Corporation, BeiGene Ltd., The Column Group, ORIC Pharmaceuticals Inc., KSQ Therapeutics Inc., Foghorn Therapeutics Inc., and PMV Pharmaceuticals Inc.

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 | Nationality: British/American | Year of Birth: 1961

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 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. From 2011 to 2015, he was chairman and CEO of Renshaw Bay, an alternative asset management firm. Prior to that, he 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

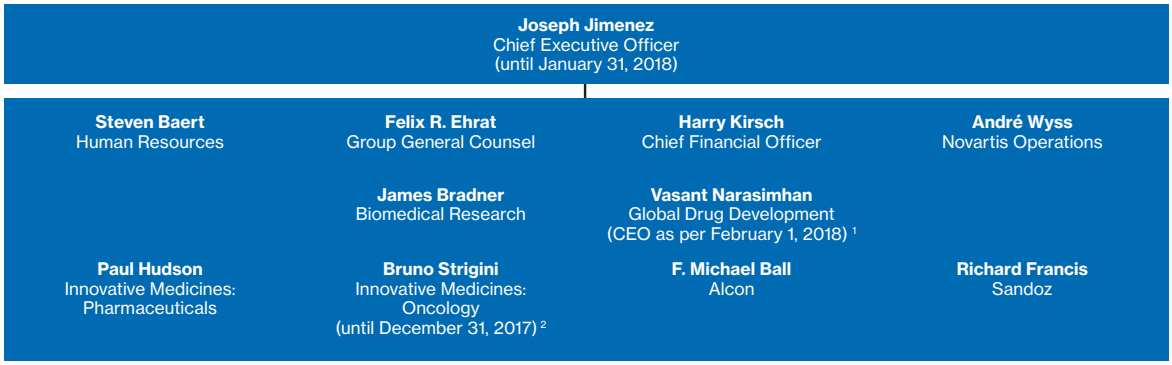
Alex Krauer, Ph.D.
Daniel Vasella, M.D.

Corporate Secretary

Charlotte Pamer-Wieser, Ph.D.

Our management

Composition of the Executive Committee



[1] Search for new Head Global Drug Development is ongoing; an interim Head has been appointed, who is not a member of the Executive Committee.
[2] Elizabeth Barrett appointed CEO Novartis Oncology and member of the Executive Committee, effective February 1, 2018.

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:

- 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
- Developing policies and strategic plans for Board approval, and implementing those approved
- Submitting the following to the Board for approval: investments, divestments, transactions, contracts and litigations with a value exceeding USD 500 million, important capital market and other financing transactions, as well as all (other) matters of fundamental significance for the Novartis Group
- 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
- 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 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

According to article 34 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), 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 | Nationality: American | Year of Birth: 1959

Joseph Jimenez has been Chief Executive Officer (CEO) of Novartis since 2010. Effective February 1, 2018, Mr. Jimenez will step down as CEO.

Mr. Jimenez previously held the position of Division Head, Novartis Pharmaceuticals. He joined Novartis in 2007 as Division Head, Novartis Consumer Health. Before that, from 1998 to 2006, 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 | Nationality: Belgian | Year of Birth: 1974

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 | Nationality: American | Year of Birth: 1955

F. Michael (Mike) Ball was appointed CEO of Alcon in February 2016. He is a member of the Executive Committee of Novartis.

Mr. Ball previously served as CEO of Hospira Inc. from 2011 to 2015. Prior to that, he held a number of senior leadership positions at Allergan Inc., including president from 2006 to 2011. Before joining Allergan in 1995, Mr. Ball held roles of increasing responsibility in marketing and sales at Syntex Corporation and Eli Lilly & Co. He began his career in the healthcare industry in 1981.

Mr. Ball has served on the boards of several companies based in the United States, including Kythera Biopharmaceuticals Inc. (2013 to 2015), Hospira (2011 to 2015), IntraLase Corp. (2005 to 2006), and sTec Inc. (2000 to 2013). He 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) | Nationality: American | Year of Birth: 1972

James (Jay) Bradner, M.D., joined Novartis in January 2016 and became President of the Novartis Institutes for BioMedical Research (NIBR) in March 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 from 2005 through 2015. He is a co-founder of five biotechnology companies and has authored more than 180 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 | Nationality: Swiss | Year of Birth: 1957

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, and served as senior partner from 2003 to 2011, and as executive chairman of the board from 2007 to 2011. Since 2011, he has also held various other leadership positions at the Novartis Group level, including in compliance and country management. He is chairman of Globalance Bank AG and a board member of Geberit AG and Avenir Suisse (a think tank for economic and social issues), all headquartered in Switzerland. He previously served as chairman and board member of several listed and non-listed companies based in Switzerland and elsewhere.

After being admitted to the bar, Mr. Ehrat received his Master of Laws from McGeorge School of Law in the United States in 1986, and his doctorate in law from the University of Zurich in Switzerland in 1990. He has held leadership roles at international legal organizations including the International Bar Association and Association Internationale des Jeunes Avocats.

Richard Francis

CEO, Sandoz | Nationality: British | Year of Birth: 1968

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 also held sales and marketing positions at Lorex Synthélabo and Wyeth.

Mr. Francis is a member of the board of directors of Mettler-Toledo International Inc., based in the US. He received a Bachelor of Arts in economics from Manchester Metropolitan University in the UK.

Paul Hudson

CEO, Novartis Pharmaceuticals | Nationality: British | Year of Birth: 1967

Paul Hudson has been CEO of Novartis Pharmaceuticals since July 2016. He is a member of the Executive Committee of Novartis.

Mr. Hudson joined Novartis from AstraZeneca PLC, 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 joining AstraZeneca in 2006, 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 | Nationality: Swiss, German | Year of Birth: 1965

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.

Executive Committee (continued)

Vasant (Vas) Narasimhan, M.D.

Global Head of Drug Development and Chief Medical Officer for Novartis | Nationality: American | Year of Birth: 1976

Vasant (Vas) Narasimhan, M.D., has been Global Head of Drug Development and Chief Medical Officer for Novartis since February 2016. He is a member of the Executive Committee of Novartis, and effective February 1, 2018, will become Chief Executive Officer of the company.

Dr. Narasimhan previously was Global Head of Development for Novartis Pharmaceuticals, overseeing the entire general medicines pipeline. He has also served as Global Head of the Sandoz Biopharmaceuticals and Oncology Injectables business unit, Global Head of Development for Novartis Vaccines, North America Region Head for Novartis Vaccines, and United States Country President for Novartis Vaccines and Diagnostics. Before joining Novartis in 2005, he worked at McKinsey & Company.

Dr. Narasimhan received his medical degree from Harvard Medical School in the US, a master's degree in public policy from Harvard's John F. Kennedy School of Government, and a bachelor's degree in biological sciences from the University of Chicago in the US. During and after his medical studies, he worked extensively on a range of public health issues in developing countries. He is an elected member of the US National Academy of Medicine and serves on the board of fellows of Harvard Medical School.

Bruno Strigini

CEO, Novartis Oncology | Nationality: French | Year of Birth: 1961

Bruno Strigini has been CEO of Novartis Oncology since July 2016. On December 31, 2017, he stepped back from the Executive Committee of Novartis, and he will step down as CEO of Novartis Oncology in early 2018.

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) from 2009 to 2014. He previously worked at Schering-Plough from 2006 to 2009 as group vice president and president of EUCAN Region II (encompassing Austria, Belgium, Greece, the Netherlands, Portugal, Switzerland, Central and Eastern Europe, the Middle East and Africa). Before that, he held positions at UCB Celltech and SmithKline Beecham.

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 | Nationality: Swiss | Year of Birth: 1967

André Wyss has been President of Novartis Operations since February 2016, and is responsible for manufacturing, shared services and corporate affairs. He is also Country President for Switzerland and a member of the Executive Committee of Novartis.

Mr. Wyss has been with Novartis since 1984 when he was a chemistry apprentice in manufacturing at Sandoz. 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. Martin Kennard, auditor in charge, began serving in his role in 2017, and Stephen Johnson, global relationship partner, began serving in his role in 2014. The Audit and Compliance Committee together with 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 2017, this committee held seven meetings. PwC was invited to six 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, 2017. 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, based on this, 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 fees for professional services related to the 12-month periods ended December 31, 2017 and December 31, 2016 are as follows:

	2017 USD million	2016 USD million
Audit services	24.6	26.7
Audit-related services	7.2	2.9
Tax services	0.8	0.7
Other services	1.4	1.3
Total	**34.0**	**31.6**

Audit services include work performed to issue opinions on consolidated financial statements and parent company financial statements of Novartis AG, to issue opinions related 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, other audit-related services, and in 2017 audit services related to the Alcon strategic review.

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 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/investors/company-overview/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/investors/company-overview/corporate-governance

Printed copies of the Novartis Articles of Incorporation as well as the Regulations of the Board, including the charters of Board committees (in English), can be obtained by writing to: Novartis AG, Attn: Corporate Secretary, Lichtstrasse 35, CH-4056 Basel, Switzerland. Electronic copies are available at: www.novartis.com/investors/company-overview/corporate-governance.

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 31 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 75.3 million at December 31, 2017, 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 283.2 million, and that of the shares owned by Novartis was USD 207.9 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, 2017, was USD 13.4 billion. The total market value of Roche Holding AG was USD 217.6 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 until latest 2035.

Political contributions and lobbying

Novartis makes political contributions to support 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 2017, Novartis made political contributions totaling approximately USD 2.0 million, thereof approximately USD 600 000 in Switzerland, USD 1 365 000 in the US, and USD 65 000 in Australia. 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 220 000.

In Switzerland, Novartis supports political parties that have a political agenda and that hold positions supporting 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.

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 (www.novartis.com/our-company/corporate-responsibility/doingbusiness-responsibly/transparency-disclosure/public-policy-advocacy).

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 and other Board members, the CEO and other Executive Committee members, and 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 financial results in accordance with IFRS on a quarterly basis, and issues press releases from time to time regarding business developments.

Novartis furnishes press releases related 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/our-company/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. More 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/investors/company-overview/corporate-governance Novartis key share data www.novartis.com/key-share-data
Shareholder rights	Articles of Incorporation of Novartis AG www.novartis.com/investors/company-overview/corporate-governance Investor Relations information www.novartis.com/investors
Board regulations	Board regulations www.novartis.com/investors/company-overview/corporate-governance
Executive Committee	Executive Committee www.novartis.com/our-company/executive-committee
Novartis code for senior financial officers	Novartis Code of Ethical Conduct for CEO and Senior Financial Officers www.novartis.com/investors/company-overview/corporate-governance
Additional information	Novartis Investor Relations www.novartis.com/investors

Compensation Report

Contents

Dear Shareholder,

As Chairman of the Compensation Committee, I am pleased to present the 2017 Compensation Report of Novartis AG.

This report includes an "at a glance" management summary of key information, followed by full details of our Executive Committee and Board compensation for 2017, including changes that will apply from 2018.

During the year, we engaged in dialogue with many of our major shareholders and proxy advisors to gather feedback on our compensation systems and disclosures, and we considered this feedback when making decisions on both topics. Through these discussions, we also addressed concerns of some shareholders who opposed the 2016 Compensation Report at the 2017 Annual General Meeting (AGM).

2017 company performance

Novartis delivered strong performance in 2017, with Group sales, net income and free cash flow ahead of target in constant currencies. Growth drivers in the Innovative Medicines division, including *Cosentyx, Entresto, Promacta/Revolade,* and *Tafinlar + Mekinist*, more than offset the loss of exclusivity of *Gleevec/Glivec*. Sandoz experienced a small decline in sales but gained market share and outperformed peers in a challenging market. Alcon returned to growth and made good progress toward becoming a leaner and more agile medical devices company.

Novartis achieved or surpassed pipeline milestone targets, including a number of positive readouts of major studies. Access to healthcare programs were expanded. Talent has been strengthened in key leadership positions in many parts of the organization. Culture, particularly collaboration, has been further improved.

Shareholders benefited from an annual total shareholder return (TSR) in USD of 20.4%, including an increased dividend.

2017 CEO realized pay

The Board determined that the CEO met or exceeded his financial targets and strategic objectives set at the beginning of the year, and that he role modeled the Novartis Values and Behaviors. When determining his compensation, the Board also considered other factors such as the external business environment and competition. The CEO was awarded a 2017 Annual Incentive of 125% of target, i.e. CHF 3 937 542.

The first of the two Long-Term Incentives, the Long-Term Performance Plan (LTPP) for the 2015-2017 performance cycle, based on a cumulative three-year Novartis Cash Value Added target and long-term innovation milestones, vested at 114% of target, i.e. CHF 5 068 337.

The second Long-Term Incentive, the Long-Term Relative Performance Plan (LTRPP) for the 2015-2017 performance cycle, based on three-year relative TSR compared to the global healthcare peer group, did not vest due to our rank at No. 12 out of 13 companies, i.e. no payout.

In light of the company's performance, the 2017 total realized compensation for the CEO was **CHF 11 344 462**, (compared with CHF 10 556 685 in 2016), and includes his base salary and benefits, his Annual Incentive for the

2017 performance year, and the vesting of his LTPP award for the 2015-2017 performance cycle, including dividend equivalents.

Compensation Report transparency

To provide greater transparency, we have enhanced the disclosures in this Compensation Report, including:

- Prospective disclosure of the retirement conditions of the outgoing CEO, Joseph Jimenez, as well as the target compensation of the newly appointed CEO, Vasant Narasimhan.
- Prospective disclosure of any 2018 increases in Executive Committee members' target compensation, as well as the policy for setting compensation of newly appointed Executive Committee members.
- Realized compensation of the CEO – and for the first time, on an aggregated basis – the other members of the Executive Committee.
- An interim update on the one-off three-year performance award granted in 2016 to the Alcon CEO for the 2016-2018 performance cycle.

Changes to our executive compensation system

During the year, the Compensation Committee conducted a review of the Executive Committee compensation system, considering business needs, feedback from dialogue with shareholders and developments in compensation best practices. After the review, the Board and Compensation Committee approved the following changes:

- A simplified Annual Incentive balanced scorecard will be introduced that places additional weighting on financial performance (60% weighting) and that also focuses on key strategic objectives in the areas of innovation, access to healthcare, people and culture, data and digital (40% weighting). Values and Behaviors remain a key component of the Annual Incentive and are embedded in our culture. As such, members of the Executive Committee are expected to demonstrate these to the highest standard.
- The performance condition for the LTRPP has been made more stringent from the 2018-2020 performance cycle onward. Going forward, Executive Committee members will receive no payout if relative TSR is below the median of the companies in our global healthcare peer group.
- Finally, in line with evolving governance practices, we have revised our Long-Term Incentive plan rules for retiring Executive Committee members. From grants made in 2019 onwards, members who fulfill the retirement conditions under the plan rules will receive pro-rata vesting, rather than full vesting, of outstanding Long-Term Incentives. The timing of this change respects the one-year notice period required per Executive Committee employment contracts. Two members who have already met the conditions to retire with full vesting will be grandfathered under the current rules. These incentives will continue to have performance conditions applied and will vest at the end of the cycle on the normal vesting date.

Changes to our Board compensation system from the 2018 AGM

Board and committee membership fees have remained unchanged since the reduction that took place at the 2014 AGM. The Board has decided to rebalance its fee structure from the 2018 AGM to better recognize the responsibilities and time commitment of the committees, both of which have increased as a result of the evolving governance and regulatory environment. In particular, developments in compensation governance requirements have, over the last few years, resulted in a greater number of interactions between the Compensation Committee and shareholders and other external stakeholders.

The Board membership fee will decrease, and the committee membership fees will increase. The Board took into consideration external benchmarking information in the Swiss market as well as independent advice. The change is cost-neutral for the company, as the new fee structure results in the same average fee per Board member, excluding the Chairman.

In addition, following a review of practices among our peer group companies, the share ownership requirement for Board members will be increased from 4 000 to 5 000 shares, effective from the 2018 AGM. This minimum share ownership increase will strengthen the alignment of interests with those of shareholders. To allow sufficient time for Board members to achieve the increased requirement, they will have four years from appointment to acquire the minimum 5 000 shares under the new policy.

This change excludes the Chairman of the Board, whose share ownership requirement of 30 000 shares remains the same. In addition, all Board members will continue to be required to hold these shares for 12 months after retiring from the Board.

2018 CEO succession

Mr. Jimenez steps down as CEO on January 31, 2018, and will continue to support the Board and new CEO until his retirement date and the end of his notice period on August 31, 2018. He will retire in full compliance with the terms of his employment contract and the Novartis incentive plan rules. He will receive his annual base salary and pro-rated Annual Incentive until August 31, 2018. No new Long-Term Incentive awards will be made in January 2018. There will be no accelerated vesting of outstanding Long-Term Incentives, which will remain subject to performance over their full term. There will be no severance or non-compete payments.

Dr. Narasimhan will become CEO effective February 1, 2018. The Board determined Dr. Narasimhan's compensation by taking into account the fact that this is his first Group CEO role. He will receive an annual base salary of CHF 1.55 million, with a view to increasing this over a period of three to four years, dependent on strong performance and proven ability in the role. Total performance-based variable compensation at target will be 475% of base salary split into his Annual Incentive (150%) and his two Long-Term Incentives (325%). This will result in an initial total annual compensation at target of CHF 8.91 million, 26% lower than that of Mr. Jimenez.

On behalf of Novartis and the Compensation Committee, thank you for your continued support and feedback, which we 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

Executive Committee compensation at a glance (pages 127 to 142)

2017 Executive Committee compensation system

Reflecting a strong focus on pay for performance and alignment with shareholder interest, variable pay represents a significant proportion of the package. Outcomes from variable pay elements can vary significantly (from 0% to 200% of the target level), depending on the level of performance achieved.

	Fixed pay and benefits		Variable pay – performance-related		
	Annual base salary	Pension and other benefits	Annual Incentive	Long-term share awards	
				LTPP[1]	LTRPP[2]
Purpose	Reflects responsibilities, experience and skill sets	Tailored to local market practices / regulations	Rewards for performance against key short-term targets and Values and Behaviors	Rewards long-term shareholder value creation and innovation in line with our strategy	
Form of payment	Cash	Country / individual specific	50% cash 50% equity[3] deferred for three years	Equity	
Performance measures	–	–	Performance matrix based on: • Individual balanced scorecard, including financial targets and individual objectives • Values and Behaviors	• Novartis Cash Value Added • Innovation milestones	• Relative TSR vs. global sector peers

[1] LTPP = Long-Term Performance Plan
[2] LTRPP = Long-Term Relative Performance Plan
[3] Executive Committee members may elect to receive more of their Annual Incentive in equity instead of cash.

The CEO's Annual Incentive at target is 150% of base salary, his target LTPP is 200% of base salary and his target LTRPP is 125% of base salary. Based on Novartis' compensation guidelines, the other members of the Executive Committee have Annual Incentive targets that range from 90% to 120% of base salary, and have Long-Term Incentives (LTPP and LTRPP) in total that range from 170% to 270% of base salary.

2017 CEO pay for performance – outcomes

2017 ANNUAL INCENTIVE – NOVARTIS PERFORMANCE

Deliver financial results	• **Group net sales, net income and free cash flow as a % of sales** above target
Ensure world-class commercial execution	• **Innovative Medicines** delivered strong performance; *Cosentyx* well ahead of target, *Entresto* in line with expectations, Oncology sales slightly below target • **Sandoz** sales below target due to pricing pressure in the US
Transform Alcon into an agile medical device company	• **Alcon** returned to growth with sales and core operating income results ahead of target, and all seven key approvals in innovation projects achieved
Strengthen R&D	• **Pipeline milestone targets** either achieved or surpassed, including 16 major approvals, 16 major submissions and six FDA breakthrough therapy designations
Improve access to healthcare	• **Novartis access** to healthcare programs expanded, with agreements now signed in six countries, delivering a portfolio of 15 products for USD 1 per treatment, per month
Create a stronger company for the future	• **NTO, NBS and GDD** delivered or over-delivered on productivity targets • **Compliance, reputation and culture** further improved
Overall performance outcome	• Overall performance of the CEO was determined to be above expectations, based on achievements versus the targets set by the Board, and demonstration of the Novartis Values and Behaviors **Overall outcome of 125% of target**

2015–2017 LONG-TERM INCENTIVES

Long-Term Performance Plan (LTPP)	• Novartis Cash Value Added outcome of 113% of target (75% weighting) • Key innovation milestones outcome of 115% of target (25% weighting) **Overall outcome of 114% of target**
Long-Term Relative Performance Plan (LTRPP)	• Annual Total Shareholder Return (TSR) in USD was 20.4%. Absolute TSR growth in USD was 0.1% over the last three years. Relative performance in USD over the three-year performance cycle compared to peers was rank No. 12 out of 13 companies **Overall outcome of 0% of target**

2017 total realized pay for the CEO

The 2017 total realized pay for the CEO was **CHF 11 344 462** (compared with CHF 10 556 685 in 2016), and includes the payouts of the Annual Incentive, LTPP and LTRPP based on actual performance assessed for cycles concluding in 2017.

	Fixed pay and benefits		Variable pay – performance related			
CHF 000s	Annual base salary	Pension and other benefits	2017 Annual Incentive	LTPP 2015–2017[1]	LTRPP 2015–2017[1]	Total realized compensation
Joseph Jimenez (CEO)	2 100	239	3 937	5 068	0	**11 344**

[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 cycle 2015-2017.

CEO succession – compensation elements

In September 2017, Novartis announced that Mr. Jimenez will retire following eight years as CEO and will be succeeded by Dr. Narasimhan effective February 1, 2018. An overview of the key compensation elements of the CEO succession is provided below. All terms are fully in line with the Swiss Ordinance against Excessive Compensation in Listed Companies.

KEY COMPENSATION TERMS

Joseph Jimenez (retiring CEO)

All retirement terms are consistent with employment contract and incentive plan rules
- 12-month notice period ending August 31, 2018
- No compensation increase in 2018
- Annual base salary, pension and other benefits, and Annual Incentive will be paid pro-rata in 2018
- No new Long-Term Incentive grants in January 2018
- Outstanding equity awards:
  - No accelerated vesting
  - Payout subject to achievement of performance conditions, share price movement and dividend equivalents
- Incentives fully at risk, and subject to malus and clawback

Vasant Narasimhan (appointed CEO)

Target annual compensation	CHF 000s
Salary	1 550
Annual Incentive (150% of salary)	2 325
LTPP (200% of salary; three-year cycle)	3 100
LTRPP (125% of salary; three-year cycle)	1 938
Total at target	**8 913**

- 83% of total target compensation is variable performance-related pay
- 26% reduction versus his predecessor
- Base salary will be kept under review, with any increases based on development and performance as CEO, consistent with the Executive Committee appointments compensation policy (details on page 124)

Board compensation at a glance (pages 146 to 150)

2017 Board compensation system

The compensation system applicable to the Board is shown below. All fees to Board members are delivered at least 50% in equity and the remainder in cash.

CHF 000s	AGM 2017-2018 annual fee
Chairman of the Board	3 800
Board membership	300
Vice Chairman	50
Chair of the Audit and Compliance Committee	120
Chair of the following committees: • Compensation Committee • Governance, Nomination and Corporate Responsibilities Committee • Research & Development Committee • Risk Committee	60
Membership of the Audit and Compliance Committee	60
Membership of the following committees: • Compensation Committee • Governance, Nomination and Corporate Responsibilities Committee • Research & Development Committee • Risk Committee	30

2017 Board compensation

Total actual compensation paid to Board members in the 2017 financial year is shown in the table below.

CHF 000s	2017 total compensation[1]
Chairman of the Board	3 805
Other 12 members of the Board	4 591
Total	**8 396**

[1] Includes an amount of CHF 15 622 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 298 206, and provides a right to the maximum future insured government pension benefit for the Board member.

Compensation governance at a glance (page 152)

A summary of the compensation decision authorization levels within the parameters set by the AGM is shown below, along with an overview of the risk management principles.

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
- Performance evaluation under the Annual Incentive includes 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 from the end of employment (annual base salary and Annual Incentive of the prior year only) as per contract, if applicable
- Good and bad leaver provisions apply to variable compensation of leavers
- No severance payments or change-of-control clauses
- Clawback and malus 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 Executive Committee members are rewarded according to their success in implementing the company strategy as well as their contribution to company performance and long-term value creation.

Pay for performance	• Variable compensation is tied directly to the achievement of strategic company targets
Shareholder alignment	• Our incentives are significantly weighted toward long-term, equity-based plans • Measures under the Long-Term Incentives are calibrated to promote the creation of shareholder value • Executive Committee members are expected to build and maintain substantial shareholdings
Balanced rewards	• Balanced set of measures to create sustainable value • Mix of targets 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 • Forms part of the assessment of the individual objectives for the Annual Incentive
Competitive compensation	• Total compensation must be sufficient to attract and retain key global talent • Overarching emphasis on pay for performance

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 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, the company operates both a short-term Annual Incentive and two Long-Term Incentive plans with a balanced set of measures and targets.

The Board determines specific, measurable and time-bound performance metrics for the Annual Incentive and the two Long-Term Incentive plans.

Executive Committee compensation

There is fierce competition within the pharmaceutical and biotechnology industries for top executive talent with deep expertise, competencies and proven performance. The Board and the Compensation Committee determine compensation for appointed Executive Committee members in line with the appointments compensation policy outlined on page 124.

Approach to benchmarking

Novartis takes a rigorous approach to peer group construction and maintenance. In recent years, the Compensation Committee has solicited feedback from shareholders and the Compensation Committee's independent advisor in selecting peer companies for executive compensation comparison purposes. External peer data is one of the elements considered by the Board and the Compensation Committee when making decisions on executive pay and helps ensure the system and levels at Novartis remain competitive.

The Compensation Committee considers executive compensation among the peer group of 15 global healthcare companies set out in the table below, as communicated in last year's Compensation Report. The companies in this peer group were selected based on a number of criteria that reflect our industry, as well as the size and scope of operations. Target compensation is generally positioned around the market median benchmark for comparable roles within this group.

GLOBAL HEALTHCARE PEER GROUP

AbbVie	Amgen	AstraZeneca
Biogen	Bristol-Myers Squibb	Celgene
Eli Lilly & Co.	Gilead Sciences	GlaxoSmithKline
Johnson & Johnson	Merck & Co.	Novo Nordisk
Pfizer	Roche	Sanofi

The Compensation Committee believes that using a consistent set of peers that have a similar scope and size enables shareholders to evaluate the compensation year on year and make pay-for-performance comparisons. Novartis therefore makes the commitment to shareholders to confirm benchmarking practices, including the peer group, each year.

Although Novartis is headquartered in Switzerland, more than a third of sales come from the US market, and the US remains a significant talent pool for the recruitment of executives by the company. All current Executive Committee members have either worked in or have extensive experience with the US. It is therefore critical that Novartis is able to attract and retain key talent globally, especially from the US.

For consideration of European and local practices, the Compensation Committee also references a cross-industry peer group of Europe-headquartered multinational companies selected on the basis of comparability in size, scale, global scope of operations, and economic influence to Novartis. Five of these companies focus exclusively on healthcare: AstraZeneca, GlaxoSmithKline, Novo Nordisk, Roche and Sanofi. Ten companies are selected from the STOXX® All Europe 100 Index representing multiple sectors: Anheuser-Busch InBev, Bayer, BMW, Daimler, Danone, Heineken, L'Oréal, Merck KgaA, Nestlé and Unilever.

While the global healthcare peer group remains the primary comparator group for pay decisions, this second cross-industry group, which remains unchanged since last year, is used as an additional reference point to assess wider market pay practices and to minimize any distortions in Novartis compensation practices and systems.

Executive Committee compensation policies

Executive Committee appointments compensation policy

The Compensation Committee takes a prudent approach to setting compensation. Consistent with that philosophy, when determining the compensation arrangements for a newly appointed Executive Committee member, the following principles are applied:

ELEMENT OF COMPENSATION	POLICY
Level	The overall package should be market-competitive to facilitate the recruitment of global executive talent with deep expertise and competencies. The Compensation Committee will always intend to pay no more than it believes is necessary to secure the required individual.
Annual base salary	The Compensation Committee may appoint individuals who are new to a role on an annual base salary that is below the market level, with a view to increasing this toward a market level over a period of three to four years as an individual develops in the role. This prudent approach ensures pay levels are merit-based, with increases dependent on strong performance and proven ability in the role over a sustained period.
Incentives	The ongoing compensation package will normally include the key compensation elements and incentive opportunities in line with those offered to current Executive Committee members. In exceptional circumstances, higher Long-Term Incentive opportunities than those offered to current Executive Committee members may be provided, at the Compensation Committee's discretion. Performance measures may include business-specific measures tailored to the specific role.
Pension and other benefits	Newly appointed Executive Committee members are eligible for local market pension and other benefits in line with the wider senior employee group.
Buy-outs	The Compensation Committee seeks to balance the need to offer competitive compensation opportunities to acquire the talent required by the business with the principle of maintaining a strong focus on pay for performance. As such, when an individual forfeits variable compensation as a result of appointment at Novartis, the Compensation Committee may offer replacement awards in such form as the Compensation Committee considers appropriate, taking into account relevant factors. Relevant factors include the replacement vehicle (i.e. cash, restricted share units, restricted shares or performance share units), whether the award is contingent on meeting performance conditions or not, the expected value of the forfeited award, the timing of forfeiture (i.e. Novartis mirrors the blocking or vesting period of the forfeited award) and the leaver conditions, in case the recruited individual leaves Novartis prior to the end of the blocking or vesting period. The Compensation Committee will seek to pay no more than is required to match the commercial value or fair value of payments and awards forfeited by the individual.
International mobility	If individuals are required to relocate or be assigned from their home location to take up their position, relocation support may be provided in line with our global mobility policies (e.g., relocation support, tax equalization).

Treatment of variable compensation for Executive Committee member leavers

The following table sets out the treatment of variable compensation for associates (including Executive Committee members) who leave Novartis during the performance or vesting period. All variable compensation is subject to malus and clawback provisions, including after termination of employment.

ELEMENT OF COMPENSATION	POLICY
Annual Incentive – cash element	**Retirement, termination by the company (for reasons other than performance or conduct), change of control, disability, death** Pro-rata Annual Incentive is paid to reflect the portion of the year the individual was employed. **Any other reason** No Annual Incentive
Annual Incentive – mandatory deferral into restricted shares / RSUs	If a participant leaves employment due to voluntary resignation or misconduct, unvested restricted shares and restricted share units (RSUs) are forfeited. All awards are subject to non-compete terms until the end of the three-year blocking date, starting from the date of grant.
Annual Incentive – voluntary restricted shares / RSUs / ADRs (US associates only)	Awards are not subject to forfeiture during the deferral period.
Long-Term Incentives (LTPP / LTRPP)	**Voluntary resignation or termination by the company for misconduct** All of the award will be forfeited. **Terminated by the company for reasons other than performance or conduct, and change in control due to divestment** Awards vest on the regular vesting date, subject to performance, on a pro-rata basis for time spent with the company during the performance cycle. There is no accelerated vesting. **Retirement** For grants made until the end of 2018, awards vest on the normal vesting date, subject to performance, without the application of time pro-rating. For grants made to members of the Executive Committee from 2019 onward, awards will vest on the normal vesting date, subject to performance, with the application of time pro-rating. The timing of this change respects the one-year notice period required in the Executive Committee employment contracts. **Death or long-term disability** Accelerated vesting at target will be applied in the case of death and long-term disability. **Non-compete agreement** All awards are subject to non-compete terms against the healthcare peer group until the vesting date.

Malus and clawback

Any incentive compensation paid to Executive Committee members is subject to malus and clawback rules. This means that the Board for the CEO, and the Compensation Committee for the other Executive Committee members, may decide – subject to applicable law – to retain any unpaid or unvested incentive compensation (malus), or to recover incentive compensation that has been paid or has vested in the past (clawback). This applies in cases where the payout conflicts with internal management standards, including company and accounting policies, or violates laws.

This principle applies to both the short-term Annual Incentive and the Long-Term Incentive plans.

In 2017, malus or clawback for current or former Executive Committee members was not required.

Executive Committee performance management process

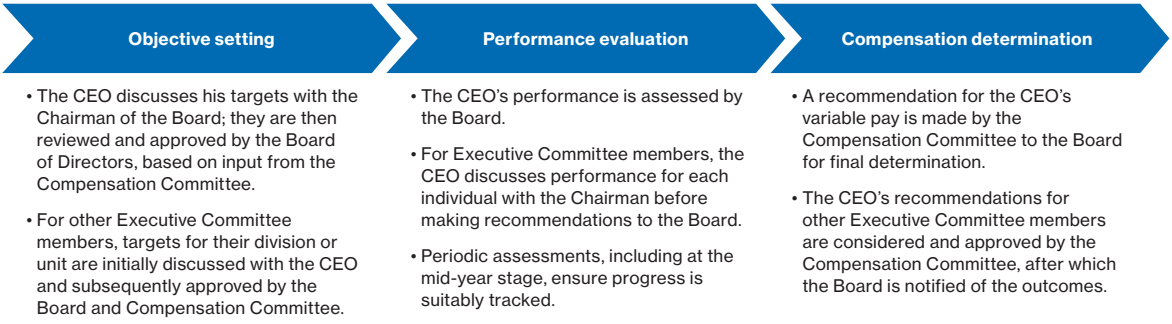
To foster a high-performance culture, the company applies a uniform performance management process worldwide based on quantitative and qualitative criteria, including our Values and Behaviors. All Novartis associates, including the CEO and other Executive Committee members, are subject to a formal three-step process: objective setting, performance evaluation and compensation determination. This process is explained below.

Performance targets are generally set before the start of the relevant performance cycle. There is a rigorous framework in place for establishing targets to ensure they are suitably robust and challenging, and align with the strategic priorities of the Group. The key factors taken into account when setting targets include:

- Novartis strategic priorities.
- Internal and external market expectations.
- Regulatory factors (e.g., new launches, patent expiries).
- Investment in capital expenditure.
- Values and Behaviors.

The targets are challenged at multiple stages before they are ultimately approved by the Board. In line with good governance practices, the Compensation Committee works to set targets that are ambitious and challenging but that do not encourage undue risk taking.

Following the end of the performance cycle, the Board and the Compensation Committee consider performance against the targets originally set. The CEO and Executive Committee members are not present while the Board and Compensation Committee discuss their individual performance evaluations. Prior to determining the final outcome, related factors – such as performance relative to peers, wider market conditions and general industry trends – are used to inform the overall performance assessment.



2017 Executive Committee compensation

System and performance outcomes

Annual base salary

Overview	• The annual base salary is reviewed each year, taking into account the individual's role, performance and experience; business performance and the external environment; increases across the Group; and market movements.
2017 annual base salaries	Annual base salary (effective March 1, 2017): • **CEO:** CHF 2 100 000 (no increase awarded during the year) • **Other Executive Committee members:** see details on page 138

Pension and other benefits

Overview	• Pension and other benefits do not constitute a significant proportion of total compensation and are provided to Executive Committee members on the same terms as all other associates, based on country practices and regulations. • The company operates both defined benefit and defined contribution pension plans (see also Note 24 to the Group's consolidated financial statements). • Novartis may provide other benefits according to local market practice. These include company car provision, tax and financial planning, and insurance benefits. • Executive Committee members who are required to relocate internationally may also receive additional benefits (including tax equalization), in line with the company's global mobility policies.

Annual Incentive – 2017

PLAN OVERVIEW

Grant formula

Annual base salary	x	Target incentive %	=	Target Annual Incentive

On-target opportunities

- **CEO:** 150% of annual base salary
- **Other Executive Committee members:** 90% to 120% of annual base salary

Performance measures

- Performance is measured against a balanced scorecard of quantitative targets and individual objectives; behavior is assessed against the Novartis Values and Behaviors.

Balanced scorecard

- The 2017 balanced scorecard targets and achievements of the CEO are detailed on the next page.
- Balanced scorecards for the other Executive Committee members have quantitative objectives (weighted 60%) specific to their division or business unit. For Group function heads, these are the same as the Group financial targets of the CEO. The individual objectives (weighted 40%) differ by role. They may include additional financial and strategic targets, such as EPS; growth, productivity and development initiatives; leadership; diversity; quality; and corporate responsibility initiatives, including access to medicine. They also include managing company reputational risk.

Values and Behaviors

- The Annual Incentive also takes into account an assessment of the following six Values and Behaviors: innovation, quality, collaboration, performance, courage and integrity.
- The Executive Committee members are expected to demonstrate these at the highest level. Further details on the Values and Behaviors can be found on page 18.

Payout matrix

- The payout matrix equally recognizes performance against the balanced scorecard of financial and non-financial targets, and demonstration of our Values and Behaviors. The payout range is 0–200% of on-target opportunity based on performance, as shown below:

		% Payout		
Performance vs. balanced scorecard	**Exceeding expectations**	60–90%	130–160%	170–200%
	Meeting expectations	0–70%	90–120%	130–160%
	Partially meeting expectations	0%	0–70%	60–90%
		Partially meeting expectations	**Meeting expectations**	**Exceeding expectations**
		Values and Behaviors assessment		

Form of award

- At the end of the performance period, 50% is paid in cash and the remaining 50% is paid in Novartis restricted shares or RSUs, deferred for three years (see table on page 125 for details on leaver treatment).
- Executives may choose to receive all or part of the cash portion of their Annual Incentive in Novartis shares or American Depositary Receipts (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.
- Clawback and malus provisions apply to all Annual Incentive awards.

Dividend rights, voting rights and settlement

- Restricted shares carry voting rights and dividends during vesting period. RSUs are of equivalent value but do not carry voting rights and dividends during vesting period.
- Following the vesting period, settlement of RSUs is made in unrestricted Novartis shares or ADRs.

DISCLOSURE OF CEO ANNUAL INCENTIVE

Principles

Targets and achievements of the Annual Incentive are disclosed in arrears due to commercial sensitivity of the targets. However, to ensure that shareholders can understand the basis for CEO Annual Incentive awards, a detailed balanced scorecard is disclosed annually after the end of the performance cycle.

2017 CEO BALANCED SCORECARD

Balanced scorecard performance is measured in constant currencies to reflect operational performance that can be influenced. The Board uses a stringent process to set ambitious financial targets and incentivize superior performance.

	CEO achievements – 2017	Target	Achievement vs. target
Group financial targets (60%)	Group net sales	USD 48.4 billion	Above
	Corporate net result	USD -1.5 billion	Above
	Group net income	USD 7.0 billion	Above
	Group free cash flow as a % of sales	19%	Strongly above
	Overall assessment of Group financial targets in constant currencies		**Above**
Individual objectives (40%)	**Additional financial targets** In constant currencies, operating income and earnings per share, as well as core operating income and core earnings per share, were above target. Annual total shareholder return in USD was 20.4%. Pharmaceuticals, Alcon and Sandoz exceeded their market share growth targets, while Oncology was slightly below target.		Above
	Ensure world-class commercial execution The Innovative Medicines Division delivered strong performance. *Cosentyx* was well ahead of target, while *Entresto* was in line with expectations. Oncology sales were slightly below target, mainly due to a slower launch uptake of *Kisqali*. Sandoz sales were below target, impacted by industry pricing pressure in the US, partly offset by continued strong growth outside the US. Strong sales in biosimilars reinforced global leadership in the field.		Largely met
	Transform Alcon into an agile medical device company Alcon made good progress and returned to growth in 2017, with four quarters of successive growth. Sales and core operating income results were ahead of target. Seven key approvals were achieved (e.g., *AcrySof IQ ReSTOR* +2.5 D Multifocal Toric IOL launched in the US, *CyPass* Micro-Stent launched in the EU), and fundamentals in both the commercial organization and the supply chain were significantly improved.		Met
	Strengthen R&D Pipeline milestone targets were achieved or surpassed, including 16 major approvals and 16 major submissions. Novartis received six breakthrough therapy designations from the FDA. 15 positive readouts from major studies were delivered (e.g., CAR-T 19, RTH258, CANTOS and BAF312). Sandoz had five key filings of biosimilars. The Novartis Institutes for BioMedical Research launched an initiative to better explore new targets, showing positive results, and Global Drug Development efficacy improved significantly.		Strongly above
	Expand access to healthcare, and corporate responsibility Access to healthcare programs were expanded, with agreements now signed in six countries to bring a portfolio of 15 products to participating governments and organizations for the price of USD 1 per treatment, per month. Over USD 530 000 of such treatments were delivered in 2017. Global endorsement of a new action plan to accelerate leprosy elimination was reached. Novartis reached new milestones in efforts to eliminate malaria. USD 850 million in treatments have now been delivered since 2001, and Novartis initiated clinical trials for KAF156, a novel compound against multidrug-resistant malaria. Novartis signed its first US windfarm power purchase agreement to offset carbon emissions.		Met
	Create a stronger company for the future NTO, NBS and GDD delivered or over-delivered on productivity targets. Compliance and integrity were strengthened. The global compliance program Step Change was fully transitioned and embedded into the organization. Novartis announced the acquisition of Advanced Accelerator Applications SA in Oncology and invested in a number of digital technologies in R&D, commercial and operations. 99% of health authority quality inspections were deemed good or acceptable. Reputation improved further, with good progress in a number of important industry rankings. Culture, particularly collaboration across the organization, further improved. Talent was upgraded in all divisions, and diversity targets for leadership were met.		Met
	Overall assessment of individual objectives		**Above**
Overall assessment of CEO balanced scorecard			**Above target**

ANNUAL INCENTIVE PAYOUT FOR THE 2017 PERFORMANCE YEAR

CEO payout	In reaching its recommendation to the Board on the CEO's 2017 Annual Incentive payout factor, the Compensation Committee recognized that overall, he exceeded expectations. **Overall, the Board approved an Annual Incentive payout of 125% of target, i.e. CHF 3 937 542 for the CEO.**

Long-Term Performance Plan – 2015-2017 cycle

The Long-Term Performance Plan (LTPP) is the first of two Long-Term Incentive plans, which rewards creation of long-term value and innovation, in line with our business strategy.

PLAN OVERVIEW

Grant formula

At the start of the performance cycle, performance share units (PSUs) are granted under each of the Long-Term Incentive plans, as follows:

Step 1	Annual base salary	x	Target incentive %	=	Grant value
Step 2	Grant value	/	Share price	=	Target number of PSUs

On-target opportunity and payout range

On-target opportunities:
- **CEO:** 200% of annual base salary
- **Other Executive Committee members:** between 140% and 190% of annual base salary

Payout range: from 0% to 200% of the on-target amount based on performance

Form of award

PSUs granted at the beginning of the cycle will vest at the end of the three-year performance cycle and are converted into Novartis shares.
PSUs carry dividend equivalents that are paid in shares at the end of the cycle to the extent that performance conditions have been met.

Payout formula:

Target number of PSUs	x	Performance factor	+	Dividend equivalents	=	Realized PSUs

Policy information on page 125 provides details on the treatment of Long-Term Incentive awards for leavers.

For the 2015-2017 cycle, the tables below provide details on the achievements and payouts for each of the two performance measures of the LTPP. The Novartis Cash Value Added performance measure (75% weighting) applies equally for the CEO and the other Executive Committee members. The innovation performance measure (25% weighting) is specific to the respective head of the division or unit, and is a weighted average of the divisions or units for the CEO and Group function heads.

PERFORMANCE MEASURE 1: NOVARTIS CASH VALUE ADDED (NCVA) FOR 2015-2017 CYCLE (75% OF LTPP)

Description

NCVA incentivizes sales growth and margin improvement as well as asset efficiency. It is calculated as follows:

Operating income + Amortization, impairments, and adjusting for gains / losses from non-operating 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) x gross operational assets 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.

Group performance outcome for the 2015-2017 cycle

During the 2015-2017 cycle, Novartis delivered an NCVA of USD 8.3 billion, 4.4% ahead of a target of USD 7.9 billion in constant currencies. This was mainly due to a much stronger operational performance in 2017, driven especially by *Cosentyx* and *Entresto*, and Alcon returning to growth. Following the application of the 1:3 payout curve, the 104.4% achievement versus target generates a performance factor of 113% of target for this part of the LTPP.
When determining the NCVA target for 2015-2017 in comparison to the 2014-2016 cycle, the Board took into account predominantly the loss of exclusivity of *Glivec/Gleevec*, a total of USD 2.8 billion of sales in 2017 compared to 2014. They also considered the impact of the negative currency effects (strengthening of the US dollar), which were partly offset by lower costs of capital resulting from lower interest rates.

PERFORMANCE MEASURE 2: INNOVATION MEASURE FOR CYCLE 2015-2017 (25% OF LTPP)

Description	Innovation is a key value driver for shareholders and is critical to our future. At the beginning of the cycle, the Research & Development Committee determines the most important target milestones, considering the following: • The expected future potential revenue • The potential qualitative impact of research and development on science and medicine • The potential impact of research and development on the treatment or care of patients At the end of the cycle, the Compensation Committee determines the payout factor based on the performance assessment made by the Research & Development Committee. Payout range 0–150% based on achievement of target milestones; payout range 150–200% for truly exceptional performance.
Group performance outcome for the 2015-2017 cycle	During the 2015-2017 performance cycle, Novartis delivered solid performance versus target on innovation, which accelerated over the three-year performance period. Some of the successes in the Innovative Medicines Division included approvals of *Cosentyx* (ankylosing spondylitis and psoriatic arthritis) and *Kisqali* (metastatic breast cancer), as well as the AMG 334 (migraine) submission. The serelaxin (acute heart failure) pivotal study readout was disappointing. Sandoz achievements included the rituximab US and EU filings, as well as epoetin alfa EU approval. Sandoz did not achieve approval in the US and EU for pegfilgrastim. Alcon achieved EU approval for the *Clareon* IOL with *AutonoMe* pre-loaded delivery system, and EU approval for *Dailies Total1* Multifocal. NIBR discovered several unanticipated targets using shRNA/CRISPR and phenotypic screens, translational clinical research and integrative genomics. The achievements made over the three-year performance cycle will have a positive impact on Novartis, the scientific and medical community, and patient outcomes. Following input from the Research and Development Committee, the Board approved an innovation performance factor for the Group of 115% of target.

LTPP PAYOUT FOR THE 2015-2017 PERFORMANCE CYCLE

CEO payout	**Overall, the Board approved an LTPP payout of 114% of target for the CEO, i.e. CHF 5 068 337** (including CHF 446 250 of dividend equivalents accrued and CHF -66 618 in share price evolution over the performance cycle).

DISCLOSURE OF LTPP TARGETS

Principles	LTPP targets (NCVA and long-term innovation) are considered commercially sensitive at the time of setting and therefore are not disclosed on a prospective basis. However, to ensure that shareholders are able to understand the link between pay and performance, we will disclose the targets, achievements and payout after the end of the performance cycle.

Long-Term Relative Performance Plan – 2015-2017 cycle

The Long-Term Relative Performance Plan (LTRPP) is the second of two Long-Term Incentive plans, which rewards competitive shareholder return relative to the global healthcare peer group.

PLAN OVERVIEW

Grant formula

At the start of the performance cycle, PSUs are granted under each of the Long-Term Incentive plans, as follows:

Step 1	Annual base salary	x	Target incentive %	=	Grant value
Step 2	Grant value	/	Share price	=	Target number of PSUs

On-target opportunity and payout range

On-target opportunities:
- **CEO:** 125% of annual base salary
- **Other Executive Committee members:** between 30% and 80% of annual base salary

Payout range: from 0% to 200% of the on-target amount based on performance

Form of award

PSUs granted at the beginning of the cycle will vest at the end of the three-year performance cycle and are converted into Novartis shares.
PSUs carry dividend equivalents that paid in shares at the end of the cycle to the extent that performance conditions have been met.

Payout formula:

Target number of PSUs	x	Performance factor	+	Dividend equivalents	=	Realized PSUs

Policy information on page 125 provides details on the treatment of Long-Term Incentive awards for leavers.

RELATIVE TSR PERFORMANCE FOR CYCLE 2015-2017 (100% OF LTRPP)

Description

Performance is based on our TSR relative to a global healthcare peer group. Outperformance of this peer group is a key indicator of the extent to which Novartis is delivering long-term value for shareholders.

The peer group and payout matrix for the 2015-2017 performance cycle are as follows:

2015-2017 peer group (12 companies, excluding Novartis)[1]		
Abbot	AbbVie	Amgen
AstraZeneca	Bristol-Myers Squibb	Eli Lilly & Co.
GlaxoSmithKline	Johnson & Johnson	Merck & Co.
Pfizer	Roche	Sanofi

Novartis position in the peer group	Payout range[2] (% of target)
Position 1 – 3	160 – 200%
Position 4 – 6	100 – 140%
Position 7 – 10	20 – 80%
Position 11 – 13	0%

[1] From the LTRPP 2017-2019 performance cycle onward, a revised peer group of 15 global healthcare companies applies, as listed on page 123.
[2] From the LTRPP 2018-2020 performance cycle onward, there will be no vesting for below median performance.

The payout matrix includes a significant reduction (including scope to reduce to nil) when Novartis does not outperform the majority of the companies in the group.

At the end of the performance cycle, all companies are ranked in order of highest to lowest TSR in USD. The Compensation Committee uses its discretion to determine the payout factor within the ranges shown above, and takes into consideration factors such as absolute TSR, overall economic conditions, currency fluctuations and other unforeseeable economic situations.

Group performance outcome for the 2015-2017 cycle

Absolute annual TSR in USD was 20.4%. Absolute TSR over the three-year cycle was 0.1% in USD (-1.4% in CHF). Relative TSR performance in USD was rank number 12 out of 13 companies (rank number four among five European comparators).

The Board awarded a performance factor of 0%.

LTRPP PAYOUT FOR THE 2015-2017 PERFORMANCE CYCLE

CEO payout

Overall, the Board approved an LTRPP payout of 0% of target for the CEO, i.e. no payout.

Realized compensation

To aid shareholders' understanding of the link between pay and short-term and long-term performance, the Compensation Committee has decided to disclose the realized compensation for the CEO individually and, for the first time, the other members of the Executive Committee on an aggregated basis. Disclosing realized compensation means that the Annual Incentive and the Long-Term Incentives are disclosed at the end of their respective performance cycles, reflecting **actual** payouts based on performance.

The total actual payout may vary year-on-year depending on multiple factors, including the composition of the Executive Committee and the tenure of its members (as new members may not have vested Long-Term Incentives), compensation increases, payout of variable compensation based on actual performance, share price fluctuations of Long-Term Incentives, and dividend equivalents.

2017 realized compensation for the CEO and other Executive Committee members

The table below reports the fixed and other compensation for the year, including the Annual Incentive for the 2017 performance year, as well as the realized Long-Term Incentives for the 2015-2017 performance cycle. The portion of the Annual Incentive paid in shares for the year 2017 is disclosed using the underlying value of Novartis shares at the date of grant, while the realized value of the LTPP and LTRPP payouts (including dividend equivalents) is calculated using the share price on the date of vesting.

		2017 annual base salary	2017 pension benefits	2017 Annual Incentive[1]		Long-Term Incentives		Other 2017 Compensation[2]	
						LTPP 2015–2017 cycle	LTRPP 2015–2017 cycle		
	Currency	Cash (amount)	Amount	Cash	Equity[1]	Equity (value at vesting date)[2]	Equity (value at vesting date)[2]	Amount[3]	Total realized compensation (incl. Share price movement)[4]
Executive Committee members active on December 31, 2017									
Joseph Jimenez (CEO)	CHF	2 100 000	166 397	1 968 750	1 968 792	5 068 337	0	72 186	11 344 462
Aggregate realized compensation of the other 10 ECN members	CHF	9 310 740	1 675 398	5 841 107	7 743 069	8 355 739	0	3 248 419	36 174 472
Total[5]	**CHF**	**11 410 740**	**1 841 795**	**7 809 857**	**9 711 861**	**13 424 076**	**0**	**3 320 605**	**47 518 934**

See page 134 for 2016 comparative figures.

[1] 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 18, 2018) of CHF 82.90 per Novartis share and USD 86.41 per ADR.

[2] The amounts represent the underlying share value of the 160 733 PSUs vesting on January 21, 2018 to the CEO and other Executive Committee members for the performance cycle 2015-2017, inclusive of earned dividend equivalents for the three-year cycle. The value is determined using the closing share price on the last trading day (January 19, 2018) before the vesting date of CHF 83.38 per Novartis share and USD 86.94 per ADR. For two members of the Executive Committee, the vesting value is reported pro-rata based on the period they were an Executive Committee member during the performance cycle.

[3] Includes any other perquisites, benefits in kind, international assignment benefits as per the global mobility policy (e.g., housing, international health insurance, children's school fees, tax equalization).

[4] All amounts are before deduction of the social security contribution and income tax due by the Executive Committee member.

[5] Amounts for Executive Committee members paid in USD were converted at a rate of CHF 1.00 = USD 1.015, which is the same average exchange rate used in the Group's 2017 consolidated financial statements.

The aggregate amount of realized compensation for the members of the Executive Committee shown in the table above is CHF 47 518 934 million. This figure is below past and expected future levels, despite the fact that the Annual Incentive and the LTPP paid out above target on average for the members, mainly due to the following factors:

- There was no payout for the LTRPP for any of the Executive Committee members in 2017, due to relative TSR over the 2015-2017 performance cycle.
- Five members of the Executive Committee either did not receive LTPP vesting or received limited LTPP vesting in 2017. This is because they were either recent external hires who did not receive a grant three years earlier, or internal promotions who received lower Long-Term Incentive grants based on their compensation prior to Executive Committee appointment.

At the start of the 2015-2017 performance cycle, the CEO was granted 48 626 target performance share units under the LTPP at a share price of CHF 84.75, for a total target grant value of CHF 4 121 054. As shown in the table above, the realized value of the LTPP for the CEO was CHF 5 068 337. Compared to the target value at the grant date, this includes CHF 567 651 relating to the performance over the cycle, CHF -66 618 due to share price movement and CHF 446 250 of dividend equivalents.

At the start of the 2015-2017 performance cycle, the other members of the Executive Committee were granted 80 325 target performance share units under the LTPP at a share price of CHF 84.75 (ADR price of USD 98.75 for Executive Committee members on a US employment contract at an exchange rate of CHF 1 = USD 1.040 at grant), for a total target grant value of CHF 6 887 395 (which is pro-rated for two Executive Committee members based on the period they were an Executive Committee member during the performance cycle). As shown in the table

above, the realized value of the LTPP for the other members of the Executive Committee was CHF 8 355 739. Compared to the target value at the grant date, this includes CHF 931 727 relating to the performance over the cycle, CHF -195 650 due to share price and foreign exchange movements and CHF 732 267 of dividend equivalents.

The column titled "Other 2017 Compensation" in the 2017 total realized compensation of the Executive Committee includes the following amounts:
- CHF 470 925 relating to the vesting of a buy-out award made to Richard Francis when he joined Novartis in 2014 to replace a time-vesting long-term incentive that he lost by leaving his previous employer upon joining Novartis.
- CHF 40 174 relating to the vesting of a buy-out award made to Paul Hudson to replace a time-vesting long-term incentive he lost upon joining Novartis in 2016, and CHF 729 047 relating to the vesting of a buy-out award made to him to replace a performance-vesting long-term incentive that he lost with his previous employer upon joining Novartis. This latter award was granted with performance conditions attached, to mirror the forfeited award. The performance conditions applied were the same as those for the LTPP for the 2014-2016 performance cycle (NCVA and long-term innovation).

All abovementioned buy-out awards were disclosed at the time of grant in previous Compensation Reports.

2016 realized compensation for the CEO and other Executive Committee members (comparative information)

For comparative purposes, 2016 realized compensation is provided below. The main reason for the higher aggregate realized pay in 2016 was the overlap in compensation for outgoing and newly appointed Executive Committee members in 2016. Three members who stepped down in 2016 received ongoing contractual payments during their notice periods while their successors were already in place.

		2016 annual base salary	2016 pension benefits	2016 Annual Incentive[1]		Long-Term Incentives		Other 2016 Compensation[2]	
						LTPP 2014–2016 cycle	LTRPP 2014–2016 cycle		
	Currency	Cash (amount)	Amount	Cash	Equity[1]	Equity (value at vesting date)[2]	Equity (value at vesting date)[2]	Amount[3]	Total realized compensation (incl. Share price movement)[4]
Executive Committee members active on December 31, 2016 and members who stepped down during financial year 2016									
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
Aggregate realized compensation of the other 13 ECN members[5]	CHF	8 778 483	1 675 484	4 825 680	6 516 148	12 190 674	733 656	9 684 126	44 404 251
Total[6]	**CHF**	**10 871 900**	**1 835 767**	**6 243 180**	**7 933 658**	**17 141 008**	**1 175 669**	**9 759 754**	**54 960 936**

[1] 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.
[2] The amounts represent the underlying share value of the PSUs vesting to Executive Committee members for the performance cycle 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, plus earned dividend equivalents during the three-year cycle.
[3] Includes any other perquisites, benefits in kind, international assignment benefits as per the global mobility policy (e.g., housing, international health insurance, children's school fees, tax equalization). In addition, for the three Executive Committee members who stepped down during 2016, it includes, inter alia, their pro-rata compensation from the date they stepped down from the Executive Committee to December 31, 2016.
[4] All amounts are before deduction of the social security contribution and income tax due by the Executive Committee member.
[5] This represents realized compensation of ten Executive Committee members who were active on December 31, 2016 as well as three members who stepped down during 2016.
[6] Amounts for Executive Committee members paid in USD 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.

The column titled "Other 2016 Compensation" 2016 total realized compensation of the Executive Committee includes the following amounts:
- CHF 1 059 750 relating to the vesting of a buy-out award made to Richard Francis when he joined Novartis in 2014 to replace a time-vesting long-term incentive that he lost by leaving his previous employer.
- CHF 191 300 relating to a cash buy-out award made to Paul Hudson when he joined Novartis in 2016 to replace a short-term incentive that he lost by leaving his previous employer.
- USD 844 250 relating to a cash buy-out award made to James Bradner when he joined Novartis in 2016 to replace lost entitlements at one of his former scientific companies.

All abovementioned buy-out awards were disclosed at the time of grant in previous Compensation Reports.

Compensation at grant value

In accordance with the Swiss Ordinance against Excessive Compensation in Listed Companies, Novartis continues to disclose total compensation at grant value for the CEO and other Executive Committee members. The tables below disclose for the CEO and other Executive Committee members:

- Fixed 2017 compensation (base salary and benefits).
- The actual cash portion and the deferred portion granted in equity of the 2017 Annual Incentive.
- LTPP and LTRPP 2017-2019 performance cycle awards, which are reported at target value at grant date under the **assumption** that the awards will vest at 100% achievement and excluding any share price movement and dividend equivalents that may be accrued over the performance cycle. The future payout will only be determined after the performance cycle concludes in three years (i.e., end of 2019), with a payout range of 0–200% of the target value.
- Other compensation for 2017, which includes other benefits and the full amount of compensation for lost entitlements from former employers, either paid in cash or granted in equity in the year.

To assess CEO pay for performance in 2017, including the Annual Incentive payout for the 2015-2017 performance year and the Long-Term Incentive payouts for the 2015-2017 performance cycle, shareholders should refer to the 2017 realized compensation table on page 133.

2017 compensation at grant value for the CEO and other Executive Committee members

		Fixed compensation and pension benefits		Variable compensation					
		Actual compensation paid or granted for 2017				Long-Term Incentive 2017-2019 cycle grants at target			
		2017 annual base salary	2017 pension benefits	2017 Annual Incentive (performance achieved)		LTPP 2017–2019 cycle	LTRPP 2017–2019 cycle	Other 2017 compensation	Total compensation paid, promised or granted 2017
	Currency	Cash (amount)	Amount [1]	Cash	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, 2017									
Joseph Jimenez (CEO)	CHF	2 100 000	166 397	1 968 750	1 968 792	4 200 018	2 625 038	72 186	13 101 181
Steven Baert	CHF	775 000	154 652	663 000	663 034	1 170 069	468 056	119 218	4 013 029
F. Michael Ball	USD	1 120 000	203 546	873 600	873 605	1 792 047	784 043	293 289	5 940 130
James Bradner	USD	1 066 385	117 394	898 800	898 837	1 819 043	856 033	45 855	5 702 347
Felix R. Ehrat	CHF	928 333	137 334	223 200	892 833	1 581 045	558 028	15 034	4 335 807
Richard Francis	CHF	841 667	176 362	425 000	425 028	1 360 002	510 010	1 112 948	4 851 017
Paul Hudson	CHF	958 333	203 485	950 400	950 449	1 536 023	672 046	197 101	5 467 837
Harry Kirsch	CHF	1 038 333	153 854	800 800	800 814	1 768 053	832 012	58 710	5 452 576
Vasant Narasimhan	CHF	841 667	168 562	807 500	807 529	1 360 002	510 010	50 603	4 545 873
Bruno Strigini (until December 31, 2017) [6]	CHF	898 333	210 613	225 000	225 074	1 440 057	540 048	50 000	3 589 125
André Wyss	CHF	875 000	154 339	0	1 232 060	1 408 021	528 061	70 526	4 268 007
Total [7]	**CHF**	**11 410 740**	**1 841 795**	**7 809 857**	**9 711 861**	**19 381 014**	**8 859 147**	**2 080 458**	**61 094 873**

Based on assumption of 100% payout at target. Actual payout (0–200% of target) will be known at the end of the three-year cycle in January 2020.

See page 136 for 2016 comparative figures.

[1] Includes mandatory employer contributions of CHF 4 336 for the CEO and CHF 50 227 for the other Executive Committee members paid by Novartis to governmental social security systems. This amount is out of total employer contributions of CHF 2 710 445 paid in 2017 for all Executive Committee members, 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 18, 2018) of CHF 82.90 per Novartis share and USD 86.41 per ADR.

[3] The amounts represent the underlying share value of the target number of PSUs granted to Executive Committee members for the performance cycle 2017-2019, 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.

[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).

[5] All amounts are before deduction of the social security contribution and income tax due by the Executive Committee member.

[6] Bruno Strigini stepped down from the Executive Committee at the end of the 2017 business year. The LTPP and LTRPP grants for the 2017-19 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis per his contractual agreement and subject to the plan rules .

[7] Amounts in USD for F. Michael Ball and James Bradner were converted at a rate of CHF 1.00 = USD 1.015, which is the same average exchange rate used in the Group's 2017 consolidated financial statements.

When comparing the Executive Committee compensation at grant in 2017 to the compensation at grant in 2016, it may be noted that the two members of the Executive Committee who joined in July 2016, Mr. Hudson and Mr. Strigini, were compensated in 2017 for the first time on a full year basis, including their Annual Incentive based on 2017 performance and full Long-Term Incentive grants.

2016 compensation at grant value for the CEO and other Executive Committee members

For comparative purposes, the table below provides the compensation at grant value for 2016.

		Fixed compensation and pension benefits		Variable compensation					
		Actual compensation paid or granted for 2016				Long-Term Incentive 2016-2018 cycle grants at target			
		2016 annual base salary	2016 pension benefits	2016 Annual Incentive (performance achieved)		LTPP 2016–2018 cycle	LTRPP 2016–2018 cycle	Other 2016 compensation	Total compensation paid, promised or granted 2016
	Currency	Cash (amount)	Amount [1]	Cash	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)	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)	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)	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 [7]	**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 [8]									
David Epstein (until June 30, 2016)	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)	USD	175 154	107 706	195 000	0	0	0	126 454	604 314
Jeff George (until January 31, 2016)	USD	80 000	18 558	44 000	43 986	0	0	2 996 905	3 183 449
Subtotal [7]	**CHF**	**940 809**	**410 492**	**657 537**	**465 417**	**1 266 270**	**633 135**	**7 540 067**	**11 913 726**
Total [7]	**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**

Based on assumption of 100% payout at target. Actual payout (0–200% of target) will be known at the end of the three-year cycle in January 2019.

[1] Includes mandatory employer contributions of CHF 4 336 for the CEO and CHF 70 880 for the other Executive Committee members paid by Novartis to governmental social security systems. This amount is out of total employer contributions of CHF 3 263 989 paid in 2016 for all Executive Committee members, 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 amounts represent the underlying share value of the target number of PSUs granted to Executive Committee members for the performance cycle 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, 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, international assignment benefits as per the global mobility policy (e.g., housing, international health insurance, children's school fees, tax equalization), compensation granted for forfeited entitlements at previous employers and, for F. Michael Ball, a one-off performance award with target value at grant date of USD 3.9 million. In addition, for Executive Committee members who stepped down during 2016, it includes, inter alia, their pro-rata compensation from the date they stepped down from the Executive Committee to December 31, 2016 (see also note 8 below).

[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 "annual base salary", "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" columns reflects their pro-rata compensation at target for the period to December 31, 2018.

[7] Amounts in USD for Mr. Ball, James Bradner, David Epstein, Mark C. Fishman and Jeff 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.

[8] For those members who stepped down from the Executive Committee in 2016, the information under the columns "annual base salary", "pension benefits", "Annual Incentive", "LTPP" and "LTRPP" reflects the pro-rata value during 2016 for the period they were an Executive Committee member. The information under the column "Other 2016 compensation" includes, inter alia, the aggregated pro-rata value from the date they stepped down from the Executive Committee to December 31, 2016.

Interim update on the Alcon CEO's 2016 one-off performance award (performance cycle 2016-2018)

As disclosed in last year's Compensation Report, the Alcon CEO received a one-off award of 50 000 performance share units in February 2016, subject to the achievement of targets linked to the turnaround of Alcon during the 2016-2018 performance cycle. The targets of this one-off performance award are separate from the Annual Incentive or the LTPP and LTRPP targets.

The performance metrics are based on financial and non-financial targets of Alcon, including sales growth ahead of peers, core operating income growth ahead of sales growth, core operating income margin at the average of peers, and successful launches of new products. Should the Alcon CEO achieve these ambitious targets, Alcon will be performing at a very competitive level in the market.

After 2016, performance was tracking significantly below target. Toward the end of 2017 (the second year of the three-year performance cycle), Alcon began to close that gap versus target. Sales growth is accelerating and core operating income is growing ahead of sales. Innovation targets are being met and products in development are beginning to emerge.

We will disclose the targets and final payout of this Long-Term Incentive award after the full three-year performance cycle concludes and once we are able to assess Alcon's performance relative to peers.

2017 CEO and Executive Committee member total target compensation increases

During 2017, the CEO did not receive an increase in his total target compensation. Most other members of the Executive Committee were awarded increases of between 0% and 3%. Exceptions are outlined below. For context, the average of all Novartis employee annual base salary increases was 1% in Switzerland and 3% in the US.

Consistent with our Executive Committee appointments compensation policy (see page 124), four members were appointed to the Executive Committee in recent years with total target compensation below the market median level of compensation against comparable roles at external peer companies. In making its decisions, the Compensation Committee took into account the annual benchmarking analysis, for each of these roles, provided by Willis Towers Watson. The total target compensation for these members has been assessed over the last two to three years, and increases in line with proven performance have been made, as described below.

Vasant Narasimhan
Vasant Narasimhan was promoted to Global Head of Drug Development and Chief Medical Officer, and joined the Executive Committee in early 2016. The Board assessed his performance since appointment as outstanding. He strengthened the pipeline by receiving 11 development approvals and completing 13 major submissions. He also strengthened the interface between the Novartis Institutes for BioMedical Research and Global Drug Development. Therefore, for 2017, his annual base salary was increased by 6.3%, and his target aggregate incentive opportunity was increased from 290% of annual base salary to 320%. Overall, his 2017 total target compensation* increased by 14% compared to 2016. The 2018 compensation details for Dr. Narasimhan following his appointment as CEO, effective February 2018, are disclosed on page 143.

Steven Baert
Steven Baert was promoted to Head of Human Resources (HR) in 2014. During 2016, he played a leading role in the design and transformation of the Novartis operating model, the execution of the portfolio transformation, and various other key HR functions. In this context, Mr. Baert received an annual base salary increase of 4% at the onset of 2017, and his target aggregate incentive opportunity was increased from 290% of annual base salary to 310% for 2017. Overall, his 2017 total target compensation* increased by 9% compared to 2016.

André Wyss
André Wyss was promoted to President of Novartis Operations in 2016. He led Novartis Business Services (NBS) to perform notably ahead of target for the second consecutive year on all customer and financial performance metrics during 2016. He has strengthened the Novartis Business Services organization by improving the governance and optimizing processes. He has ensured great quality of service, as reflected by customer satisfaction scores. At the onset of 2017, his annual base salary was increased by 4% and his target aggregate incentive opportunity was increased from 310% of annual base salary to 320% for 2017. Overall, his 2017 total target compensation* increased by 6% compared to 2016.

Richard Francis
Richard Francis was appointed Sandoz CEO in 2014. He led his team during difficult circumstances to deliver each quarter in 2016 at a high level against ambitious targets in sales and profitability, and without jeopardizing sustainability. Biosimilars sales were significantly ahead of target following the filings for rituximab and etanercept in Europe, and they will continue to be key to the success of Sandoz. Pricing pressures persist on retail generics, especially in the US. Mr. Francis' annual base salary was increased by 6% at the onset of 2017, reflecting his strong leadership since his appointment and his development in the role during 2016. His target aggregate incentive opportunity remained unchanged at 320% of base salary for 2017. Overall, his 2017 total target compensation* increased by 6% compared to 2016.

* Total target compensation comprises annual base salary plus the value at target of the Annual Incentive and Long-Term Incentive awards.

Additional disclosures

This section provides additional disclosures, including information about the shareholdings of the CEO and the other Executive Committee members.

Number of equity instruments granted to the CEO and other Executive Committee members for financial year 2017[1]

	Variable compensation		
	2017 Annual Incentive (performance achieved)	LTPP 2017–2019 cycle	LTRPP 2017–2019 cycle
	Equity (number)[2]	PSUs (target number)[3]	PSUs (target number)[3]
Executive Committee members active on December 31, 2017			
Joseph Jimenez (CEO)	23 749	58 865	36 791
Steven Baert	7 998	16 399	6 560
F. Michael Ball	10 110	24 893	10 891
James Bradner	10 402	25 268	11 891
Felix R. Ehrat	10 770	22 159	7 821
Richard Francis	5 127	19 061	7 148
Paul Hudson	11 465	21 528	9 419
Harry Kirsch	9 660	24 780	11 661
Vasant Narasimhan	9 741	19 061	7 148
Bruno Strigini (until December 31, 2017)[4]	2 715	20 183	7 569
André Wyss	14 862	19 734	7 401
Total	**116 599**	**271 931**	**124 300**

See page 140 for 2016 comparative figures.

[1] The values of the awards are reported in the table "2017 compensation at grant value for the CEO and other Executive Committee members" on page 135.

[2] Vested shares, restricted shares and/or RSUs granted under the Annual Incentive for performance period 2017

[3] Target number of PSUs granted under the LTPP and LTRPP as applicable for the performance cycle 2017-2019

[4] Bruno Strigini stepped down from the Executive Committee at the end of the 2017 business year. The LTPP and LTRPP grants for the 2017-19 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis per his contractual agreement and subject to the plan rules

Number of equity instruments granted to the CEO and other Executive Committee members for financial year 2016[1] (comparative information)

	Variable compensation			
	2016 Annual Incentive (performance achieved)	LTPP 2016–2018 cycle	LTRPP 2016–2018 cycle	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**

[1] The values of the awards are reported in the table "2016 compensation at grant value for the CEO and other Executive Committee members" on page 136.
[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 cycle 2016-2018
[4] Paul Hudson, Mark C. Fishman and Jeff George were not granted LTPP and LTRPP awards for the performance cycle 2016-2018.

Share ownership requirements for the CEO and other Executive Committee members

Executive Committee members are required to own at least a minimum multiple of their annual base salary in Novartis shares or restricted share units (RSUs) 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 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 American depositary receipts (ADRs), as well as RSUs acquired under the company's compensation plans. However, unvested matching shares granted under former matching programs such as the Leveraged Share Savings Plan (LSSP) and 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.

Shares, ADRs and other equity rights owned by Executive Committee members at December 31, 2017[1]

The following table shows, in alphabetical order after the CEO, the total number of shares, ADRs and other equity rights owned by the CEO and the other Executive Committee members and "persons closely linked" to them as of December 31, 2017.

As of December 31, 2017, no members of the Executive Committee, either individually or 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 Executive Committee held any share options to purchase Novartis shares, with the exception of André Wyss, who held 373 000 options, purchased on a private basis.

As of December 31, 2017, all members who have served at least five years on the Executive Committee have met or exceeded their personal Novartis share ownership requirements.

	Vested shares and ADRs	Unvested shares and other equity rights[2]	Equity ownership level as a multiple of annual base salary[3]	Unvested target PSUs (e.g., LTPP / LTRPP)[4]	Matching shares under the LSSP[5]	**Total at December 31, 2017**
Joseph Jimenez (CEO)	287 699	62 693	14x	225 685	0	576 077
Steven Baert	10 955	21 410	3x	33 715	0	66 080
F. Michael Ball	0	7 690	1x	101 532	0	109 222
James Bradner	0	13 234	1x	34 130	0	47 364
Felix R. Ehrat	189 940	23 541	19x	79 764	19 950	313 195
Richard Francis	35 117	17 305	5x	40 453	0	92 875
Paul Hudson	6 616	6 498	1x	29 695	0	42 809
Harry Kirsch	64 769	30 309	8x	58 792	6 277	160 147
Vasant Narasimhan	16 279	58 887	7x	23 413	3 426	102 005
Bruno Strigini	27 871	39 844	6x	38 930	0	106 645
André Wyss	51 183	22 784	7x	40 456	0	114 423
Total	**690 429**	**304 195**		**706 565**	**29 653**	**1 730 842**

[1] Includes holdings of "persons closely linked" to Executive Committee members (see definition on page 142)

[2] Includes unvested shares and ADRs as well as other equity rights applicable for the determination of equity amounts for the share ownership requirements, as per the definition above

[3] The multiple is calculated based on the full year annual base salary and the closing share price as at the end of the 2017 Financial Year. The share price on the final trading day of 2017 was CHF 82.40 / USD 83.96 as at December 29, 2017.

[4] Target number of PSUs are disclosed pro-rata to December 31, 2017, unless the award qualified for full vesting under the relevant plan rules.

[5] Matching shares under the Leveraged Share Savings Plan (LSSP) are disclosed pro-rata to December 31, 2017, unless the award qualified for full vesting under the plan rules. LSSP participation for Executive Committee members ceased in 2014 and no new LSSP awards have been made since then. Outstanding awards will vest five years from the grant date, subject to the LSSP plan rules.

Fixed and variable compensation

CEO and other Executive Committee members' annual base salary and variable compensation mix at grant value for financial year 2017.

	Annual base salary[1]	Variable compensation[2]
Joseph Jimenez (CEO)	16.3%	83.7%
Steven Baert	20.7%	79.3%
F. Michael Ball	20.6%	79.4%
James Bradner	19.3%	80.7%
Felix R. Ehrat	22.2%	77.8%
Richard Francis	23.6%	76.4%
Paul Hudson	18.9%	81.1%
Harry Kirsch	19.8%	80.2%
Vasant Narasimhan	19.5%	80.5%
Bruno Strigini	27.0%	73.0%
André Wyss	21.6%	78.4%
Total	**20.0%**	**80.0%**

[1] Excludes pension and other benefits

[2] See table "2017 compensation at grant value for the CEO and other Executive Committee members" on page 135 with regard to the disclosure principles of variable compensation.

Other payments to Executive Committee members

During 2017, 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

Two former Executive Committee members stepped down in 2016 and ceased employment in 2017 following a 12-month contractual notice period. During 2017, they received pro-rata payments of salary, pension and other benefits, and an Annual Incentive totaling CHF 2 305 599 per their employment contracts.

Five former Executive Committee members received payments totaling CHF 5 988 375 in line with the company's Long-Term Incentive plan rules. The payments related to the vesting of LTPP for the 2015-2017 performance cycle, based on actual performance outcomes plus dividend equivalents. No payments were or will be made for the 2015-2017 LTRPP performance cycle.

In addition, in line with the company's global mobility policy, during 2017 three former members received tax equalization payments totaling CHF 718 151 related to incentive compensation granted during an international assignment.

No other payments (or waivers of claims) were made to former Executive Committee members or to "persons closely linked" to them during 2017.

Loans to Executive Committee members

Our policy does not allow loans to be granted to current or former members of the Executive Committee or to "persons closely linked" to them. Therefore no loans were granted in 2017, and none were outstanding as of December 31, 2017.

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 26 to the Group's audited consolidated financial statements

The total expense for the year for compensation awarded to Executive Committee and Board members, using International Financial Reporting Standards (IFRS) measurement rules, is presented in the Financial Report in Note 26 to the Group's audited consolidated financial statements (see page 240).

Award and delivery of equity to Novartis associates

During 2017, 15.4 million unvested restricted shares (or ADRs), RSUs and target PSUs were granted, and 10.7 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 1.98% 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.

2018 Executive Committee compensation

2018 CEO succession – compensation elements

Retiring CEO, Joseph Jimenez

In September 2017, Mr. Jimenez notified the Board that he had decided to retire, following eight years as CEO. He steps down as CEO on January 31, 2018, and will continue to support the Board and new CEO until his retirement date and the end of his 12-month notice period on August 31, 2018.

He will retire in full compliance with the terms of his employment contract and the Novartis incentive plan rules. He will receive his annual base salary and pro-rated Annual Incentive until August 31, 2018. There will be no increase to his target compensation in 2018. No new Long-Term Incentive awards will be made in January 2018.

In line with the incentive plan rules, there will be no accelerated vesting of his unvested equity. The deferred equity under the Annual Incentive for the performance years 2015 and 2016 will respectively vest in January 2019 and 2020 per the rules of the Deferred Share Bonus Plan. His Long-Term Incentives for the 2016-2018 and 2017-2019 performance cycles will vest on the normal vesting dates (January 2019 and January 2020, respectively), to the extent that the company performance conditions are met. As Mr. Jimenez meets the retirement conditions under the Long-Term Incentive plan rules, these two outstanding Long-Term Incentives will not be pro-rated in line with the plan rules. Clawback and malus, and non-compete restrictions as defined by the plan rules will apply.

No severance or non-compete payments will be made to Mr. Jimenez.

Appointed CEO, Vasant Narasimhan

Dr. Narasimhan will become CEO effective February 1, 2018. The Board determined Dr. Narasimhan's compensation by taking into account his experience and skills, CEO compensation levels at our 15 global healthcare peer companies, advice from the Compensation Committee's independent advisor, and the fact that this is his first Group CEO role.

As of February 1, 2018, Dr. Narasimhan's annual base salary will be CHF 1.55 million. Short- and Long-Term Incentive opportunities at target are a percentage of annual base salary as follows: Annual Incentive at 150% (CHF 2.32 million); LTPP at 200% (CHF 3.10 million); and LTRPP at 125% (CHF 1.94 million). Dr. Narasimhan's total target compensation is CHF 8.91 million. He will also receive pension and other benefits in line with all other Swiss-based employees.

The Board decided to keep Dr. Narasimhan's compensation strongly performance-based (83% is subject to performance conditions), with an emphasis on equity, to align his interests strongly with those of shareholders. His equity ownership requirement will be five times his annual base salary.

Dr. Narasimhan's initial compensation is 26% lower than that of his predecessor. It is the Board's intention to keep Dr. Narasimhan's annual base salary under review in the coming three to four years, with a view to increasing it subject to strong performance and proven ability in the role.

Dr. Narasimhan's employment contract and compensation are in line with the requirements of the Ordinance against Excessive Compensation in Listed Companies.

Other Executive Committee member appointments and departures

Retiring CEO Oncology, Bruno Strigini

Mr. Strigini stepped down from the Executive Committee on December 31, 2017. During his contractual notice period, which ends on December 31, 2018, he will receive his annual base salary and Annual Incentive in accordance with plan rules. No new grants of Long-Term Incentives will be made in 2018.

Mr. Strigini's outstanding Long-Term Incentives will be pro-rated for time employed during the performance period. There will be no accelerated vesting, as awards will remain subject to performance over the full cycle. Clawback and malus, and non-compete restrictions as defined by the plan rules will apply. No severance or non-compete payments will be made.

Appointed CEO Oncology, Elizabeth Barrett

Novartis announced the appointment of Elizabeth Barrett as the new CEO of Oncology, starting on February 1, 2018. Her annual base salary will be CHF 850 000, her target Annual Incentive of 100%, and her target Long-Term Incentives totaling 260%.

Elizabeth will receive compensation for loss of entitlements with her previous employer on a like-for-like basis, subject to evidence and in line with our Executive Committee members appointment compensation policy regarding buy-outs. The value of the replacement cash and equity awards will be determined on the date of her entry into the company. Therefore, details of this buy-out will be communicated in the 2018 Compensation Report.

Changes to the 2018 Executive Committee compensation system

In 2017, the Compensation Committee conducted a review of the Executive Committee compensation system, taking into account developments in market practice, and alignment with the strategic objectives and talent agenda at Novartis.

The Compensation Committee believes the compensation system supports the company's strategy and ensures a strong link between pay and performance.

In view of market changes since the current system was implemented in 2014, the Board and Compensation Committee have decided to make evolutionary changes to provide greater simplicity and further enhance the link between pay and performance. Changes are also based on constructive feedback from shareholders as part of our ongoing dialogue and consideration of their views. They will take effect from January 2018.

2018 Annual Incentive

A simplified Annual Incentive balanced scorecard will be introduced that places additional weighting on financial performance (60% weighting) and that also focuses on key strategic objectives in the areas of innovation, access to healthcare, people and culture, data and digital (40% weighting). Values and Behaviors remain a key component of the Annual Incentive and are embedded in our culture. As such, members of the Executive Committee are expected to demonstrate these to the highest standard.

From 2018, the CEO balanced scorecard metrics will be as follows:

CEO BALANCED SCORECARD – KEY METRICS
Group financial targets (60% weighting)
• Group net sales
• Group operating income
• Group FCF as % of sales
• Share of peers
Strategic objectives (40% weighting)
• Innovation
• Access to healthcare
• People and culture
• Data and digital

The payout schedule for the Annual Incentive will be amended to reflect the simplified structure as follows:

PERFORMANCE	PAYOUT
Outstanding	170–200%
Exceeds expectations	130–160%
Meets expectations	80–120%
Partially meets expectations	40–70%
Below expectations	0–30%

LTRPP payout for cycles starting in 2018 onward

The performance condition for the LTRPP has been made more stringent from the 2018-2020 performance cycle onward. Going forward, Executive Committee members will receive no payout if relative TSR is below the median of the companies in our global healthcare peer group. The Board retains the right to apply its judgment in determining the final payout, considering factors such as absolute TSR, currency fluctuations and overall economic conditions.

The payout matrix for the 2018-2020 performance cycle onward will be as follows:

NOVARTIS POSITION IN THE PEER GROUP	PAYOUT RANGE (% OF TARGET)
Positions 1–2	170–200%
Positions 3–5	130–160%
Positions 6–8	80–120%
Positions 9–16	0%

Change in Executive Committee retirement rules for the LTPP and LTRPP from 2019

In line with evolving governance practices, we have revised our Long-Term Incentive plan rules for retiring Executive Committee members, applicable to grants made from 2019 onward. Going forward, members who fulfill the retirement conditions under the plan rules will receive pro-rata vesting, rather than full vesting, of outstanding Long-Term Incentives. These incentives will continue to have performance conditions applied, and will vest at the end of the cycle on the normal vesting date. The timing of this change respects the one-year notice period required in the Executive Committee member employment contracts.

Two members of the Executive Committee (the CEO of Alcon and the General Counsel), who have already met the retirement conditions under the plan rules for LTPP and LTRPP, will be grandfathered under the current rules (with the exception of the one-off performance award granted to the CEO of Alcon in 2016, which vests pro-rata on retirement, as per his contract).

2018 Executive Committee total target compensation increases

To aid transparency and as part of our commitment to good governance, the Compensation Committee has decided to voluntarily disclose the 2018 Executive Committee total target compensation increases at the start of the year.

Details of the 2018 compensation for Mr. Jimenez as the retiring CEO and Dr. Narasimhan as the appointed CEO are provided on page 143.

The other members of the Executive Committee will not be awarded any increases for 2018 with the exception of two members for reasons set out below. For context, average associate merit increases were 1% in Switzerland and 3% in the US.

James Bradner
James Bradner was hired externally as the President of Novartis Institute of Biomedical Research (NIBR) in 2015. Since he joined the organization he has delivered strong performance and has played a key role in increasing cooperation between NIBR and Global Drug Development. His compensation was adjusted to recognize his performance and also catch up towards US peers (NIBR, as well as most of its competitors are based and headquartered in the US). In this context, Mr. Bradner will receive an annual base salary increase in line with other US associates of 3% as from March 1, 2018. He will not receive increases to target incentives. Overall, his 2018 total target compensation will be increased by 2.8% compared to 2017.

Paul Hudson
Paul Hudson was hired externally as the CEO of the Pharmaceuticals division in June 2016. He led the division to overachieve its targets for 2017, contributing substantially to Novartis' overall performance for the year. His leadership focused the division on new product performance, securing future revenue for Novartis. He has also enhanced the division's culture and engagement. His compensation was adjusted to recognize these factors, as well as to gradually bring his compensation in line with his global peers. In this context, Mr. Hudson will receive an annual base salary increase of 3.1% as from March 1, 2018, and his target Long Term incentive will be increased from 230% of annual base salary to 250% as from 2018. No changes will be made to his Annual Incentive. Overall, his 2018 total target compensation will be increased by 7.8% compared to 2017.

2018 Executive Committee compensation system review

The current Executive Committee compensation system has been in place since January 2014. Each year, the Board and Compensation Committee review it to ensure it is in line with business needs and evolving best practice. In 2018, the review will focus particularly on the performance measures for the Long Term Incentive, to ensure they are appropriately aligned to the company's strategy and goals of the new CEO. The Compensation Committee will engage in dialogue with Novartis' major shareholders and will consult its independent advisor on this topic.

2017 Board compensation

Board compensation philosophy and benchmarking

In line with market practice in Switzerland, the Board sets compensation for its members at a level that allows for the attraction 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. Each year at the AGM, shareholders are requested to approve, in a binding vote, the total compensation of the Board until the following AGM.

The Board sets the level of compensation for its Chairman and the other members to be in line with relevant benchmark companies, which include other large Switzerland-based multinational companies: ABB, Credit Suisse, LafargeHolcim, Nestlé, Roche 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 Swiss rules regarding Board and Executive Committee compensation 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 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

As Chairman, 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.

For 2017, 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 2017).

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 with effect from the 2014 AGM, and align our aggregate Board compensation with the current levels of other large Swiss companies.

2017 Board member annual fee rates

CHF	AGM 2017-2018 annual fee
Chairman of the Board	3 800 000
Board membership	300 000
Vice Chairman	50 000
Chair of the Audit and Compliance Committee	120 000
Chair 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.

Board member total compensation earned for financial year 2017

The following tables disclose the 2017 Board member total compensation and prior-year comparative information. Board compensation is reported as the amount earned in the financial year.

	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, 2017												
Joerg Reinhardt [4]	Chair					Chair		24 407	1 900 000	1 900 000	4 336	3 804 336
Enrico Vanni	•	•	•	Chair	•			3 210	250 000	250 000	3 475	503 475
Nancy Andrews	•					•	•	2 311	180 000	180 000	–	360 000
Dimitri Azar	•		•			•		2 504	195 000	195 000	–	390 000
Ton Buechner	•						• [5]	4 039	–	325 000	–	325 000
Srikant Datar	•		• [7]	•			Chair [5]	2 989	227 500	227 500	–	455 000
Elizabeth Doherty	•		Chair [5]				• [5]	2 591	217 500	217 500	–	435 000
Ann Fudge	•			•	•		•	2 504	195 000	195 000	–	390 000
Frans van Houten (from February 28, 2017)	•							1 305	75 000	175 000	–	250 000
Pierre Landolt [6]	•				•			4 238	–	330 000	3 475	333 475
Andreas von Planta	•		•		Chair		• [8]	2 989	227 500	227 500	4 336	459 336
Charles L. Sawyers	•				•	•		2 311	180 000	180 000	–	360 000
William T. Winters	•			•				4 238	–	330 000	–	330 000
Total								**59 636**	**3 647 500**	**4 732 500**	**15 622**	**8 395 622**

See next page for 2016 comparative figures.

[1] The shown amounts represent the gross number of shares delivered to each Board member in 2017 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 2017 for the services from the 2016 AGM to the 2017 AGM, and (ii) the first of two equity installments delivered in August 2017 for the services from the 2017 AGM to the 2018 AGM. The second and final equity installment for the services from the 2017 AGM to the 2018 AGM will take place in February 2018.
[2] Includes an amount of CHF 15 622 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 298 206, 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] No additional committee fees for chairing the Research & Development Committee were delivered to Dr. Reinhardt.
[5] From February 28, 2017
[6] According to Pierre Landolt, the Sandoz Family Foundation is the economic beneficiary of the compensation.
[7] Until February 27, 2017, Chair of the Audit and Compliance Committee
[8] Until February 27, 2017, Chair of the Risk Committee

Board member total compensation earned for financial year 2016 (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) [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**

[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.

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
	2017	**January 1, 2017 to 2017 AGM**	**January 1, 2018 to 2018 AGM[2]**	**2017 AGM to 2018 AGM**	**2017 AGM**	**2017 AGM**
Joerg Reinhardt	3 804 336	633 334	633 334	3 804 336	3 805 000	Yes
Other Board members	4 591 286	713 334	773 334	4 651 286	4 720 000	Yes
Total	**8 395 622**	**1 346 668**	**1 406 668**	**8 455 622**	**8 525 000**	**Yes**
	2016	January 1, 2016 to 2016 AGM	January 1, 2017 to 2017 AGM	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**

[1] See page 147 for 2017 Board member compensation.
[2] To be confirmed and reported in the 2018 Compensation Report

Additional disclosures

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 are required to own at least 4 000 Novartis shares within three years after joining the Board, to ensure their interests are aligned with those of 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. As of December 31, 2017, all current and former members of the Board who were required to meet the minimum share ownership requirements did so. From the 2018 AGM, the requirement will be increased (see details on page 151).

Shares, ADRs and share options owned by Board members

The total number of vested Novartis shares and ADRs owned by members of the Board and "persons closely linked" to them as of December 31, 2017, is shown in the table below.

As of December 31, 2017, no members of the Board, either individually or 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 held any share options to purchase Novartis shares.

	Number of shares At December 31, 2017[1,2]
Joerg Reinhardt	518 310
Enrico Vanni	20 101
Nancy Andrews	4 042
Dimitri Azar	13 094
Ton Buechner	4 428
Srikant Datar	37 239
Elizabeth Doherty	2 761
Ann Fudge	15 457
Frans van Houten	978
Pierre Landolt[3]	61 029
Andreas von Planta	130 634
Charles L. Sawyers	7 763
William T. Winters	12 397
Total	**828 233**

[1] Includes holdings of "persons closely linked" to Board members (see definition on page 142)
[2] Each share provides entitlement to one vote.
[3] According to Pierre Landolt, the Sandoz Family Foundation is the economic beneficiary of the shares

Loans to Board members

Our policy does not allow loans to be granted to current or former members of the Board or to "persons closely linked" to them. Therefore no loans were granted in 2017, and none were outstanding as of December 31, 2017.

Other payments to Board members

During 2017, no payments (or waivers of claims) other than those set out in the Board member compensation table (including its footnotes) on page 147 were made to current members of the Board or to "persons closely linked" to them.

Payments to former Board members

During 2017, no payments (or waivers of claims) were made to former Board members or to "persons closely linked" to them, except for the payments reported in Note 26 to the Group's audited consolidated financial statements (page 240).

2018 Board compensation

Board and committee membership fees

For the year 2018, the Chairman has voluntarily waived his contractual compensation increase entitlement, which is an amount not lower than the average annual compensation increase awarded to associates based in Switzerland.

Board and committee membership fees have remained unchanged since the reduction that took place at the 2014 AGM. The Board has decided to rebalance its fee structure from the 2018 AGM to better recognize the responsibilities and time commitment of the committees, both of which have increased as a result of the evolving governance and regulatory environment. In particular, developments in compensation governance requirements have, over the last few years, resulted in a greater number of interactions between the Compensation Committee and shareholders and other external stakeholders.

The Board membership fee will decrease, and the committee membership fees will increase. The Board took into consideration external benchmarking information in the Swiss market and independent advice. The change is cost-neutral for the company, as the new fee structure results in the same average fee per Board member, excluding the Chairman. The total aggregated Board fees will decrease in 2018 due to the reduction in the number of Board members, following the departure of Mr. Pierre Landolt, who will reach the age limit for Board membership specified in the Articles of Incorporation.

CHF	AGM 2018-2019 annual fee
Chairman of the Board	3 800 000
Board membership	280 000
Vice Chairman	50 000
Chair of the Audit and Compliance Committee	130 000
Chair of the Compensation Committee	90 000
Chair of the following committees: • Governance, Nomination and Corporate Responsibilities Committee • Research & Development Committee • Risk Committee	70 000
Membership of the Audit and Compliance Committee	70 000
Membership of the following committees: • Compensation Committee • Governance, Nomination and Corporate Responsibilities Committee • Research & Development Committee • Risk Committee	40 000

Share ownership requirements

The Chairman's share ownership requirement of 30 000 shares will remain unchanged for 2018.

For the other Board members, and following a review of market practices at our peer group companies, the Board has decided to increase the share ownership requirement from 4 000 to 5 000 shares, effective from the 2018 AGM. The increase will also strengthen the alignment of interests with those of our shareholders.

To allow sufficient time for Board members to achieve the increased requirement, they will have four years from appointment to acquire the minimum 5 000 shares under the new policy. In addition, Board members will continue to be required to hold these shares for 12 months after retiring from the Board.

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).

Risk management principles

The Compensation Committee, with support from its independent advisor, reviews market trends in compensation and changes in corporate governance rules and best practices. 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
- Balanced mix of short-term and long-term variable compensation elements
- Performance evaluation under the Annual Incentive includes an individual balanced scorecard and assessed Values and Behaviors
- Clawback and malus principles apply to all elements of variable compensation
- Performance-vesting 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 from the end of employment (annual base salary and Annual Incentive of the prior year only) as per contract, if applicable
- Good and bad leaver provisions apply to variable compensation of leavers
- 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).

For share ownership requirements, please refer to page 141 – share ownership requirements for the CEO and other Executive Committee members.

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/investors/company-overview/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 in line with the Compensation Committee Charter. A summary of discussions and conclusions of each committee meeting is delivered to the full Board. 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 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 a 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., appointed in 2011, as its independent external compensation advisor until June 2017. During the year, as part of its normal governance practices, the Compensation Committee conducted a market review of compensation advisors, with a focus on companies with extensive experience in European markets. Following a tendering process and an analysis to ensure that there were no conflicts-of-interest, the Compensation Committee appointed Mercer Limited as its independent compensation advisor with effect from July 2017.

Compensation Committee meetings held in 2017

In 2017, the Compensation Committee held six formal meetings, and one additional joint meeting with the Research & Development Committee to review and endorse for approval by the Board the innovation targets and achievements of the LTPP and Annual Incentive. The Compensation Committee annual performance evaluation was undertaken by an external specialist firm (Egon Zehnder) as part of a wider review of the Board and each of its committees in 2017. In addition, the Compensation Committee reviewed its charter, as it does every year, and recommended updates to the Board to reflect the ongoing evolution of compensation governance practices.

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Novartis Group consolidated financial statements

Consolidated income statements

(For the years ended December 31, 2017, 2016 and 2015)

(USD millions unless indicated otherwise)	Note	2017	2016	2015
Net sales to third parties from continuing operations	3	**49 109**	**48 518**	**49 414**
Sales to discontinued segments				26
Net sales from continuing operations	3	**49 109**	**48 518**	**49 440**
Other revenues		1 026	918	947
Cost of goods sold		– 17 175	– 17 520	– 17 404
Gross profit from continuing operations		**32 960**	**31 916**	**32 983**
Marketing & Sales		– 12 861	– 11 998	– 11 772
Research & Development		– 8 972	– 9 039	– 8 935
General & Administration		– 2 136	– 2 194	– 2 475
Other income		1 969	1 927	2 049
Other expense		– 2 331	– 2 344	– 2 873
Operating income from continuing operations	3	**8 629**	**8 268**	**8 977**
Income from associated companies	4	1 108	703	266
Interest expense	5	– 777	– 707	– 655
Other financial income and expense	5	39	– 447	– 454
Income before taxes from continuing operations		**8 999**	**7 817**	**8 134**
Taxes	6	– 1 296	– 1 119	– 1 106
Net income from continuing operations		**7 703**	**6 698**	**7 028**
Net income from discontinued operations	29			10 766
Net income		**7 703**	**6 698**	**17 794**
Attributable to:				
Shareholders of Novartis AG		*7 703*	*6 712*	*17 783*
Non-controlling interests		*0*	*– 14*	*11*
Basic earnings per share (USD) from continuing operations		3.28	2.82	2.92
Basic earnings per share (USD) from discontinued operations				4.48
Total basic earnings per share (USD)	7	**3.28**	**2.82**	**7.40**
Diluted earnings per share (USD) from continuing operations		3.25	2.80	2.88
Diluted earnings per share (USD) from discontinued operations				4.41
Total diluted earnings per share (USD)	7	**3.25**	**2.80**	**7.29**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated statements of comprehensive income

(For the years ended December 31, 2017, 2016 and 2015)

(USD millions)	Note	2017	2016	2015
Net income		**7 703**	**6 698**	**17 794**
Other comprehensive income to be eventually recycled into the consolidated income statement:				
Fair value adjustments on marketable securities, net of taxes	8.1	38	– 113	28
Fair value adjustments on deferred cash flow hedges, net of taxes	8.1	12	15	20
Total fair value adjustments on financial instruments, net of taxes	8.1	50	– 98	48
Novartis share of other comprehensive income recognized by associated companies, net of taxes		– 37	671	– 48
Net investment hedge		– 237		
Currency translation effects	8.2	2 210	– 2 391	– 1 662
Total of items to eventually recycle		1 986	– 1 818	– 1 662
Other comprehensive income never to be recycled into the consolidated income statement:				
Actuarial gains/(losses) from defined benefit plans, net of taxes	8.3	851	– 515	– 147
Total comprehensive income		**10 540**	**4 365**	**15 985**
Attributable to:				
Shareholders of Novartis AG		*10 538*	*4 382*	*15 977*
Continuing operations		*10 538*	*4 382*	*5 238*
Discontinued operations				*10 739*
Non-controlling interests		*2*	*– 17*	*8*

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated balance sheets

(At December 31, 2017 and 2016)

(USD millions)	Note	2017	2016
Assets			
Non-current assets			
Property, plant & equipment	9	16 464	15 641
Goodwill	10	31 750	30 980
Intangible assets other than goodwill	10	29 997	31 340
Investments in associated companies	4	15 370	14 304
Deferred tax assets	11	8 229	10 034
Financial assets	12	2 243	2 196
Other non-current assets	12	818	698
Total non-current assets		**104 871**	**105 193**
Current assets			
Inventories	13	6 867	6 255
Trade receivables	14	8 600	8 202
Income tax receivables		202	156
Marketable securities, commodities, time deposits and derivative financial instruments	15	625	770
Cash and cash equivalents	15	8 860	7 007
Other current assets	16	3 054	2 541
Total current assets		**28 208**	**24 931**
Total assets		**133 079**	**130 124**
Equity and liabilities			
Equity			
Share capital	17	969	972
Treasury shares	17	– 100	– 76
Reserves		73 299	73 936
Issued share capital and reserves attributable to Novartis AG shareholders		**74 168**	**74 832**
Non-controlling interests		59	59
Total equity		**74 227**	**74 891**
Liabilities			
Non-current liabilities			
Financial debts	18	23 224	17 897
Deferred tax liabilities	11	5 168	6 657
Provisions and other non-current liabilities	19	7 057	8 470
Total non-current liabilities		**35 449**	**33 024**
Current liabilities			
Trade payables		5 169	4 873
Financial debts and derivative financial instruments	20	5 308	5 905
Current income tax liabilities		1 723	1 603
Provisions and other current liabilities	21	11 203	9 828
Total current liabilities		**23 403**	**22 209**
Total liabilities		**58 852**	**55 233**
Total equity and liabilities		**133 079**	**130 124**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated statements of changes in equity

(For the years ended December 31, 2017, 2016 and 2015)

(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, 2015		**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	17.1			– 6 643		– 6 643		– 6 643
Purchase of treasury shares	17.2		– 33	– 6 086		– 6 119		– 6 119
Reduction of share capital		– 10	15	– 5				
Exercise of options and employee transactions	17.2		14	1 578		1 592		1 592
Equity-based compensation	17.2		6	809		815		815
Decrease of treasury share repurchase obligation under a share buyback trading plan	17.4			658		658		658
Changes in non-controlling interests	17.3						– 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	17.1			– 6 475		– 6 475		– 6 475
Purchase of treasury shares	17.2		– 7	– 985		– 992		– 992
Reduction of share capital		– 19	25	– 6				
Exercise of options and employee transactions	17.2		2	212		214		214
Equity-based compensation	17.2		5	659		664		664
Impact of change in ownership of consolidated entities	17.5			– 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**
Net income				7 703		7 703		7 703
Other comprehensive income	8			– 37	2 872	2 835	2	2 837
Total comprehensive income				**7 666**	**2 872**	**10 538**	**2**	**10 540**
Dividends	17.1			– 6 495		– 6 495		– 6 495
Purchase of treasury shares	17.2		– 36	– 5 538		– 5 574		– 5 574
Reduction of share capital		– 3	5	– 2				
Exercise of options and employee transactions	17.2		2	253		255		255
Equity-based compensation	17.2		5	607		612		612
Changes in non-controlling interests	17.3						– 2	– 2
Total of other equity movements		**– 3**	**– 24**	**– 11 175**		**– 11 202**	**– 2**	**– 11 204**
Total equity at December 31, 2017		**969**	**– 100**	**77 639**	**– 4 340**	**74 168**	**59**	**74 227**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated cash flow statements

(For the years ended December 31, 2017, 2016 and 2015)

(USD millions)	Note	2017	2016	2015
Net income from continuing operations		**7 703**	**6 698**	**7 028**
Reversal of non-cash items	22.1	7 058	8 437	9 070
Dividends received from associated companies and others		987	899	432
Interest received		97	43	34
Interest paid		– 708	– 723	– 646
Other financial receipts				714
Other financial payments		– 272	– 155	– 23
Taxes paid [1]		– 1 611	– 2 111	– 2 454
Cash flows before working capital and provision changes from continuing operations		**13 254**	**13 088**	**14 155**
Payments out of provisions and other net cash movements in non-current liabilities		– 877	– 1 536	– 1 207
Change in net current assets and other operating cash flow items	22.2	244	– 77	– 863
Cash flows from operating activities from continuing operations		**12 621**	**11 475**	**12 085**
Cash flows used in operating activities from discontinued operations [1]				– 188
Total cash flows from operating activities		**12 621**	**11 475**	**11 897**
Purchase of property, plant & equipment		– 1 696	– 1 862	– 2 367
Proceeds from sales of property, plant & equipment		92	161	237
Purchase of intangible assets		– 1 050	– 1 017	– 1 138
Proceeds from sales of intangible assets		640	847	621
Purchase of financial assets		– 468	– 247	– 264
Proceeds from sales of financial assets		330	247	166
Purchase of other non-current assets		– 42	– 149	– 82
Proceeds from sales of other non-current assets		1		1
Divestments of interests in associated companies		29		
Acquisitions and divestments of businesses, net	22.3	– 784	– 765	– 16 507
Purchase of marketable securities and commodities		– 580	– 530	– 595
Proceeds from sales of marketable securities and commodities		549	622	262
Cash flows used in investing activities from continuing operations		**– 2 979**	**– 2 693**	**– 19 666**
Cash flows used in/from investing activities from discontinued operations [1]	22.4	– 140	– 748	8 882
Total cash flows used in investing activities		**– 3 119**	**– 3 441**	**– 10 784**
Dividends paid to shareholders of Novartis AG		– 6 495	– 6 475	– 6 643
Acquisition of treasury shares		– 5 490	– 1 109	– 6 071
Proceeds from exercise options and other treasury share transactions		252	214	1 581
Increase in non-current financial debts	22.5	4 933	1 935	4 596
Repayment of non-current financial debts	22.5	– 188	– 1 696	– 3 086
Change in current financial debts	22.5	– 755	1 816	451
Impact of change in ownership of consolidated entities		0	– 6	0
Dividends paid to non-controlling interests and other financing cash flows		10	7	– 4
Cash flows used in financing activities		**– 7 733**	**– 5 314**	**– 9 176**
Effect of exchange rate changes on cash and cash equivalents		84	– 387	– 286
Net change in cash and cash equivalents		**1 853**	**2 333**	**– 8 349**
Cash and cash equivalents at January 1		7 007	4 674	13 023
Cash and cash equivalents at December 31		**8 860**	**7 007**	**4 674**

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.

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 level of these groups of CGUs, 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 products.

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 products" 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
- Long-term sales forecasts for periods of up to 25 years
- Actions of competitors (launch of competing products, marketing initiatives, etc.)
- Sales erosion rates after the end of patent or other intellectual property rights protection and timing of the entry of generic competition
- 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
- Future tax rate
- Appropriate royalty rate for the Alcon Brand name
- Appropriate terminal growth rate
- Appropriate 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 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 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. The majority of non-quoted investments are valued initially at fair value through the established purchase price between a willing buyer and seller. Non-quoted investments are subsequently adjusted based on values derived from using discounted cash flow analysis or other pricing models. These investment values are what is known as "Level 3" in the fair value hierarchy.

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 that 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 held for long-term strategic purposes, are carried at amortized cost, which reflects the time value of money less any allowances for uncollectable amounts. For these financial assets, impairments and exchange rate losses are included in "Other expense" in the consolidated income statement and exchange rate gains and interest income using the effective interest rate method are included in "Other income" in the consolidated income statement.

Derivative financial instruments

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 of various types of business risks. To mitigate these risks, the Group enters into certain derivative financial instruments. The risk reduction is obtained because the derivative's value or cash flows are expected, wholly or partly, to offset changes in the value or cash flows of the recognized assets or liabilities. The overall strategy is aiming to mitigate the currency and interest exposure risk of positions that are contractually agreed and to partially mitigate the exposure risk of selected anticipated transactions.

Certain derivative financial instruments meet the criteria for hedge accounting treatment. 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. Other derivative financial instruments do not meet the criteria to qualify for hedge accounting. Changes in the fair value of those derivative instruments are recognized immediately in "Other financial income and expense" in the consolidated income statement.

In addition, the Group has designated certain long-term debt components as hedges of the translation risk arising on certain net investments in foreign operations. On consolidation, foreign currency differences arising on long-term debt designated as net investment hedges of a foreign operation are recognized in other comprehensive income and accumulated in currency translation effects, to the extent that the hedge is effective. The foreign currency differences arising from hedge ineffectiveness are recognized in the income statement in "Other financial income and expense".

When a hedged net investment is disposed of, the proportionate portion of the cumulative amount recognized in equity in relation to the hedged net investment is transferred to the income statement as an adjustment to the profit or loss on disposal.

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 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 financial 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, are 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 income" or "Other expense", depending on its nature.

The effect of unwinding the discount over time is recognized for contingent liabilities in "Interest expense" and for contingent assets in "other financial income and expense" in the consolidated income statement.

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, 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 installment 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 their 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 and profit sharing 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, such as contract research and development organizations in compensation for subcontracted R&D, that is deemed to not 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 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 products.

Inventory produced ahead of regulatory approval is fully provisioned 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) that 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 adjustments for assumptions related to their forfeiture during the vesting period, is expensed on a straight-line basis over the respective vesting period.

PSUs are subject to certain performance criteria being achieved during the vesting period and require plan participants to provide services 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 is 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 that 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 conditional on the provision of services by the plan participant during the vesting period as well as 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 that 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 PSUs are

forfeited, unless determined otherwise by the provision of the plan rules or by the Compensation Committee of the Novartis Board of Directors, for example, in connection with a reorganization or divestment.

Measuring the fair values of PSUs granted under the LTRPP, requires estimates. 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; the grant price of underlying shares or ADRs; expected volatilities; the 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 that 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 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 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 that are effective for the financial year beginning on January 1, 2017, 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

IFRS 9 Financial Instruments will substantially change the classification and measurement of financial instruments. The new standard requires impairments to be based on a forward-looking model, changes the approach to hedging financial exposures and related documentation, changes the recognition of certain fair value changes and amends disclosures requirements.

The impairment of financial assets, including trade and lease receivables, will be assessed using an expected credit loss model rather than the current incurred loss model. Given the nature of Novartis' financial assets, the Group does not expect a significant impact to our provisions for doubtful accounts or impairments from this change.

The new hedge accounting model introduced by the standard requires hedge accounting relationships to be based upon the Group's own risk management strategy and objectives, and to be discontinued only when the relationships no longer qualify for hedge accounting. Based on the impact of adoption assessment performed, Novartis expects that the existing hedge relationship will continue to be designated as such under the new hedge accounting requirements.

The Group will implement the new standard on January 1, 2018 and will apply the modified retrospective method, which requires the recognition of the cumulative effect of initially applying IFRS 9, as at January 1, 2018, to retained earnings and not restate prior years.

The most significant impact to the Group, upon adoption of IFRS 9, will be the treatment of the unrealized gains and losses from changes in fair value on certain of

the Group's financial instruments, which are classified as available-for-sale marketable securities and financial investments. The unrealized gains and losses (to the extent of previous recognized unrealized gains), which the Group currently recognizes in the consolidated statement of other comprehensive income, will in the future be recognized in the consolidated income statement. This approach will be applied to equity securities where the fair value through other comprehensive income irrevocable option will not be applied. If this accounting had been applied prior to January 1, 2018, the adoption date, the cumulative effect to be recorded as an increase to retained earnings, as at January 1, 2018, is estimated at USD 0.2 billion.

IFRS 15 REVENUE FROM CONTRACTS WITH CUSTOMERS

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.

Results of our impact assessment:

- The Group's "Net sales" are derived from the sale of drug substances, vision care products, surgical equipment, other products and services, where control transfers to our customers and our performance obligations are satisfied at the time of shipment to or receipt of the products by the customer or when the services are performed. We do not expect IFRS 15 to significantly change the timing or amount of revenue recognized under these arrangements.
- The Group's "Other revenue" consists of royalty income from the out-licensing of intellectual property (IP), which is recognized as earned and from manufacturing services and other services, where revenue is recognized when control transfers to the third party and our performance obligations are satisfied. We do not expect IFRS 15 to significantly change the timing or amount of revenue recognized from these manufacturing and other services arrangements, nor from these royalty arrangements, as the standard's royalty exception will apply for IP licenses.

"Other revenue" also includes revenue from profit sharing arrangements with our collaboration partners. Furthermore, the Group receives milestone payments related to sale or out-licensing of IP. Novartis does not expect IFRS 15 to significantly change the timing or amount of revenue recognized under these arrangements.

The Group will implement the new standard on January 1, 2018 and will apply the modified retrospective method, which requires the recognition of the cumulative effect of initially applying IFRS 15, as at January 1, 2018, to retained earnings and not restate prior years. However, since the results of the Group's impact assessment indicates that IFRS 15 is not expected to significantly change the amount or timing of revenue recognition in 2017 or prior periods, an insignificant cumulative adjustment to increase retained earnings will be made.

IFRS 16 LEASES

IFRS 16 Leases substantially changes the financial statements as the majority of leases for which the company is the lessee 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 on January 1, 2019. The current undiscounted operating lease commitments of USD 3.2 billion as of December 31, 2017, and disclosed in Note 27 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.

Upon adoption of the new standard, a portion of the annual operating lease costs, which is currently fully recognized as a functional expense, will be recorded as interest expense. In addition, the portion of the annual lease payments recognized in the cash flow statement as a reduction of the lease liability will be recognized as an outflow from financing activities, which currently are fully recognized as an outflow from operating activities. Given the leases involved and assuming the current low interest rate environment continues, the Group does not currently expect these effects to be significant.

There are no other IFRS standards or interpretations not yet effective that would be expected to have a material impact on the Group.

2. Significant transactions

Significant transactions in 2017

INNOVATIVE MEDICINES – ACQUISITION OF ZIARCO GROUP LIMITED

On January 20, 2017, Novartis acquired Ziarco Group Limited (Ziarco), a privately held company in the United Kingdom, focused on the development of novel treatments in dermatology. This acquisition adds a once-daily oral H4 receptor antagonist in development for atopic dermatitis, commonly known as eczema, to complement the Novartis dermatology portfolio and pipeline. The fair value of the total purchase consideration was USD 420 million. The amount consisted of an initial cash payment of USD 325 million and the net present value of the contingent consideration of USD 95 million, due to Ziarco shareholders, which they are eligible to receive upon the achievement of specified development milestones. The purchase price allocation resulted in net identifiable

assets of USD 395 million and goodwill of USD 25 million. Results of operations since the date of acquisition were not material.

INNOVATIVE MEDICINES – ACQUISITION OF ENCORE VISION, INC.

On January 20, 2017, Novartis acquired Encore Vision, Inc. (Encore), a privately-held company in Fort Worth, Texas, in the United States, focused on the development of a novel treatment in presbyopia. The fair value of the total purchase consideration was USD 456 million. The amount consisted of an initial cash payment of USD 366 million and the net present value of the contingent consideration of USD 90 million, due to Encore shareholders, 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 389 million and goodwill of USD 67 million. Results of operations since the date of acquisition were not material.

Significant transaction entered into in 2017 and closed in January 2018

INNOVATIVE MEDICINES – ACQUISITION OF ADVANCED ACCELERATOR APPLICATIONS, S.A.

On October 30, 2017, Novartis entered into a binding memorandum of understanding with Advanced Accelerator Applications S.A., (AAA), a NASDAQ-listed company headquartered in Saint-Genis-Pouilly, France, under which Novartis agreed to commence a tender offer for 100% of the share capital of AAA subject to certain conditions. Novartis commenced the tender offer on December 7, 2017, to purchase all of the outstanding ordinary shares for a price of USD 41 per share and USD 82 per American Depositary Share (ADS), each representing two ordinary shares of AAA, which expired on January 19, 2018. The offer values AAAs equity at USD 3.9 billion, on a fully diluted basis. The transaction to acquire AAA is being funded mainly through external short- and long-term debt.

As of the expiration of the tender offer, approximately 97% of the then outstanding fully diluted ordinary shares, including ordinary shares represented by ADSs, were validly tendered. On January 22, 2018, Novartis accepted and paid USD 3.9 billion for the ordinary shares, including ordinary shares represented by ADSs, tendered in the offer.

On January 22, 2018 Novartis also commenced a subsequent offering period that will expire on January 31, 2018, unless extended.

AAA is a radiopharmaceutical company that develops, produces and commercializes molecular nuclear medicines, including Lutathera® (lutetium (177Lu) oxodotreotide), a first-in-class RLT product for neuroendocrine tumors (NETs) and a portfolio of diagnostic products. Radiopharmaceuticals, such as Lutathera®, are unique medicinal formulations containing radioisotopes, which are used clinically for both diagnosis and therapy.

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 contingent consideration of USD 92 million due to the Transcend shareholders, 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 294 million and goodwill of USD 38 million. The 2016 results of operations since the date of acquisition were not material.

INNOVATIVE MEDICINES – ACQUISITION OF REPRIXYS PHARMACEUTICALS CORPORATION

On November 18, 2016, Novartis acquired Reprixys Pharmaceuticals Corporation (Reprixys), a privately held, US-based company specializing in the 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 Reprixys shareholders, 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 332 million. No goodwill was recognized. The 2016 results of operations since the date of acquisition were not material.

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 United States 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.

3. Segmentation of key figures 2017, 2016 and 2015

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.

Innovative Medicines 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 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 cardiovascular, central nervous system, dermatology, gastrointestinal and hormonal therapies, metabolism, oncology, ophthalmics, pain, and respiratory, 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.

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 products of the 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, Global Drug Development, Novartis Technical Operations and Novartis Business Services organizations.

- The Novartis Institutes for BioMedical Research (NIBR) conducts research activities of the Innovative Medicines Division and also collaborates with Sandoz.
- Global Drug Development organization was established in July 2016 and oversees all drug development activities for our Innovative Medicines Division and the biosimilars portfolio of our Sandoz Division.
- Novartis Technical Operations organization was established in July 2016, to centralize management of our manufacturing operations across our Innovative Medicines and Sandoz Divisions.
- Novartis Business Services (NBS) was established in January 2015 as a shared services organization and delivers 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.

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. 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 that 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		Sandoz		Alcon		Corporate (including eliminations)		Group	
(USD millions)	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016
Net sales to third parties	**33 025**	**32 562**	**10 060**	**10 144**	**6 024**	**5 812**			**49 109**	**48 518**
Sales to other segments	668	624	118	104	3		– 789	– 728		
Net sales	**33 693**	**33 186**	**10 178**	**10 248**	**6 027**	**5 812**	**– 789**	**– 728**	**49 109**	**48 518**
Other revenues	898	815	37	37	3	4	88	62	1 026	918
Cost of goods sold	– 9 007	– 9 331	– 5 800	– 5 971	– 3 231	– 3 092	863	874	– 17 175	– 17 520
Gross profit	**25 584**	**24 670**	**4 415**	**4 314**	**2 799**	**2 724**	**162**	**208**	**32 960**	**31 916**
Marketing & Sales	– 9 089	– 8 435	– 1 811	– 1 681	– 1 961	– 1 882			– 12 861	– 11 998
Research & Development	– 7 630	– 7 709	– 774	– 814	– 568	– 516			– 8 972	– 9 039
General & Administration	– 986	– 978	– 315	– 300	– 383	– 410	– 452	– 506	– 2 136	– 2 194
Other income	1 027	1 091	204	185	47	48	691	603	1 969	1 927
Other expense	– 1 124	– 1 213	– 351	– 259	– 124	– 96	– 732	– 776	– 2 331	– 2 344
Operating income	**7 782**	**7 426**	**1 368**	**1 445**	**– 190**	**– 132**	**– 331**	**– 471**	**8 629**	**8 268**
Income from associated companies	– 1		23	6			1 086	697	1 108	703
Interest expense									– 777	– 707
Other financial income and expense									39	– 447
Income before taxes									**8 999**	**7 817**
Taxes									– 1 296	– 1 119
Net income									**7 703**	**6 698**
Attributable to:										
Shareholders of Novartis AG									*7 703*	*6 712*
Non-controlling interests									*0*	*– 14*
Included in net income are:										
Interest income									110	43
Depreciation of property, plant & equipment	– 916	– 883	– 270	– 260	– 217	– 229	– 117	– 117	– 1 520	– 1 489
Amortization of intangible assets	– 2 291	– 2 470	– 447	– 450	– 942	– 929	– 10	– 12	– 3 690	– 3 861
Impairment charges on property, plant & equipment, net	– 84	– 93	– 73	– 2		– 5		– 2	– 157	– 102
Impairment charges on intangible assets, net	– 591	– 522	– 61	– 65	– 57	– 4			– 709	– 591
Impairment charges and fair value gains on financial assets, net	– 42	– 55			– 29		– 185	– 77	– 256	– 132
Additions to restructuring provisions	– 122	– 236	– 61	– 46	– 8	– 36	– 3	– 25	– 194	– 343
Equity-based compensation of Novartis equity plans	– 593	– 582	– 52	– 47	– 71	– 53	– 208	– 164	– 924	– 846

(USD millions)	Innovative Medicines 2016	Innovative Medicines 2015	Sandoz 2016	Sandoz 2015	Alcon 2016	Alcon 2015	Corporate (including eliminations) 2016	Corporate (including eliminations) 2015	Group 2016	Group 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

Segmentation – Consolidated balance sheets

	Innovative Medicines		Sandoz		Alcon		Corporate (including eliminations)		Group	
(USD millions)	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016
Total assets	**54 075**	51 911	**18 231**	17 611	**22 014**	22 970	**38 759**	37 632	**133 079**	130 124
Total liabilities	**– 11 457**	– 10 007	**– 3 459**	– 3 168	**– 1 893**	– 2 520	**– 42 043**	– 39 538	**– 58 852**	– 55 233
Total equity									**74 227**	74 891
Net debt									**19 047**	16 025
Net operating assets	**42 618**	41 904	**14 772**	14 443	**20 121**	20 450			**93 274**	90 916
Included in assets and liabilities are:										
Total property, plant & equipment	10 857	10 410	2 525	2 374	2 403	2 163	679	694	16 464	15 641
Additions to property, plant & equipment [1]	877	996	326	316	431	396	94	127	1 728	1 835
Total goodwill and intangible assets	31 571	31 630	10 993	10 774	16 176	16 914	3 007	3 002	61 747	62 320
Additions to goodwill and intangible assets [1]	984	865	64	45	82	63	16	5	1 146	978
Total investment in associated companies	41	16	7	18			15 322	14 270	15 370	14 304
Additions to investment in associated companies	6	4					40	37	46	41
Cash and cash equivalents, marketable securities, commodities, time deposits and derivative financial instruments							9 485	7 777	9 485	7 777
Financial debts and derivative financial instruments							28 532	23 802	28 532	23 802
Current income tax and deferred tax liabilities							6 891	8 260	6 891	8 260

[1] 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, as well as regional information for net sales for the years ended December 31, 2017, 2016 and 2015, and for selected non-current assets for the years ended December 31, 2017 and 2016:

	Net sales[1]						Total of selected non-current assets[2]			
(USD millions)	**2017**	**%**	2016	%	2015	%	**2017**	**%**	2016	%
Country										
Switzerland	836	2	830	2	774	2	43 920	47	44 413	48
United States	16 935	34	17 117	35	18 079	37	28 476	30	28 484	31
United Kingdom	1 160	2	1 182	2	1 277	3	7 957	9	6 892	7
Germany	3 690	8	3 634	7	3 262	7	3 128	3	2 733	3
France	2 490	5	2 390	5	2 269	5	284		199	
Japan	3 177	6	3 267	7	3 163	6	148		145	
Other	20 821	43	20 098	42	20 590	40	9 668	11	9 399	11
Group	**49 109**	**100**	48 518	**100**	49 414	**100**	**93 581**	**100**	92 265	**100**
Region										
Europe	17 492	36	17 079	35	16 472	33	61 699	66	59 879	65
Americas	20 899	42	20 998	43	22 414	45	29 113	31	29 831	32
Asia/Africa/Australasia	10 718	22	10 441	22	10 528	22	2 769	3	2 555	3
Group	**49 109**	**100**	48 518	**100**	49 414	**100**	**93 581**	**100**	92 265	**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-largest and third-largest customers account for approximately 17%, 12% and 7% of net sales, respectively (2016: 16%, 12% and 6% respectively; 2015: 14%, 11% and 5% respectively). All segments had sales to these customers in 2017, 2016 and 2015. 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 and amounted to 14%, 9% and 5%, respectively, of the trade receivables at December 31, 2017 (2016: 14%, 9% and 6% respectively).

Innovative Medicines net sales by business franchise

	2017 USD millions	2016 USD millions	Change (2016 to 2017) USD %	2015 USD millions	Change (2015 to 2016) USD %
Oncology					
Gleevec/Glivec	1 943	3 323	– 42	4 658	– 29
Tasigna	1 841	1 739	6	1 632	7
Sandostatin	1 612	1 646	– 2	1 630	1
Afinitor/Votubia	1 525	1 516	1	1 607	– 6
Exjade/Jadenu	1 059	956	11	917	4
Tafinlar + Mekinist	873	672	30	453	nm
Promacta/Revolade	867	635	37	402	nm
Votrient	808	729	11	565	nm
Jakavi	777	581	34	410	42
Kisqali	76	0	nm	0	nm
Other	893	993	– 10	1 030	– 4
Total Oncology business unit	**12 274**	**12 790**	**– 4**	**13 304**	– 4
Ophthalmology					
Lucentis	1 888	1 835	3	2 060	– 11
Travoprost Group	589	619	– 5	631	– 2
Systane Group	400	377	6	380	– 1
Topical Olopatadine Group	284	335	– 15	457	– 27
Other	2 207	2 297	– 4	2 395	– 4
Total Ophthalmology	**5 368**	**5 463**	**– 2**	**5 923**	– 8
Immunology and Dermatology					
Cosentyx	2 071	1 128	84	261	nm
Neoral/Sandimmun(e)	488	515	– 5	570	– 10
Zortress/Certican	414	398	4	335	19
Ilaris	402	283	42	236	20
Myfortic	378	383	– 1	441	– 13
Other	288	308	– 6	294	5
Total Immunology and Dermatology	**4 041**	**3 015**	**34**	**2 137**	41
Neuroscience					
Gilenya	3 185	3 109	2	2 776	12
Other	102	124	– 18	141	– 12
Total Neuroscience	**3 287**	**3 233**	**2**	**2 917**	11

	2017 USD millions	2016 USD millions	Change (2016 to 2017) USD %	2015 USD millions	Change (2015 to 2016) USD %
Respiratory					
Ultibro Breezhaler	411	363	13	260	40
Seebri Breezhaler	151	149	1	150	– 1
Onbrez Breezhaler	112	143	– 22	166	– 14
Subtotal COPD[1] portfolio	**674**	**655**	**3**	**576**	14
Xolair[2]	920	835	10	755	11
Other	23	31	– 26	37	– 16
Total Respiratory	**1 617**	**1 521**	**6**	**1 368**	11
Cardio-Metabolic					
Entresto	507	170	198	21	nm
Other	17	14	21	0	nm
Total Cardio-Metabolic	**524**	**184**	**185**	**21**	nm
Established Medicines					
Galvus	1 233	1 193	3	1 140	5
Exforge	960	926	4	1 047	– 12
Diovan/Co-Diovan	957	1 073	– 11	1 284	– 16
Voltaren/Cataflam	465	525	– 11	558	– 6
Exelon/Exelon Patch	381	444	– 14	728	– 39
Ritalin/Focalin	236	282	– 16	365	– 23
Other	1 682	1 913	– 12	2 553	– 25
Total Established Medicines	**5 914**	**6 356**	**– 7**	**7 675**	– 17
Total Pharmaceutical business unit	**20 751**	**19 772**	**5**	**20 041**	– 1
Total division net sales	**33 025**	**32 562**	**1**	**33 345**	– 2

[1] Chronic obstructive pulmonary disease

[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 franchise)

nm = not meaningful

The product portfolio of other segments is widely spread in 2017, 2016 and 2015.

4. Associated companies

	Net income statement effect			Other comprehensive income effect			Total comprehensive income effect		
(USD millions)	**2017**	2016	2015	**2017**	2016	2015	**2017**	2016	2015
Roche Holding AG, Switzerland	456	464	343	108	– 39	– 149	564	425	194
GlaxoSmithKline Consumer Healthcare Holdings Ltd., UK	629	234	– 79	– 145	710	– 4	484	944	– 83
Others	23	5	2				23	5	2
Associated companies related to continuing operations	**1 108**	**703**	**266**	**– 37**	**671**	**– 153**	**1 071**	**1 374**	**113**

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 that are accounted for as associated companies.

	Balance sheet value	
(USD millions)	**December 31, 2017**	December 31, 2016
Roche Holding AG, Switzerland	8 121	7 644
GlaxoSmithKline Consumer Healthcare Holdings Ltd., UK	7 020	6 448
Others	229	212
Total	**15 370**	**14 304**

Roche Holding AG

The Group's holding in Roche voting shares was 33.3% at December 31, 2017, 2016 and 2015. This investment represents approximately 6.3% of Roche's total outstanding voting and non-voting equity instruments at December 31, 2017, 2016 and 2015.

Since full-year 2017 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 2018 consolidated financial statements when available.

The following tables show summarized financial information for Roche, including current values of fair value adjustments made at the time of the acquisition of the shares, for the year ended December 31, 2016 and for the six months ended June 30, 2017 (since full-year 2017 data is not yet available):

(CHF billions)	Current assets	Non-current assets	Current liabilities	Non-current liabilities
December 31, 2016	28.7	61.4	22.6	27.8
June 30, 2017	26.7	56.9	20.6	26.0

(CHF billions)	Revenue	Net income	Other comprehensive income	Total comprehensive income
December 31, 2016	50.6	7.5	0.7	8.2
June 30, 2017	26.3	4.4	0.2	4.6

A purchase price allocation was performed on the basis of publicly available information at the time of acquisition of the investment. The December 31, 2017 balance sheet value allocation is as follows:

(USD millions)	**December 31, 2017**
Novartis share of Roche's estimated net assets	2 412
Novartis share of re-appraised intangible assets	673
Implicit Novartis goodwill	2 915
Current value of share in net identifiable assets and goodwill	**6 000**
Accumulated equity accounting adjustments and translation effects less dividends received	2 121
Balance sheet value	**8 121**

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 2017, dividends received from Roche in relation to the distribution of its 2016 net income amounted to USD 438 million (2016: USD 433 million in relation to the distribution of its 2015 net income).

The consolidated income statement effects from applying Novartis accounting principles for this investment in 2017, 2016 and 2015 are as follows:

(USD millions)	**2017**	2016	2015
Novartis share of Roche's estimated current-year consolidated net income	669	678	650
Prior-year adjustment	– 67	– 68	– 157
Amortization of fair value adjustments relating to intangible assets, net of taxes of USD 42 million (2016: USD 42 million; 2015: USD 41 million)	– 146	– 146	– 150
Net income effect	**456**	**464**	**343**

The publicly quoted market value of the Novartis interest in Roche (SIX symbol: RO) at December 31, 2017, was USD 13.4 billion (2016: USD 12.4 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, 2017, 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.

The December 31, 2017 balance sheet value allocation is as follows:

(USD millions)	December 31, 2017
Novartis share of GSK Consumer Healthcare's estimated net assets	1 505
Novartis share of re-appraised intangible assets	3 852
Implicit Novartis goodwill	1 763
Current value of share in net identifiable assets and goodwill	**7 120**
Accumulated equity accounting adjustments and translation effects less dividends received	– 100
Balance sheet value	**7 020**

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.

At acquisition date, 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. The retained interest in the OTC Division business contributed was accounted for at net book value at the time of contribution.

The following tables show summarized financial information for GSK Consumer Healthcare, including current values of fair value adjustments made at the time of acquisition, for the year ended December 31, 2016, and for the nine months ended September 30, 2017 (interim unaudited), since full-year 2017 data is not yet available:

(GBP billions)	Current assets	Non-current assets	Current liabilities	Non-current liabilities
December 31, 2016	4.0	21.1	3.1	2.1
September 30, 2017	3.3	20.6	2.6	2.0

(GBP billions)	Revenue	Net income	Other comprehensive income	Total comprehensive income
December 31, 2016	6.5	0.6	1.6	2.2
September 30, 2017	5.3	0.6	– 0.4	0.2

Since full-year 2017 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 2018 consolidated financial statements when available.

In 2017, dividends received from GSK Consumer Healthcare amounted to USD 544 million (2016: USD 463 million).

The consolidated income statement effects from applying Novartis accounting principles for this investment in 2017, 2016 and 2015 are as follows:

(USD millions)	**2017**	2016	2015
Novartis share of GSK Consumer Healthcare's estimated current-year consolidated net income	589	268	– 17
Prior-year adjustment	47	– 22	
Amortization of fair value adjustments relating to intangible assets and inventory, net of taxes of USD 1 million (2016: USD 2 million; 2015: USD 18 million)	– 7	– 12	– 62
Net income effect	**629**	**234**	**– 79**

5. Interest expense and other financial income and expense

Interest expense

(USD millions)	2017	2016	2015
Interest expense	– 758	– 709	– 669
(Expense)/ income arising from discounting long-term liabilities	– 19	2	14
Total interest expense	**– 777**	**– 707**	**– 655**

Other financial income and expense

(USD millions)	2017	2016	2015
Interest income	110	43	33
Dividend income	1	1	1
Net capital losses on available-for-sale securities	– 1	– 1	– 8
Income on forward contracts and options			1
Impairment of commodities and available-for-sale securities, net	12	7	– 132
Other financial expense	– 25	– 20	– 23
Monetary loss from hyperinflation accounting			– 72
Currency result, net	– 58	– 477	– 254
Total other financial income and expense	**39**	**– 447**	**– 454**

6. Taxes

Income before taxes

(USD millions)	2017	2016	2015
Switzerland	5 289	3 110	5 765
Foreign	3 710	4 707	2 369
Income before taxes from continuing operations	**8 999**	**7 817**	**8 134**
Income before taxes from discontinued operations			12 479
Total income before taxes	**8 999**	**7 817**	**20 613**

Current and deferred income tax expense

(USD millions)	2017	2016	2015
Switzerland	– 462	– 709	– 317
Foreign	– 1 594	– 1 418	– 1 333
Current income tax expense from continuing operations	**– 2 056**	**– 2 127**	**– 1 650**
Switzerland	– 298	765	– 68
Foreign	1 058	243	612
Deferred tax income from continuing operations	**760**	**1 008**	**544**
Income tax expense from continuing operations	**– 1 296**	**– 1 119**	**– 1 106**
Income tax expense from discontinued operations			– 1 713
Total income tax expense	**– 1 296**	**– 1 119**	**– 2 819**

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)	2017	2016	2015
Applicable tax rate	14.5	13.2	12.4
Effect of disallowed expenditures	3.4	3.5	3.5
Effect of utilization of tax losses brought forward from prior periods	– 0.1	– 0.2	– 0.2
Effect of income taxed at reduced rates	– 0.2	– 0.2	– 0.3
Effect of tax credits and allowances	– 2.2	– 2.8	– 2.7
Effect of release of contingent consideration liability	– 1.2	0.0	0.0
Effect of tax rate change on current and deferred tax assets and liabilities [1]	0.7	0.2	– 0.5
Effect of write-off of deferred tax assets	0.0	0.5	0.0
Effect of write down and reversal of write-down of investments in subsidiaries	– 1.1	– 1.0	– 0.9
Effect of tax benefits expiring in 2017	– 0.8	– 0.5	– 0.4
Effect of non-deductible losses in Venezuela	0.0	1.3	1.2
Effect of prior year items	1.2	0.2	1.0
Effect of other items [2]	0.2	0.1	0.5
Effective tax rate for continuing operations	**14.4**	**14.3**	**13.6**
Effective tax rate for discontinued operations			13.7
Effective tax rate	**14.4**	**14.3**	**13.7**

[1] Included in 2017 is a 0.7% impact related to the revaluation of the deferred tax assets and liabilities and a portion of current tax payables. This revaluation resulted from the US tax reform legislation enacted on December 22, 2017, refer to Note 11 for additional disclosures.

[2] 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 7 million in 2017, and by USD 18 million and USD 15 million in 2016 and 2015, respectively.

7. Earnings per share

	2017	2016	2015
Net income attributable to shareholders of Novartis AG (USD millions)			
– Continuing operations	7 703	6 712	7 025
– Discontinued operations			10 758
– Total	**7 703**	**6 712**	**17 783**
Number of shares (in millions)			
Weighted average number of shares outstanding used in basic earnings per share	2 346	2 378	2 403
Adjustment for vesting of restricted shares, restricted share units and dilutive shares from options	25	22	35
Weighted average number of shares in diluted earnings per share	**2 371**	**2 400**	**2 438**
Basic earnings per share (USD)			
– Continuing operations	3.28	2.82	2.92
– Discontinued operations			4.48
– Total	**3.28**	**2.82**	**7.40**
Diluted earnings per share (USD)			
– Continuing operations	3.25	2.80	2.88
– Discontinued operations			4.41
– Total	**3.25**	**2.80**	**7.29**

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 2017, 2016, or 2015, 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 gains/(losses) from defined benefit plans	Net investment hedge	Cumulative currency translation effects	Total value adjustments
Value adjustments at January 1, 2015	**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**
Fair value adjustments on financial instruments	38	12				50
Net investment hedge				– 237		– 237
Net actuarial gains from defined benefit plans			851			851
Currency translation effects					2 208	2 208
Total value adjustments in 2017	**38**	**12**	**851**	**– 237**	**2 208**	**2 872**
Value adjustments at December 31, 2017	**386**	**9**	**– 5 064**	**– 237**	**566**	**– 4 340**

[1] Net actuarial gains of USD 10 million in 2015 were attributable to discontinued operations up to the respective divestment dates
[2] Currency translation losses of USD 29 million in 2015 were attributable to discontinued operations up to the respective divestment dates

8.1) The 2017, 2016 and 2015 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, 2017	**348**	**– 3**	**345**
Changes in fair value:			
– Available-for-sale marketable securities	11		11
– Available-for-sale financial investments	47		47
Realized net gains transferred to the consolidated income statement:			
– Other financial assets sold	– 109		– 109
Amortized net losses on cash flow hedges transferred to the consolidated income statement		13	13
Impaired financial assets transferred to the consolidated income statement	102		102
Deferred tax on above items [1]	– 13	– 1	– 14
Fair value adjustments during the year	**38**	**12**	**50**
Fair value adjustments at December 31, 2017	**386**	**9**	**395**

[1] Included in 2017 is a USD 18 million impact related to the revaluation of deferred tax liabilities on available-for-sale financial investments held in the US that were previously recognized through other comprehensive income. This revaluation resulted from the US tax reform legislation enacted on December 22, 2017, refer to Note 11 for additional disclosures.

(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**

8.2) In 2015, cumulative currency translation losses of USD 10 million were recycled through the income statement as a result of the divestments of subsidiaries. No currency translation losses or gains were recycled through the income statement in 2017 and 2016.

8.3) Remeasurements from defined benefit plans arise as follows:

(USD millions)	**2017**	2016	2015
Defined benefit pension plans before tax	1 367	– 667	– 252
Other post-employment benefit plans before tax	76	12	168
Taxation on above items [1]	– 592	140	– 63
Total after tax	**851**	**– 515**	**– 147**
Attributable to:			
Shareholders of Novartis AG	*851*	*– 514*	*– 147*
Non-controlling interests		*– 1*	

[1] Included in 2017 is a USD -272 million impact related to the revaluation of deferred tax assets on US post-employment benefits that were previously recognized through other comprehensive income. This revaluation resulted from the US tax reform legislation enacted on December 22, 2017, refer to Note 11 for additional disclosures.

9. Property, plant & equipment

The following table summarizes the movements of property, plant and equipment during 2017:

(USD millions)	Land	Buildings	Construction in progress	Machinery & other equipment	Total
Cost					
January 1, 2017	**687**	**13 113**	**2 680**	**14 816**	**31 296**
Reclassifications [1]	5	508	– 1 617	1 104	
Additions	13	104	1 186	425	1 728
Disposals and derecognitions [2]	– 23	– 324	– 71	– 593	– 1 011
Currency translation effects	38	663	190	1 106	1 997
December 31, 2017	**720**	**14 064**	**2 368**	**16 858**	**34 010**
Accumulated depreciation					
January 1, 2017	**– 40**	**– 5 436**	**– 15**	**– 10 164**	**– 15 655**
Depreciation charge	– 3	– 510		– 1 007	– 1 520
Accumulated depreciation on disposals and derecognitions [2]	6	275	34	534	849
Impairment charge		– 25	– 58	– 106	– 189
Reversal of impairment charge			2	30	32
Currency translation effects	– 3	– 287	– 1	– 772	– 1 063
December 31, 2017	**– 40**	**– 5 983**	**– 38**	**– 11 485**	**– 17 546**
Net book value at December 31, 2017	**680**	**8 081**	**2 330**	**5 373**	**16 464**
Net book value of property, plant & equipment under finance lease contracts					**78**
Commitments for purchases of property, plant & equipment					**318**
Capitalized borrowing costs					**9**

[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.

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**
Capitalized borrowing costs					**9**

[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.

10. Goodwill and intangible assets

The following table summarizes the movements of goodwill and intangible assets in 2017:

	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, 2017	**31 381**	**5 150**	**2 980**	**6 548**	**33 007**	**5 960**	**1 492**	**55 137**
Impact of business combinations	94	1 223						1 223
Reclassifications [1]		– 389			175		214	
Additions		697		5	282		162	1 146
Disposals and derecognitions [2]		– 353		– 1	– 328		– 64	– 746
Currency translation effects	704	134		86	969		48	1 237
December 31, 2017	**32 179**	**6 462**	**2 980**	**6 638**	**34 105**	**5 960**	**1 852**	**57 997**
Accumulated amortization								
January 1, 2017	**– 401**	**– 886**		**– 3 637**	**– 16 863**	**– 1 430**	**– 981**	**– 23 797**
Reclassifications [1]		6			– 6			
Amortization charge				– 577	– 2 571	– 238	– 304	– 3 690
Accumulated impairments on disposals and derecognitions [2]		352			317		61	730
Impairment charge		– 615			– 92		– 2	– 709
Currency translation effects	– 28	– 27		– 54	– 416		– 37	– 534
December 31, 2017	**– 429**	**– 1 170**		**– 4 268**	**– 19 631**	**– 1 668**	**– 1 263**	**– 28 000**
Net book value at December 31, 2017	**31 750**	**5 292**	**2 980**	**2 370**	**14 474**	**4 292**	**589**	**29 997**

[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 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 [1]		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, 2017:

	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	15 237	4 368		9	11 604		353	16 334
Sandoz	8 210	625		539	1 589		30	2 783
Alcon	8 295	291		1 822	1 281	4 292	195	7 881
Corporate	8	8	2 980				11	2 999
Net book value at December 31, 2017	**31 750**	**5 292**	**2 980**	**2 370**	**14 474**	**4 292**	**589**	**29 997**

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	2.6
Discount rate (post-tax)	7.0	7.0	7.0	7.0

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 this 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.

The following table shows the intangible asset impairment charges for 2017 and 2016:

(USD millions)	**2017**	2016
Innovative Medicines	– 591	– 522
Sandoz	– 61	– 65
Alcon	– 57	– 4
Total	**– 709**	**– 591**

11. 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, 2017	**224**	**1 331**	**1 839**	**4 160**	**146**	**2 597**	**10 297**
Gross deferred tax liabilities at January 1, 2017	**– 629**	**– 4 019**	**– 358**	**– 511**		**– 1 403**	**– 6 920**
Net deferred tax balance at January 1, 2017	**– 405**	**– 2 688**	**1 481**	**3 649**	**146**	**1 194**	**3 377**
At January 1, 2017	**– 405**	**– 2 688**	**1 481**	**3 649**	**146**	**1 194**	**3 377**
Credited/(charged) to income	– 30	1 279	– 90	– 304	– 49	– 46	760
Charged to equity						– 101	– 101
Charged to other comprehensive income			– 592			– 69	– 661
Impact of business combinations		– 322			5		– 317
Other movements	– 41	33	37	– 14	– 14	2	3
Net deferred tax balance at December 31, 2017	**– 476**	**– 1 698**	**836**	**3 331**	**88**	**980**	**3 061**
Gross deferred tax assets at December 31, 2017	137	1 287	1 090	3 786	97	1 983	8 380
Gross deferred tax liabilities at December 31, 2017	– 613	– 2 985	– 254	– 455	– 9	– 1 003	– 5 319
Net deferred tax balance at December 31, 2017	**– 476**	**– 1 698**	**836**	**3 331**	**88**	**980**	**3 061**

After offsetting the following amount of deferred tax assets and liabilities within the same tax jurisdiction the balance amounts to:	151
Deferred tax assets at December 31, 2017	8 229
Deferred tax liabilities at December 31, 2017	– 5 168
Net deferred tax balance at December 31, 2017	**3 061**

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 the following amount of deferred tax assets and liabilities within the same tax jurisdiction the balance amounts to:	263
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**

The following table presents deferred tax assets and deferred tax liabilities, which are expected to have an impact on current taxes payable after more than twelve months:

(USD billions)	**2017**	2016
Expected to have an impact on current tax payable after more than 12 months		
– Deferred tax assets	3.5	4.8
– Deferred tax liabilities	4.4	5.9

For unremitted earnings retained by consolidated entities for reinvestment, 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 billions)	**2017**	2016
Unremitted earnings that have been retained by consolidated entities for reinvestment	66	63

Temporary differences on which no deferred tax has been provided as they are permanent in nature related to:

(USD billions)	**2017**	2016
Investments in subsidiaries	3	2
Goodwill from acquisitions	– 29	– 28

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	**2017 total**
One year	37	3	40
Two years	64	4	68
Three years	87	5	92
Four years	26	25	51
Five years	67	16	83
More than five years	654	1 671	2 325
Total	**935**	**1 724**	**2 659**

(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**

(USD millions)	**2017**	2016	2015
Tax losses carried forward that expired	1	19	13

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.

On December 22, 2017, the US enacted tax reform legislation (Tax Cuts and Jobs Act), which among other provisions, reduced the US corporate tax rate from 35% to 21%, effective January 1, 2018. This required a revaluation of the deferred tax assets and liabilities and a portion of current tax payables to the newly enacted tax rates at the date of enactment.

The following table shows the impact on the revaluation of deferred assets and liabilities and current income tax liabilities:

(USD millions)	Income statement	Equity	**Total**
Deferred tax asset and liability revaluation			
Items previously recognized in consolidated income statement	– 24		– 24
Items previously recognized in other comprehensive income [1]		– 254	– 254
Items previously recognized in retained earnings [2]		– 71	– 71
Total revaluation of deferred tax assets and liabilities	– 24	– 325	– 349
Total revaluation of current tax payables	– 37		– 37
Total revaluation of deferred tax assets and liabilities and current income tax liabilities	**– 61**	**– 325**	**– 386**

[1] Related to post-employment benefits and available for sale financial investments.
[2] Related to equity based compensation plans.

The enacted US tax reform legislation includes a provision that requires the US parent company's foreign subsidiaries' unremitted earnings to be subject to an immediate toll tax on the qualifying amount of unremitted earnings (the deemed repatriated earnings). Previously, these earnings were taxable upon distribution to the US parent company. The toll tax amount owed is payable, without interest, in installments over an eight year period through 2024. Certain of the Group's US subsidiaries are the parent company of non-US domiciled companies, and as a result, USD 70 million of deferred tax liabilities related to these entities' unremitted earnings, the majority of which were recognized in the prior year, were reclassified to current income tax liabilities.

12. Financial and other non-current assets

Financial assets

(USD millions)	2017	2016
Available-for-sale long-term financial investments	1 275	1 096
Long-term receivables from customers	197	231
Minimum lease payments from finance lease agreements	122	147
Contingent consideration receivables [1]	394	586
Long-term loans, advances and security deposits	255	136
Total financial assets	**2 243**	**2 196**

[1] Note 28 provides additional disclosures related to contingent considerations.

Other non-current assets

(USD millions)	2017	2016
Deferred compensation plans	484	451
Prepaid post-employment benefit plans	133	47
Other non-current assets	201	200
Total other non-current assets	**818**	**698**

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".

	2017					2016				
(USD millions)	Total future payments	Unearned finance income	Present value	Provision	Net book value	Total future payments	Unearned finance income	Present value	Provision	Net book value
Not later than one year [1]	83	– 7	76	– 3	73	91	– 5	86	– 2	84
Between one and five years	180	– 14	166	– 59	107	182	– 16	166	– 37	129
Later than five years	31	– 2	29	– 14	15	63	– 4	59	– 41	18
Total	**294**	**– 23**	**271**	**– 76**	**195**	**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).

13. Inventories

(USD millions)	2017	2016
Raw material, consumables	841	705
Work in progress	2 957	2 700
Finished products	3 069	2 850
Total inventories	**6 867**	**6 255**

The following table shows the amount of inventory recognized as an expense in "Cost of goods sold" in the consolidated income statements:

(USD billions)	2017	2016	2015
Cost of goods sold	– 10.3	– 10.3	– 10.5

The following table shows the recognized amount of inventory provisions and reversals of inventory provisions:

(USD millions)	2017	2016	2015
Inventory provisions	– 470	– 283	– 356
Reversals of inventory provisions	189	67	148

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.

14. Trade receivables

(USD millions)	2017	2016
Total gross trade receivables	8 790	8 364
Provisions for doubtful trade receivables	– 190	– 162
Total trade receivables, net	**8 600**	**8 202**

The following table summarizes the movement in the provision for doubtful trade receivables:

(USD millions)	2017	2016	2015
January 1	**– 162**	**– 142**	**– 156**
Impact of divestments	12		
Provisions for doubtful trade receivables charged to the consolidated income statement	– 119	– 76	– 68
Utilization provisions for doubtful trade receivables	12	17	39
Reversal of provisions for doubtful trade receivables	76	37	32
Currency translation effects	– 9	2	11
December 31	**– 190**	**– 162**	**– 142**

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)	2017	2016
Not overdue	7 758	7 386
Past due for not more than one month	279	262
Past due for more than one month but less than three months	230	223
Past due for more than three months but less than six months	137	185
Past due for more than six months but less than one year	137	145
Past due for more than one year	249	163
Provisions for doubtful trade receivables	– 190	– 162
Total trade receivables, net	**8 600**	**8 202**

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, particularly in Greece, Italy, Portugal, Spain, Brazil, Russia, Saudi Arabia and Turkey, 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, Brazil and Turkey, which are due from private entities. Deteriorating credit and economic conditions as well as 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 following table shows the gross trade receivables balance from these closely monitored countries at December 31, 2017 and 2016, the amounts that are past due for more than one year and the related provisions that have been recorded:

(USD millions)	2017	2016
Total balance of gross trade receivables from closely monitored countries	1 733	1 717
Past due for more than one year	124	82
Provisions	95	63

At December 31, 2017 amounts past due for more than one year are not significant in any of these countries on a standalone basis.

Total trade receivables include amounts denominated in the following major currencies:

(USD millions)	2017	2016
US dollar (USD)	3 451	3 432
Euro (EUR)	1 533	1 366
Japanese yen (JPY)	600	567
Chinese yuan (CNY)	312	264
Russian ruble (RUB)	268	347
Brazilian real (BRL)	237	222
British pound (GBP)	208	160
Australian dollar (AUD)	165	147
Swiss franc (CHF)	127	135
Canadian dollar (CAD)	73	97
Other currencies	1 626	1 465
Total trade receivables, net	**8 600**	**8 202**

15. Marketable securities, commodities, time deposits, derivative financial instruments and cash and cash equivalents

Marketable securities, commodities, time deposits and derivative financial instruments

(USD millions)	2017	2016
Debt securities	328	306
Fund investments	34	31
Total available-for-sale marketable securities	**362**	**337**
Commodities	106	94
Time deposits with original maturity more than 90 days	125	108
Derivative financial instruments	31	230
Accrued interest on debt securities and time deposits	1	1
Total marketable securities, commodities, time deposits and derivative financial instruments	**625**	**770**

The following table provides a breakdown of debt securities by currency:

(USD millions)	2017	2016
US dollar (USD)	303	284
Euro (EUR)	14	12
Japanese yen (JPY)	11	10
Total debt securities	**328**	**306**

Cash and cash equivalents

(USD millions)	2017	2016
Current accounts	2 970	1 912
Time deposits and short-term investments with original maturity less than 90 days	5 890	5 095
Total cash and cash equivalents	**8 860**	**7 007**

16. Other current assets

(USD millions)	2017	2016
VAT receivable	717	521
Withholding tax recoverable	93	282
Prepaid expenses		
– Third parties	753	692
– Associated companies	3	5
Receivables from associated companies	8	7
Contingent consideration receivable [1]	450	
Other receivables and current assets	1 030	1 034
Total other current assets	**3 054**	**2 541**

[1] Note 28 provides additional disclosures related to contingent consideration.

17. Equity

The following table shows the movement in the share capital:

(USD millions)	Jan 1, 2015	Movement in year	Dec 31, 2015	Movement in year	Dec 31, 2016	Movement in year	Dec 31, 2017
Share capital	1 001	– 10	991	– 19	972	– 3	969
Treasury shares	– 103	2	– 101	25	– 76	– 24	– 100
Outstanding share capital	**898**	**– 8**	**890**	**6**	**896**	**– 27**	**869**

The following table shows the movement in the shares:

		2017			2016			2015		
Number of outstanding shares (in millions)	Note	Total Novartis shares	Total treasury shares	Total outstanding shares	Total Novartis shares	Total treasury shares	Total outstanding shares	Total Novartis shares	Total treasury shares	Total outstanding shares
Balance at beginning of year		**2 627.1**	**– 253.0**	**2 374.1**	**2 677.0**	**– 303.1**	**2 373.9**	**2 706.2**	**– 307.6**	**2 398.6**
Shares canceled for capital reduction [1]		– 10.3	10.3		– 49.9	49.9		– 29.2	29.2	
Shares acquired to be held in Group Treasury [2]									– 9.6	– 9.6
Shares acquired to be canceled [3]			– 66.2	– 66.2		– 10.3	– 10.3		– 49.9	– 49.9
Other share purchases [4]			– 3.8	– 3.8		– 2.6	– 2.6		– 4.1	– 4.1
Exercise of options and employee transactions [5]	17.6		4.6	4.6		4.1	4.1		27.0	27.0
Equity-based compensation [5]			8.8	8.8		9.0	9.0		11.9	11.9
Total movements		**– 10.3**	**– 46.3**	**– 56.6**	**– 49.9**	**50.1**	**0.2**	**– 29.2**	**4.5**	**– 24.7**
Balance at end of year		**2 616.8**	**– 299.3**	**2 317.5**	**2 627.1**	**– 253.0**	**2 374.1**	**2 677.0**	**– 303.1**	**2 373.9**

[1] Novartis reduced its share capital by cancelling shares which were repurchased on the SIX Swiss Exchange second trading line during previous years.
[2] Shares repurchased on the SIX Swiss Exchange first trading line
[3] For 2017 and 2016, shares repurchased on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback authority approved at the 2016 Annual General Meeting (AGM). For 2015, shares repurchased on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback authority approved at the 2008 Annual General Meeting (AGM).
[4] Shares acquired from employees, which were previously granted to them under the respective programs
[5] Shares delivered as a result of options being exercised and physical share deliveries related to equity-based participation plans

17.1) 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.

	2017	2016	2015
Dividend per share (in CHF)	2.75	2.70	2.60
Total dividend payment (in USD billion)	6.5	6.5	6.6

17.2) The following table summarizes the treasury shares movements:

	Note	2017 Number of outstanding shares (in millions)	2017 Equity impact USDm	2016 Number of outstanding shares (in millions)	2016 Equity impact USDm	2015 Number of outstanding shares (in millions)	2015 Equity impact USDm
Shares acquired to be held in Group Treasury [1]						– 9.6	– 897
Shares acquired to be canceled [2]		– 66.2	– 5 270	– 10.3	– 784	– 49.9	– 4 805
Other share purchases [3]		– 3.8	– 304	– 2.6	– 208	– 4.1	– 417
Purchase of treasury shares		– 70.0	– 5 574	– 12.9	– 992	– 63.6	– 6 119
Exercise of options and employee transactions [4]	17.6	4.6	255	4.1	214	27.0	1 592
Equity-based compensation [5, 6]		8.8	612	9.0	664	11.9	815
Total		**– 56.6**	**– 4 707**	**0.2**	**– 114**	**– 24.7**	**– 3 712**

[1] Shares repurchased on the SIX Swiss Exchange first trading line

[2] For 2017 and 2016, shares repurchased on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback authority approved at the 2016 Annual General Meeting (AGM). For 2015, shares repurchased on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback authority approved at the 2008 Annual General Meeting (AGM).

[3] Shares acquired from employees, which were previously granted to them under the respective programs

[4] Shares delivered as a result of options being exercised related to equity-based participation plans and the delivery of treasury shares. The average share price of the shares delivered was significantly below market price reflecting the strike price of the options exercised.

[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 addition, tax benefits arising from tax deductible amounts exceeding the expense recognized in the income statement are credited to equity.

[6] Included in 2017 is a USD 71 million impact related to the revaluation of deferred tax assets on equity based compensation that were previously recognized through retained earnings. This revaluation resulted from the US tax reform legislation enacted on December 22, 2017, refer to Note 11 for additional disclosures.

17.3) Changes in non-controlling interests represent the impact on the non-controlling interest of transactions with minority shareholders such as change in ownership percentage, dividend payments, and other equity transactions.

17.4) In 2017, Novartis entered into an irrevocable, non-discretionary arrangement with a bank to repurchase Novartis shares on the second trading line under its up-to USD 5 billion share buyback, as well as to mitigate dilution from equity-based participation plans. The commitment under this arrangement is the expected purchases by the bank under such trading plan over a rolling 90-day period. As of December 31, 2017, this trading plan commitment was fully executed and expired, and as a consequence, there is no contingent liability related to this plan recognized.

In 2014, Novartis entered into a similar irrevocable, non-discretionary arrangement with a bank to repurchase Novartis shares. The commitment under this arrangement reflected the expected purchases by the bank under such trading plan over a rolling 90-day period. In 2015, this trading plan was fully executed and expired, resulting in a decrease of USD 658 million in the repurchase obligation. As a consequence, there is no contingent liability related to this plan as of December 31, 2015 and December 31, 2016.

17.5) The impact of change in ownership of consolidated entities 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.

17.6) At December 31, 2017, the market maker held 12 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 62.17 and they have contractual lives of 10 years, with remaining lives up to six years.

18. Non-current financial debt

(USD millions)	2017	2016
Straight bonds	22 957	17 285
Liabilities to banks and other financial institutions [1]	539	708
Finance lease obligations	87	82
Total, including current portion of non-current financial debt	**23 583**	**18 075**
Less current portion of non-current financial debt	– 359	– 178
Total non-current financial debts	**23 224**	**17 897**

[1] Average interest rate 0.3% (2016: 0.4%)

Financial debts, including current financial debts, contain only general default covenants. The Group is in compliance with these covenants.

The percentage of fixed-rate financial debt to total financial debt was 82% at December 31, 2017, and 76% at December 31, 2016.

The average interest rate on total financial debt in 2017 was 2.6% (2016: 2.8%).

The following table provides a breakdown of straight bonds:

Coupon	Currency	Nominal amount	Issuance year	Maturity year	Issuer	Issue price	2017 (USD millions)	2016 (USD millions)
5.125%	USD	3 000	2009	2019	Novartis Securities Investment Ltd., Hamilton, Bermuda	99.822%	2 997	2 995
4.400%	USD	1 000	2010	2020	Novartis Capital Corporation, New York, United States	99.237%	997	996
2.400%	USD	1 500	2012	2022	Novartis Capital Corporation, New York, United States	99.225%	1 491	1 490
3.700%	USD	500	2012	2042	Novartis Capital Corporation, New York, United States	98.325%	489	489
3.400%	USD	2 150	2014	2024	Novartis Capital Corporation, New York, United States	99.287%	2 134	2 132
4.400%	USD	1 850	2014	2044	Novartis Capital Corporation, New York, United States	99.196%	1 824	1 823
0.750%	EUR	600	2014	2021	Novartis Finance S.A., Luxembourg, Luxembourg	99.134%	713	625
1.625%	EUR	600	2014	2026	Novartis Finance S.A., Luxembourg, Luxembourg	99.697%	714	627
0.250%	CHF	500	2015	2025	Novartis AG, Basel, Switzerland	100.640%	513	491
0.625%	CHF	550	2015	2029	Novartis AG, Basel, Switzerland	100.502%	564	539
1.050%	CHF	325	2015	2035	Novartis AG, Basel, Switzerland	100.479%	333	318
3.000%	USD	1 750	2015	2025	Novartis Capital Corporation, New York, United States	99.010%	1 730	1 728
4.000%	USD	1 250	2015	2045	Novartis Capital Corporation, New York, United States	98.029%	1 218	1 217
0.125%	EUR	1 250	2016	2023	Novartis Finance S.A., Luxembourg, Luxembourg	99.127%	1 480	1 299
0.625%	EUR	500	2016	2028	Novartis Finance S.A., Luxembourg, Luxembourg	98.480%	588	516
1.800%	USD	1 000	2017	2020	Novartis Capital Corporation, New York, United States	99.609%	996	
2.400%	USD	1 000	2017	2022	Novartis Capital Corporation, New York, United States	99.449%	993	
3.100%	USD	1 000	2017	2027	Novartis Capital Corporation, New York, United States	99.109%	988	
0.000%	EUR	1 250	2017	2021	Novartis Finance S.A., Luxembourg, Luxembourg	99.133%	1 480	
1.125%	EUR	600	2017	2027	Novartis Finance S.A., Luxembourg, Luxembourg	99.874%	715	
Total straight bonds							**22 957**	**17 285**

The following tables provide a breakdown of total non-current financial debt, including current portion by maturity and currency:

Breakdown by maturity:

(USD millions)	2017	2016
2017		178
2018	359	345
2019	3 173	3 168
2020	1 997	1 000
2021	2 194	628
2022	2 485	2 442
After 2022	13 375	10 314
Total	**23 583**	**18 075**

Breakdown by currency:

(USD millions)	2017	2016
US dollar (USD)	15 945	12 952
Euro (EUR)	5 695	3 092
Japanese yen (JPY)	533	683
Swiss franc (CHF)	1 410	1 348
Total	**23 583**	**18 075**

The following table shows the comparison of balance sheet and fair value of total non-current financial debt, including current portion:

(USD millions)	2017 Balance sheet	2017 Fair values	2016 Balance sheet	2016 Fair values
Straight bonds	22 957	23 835	17 285	17 943
Others	626	626	790	790
Total	**23 583**	**24 461**	**18 075**	**18 733**

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 pledged assets:

(USD millions)	2017	2016
Total net book value of property, plant & equipment pledged as collateral for non-current financial debts	84	94

19. Provisions and other non-current liabilities

(USD millions)	2017	2016
Accrued liability for employee benefits:		
Defined benefit pension plans [1]	3 157	4 490
Other long-term employee benefits and deferred compensation	625	545
Other post-employment benefits [1]	953	1 005
Environmental remediation provisions	706	708
Provisions for product liabilities, governmental investigations and other legal matters	230	264
Contingent consideration [2]	809	840
Other non-current liabilities	577	618
Total provisions and other non-current liabilities	**7 057**	**8 470**

[1] Note 24 provides additional disclosures related to post-employment benefits.
[2] Note 28 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 following table shows the movements in the environmental liability provisions:

(USD millions)	2017	2016	2015
January 1	**773**	**871**	**923**
Cash payments	– 46	– 75	– 52
Releases	– 153		– 5
Additions	154	1	6
Currency translation effects	33	– 24	– 1
December 31	**761**	**773**	**871**
Less current provision	– 55	– 65	– 80
Non-current environmental remediation provisions at December 31	**706**	**708**	**791**

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.

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 as well as the identity and financial position of such parties in light of the joint and several nature of the liability.

The expected timing of the related cash outflows as of December 31, 2017, is currently projected as follows:

(USD millions)	Expected cash outflows
Due within two years	164
Due later than two years, but within five years	241
Due later than five years, but within ten years	315
Due after ten years	41
Total environmental remediation liability provisions	**761**

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 matters. Potential cash outflows reflected in a provision might 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 more than 1 000 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 27 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 2017.

Investigations and related litigations

SOUTHERN DISTRICT OF NEW YORK (S.D.N.Y.) MARKETING PRACTICES INVESTIGATION AND LITIGATION

In 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. The complaint, as subsequently amended, asserts federal False Claims Act (FCA) and common law claims with respect to speaker programs and other promotional activities for certain NPC cardiovascular medications (*Lotrel, Starlix* and *Valturna*) allegedly serving as mechanisms to provide kickbacks to healthcare professionals (HCPs). It seeks 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. Also in 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 vigor-

ously 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 United States Attorney's Office (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. In 2017, S.D.N.Y. and New York State declined to intervene in claims raised by an individual relator, which continue to be vigorously contested.

GOVERNMENT GENERIC PRICING ANTITRUST INVESTIGATIONS, ANTITRUST CLASS ACTIONS

In 2016 and 2017, Sandoz Inc. received subpoenas and interrogatories from the Antitrust Division of the US Department of Justice (DoJ) and from the Attorney General of the State of Connecticut 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 these investigations, which it believes to be part of a broader inquiry into industry practice.

Since the third quarter of 2016, Sandoz Inc. and Fougera have been sued alongside other generic pharmaceutical companies in more than 20 consolidated complaints by proposed classes of direct and indirect purchasers, and Attorneys General for 45 states, the District of Columbia and Puerto Rico have sought leave to file a complaint, alleging that defendants, including Sandoz, engaged in anti-competitive conduct with regard to the sales of various generic drugs and asserting violations of federal and state antitrust laws as well as consumer protection laws. Lek Pharmaceuticals d.d., Novartis AG and Novartis International AG were dismissed from the proceedings. The cases have been consolidated for pretrial purposes in the USDC for the Eastern District of Pennsylvania (E.D. Pa.) and the claims are being vigorously contested.

DISTRICT OF MASSACHUSETTS (D. MASS.) CHARITABLE FOUNDATION INVESTIGATION

In 2016 and 2017, NPC received subpoenas 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, including the respective accounting and tax treatment, as well as related to pricing strategies for *Gleevec*, *Tasigna*, *Zometa*, and *Gilenya*. The requests are focused on potential violations of federal health care offenses, including the Anti-Kickback Statute, and FCA. NPC is cooperating with this investigation, which it believes to be part of a broader inquiry into industry practices.

ASIA/RUSSIA INVESTIGATION

In 2017, Novartis Group companies, as well as present and former senior executives of Alcon, received document requests and subpoenas from the DoJ and the US Securities and Exchange Commission (SEC) requesting information concerning Alcon's business practices in Asia and Russia and related accounting treatment, both before and after Alcon became part of the Novartis Group. Novartis is cooperating with this investigation.

LUCENTIS/AVASTIN® MATTERS

In connection with an investigation into whether Novartis Farma S.p.A., Novartis AG, F. Hoffmann-La Roche AG, Genentech Inc. and Roche S.p.A. colluded to artificially preserve the market positions of Avastin® and *Lucentis*, in 2014 the Italian Competition Authority imposed a fine equivalent to USD 125 million on Novartis AG and Novartis Farma S.p.A. Novartis paid the fine, subject to the right to later claim recoupment, and is appealing before the Consiglio di Stato. In 2014 and 2015, the Italian Ministry of Health and the Lombardia region sent letters with payment requests for a total equivalent of approximately USD 1.5 billion in damages from Novartis and Roche entities based on the above allegations. 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 age-related macular degeneration (AMD). Novartis continues to vigorously contest all claims in Italy and France. Also, Novartis is challenging policies and regulations allowing off-label/unlicensed use and reimbursement for economic reasons in various countries, including in Italy and the UK.

JAPAN INVESTIGATION

In 2015, a 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. In 2017, the Tokyo District Court issued a not-guilty ruling for both the former NPKK employee and NPKK. An appeal by the Tokyo District Public Prosecutor Office remains pending.

SOUTH KOREA INVESTIGATION

In 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. A criminal trial is ongoing concerning allegations that Novartis Korea utilized medical journals to provide inappropriate economic benefits to HCPs. In addition, other authorities in South Korea, including the Korea Fair Trade Commis-

sion, the Ministry of Food and Drug Safety and the Ministry of Health and Welfare conducted investigations into Novartis Korea. Those investigations have led to total fines of approximately USD 53 million as well as sales and reimbursement suspensions on Novartis Korea products in 2017.

GREECE INVESTIGATION

Novartis is investigating allegations of potentially inappropriate economic benefits in Greece to HCPs and others. Novartis Group companies in Greece are providing information to the Greek authorities related to these allegations. Novartis is also responding to a subpoena and document requests from the SEC and DoJ that it received in 2016 and 2017 in connection with such allegations and is cooperating with their investigation.

Antitrust class actions

CONTACT LENSES

Since the first quarter of 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

In 2015 and 2016, Novartis Group companies were sued in putative antitrust class actions in D. Mass. alleging delayed generic entry of *Gleevec* and seeking damages on behalf of direct and indirect purchasers of *Gleevec*. The motion to dismiss those actions was granted and plaintiffs have appealed. A similar class action was filed in 2018 in E.D. Pa. on behalf of direct purchasers of *Gleevec*. The claims are being vigorously contested.

ENOXAPARIN

In 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 and unfair business 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). 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. 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 remains a defendant in an individual action in Pennsylvania. The putative class action in Pennsylvania was dismissed in 2017. The claims are being vigorously contested.

RECLAST/ACLASTA PRODUCT LIABILITY LITIGATION

NPC is a defendant in more than 20 US product liability actions involving *Reclast* and alleging atypical femur fracture injuries, most of which are in New Jersey state or federal court and in California state court coordinated with claims against other bisphosphonate manufacturers. The Canadian putative class action brought against numerous bisphosphonate manufacturers, including NPC, Novartis Pharmaceuticals Canada Inc. and Novartis International AG, in Quebec was discontinued in 2017. The claims are being vigorously contested.

TAXOTERE® (DOCETAXEL) PRODUCT LIABILITY LITIGATION

Sandoz is a defendant in more than 1 000 US product liability actions involving Taxotere® (docetaxel), an oncology product, many of which have been transferred to Multidistrict Litigation in the Eastern District of Louisiana. The complaints allege that Sanofi, as innovator, and several 505(b)(2) NDA holders (including Sandoz) failed to warn of the risk of permanent alopecia/hair loss. The claims are being vigorously contested.

AMIODARONE PRODUCT LIABILITY LITIGATION

Sandoz entities are named in more than 10 individual and multi-plaintiff US product liability cases involving amiodarone, a cardiac drug indicated to treat life-threatening arrhythmias that have not responded to other treatment. The complaints allege failure to warn, off-label promotion and failure to include medication guides to pharmacies. All claims are being vigorously contested.

ORIEL LITIGATION

In 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

Two putative consumer fraud class actions remain ongoing against Alcon and Sandoz in New Jersey and at the US Court of Appeals for the First Circuit after having been initially dismissed at the trial court level. They claim that Alcon's and Sandoz's eye drop products for glaucoma were unfairly designed so that the drop dosage is more than necessary and exceeds the capacity of the eye, leading to wastage and higher costs to patient consumers. The claims are being vigorously contested.

IP Matters

MIVS® PLATFORM PATENT INFRINGEMENT LITIGATION

Johns Hopkins University filed a patent infringement lawsuit against Alcon alleging that the use of certain Alcon surgical products, principally by third parties, infringes a patent directed to certain methods of ocular surgery, and a trial is scheduled for February 2018. The claims are being vigorously contested.

Concluded legal matters

NEW YORK STATE PRICING POLICY INVESTIGATION

In 2014, ALI received a civil subpoena from the New York State attorney general relating to an investigation into a unilateral pricing policy program. Novartis considers this matter concluded.

***LUCENTIS*/AVASTIN® MATTER IN FRANCE**

Novartis' appeals against a temporary recommendation of use and reimbursement of off-label Avastin® for neovascular AMD by hospital ophthalmologists, in force since September 2015, as well as against the decree on which the recommendation is based, were rejected by the Supreme Court in 2016 and 2017.

SOLODYN® ANTITRUST CLASS ACTIONS

Since the third quarter of 2013, seventeen putative class action complaints and three other complaints had been filed against manufacturers of the brand drug Solodyn® and its generic equivalent, including Sandoz Inc. The cases had been consolidated and transferred for pretrial purposes to the federal district court in Mass. The plaintiffs purported to represent direct and indirect purchasers of Solodyn® branded products and asserted 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®. In 2017, all cases were resolved through settlement, the payment of which was not material to Novartis.

Summary of product liability, governmental investigations and other legal matters provision movements

(USD millions)	2017	2016	2015
January 1	**395**	**1 194**	**849**
Cash payments	– 69	– 811	– 256
Releases of provisions	– 70	– 239	– 223
Additions to provisions	93	243	832
Currency translation effects	2	8	– 8
December 31	**351**	**395**	**1 194**
Less current portion	– 121	– 131	– 743
Non-current product liabilities, governmental investigations and other legal matters provisions at December 31	**230**	**264**	**451**

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.

20. Current financial debt and derivative financial instruments

(USD millions)	2017	2016
Interest-bearing accounts of associates payable on demand [1]	1 822	1 601
Bank and other financial debt [2]	692	836
Commercial paper	2 328	3 174
Current portion of non-current financial debt	359	178
Fair value of derivative financial instruments	107	116
Total current financial debt and derivative financial instruments	**5 308**	**5 905**

[1] Weighted average interest rate 0.5% (2016: 0.5%)
[2] Weighted average interest rate 7.0% (2016: 6.7%)

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.

Details on commercial papers are provided in Note 28 – Liquidity risk.

21. Provisions and other current liabilities

(USD millions)	2017	2016
Taxes other than income taxes	660	547
Restructuring provisions	153	222
Accrued expenses for goods and services received but not invoiced	977	880
Accruals for royalties	586	550
Provisions for deductions from revenue	4 672	4 183
Accruals for compensation and benefits including social security	2 327	1 993
Environmental remediation liabilities	55	65
Deferred income	305	287
Provisions for product liabilities, governmental investigations and other legal matters [1]	121	131
Accrued share-based payments	261	199
Contingent considerations [2]	44	49
Other payables	1 042	722
Total provisions and other current liabilities	**11 203**	**9 828**

[1] Note 19 provides additional disclosures related to legal provisions.
[2] Note 28 provides additional disclosures related to contingent considerations.

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)	2017	2016	2015
January 1	**4 183**	**3 790**	**3 533**
Impact of business combinations			3
Additions	17 997	16 622	15 603
Payments/utilizations	– 17 452	– 16 189	– 15 218
Changes in offset against gross trade receivables	– 252	10	50
Currency translation effects	196	– 50	– 181
December 31	**4 672**	**4 183**	**3 790**

Restructuring provisions movements

(USD millions)	2017	2016	2015
January 1	**222**	**260**	**333**
Additions	194	343	399
Cash payments	– 200	– 260	– 435
Releases	– 64	– 66	– 36
Transfers	– 7	– 76	
Currency translation effects	8	21	– 1
December 31	**153**	**222**	**260**

In 2017, additions to provisions of USD 194 million were mainly related to the following reorganizations:

- The Innovative Medicines Division's Pharmaceuticals business unit adjusted a regional promotional model which led to a restructuring of the sales force. It also streamlined the above country operating model to facilitate an even higher external competition oriented focus. Furthermore, the development organization streamlined its activities to create efficiencies.
- The Alcon Division continued initiatives to realign its operations to focus on the Surgical and Vision Care business after the Ophthalmic Pharmaceutical business transfer to the Innovative Medicines Division.
- The Sandoz Division launched initiatives to focus resources to gain efficiencies.
- Group-wide initiatives to streamline Novartis Technical Operations in the Innovative Medicines and Sandoz Divisions were launched.

In 2016, additions to provisions of USD 343 million were mainly related to the following reorganizations:

- The Innovative Medicines Division's Pharmaceuticals business unit realigned its operations to improve its operating agility, to focus resources on key growth drivers. Furthermore, research realigned and focused its operations resulting in redundancies from the consolidation of certain research teams and the outsourcing of certain activities to qualified third party vendors.
- The Alcon Division launched several initiatives to improve its efficiencies resulting in redundancies, as it realigned its operations to focus on its Surgical and Vision Care business franchises after the transfer of its Ophthalmic Pharmaceuticals business to Innovative Medicines division.
- The Sandoz Division launched an initiative to reallocate resources to priority, high growth and higher profitability countries.
- Various group-wide initiatives to simplify organizational structure, including the consolidation of manufacturing sites and support services.

In 2015, additions to provisions of USD 399 million were mainly related to the following reorganizations:

- The 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.
- The Alcon Division extended its initiative started in the prior year to realize productivity opportunities.
- Various group-wide initiatives to simplify the organizational structure, mainly related to the manufacturing footprint and support services.

22. Details to the consolidated cash flow statements

22.1) Adjustments for non-cash items from continuing operations

(USD millions)	**2017**	2016	2015
Taxes	1 296	1 119	1 106
Depreciation, amortization and impairments on:			
Property, plant & equipment	1 677	1 591	1 550
Intangible assets	4 399	4 452	3 921
Financial assets [1]	256	132	104
Income from associated companies	– 1 108	– 703	– 266
Gains on disposal and other adjustments on property, plant & equipment, intangible, financial and other non-current assets, net	– 1 043	– 935	– 869
Equity-settled compensation expense	683	671	773
Change in provisions and other non-current liabilities	160	956	1 642
Net financial expense	738	1 154	1 109
Total	**7 058**	**8 437**	**9 070**

[1] Including unrealized fair value gains

In 2015, the Group acquired property, plant and equipment of USD 85 million through finance lease contracts.

22.2) Cash flows from changes in working capital and other operating items included in operating cash flow from continuing operations

(USD millions)	**2017**	2016	2015
(Increase) in inventories	– 247	– 235	– 482
(Increase) in trade receivables	– 204	– 229	– 513
Increase/(Decrease) in trade payables	58	– 587	378
Change in other net current assets and other operating cash flow items	637	974	– 246
Total	**244**	**– 77**	**– 863**

22.3) 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)	**2017 Acquisitions**	**2017 Divestments**	2016 Acquisitions	2016 Divestments	2015 Acquisitions	2015 Divestments
Property, plant & equipment		25				1 000
Currently marketed products		1	– 451		– 12 970	646
(Acquired)/divested research & development	– 1 223		– 690		– 730	13
Technologies						113
Other intangible assets		3			– 15	86
Financial and other assets including deferred tax assets	– 8		– 39		– 555	40
Inventories			– 4			893
Trade receivables and other current assets		34	– 1		– 3	529
Cash and cash equivalents	– 20		– 1		– 25	311
Current and non-current financial debts						– 601
Trade payables and other liabilities including deferred tax liabilities	326	– 15	372		212	– 841
Net identifiable assets (acquired) or divested	**– 925**	**48**	**– 814**		**– 14 086**	**2 189**
Currency translation effects						98
Acquired/(divested) liquidity	20		1		25	– 479
Fair value of previously held equity interests			64			
Subtotal	**– 905**	**48**	**– 749**		**– 14 061**	**1 808**
Refinancing of intercompany financial debt, net						578
Goodwill	– 94		– 56		– 2 438	1 042
Divestment gain						7 401
Taxes paid and other portfolio transformation related cash flows		– 140		– 748		– 1 337
Receivables and payables contingent consideration, net [1]	206		84		– 8	– 519
Other payments and deferred consideration, net	– 36	– 3	– 44			
Deferred portion of sales price [2]						– 49
Net cash flows	**– 829**	**– 95**	**– 765**	**– 748**	**– 16 507**	**8 924**
Of which:						
Net cash flows used in/from discontinued operations		– 140		– 748		8 924
Net cash flows used in/from continuing operations	– 829	45	– 765		– 16 507	

[1] 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.
[2] Divestments include USD 49 million proceeds for the divestment of the Animal Health business received in 2014.

Notes 2 and 23 provide further information regarding acquisitions and divestments of businesses. All acquisitions were for cash.

22.4) Cash flows from discontinued operations

(USD millions)	**2017**	2016	2015
Cash flows used in operating activities			**– 188**
Purchase of property, plant & equipment			– 41
Proceeds from sales of property, plant & equipment			1
Purchase of financial and other non-current assets, net			– 2
Divestments of businesses [1]	– 140	– 748	8 924
Cash flows used in/from investing activities	**– 140**	**– 748**	**8 882**
Total net cash flows used in/from discontinued operations	**– 140**	**– 748**	**8 694**

[1] 2017 includes payments related to the 2015 portfolio transformation transaction. 2016 includes mainly payments for capital gains taxes and other payments related to the 2015 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, related to the 2015 portfolio transformation transaction. See Note 2 for a description of the 2015 porfolio transformation transaction.

22.5) Reconciliation of liabilities arising from financing activities

(USD millions)	Non-current financial debts	Current financial debts and derivative financial instruments	Total
January 1, 2017	**17 897**	**5 905**	**23 802**
Increase in non-current financial debts	4 933		4 933
Repayment of non-current financial debts	– 1	– 187	– 188
Change in current financial debts		– 755	– 755
Changes in fair values and other changes	– 6	– 140	– 146
Amortization of bonds discount	16		16
Currency translation effects	744	126	870
Current portion of non-current financial debt	– 359	359	
December 31, 2017	**23 224**	**5 308**	**28 532**

23. Acquisitions of businesses

Fair value of assets and liabilities arising from acquisitions

(USD millions)	**2017**	2016	2015
Currently marketed products		451	12 970
Acquired research & development	1 223	690	730
Other intangible assets			15
Deferred tax assets	8	39	555
Inventories		4	
Trade receivables and other current assets		1	3
Cash and cash equivalents	20	1	25
Payables and other liabilities including deferred tax liabilities	– 326	– 372	– 212
Net identifiable assets acquired	**925**	**814**	**14 086**
Acquired liquidity	– 20	– 1	– 25
Goodwill	94	56	2 438
Net assets recognized as a result of business combinations	**999**	**869**	**16 499**

Note 2 details significant acquisition of businesses, which were Ziarco and Encore in 2017, were Transcend and Reprixys in 2016, and were the GSK Oncology products, Spinifex and Admune in 2015. The goodwill arising out of these acquisitions is attributable to buyer-specific synergies, the assembled workforce and the accounting for deferred tax liabilities on the acquired assets. No goodwill from 2017 is tax-deductible. Goodwill of USD 18 million from 2016 and of USD 2.4 billion from 2015 is tax deductible.

24. 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 94% of the Group's total DBO for pension plans. Details of the plans in the two most significant countries of Switzerland and the United States 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, that, 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 September 2017, the pension regulations in Switzerland were amended, which resulted in a change in accounting from defined benefit to defined contribution for a component of the Swiss pension plans. This change resulted in a reduction to the defined benefit pension plans liability and in a corresponding net pre-tax gain of USD 225 million (CHF 216 million).

The United States 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 United States 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, 2017 and 2016:

	Pension plans		Other post-employment benefit plans	
(USD millions)	**2017**	2016	**2017**	2016
Benefit obligation at January 1	**23 614**	**23 402**	**1 158**	**1 132**
Current service cost	422	437	34	35
Interest cost	330	390	44	48
Past service costs and settlements	– 1 226	– 73	– 10	
Administrative expenses	27	29		
Remeasurement losses arising from changes in financial assumptions	11	1 299	32	46
Remeasurement (gains) arising from changes in demographic assumptions	– 26	– 7	– 9	– 26
Experience-related remeasurement losses/(gains)	47	117	– 87	– 33
Currency translation effects	1 138	– 896	5	7
Benefit payments	– 1 300	– 1 250	– 51	– 51
Contributions of associates	207	207		
Effect of acquisitions, divestments or transfers	– 34	– 41	– 1	
Benefit obligation at December 31	**23 210**	**23 614**	**1 115**	**1 158**
Fair value of plan assets at January 1	**19 225**	**19 536**	**153**	**172**
Interest income	236	293	5	6
Return on plan assets excluding interest income	1 429	742	12	– 1
Currency translation effects	909	– 757		
Novartis Group contributions	579	542	43	27
Contributions of associates	207	207		
Settlements	– 995	– 77		
Benefit payments	– 1 300	– 1 250	– 51	– 51
Effect of acquisitions, divestments or transfers	– 15	– 11		
Fair value of plan assets at December 31	**20 275**	**19 225**	**162**	**153**
Funded status	**– 2 935**	**– 4 389**	**– 953**	**– 1 005**
Limitation on recognition of fund surplus at January 1	**– 54**	**– 50**		
Change in limitation on recognition of fund surplus (incl. exchange rate differences)	– 30			
Interest income on limitation of fund surplus	– 5	– 4		
Limitation on recognition of fund surplus at December 31	**– 89**	**– 54**		
Net liability in the balance sheet at December 31	**– 3 024**	**– 4 443**	**– 953**	**– 1 005**

The reconciliation of the net liability from January 1 to December 31 is as follows:

	Pension plans		Other post-employment benefit plans	
(USD millions)	**2017**	2016	**2017**	2016
Net liability at January 1	**– 4 443**	**– 3 916**	**– 1 005**	**– 960**
Current service cost	– 422	– 437	– 34	– 35
Net interest expense	– 99	– 101	– 39	– 42
Administrative expenses	– 27	– 29		
Past service costs and settlements	231	– 4	10	
Remeasurements	1 397	– 667	76	12
Currency translation effects	– 229	139	– 5	– 7
Novartis Group contributions	579	542	43	27
Effect of acquisitions, divestments or transfers	19	30	1	
Change in limitation on recognition of fund surplus	– 30			
Net liability at December 31	**– 3 024**	**– 4 443**	**– 953**	**– 1 005**
Amounts recognized in the consolidated balance sheet				
Prepaid benefit cost	133	47		
Accrued benefit liability	– 3 157	– 4 490	– 953	– 1 005

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:

	2017				2016			
(USD millions)	Switzerland	United States	Rest of the world	Total	Switzerland	United States	Rest of the world	Total
Benefit obligation at December 31	**14 606**	**3 788**	**4 816**	**23 210**	**15 436**	**3 783**	**4 395**	**23 614**
Thereof unfunded		*728*	*499*	*1 227*		*739*	*497*	*1 236*
By type of member								
Active	5 627	796	1 646	8 069	6 426	891	1 460	8 777
Deferred pensioners		1 258	1 646	2 904		831	1 515	2 346
Pensioners	8 979	1 734	1 524	12 237	9 010	2 061	1 420	12 491
Fair value of plan assets at December 31	**14 445**	**2 400**	**3 430**	**20 275**	**13 958**	**2 282**	**2 985**	**19 225**
Funded status	**– 161**	**– 1 388**	**– 1 386**	**– 2 935**	**– 1 478**	**– 1 501**	**– 1 410**	**– 4 389**

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		
	2017	2016	2015	**2017**	2016	2015
Weighted average assumptions used to determine benefit obligations at December 31						
Discount rate	1.5%	1.4%	1.8%	3.7%	4.2%	4.4%
Expected rate of pension increase	0.5%	0.4%	0.4%			
Expected rate of salary increase	2.8%	2.2%	2.9%			
Interest on savings account	0.6%	0.5%	0.8%			
Current average life expectancy for a 65-year-old male in years	22	22	21	21	21	21
Current average life expectancy for a 65-year-old female in years	24	24	24	23	23	23

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 2017 year-end defined benefit pension obligation
25 basis point increase in discount rate	– 753
25 basis point decrease in discount rate	803
1 year increase in life expectancy	840
25 basis point increase in rate of pension increase	533
25 basis point decrease in rate of pension increase	– 138
25 basis point increase of interest on savings account	56
25 basis point decrease of interest on savings account	– 54
25 basis point increase in rate of salary increase	49
25 basis point decrease in rate of salary increase	– 50

The healthcare cost trend rate assumptions used for other post-employment benefits are as follows:

	2017	2016	2015
Healthcare cost trend rate assumed for next year	6.5%	7.0%	7.5%
Rate to which the cost trend rate is assumed to decline	4.5%	5.0%	5.0%
Year that the rate reaches the ultimate trend rate	2025	2022	2022

The following table shows the weighted average plan asset allocation of funded defined benefit pension plans at December 31, 2017 and 2016:

	Pension plans			
(as a percentage)	Long-term target minimum	Long-term target maximum	**2017**	2016
Equity securities	15	40	31	31
Debt securities	20	60	35	35
Real estate	5	20	15	15
Alternative investments	0	20	15	15
Cash and other investments	0	15	4	4
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 as per the below table:

	December 31, 2017	December 31, 2016
Investment in shares of Novartis AG		
Number of shares (in millions)	11.0	11.0
Market Value (in USD billions)	0.9	0.8

The weighted average duration of the defined benefit obligation is 14.6 years (2016: 14.5 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, 2017, were as follows:

(USD millions)	Pension plans	Other post-employment benefit plans
Novartis Group contributions		
2018 (estimated)	395	62
Expected future benefit payments		
2018	1 226	63
2019	1 166	65
2020	1 163	67
2021	1 147	68
2022	1 133	69
2023–2027	5 534	344

Defined contribution plans

In many subsidiaries, associates are covered by defined contribution plans. Contributions charged to the 2017 consolidated income statement for the defined contribution plans were:

(USD millions)	**2017**	2016	2015
Contributions for defined contribution plans continuing operations	406	338	359
Contributions for defined contribution plans discontinued operations			1

25. Equity-based participation plans for associates

The expense related to all equity-based participation plans and the liabilities arising from equity-based payment transactions were as follows:

(USD millions)	2017	2016	2015
Expense related to equity-based participation plans	924	846	968
of which continuing operations	924	846	903
of which discontinued operations			65
Liabilities arising from equity-based payment transactions	261	199	209

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 (RSs) 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 was extended to Novartis Top Leaders (NTLs). The Annual Incentive payout for the NTLs is 70% in cash and 30% in Novartis RSs or RSUs. Each RS 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 in certain countries may elect to also receive their cash incentive partially or fully in shares or share units that will not be subject to vesting conditions.

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 operates three share savings plans, and associates may only participate in one of the share savings plans in any given year:

- In Switzerland, Employee Share Ownership Plan (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, participants will receive one matching share for every two invested shares. Associates eligible for the equity plan "Select" are not eligible to receive ESOP matching shares starting with the 2017 performance period onwards.
- In the United Kingdom, associates can invest up to 10% of their monthly salary in shares (up to a maximum of GBP 150) and may also be invited to invest their net Annual Incentive in shares. Two invested shares are matched with one share with a holding period of three years. Starting with the 2017 performance period onwards, United Kingdom associates can only invest a maximum of 50% of their Annual Incentive in shares and this option is no longer offered to associates who are eligible for the equity plan "Select".
- The Leveraged Share Savings Plan (LSSP) was available to key executives for performance periods prior to 2016. At the participant's election, the Annual Incentive was awarded partly or entirely in shares. The elected number of shares 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 United States both the LSSP award and the corresponding match are cash settled.

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 the share savings plans.

Novartis equity plan "Select"

The equity plan "Select" is a global equity incentive plan under which eligible associates may annually be awarded a grant subject to a three year vesting period. No awards are granted for performance ratings below a certain threshold. Executive Committee members are not eligible for participation in the equity plan "Select" effective from the performance period 2014, and the NTLs are not eligible to participate effective from the performance period 2016.

The equity plan "Select" currently allows participants in Switzerland to choose the form of their equity compensation in RSs or 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 tenth anniversary from the grant date. Each tradable share option entitles the holder to purchase after vesting (and before the tenth 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.

	2017		2016	
	Options (millions)	Weighted average exercise price (USD)	Options (millions)	Weighted average exercise price (USD)
Options outstanding at January 1	**9.5**	**59.4**	**11.7**	**59.9**
Sold or exercised	– 2.1	59.2	– 2.2	61.8
Forfeited or expired				
Outstanding at December 31	**7.4**	**59.5**	**9.5**	**59.4**
Exercisable at December 31	**7.4**	**59.5**	**9.5**	**59.4**

All share options were granted at an exercise price that 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 or exercise was USD 80.1.

The following table summarizes information about share options outstanding at December 31, 2017:

	Options outstanding		
Range of exercise prices (USD)	Number outstanding (millions)	Average remaining contractual life (years)	Weighted average exercise price (USD)
45–49	0.7	1.0	46.7
50–54	1.1	2.0	54.6
55–59	2.7	3.3	57.6
65–70	2.9	5.0	66.1
Total	**7.4**	**3.6**	**59.5**

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:

	2017		2016	
	ADR options (millions)	Weighted average exercise price (USD)	ADR options (millions)	Weighted average exercise price (USD)
Options outstanding at January 1	**25.9**	**59.9**	**31.9**	**60.2**
Sold or exercised	– 5.6	59.9	– 6.0	61.7
Forfeited or expired				
Outstanding at December 31	**20.3**	**59.9**	**25.9**	**59.9**
Exercisable at December 31	**20.3**	**59.9**	**25.9**	**59.9**

All ADR options were granted at an exercise price that 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 79.9.

The following table summarizes information about ADR options outstanding at December 31, 2017:

	ADR options outstanding		
Range of exercise prices (USD)	Number outstanding (millions)	Average remaining contractual life (years)	Weighted average exercise price (USD)
45–49	1.8	1.0	46.4
50–54	2.1	2.0	53.7
55–59	8.0	3.5	58.0
65–69	8.4	5.0	66.1
Total	**20.3**	**3.7**	**59.9**

Long-Term Performance Plan

The Long-Term Performance Plan (LTPP) is an equity plan for the Novartis Group CEO, the other Executive Committee members and the NTLs. For the 2017 grant, the target incentive is 200% of base compensation for the Novartis Group CEO and ranges from 150% to 170% for other Executive Committee members. For the NTLs, the target incentive range is from 20% to 160% of base compensation.

The awards 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 a 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. The weighting of this measure is 25%. 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.

Under the LTPP, participants are granted a target number of Performance Share Units (PSUs) at the beginning of every performance period, which are converted into unrestricted Novartis shares after the performance period. Payout is between 0% and 200% of target. PSUs granted under the LTPP do not carry voting rights, but do carry dividend equivalents that are paid in shares at the end of the performance period.

Long-Term Relative Performance Plan

The Long-Term Relative Performance Plan (LTRPP) is an equity plan for the Novartis Group CEO, other ECN members and NTLs. For the 2017 grant, the target incentive is 125% of base compensation for the Novartis Group CEO and ranges from 60% to 80% for other Executive Committee members. For the NTLs, the target incentive range is from 10% to 40% of base compensation. The LTRPP is based on the ranking of Novartis' Total Shareholder Return (TSR) relative to a global healthcare peer group of 12 companies until 2016, and 15 companies from 2017, over rolling three-year performance periods. TSR in USD is calculated as price change of the Novartis share plus the dividend plus the re-investment return of the dividend amount, all translated to USD at the respective exchange rate, over the three-year performance period. The calcu-

lation is based on Bloomberg standard published TSR data, which is publicly available. The position in the peer group determines the payout range based on a payout matrix. Under the LTRPP, participants are also granted a target number of PSUs at the beginning of every performance period, which are converted into unrestricted Novartis shares after the performance period. Payout is between 0% and 200% of target. PSUs under the LTRPP do not carry voting rights, but do carry dividend equivalents that are paid in shares at the end of the performance period.

Other share awards

Selected associates, excluding the Executive Committee members, may exceptionally receive Special Share Awards of RSs or RSUs. These Special Share Awards provide an opportunity to reward outstanding achievements or exceptional performance, and aim to retain key contributors. They are based on a formal internal selection process, through which the individual performance of each candidate is thoroughly assessed at several management levels. Special Share Awards have a minimum three-year vesting period. In exceptional circumstances, Special Share Awards may be awarded 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, associates at different levels in the organization were awarded RSs and RSUs in 2017.

In addition, in 2017, 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 (RSs, RSUs and PSUs) for all plans:

	2017			2016		
	Number of shares in millions	Weighted average fair value at grant date in USD	Fair value at grant date in USD millions	Number of shares in millions	Weighted average fair value at grant date in USD	Fair value at grant date in USD millions
Non-vested shares at January 1	**21.0**	**89.5**	**1 880**	**20.1**	**87.1**	**1 751**
Granted						
– Annual incentive	1.3	69.3	90	0.1	73.8	7
– Share savings plans	4.5	69.4	312	4.4	78.1	344
– Select North America	4.5	64.1	288	4.8	72.4	348
– Select outside North America	2.0	65.3	131	1.6	74.4	119
– Long-Term Performance Plan	1.4	71.5	100	1.2	79.2	95
– Long-Term Relative Performance Plan	0.4	47.7	19	0.3	58.5	18
– Other share awards	1.3	67.8	88	0.7	65.8	46
Vested	– 10.7	78.2	– 837	– 10.4	68.8	– 716
Forfeited	– 1.8	80.7	– 145	– 1.8	73.1	– 132
Non-vested shares at December 31	**23.9**	**80.6**	**1 926**	**21.0**	**89.5**	**1 880**

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.

Both options and SSAR expire on their tenth anniversary. The last grant was made in 2009.

The following table shows the activity associated with the converted Novartis share options and SSARs during 2017 and 2016:

	Number of options (millions)	Weighted average exercise price (USD)	Number of SSARs (millions)	Weighted average exercise price (USD)
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**
Outstanding at January 1, 2017	**0.1**	**36.0**	**1.4**	**35.9**
Exercised			– 0.6	39.8
Outstanding at December 31, 2017	**0.1**	**33.7**	**0.8**	**33.0**
Exercisable at December 31, 2017	**0.1**	**33.7**	**0.8**	**33.0**

26. Transactions with related parties

Genentech/Roche

Novartis has two agreements with Genentech, Inc., United States, 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 2017, *Lucentis* sales of USD 1.9 billion (2016: USD 1.8 billion, 2015: USD 2.1 billion) were 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 US. 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 2017, Novartis recognized total sales of *Xolair* of USD 920 million (2016: USD 835 million, 2015: USD 755 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 33 million in 2017 (2016: USD 217 million, 2015: USD 309 million).

Furthermore, Novartis has several patent license, supply and distribution agreements with Roche.

Executive Officers and Non-Executive Directors Compensation

During 2017, there were 11 Executive Committee members ("Executive Officers"), including those who stepped down during the year (14 members in 2016 and 11 members in 2015 also including those who stepped down).

The total compensation for members of the Executive Committee and the 13 Non-Executive Directors (13 in 2016, 12 in 2015 including those who stepped down during the year) using the Group's accounting policies for equity-based compensation and pension benefits was as follows:

	Executive Officers			Non-Executive Directors			Total		
(USD millions)	**2017**	2016	2015	**2017**	2016	2015	**2017**	2016	2015
Cash and other compensation	18.4	20.8	17.1	4.0	4.0	4.7	22.4	24.8	21.8
Post-employment benefits	2.0	2.2	1.9				2.0	2.2	1.9
Equity-based compensation	49.9	46.2	52.9	4.8	4.6	4.4	54.7	50.8	57.3
Total	**70.3**	**69.2**	**71.9**	**8.8**	**8.6**	**9.1**	**79.1**	**77.8**	**81.0**

During 2017, there was an increase in the IFRS compensation expense for Executive Officers, mainly due to the pro-rata accelerated vesting of equity-based compensation, required by IFRS, for an ECN member who stepped down on December 31, 2017. This was partially offset by the reduction in the number of Executive Officers compared to 2016. The increase in the IFRS compensation expense for Non-Executive Directors was due to one additional Non-Executive Director appointed at the 2017 Annual General Meeting.

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.

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 on Board and Executive compensation required by the Swiss Code of Obligations and in accordance with the Swiss Ordinance against Excessive Compensation in Stock Exchange Listed Companies are shown in the Compensation Report.

Transactions with former members of the Board of Directors

During 2017, 2016 and 2015, the following payments (or waivers of claims) were made to former Board members or to "persons closely" linked to them:

	Currency	2017	2016	2015
Prof. Dr. Brody	CHF	0	25 000	100 000
Prof. Dr. Zinkernagel	CHF	0	50 000	200 000
Dr. Krauer	CHF	60 000	60 000	60 000
Dr. Vasella	CHF	26 279	0	0
	USD	0	250 000	250 000

Prof. Dr. William R. Brody and Prof. Dr. Rolf M. Zinkernagel, who stepped down from the Board of Directors at the 2014 AGM, received in 2016 and 2015, 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). No payments were made in 2017, as their respective mandates ended in 2016.

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.

In 2017, Dr. Daniel Vasella, Honorary Chairman, was paid CHF 26 279 for reimbursable costs under his agreement with the company. In 2016, Dr. Daniel Vasella received the contractual minimum compensation under an agreement which became effective on November 1, 2013 and ended in 2016. Under this agreement, Dr. Vasella was compensated at a rate of USD 25 000 per day, with an annual guaranteed minimum fee of USD 250 000. This amount was 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 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 the 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 Executive Committee of Novartis with effect from March 1, 2016. In 2015, a Novartis 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.

27. 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, 2017, the Group's commitments with respect to these leases, including estimated payment dates, were as follows:

(USD millions)	2017
2018	309
2019	224
2020	161
2021	131
2022	123
Thereafter	2 221
Total	**3 169**
Expense of current year	**337**

Research & Development and other intangible asset purchase commitments

The Group has entered into long-term research and development agreements with various institutions which provide for potential milestone payments by Novartis that may be capitalized. As of December 31, 2017 the Group's commitments to make payments under those agreements and other agreements to purchase intangible assets, and their estimated timing, were as follows:

(USD millions)	Research & Development commitments	Other intangible asset purchase commitments	Total
2018	780	130	910
2019	671		671
2020	864		864
2021	801		801
2022	353		353
Thereafter	837		837
Total	**4 306**	**130**	**4 436**

Other commitments

The Group has 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 that 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 United States 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 19 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 19 contains additional information on environmental liabilities.

28. Financial instruments – additional disclosures

(USD millions)	Note	2017[1]	2016[1]
Cash and cash equivalents	15	**8 860**	**7 007**
Financial assets – measured at fair value through other comprehensive income			
Available-for-sale marketable securities			
Debt securities	15	328	306
Fund investments	15	34	31
Total available-for-sale marketable securities		**362**	**337**
Available-for-sale long-term financial investments			
Equity securities	12	1 109	989
Fund investments	12	166	107
Total available-for-sale long-term financial investments		**1 275**	**1 096**
Total financial assets – measured at fair value through other comprehensive income		**1 637**	**1 433**
Financial assets – measured at amortized costs			
Trade receivables, income tax receivables, and other current assets (excluding contingent consideration receivables and pre-payments)	14/16	10 650	10 202
Accrued interest on debt securities and time deposits	15	1	1
Time deposits with original maturity more than 90 days	15	125	108
Long-term loans and receivables from customers and finance lease, advances, security deposits	12	574	514
Total financial assets – measured at amortized costs		**11 350**	**10 825**
Financial assets – measured at fair value through the consolidated income statement			
Associated companies at fair value through profit and loss		216	188
Derivative financial instruments	15	31	230
Contingent consideration receivables	12/16	844	586
Total financial assets – measured at fair value through the consolidated income statement		**1 091**	**1 004**
Total financial assets		**22 938**	**20 269**
Financial liabilities – measured at amortized costs			
Current financial debt			
Interest-bearing accounts of associates payable on demand	20	1 822	1 601
Bank and other financial debt	20	692	836
Commercial paper	20	2 328	3 174
Current portion of non-current debt	20	359	178
Total current financial debt		**5 201**	**5 789**
Non-current financial debt			
Straight bonds	18	22 957	17 285
Liabilities to banks and other financial institutions	18	539	708
Finance lease obligations	18	87	82
Current portion of non-current debt	18	– 359	– 178
Total non-current financial debt		**23 224**	**17 897**
Trade payables		**5 169**	**4 873**
Total financial liabilities – measured at amortized costs		**33 594**	**28 559**
Financial liabilities – measured at fair value through the consolidated income statement			
Contingent consideration (see Note 19/21) and other financial liabilities		924	1 018
Derivative financial instruments	20	107	116
Total financial liabilities – measured at fair value through the consolidated income statement		**1 031**	**1 134**
Total financial liabilities		**34 625**	**29 693**

[1] Except for straight bonds (see Note 18), 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, 2017 and 2016. 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, 2017 and 2016.

	Contract or underlying principal amount		Positive fair values		Negative fair values	
(USD millions)	**2017**	2016	**2017**	2016	**2017**	2016
Currency-related instruments						
Forward foreign exchange rate contracts	8 410	8 220	31	230	– 107	– 116
Total derivative financial instruments included in marketable securities and in current financial debts	**8 410**	**8 220**	**31**	**230**	**– 107**	**– 116**

The following table shows by currency contract or underlying principal amount the derivative financial instruments at December 31, 2017 and 2016:

			2017	
(USD millions)	EUR	USD	Other	Total
Currency-related instruments				
Forward foreign exchange rate contracts	2 768	4 361	1 281	8 410
Total derivative financial instruments	**2 768**	**4 361**	**1 281**	**8 410**

			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**

Derivative financial instruments effective for hedge accounting purposes

At the end of 2017 and 2016, 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.

	2017				
(USD millions)	Level 1	Level 2	Level 3	Valued at amortized cost	Total
Financial assets					
Debt securities	303	25			328
Fund investments	34				34
Total available-for-sale marketable securities	**337**	**25**			**362**
Time deposits with original maturity more than 90 days				125	125
Derivative financial instruments		31			31
Accrued interest on debt securities				1	1
Total marketable securities, time deposits and derivative financial instruments	**337**	**56**		**126**	**519**
Available-for-sale financial investments	672		437		1 109
Fund investments			166		166
Contingent consideration receivables			394		394
Long-term loans and receivables from customers and finance lease, advances, security deposits				574	574
Financial investments and long-term loans	**672**		**997**	**574**	**2 243**
Associated companies at fair value through profit and loss	**28**		**188**		**216**
Contingent consideration receivables short-term			**450**		**450**
Financial liabilities					
Contingent consideration payables			– 852		– 852
Other financial liabilities			– 72		– 72
Derivative financial instruments		– 107			– 107
Total financial liabilities at fair value		**– 107**	**– 924**		**– 1 031**

	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**

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:

	2017					
(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	**188**	**107**	**476**	**586**	**– 889**	**– 129**
Fair value gains and other adjustments, including from divestments recognized in the consolidated income statement	45		32	278	362	
Fair value losses (including impairments and amortizations) and other adjustments recognized in the consolidated income statement	– 34		– 45		– 193	– 37
Fair value adjustments recognized in the consolidated statement of comprehensive income		45	– 40			
Purchases	37	28	113		– 238	
Cash receipts and payments				– 20	106	94
Disposals	– 19	– 18	– 52			
Reclassification	– 29	4	– 47			
December 31	**188**	**166**	**437**	**844**	**– 852**	**– 72**
Total of fair value gains and losses recognized in the consolidated income statement for assets and liabilities held at December 31, 2017	11	0	– 13	278	169	– 37

	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

During 2017, there were several individually non-significant transfers of available-for-sale financial investments from Level 3 to Level 1 for USD 73 million (2016: USD 75 million) mainly due to Initial Public Offerings of the invested companies.

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 available-for-sale financial investments by 10% positively or negatively, this would change the amounts recorded in the 2017 consolidated statement of comprehensive income by USD 79 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 inputs used are, among others, the probability of success, sales forecast and assumptions regarding the discount rate, timing and different scenarios of triggering events. The inputs are interrelated. The significance and usage of these inputs to each contingent consideration may vary due to differences in the timing and triggering events for payments or in the nature of the asset related to the contingent consideration.

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 2017 consolidated income statement by USD 333 million and USD 322 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 US dollar 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 that 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 foreign exchange losses (USD 0.3 billion) occurred in Venezuela in 2016. The net outstanding intercompany payable balance of Venezuela subsidiaries was not significant at December 31, 2017 and at December 31, 2016, due to reserves against the intercompany balances.

The Group manages its global 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 has designated a certain portion of its long-term euro-denominated straight bonds as hedges of the translation risk arising on certain of these net investments in foreign operations with euro functional currency. As of December 31, 2017, long-term financial debt with a carrying amount of EUR 1.8 billion (USD 2.2 billion) has been designated as a hedge instrument. During 2017, USD 237 million of unrealized loss was recognized in other comprehensive income and accumulated in currency translation effects in relation with this net investment hedge. The hedge remained effective since inception, and no amount was recognized in the consolidated income statement in 2017. During 2016 and 2015, the Group did not apply net investment hedge accounting.

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 that 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 country and customer credit risk, assigns individual credit limits, and takes actions to mitigate credit risk where appropriate.

The Group's largest customer accounted for approximately 17% of net sales, and the second-largest and third-largest customers accounted for 12% and 7% of net sales, respectively (2016: 16%, 12% and 6%, 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 and amounted to 14%, 9% and 5%, respectively, of the Group's trade receivables at December 31, 2017 (2016: 14%, 9% and 6%, respectively). There is no other significant concentration of customer 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 that 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 20.2%, 15.0% and 12.7%, respectively (2016: 16.5%, 6.9% and 6.7%, 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 United States 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 2.3 billion under these three programs were outstanding as per December 31, 2017 (2016: USD 3.2 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 United States commercial paper programs. It matures in September 2020 and was undrawn as per December 31, 2017 and December 31, 2016.

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, 2017 and December 31, 2016:

	2017					
(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	71	72	105	181	58	487
Commodities					106	106
Derivative financial instruments and accrued interest	7	19	6			32
Cash and cash equivalents	4 260	4 600				8 860
Total current financial assets	**4 338**	**4 691**	**111**	**181**	**164**	**9 485**
Non-current liabilities						
Financial debt				– 9 849	– 13 375	– 23 224
Financial debt – undiscounted				*– 9 893*	*– 13 519*	*– 23 412*
Total non-current financial debt				**– 9 849**	**– 13 375**	**– 23 224**
Current liabilities						
Financial debt	– 4 576	– 169	– 456			– 5 201
Financial debt – undiscounted	*– 4 576*	*– 169*	*– 456*			*– 5 201*
Derivative financial instruments	– 31	– 48	– 28			– 107
Total current financial debt	**– 4 607**	**– 217**	**– 484**			**– 5 308**
Net debt	**– 269**	**4 474**	**– 373**	**– 9 668**	**– 13 211**	**– 19 047**

	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**

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:

	2017			
(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	– 953	– 972	– 2 824	– 4 749
Potential inflows in various currencies – from financial derivative assets	928	948	2 778	4 654

	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

Other contractual liabilities that are not part of management's monitoring of the net debt or liquidity consist of the following items:

	2017				
(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	– 113	– 507	– 1 765	– 3 859	– 6 244
Trade payables	– 5 169				– 5 169

	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

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 maturities 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 0.38:1 at December 31, 2017, compared to 0.32:1 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. The VAR computation includes all financial assets and financial liabilities as set forth in the table on page 243, except trade receivables, income tax receivables and other current assets, contingent considerations, finance lease obligations, long-term loans and receivables from customers and finance lease, advances and security deposits and trade payables.

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 interrelationships 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 the fair value of the Group's foreign currency positions (including foreign exchange translation risk), 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)	**2017**	2016
All financial instruments	498	541
Analyzed by components:		
Instruments sensitive to foreign currency exchange rates	184	222
Instruments sensitive to equity market movements	27	26
Instruments sensitive to interest rates	242	328

The average, high, and low VAR amounts are as follows:

	2017		
(USD millions)	Average	High	Low
All financial instruments	521	560	466
Analyzed by components:			
Instruments sensitive to foreign currency exchange rates	277	352	184
Instruments sensitive to equity market movements	28	35	21
Instruments sensitive to interest rates	282	338	219

	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

The VAR computation is a risk analysis tool designed to statistically estimate the 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 that 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 2017 and 2016, the worst case loss scenario was calculated as follows:

(USD millions)	**2017**	2016
All financial instruments	7	6
Analyzed by components:		
Instruments sensitive to foreign currency exchange rates		
Instruments sensitive to equity market movements		
Instruments sensitive to interest rates	7	6

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 rating of the Group.

29. Discontinued operations

Discontinued operations consolidated income statement segmentation

	2015			
(USD millions)	Vaccines	Consumer Health[1]	Corporate (including eliminations)	Total discontinued operations
Net sales to third parties of discontinued operations	**145**	**456**		**601**
Sales to continuing segments	18	1		19
Net sales of discontinued operations	**163**	**457**		**620**
Other revenues	18	5		23
Cost of goods sold	– 192	– 184		– 376
Gross profit of discontinued operations	**– 11**	**278**		**267**
Marketing & Sales	– 57	– 187		– 244
Research & Development	– 151	– 30		– 181
General & Administration	– 26	– 32		– 58
Other income	2 870	10 558	– 8	13 420
Other expense	– 57	– 14	– 656	– 727
Operating income of discontinued operations	**2 568**	**10 573**	**– 664**	**12 477**
Income from associated companies	2			2
Income before taxes of discontinued operations				**12 479**
Taxes				– 1 713
Net income of discontinued operations				**10 766**

[1] Consumer Health is the aggregation of the former OTC and Animal Health divisions.

The following are included in net income from discontinued operations:

(USD millions)	2015
Impairment charges on property, plant & equipment, net	83
Additions to restructuring provisions	– 1
Equity-based compensation of Novartis equity plans	– 65

30. Events subsequent to the December 31, 2017 consolidated balance sheet date

Significant transaction closed in January 2018
For significant transaction entered into in 2017 and closed in 2018, see Note 2.

Dividend proposal for 2017 and approval of the Group's 2017 consolidated financial statements
On January 23, 2018, the Novartis AG Board of Directors proposed the acceptance of the 2017 consolidated financial statements of the Novartis Group for approval by the Annual General Meeting on March 2, 2018. Furthermore, also on January 23, 2018, the Board proposed a dividend of CHF 2.80 per share to be approved at the Annual General Meeting on March 2, 2018. If approved, total dividend payments would amount to approximately USD 6.7 billion (2016: USD 6.5 billion) using the CHF/USD December 31, 2017 exchange rate.

31. 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. It includes all subsidiaries and associated companies with Total assets or Net sales to third parties in excess of USD 25 million. 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, 2017		Share 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	100%
Novartis Pharmaceuticals Australia Pty Ltd, North Ryde, NSW	AUD	3.8 m	100%
Sandoz Pty Ltd, North Ryde, NSW	AUD	11.6 m	100%
Alcon Laboratories (Australia) Pty Ltd, Frenchs Forest, NSW	AUD	2.6 m	100%
Austria			
Novartis Austria GmbH, Vienna	EUR	1.0 m	100%
Novartis Pharma GmbH, Vienna	EUR	1.1 m	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%
N.V. Sandoz S.A., Vilvoorde	EUR	19.2 m	100%
S.A. Alcon-Couvreur N.V., Puurs	EUR	110.6 m	100%
N.V. Alcon S.A., Vilvoorde	EUR	141 856	100%
Bermuda			
Novartis Investment Ltd., Hamilton	USD	12 000	100%
Novartis Securities Investment Ltd., Hamilton	CHF	30 000	100%
Novartis Finance Services Ltd., Hamilton	CHF	20 000	100%
Novartis B2 Ltd., Hamilton	USD	12 000	100%
Novartis B3 Ltd., Hamilton	USD	106 400	100%
Triangle International Reinsurance Limited, Hamilton	CHF	1.0 m	100%
Trinity River Insurance Co Ltd., Hamilton	USD	370 000	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	13.0 m	100%
Sandoz Canada Inc., Boucherville, Quebec	CAD	80.8 m	100%
Alcon Canada Inc., Mississauga, Ontario	CAD	2 500	100%
CIBA Vision Canada Inc., Mississauga, Ontario	CAD	82 886	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%
Sandoz (China) Pharmaceutical Co., Ltd., Zhongshan	USD	36.5 m	100%
Alcon Hong Kong Limited, Hong Kong	HKD	77 000	100%
Alcon (China) Ophthalmic Product Co., Ltd., Beijing	USD	60.0 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. farmaceutska industrija, Zagreb	HRK	25.6 m	100%
Czech Republic			
Novartis s.r.o., Prague	CZK	51.5 m	100%
Sandoz s.r.o., Prague	CZK	44.7 m	100%
Alcon Pharmaceuticals (Czech Republic) s.r.o., Prague	CZK	31.0 m	100%
Denmark			
Novartis Healthcare A/S, Copenhagen	DKK	14.0 m	100%
Sandoz A/S, Copenhagen	DKK	12.0 m	100%
Alcon Nordic A/S, Copenhagen	DKK	0.5 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%

As at December 31, 2017		Share capital [1]	Equity interest
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%
Sandoz S.A.S., Levallois-Perret	EUR	5.4 m	100%
Laboratoires Alcon S.A.S., Rueil-Malmaison	EUR	12.9 m	100%
Germany			
Novartis Deutschland GmbH, Wehr	EUR	155.5 m	100%
Novartis Business Services GmbH, Wehr	EUR	25 000	100%
Novartis Pharma GmbH, Nuremberg	EUR	25.6 m	100%
Novartis Pharma Produktions GmbH, Wehr	EUR	2.0 m	100%
Sandoz International GmbH, Holzkirchen	EUR	100 000	100%
1 A Pharma GmbH, Oberhaching	EUR	26 000	100%
HEXAL AG, Holzkirchen	EUR	93.7 m	100%
Salutas Pharma GmbH, Barleben	EUR	42.1 m	100%
Aeropharm GmbH, Rudolstadt	EUR	26 000	100%
Alcon Pharma GmbH, Freiburg im Breisgau	EUR	512 000	100%
CIBA Vision GmbH, Grosswallstadt	EUR	15.4 m	100%
WaveLight GmbH, Erlangen	EUR	6.6 m	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%
Sandoz Private Limited, Mumbai	INR	32.0 m	100%
Alcon Laboratories (India) Private Limited, Bangalore	INR	1.1 bn	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	752 545	100%
Italy			
Novartis Farma S.p.A., Origgio	EUR	18.2 m	100%
Sandoz S.p.A., Origgio	EUR	1.7 m	100%
Sandoz Industrial Products S.p.A., Rovereto	EUR	2.6 m	100%
Alcon Italia S.p.A., Milan	EUR	3.7 m	100%
Japan			
Novartis Holding Japan K.K., Tokyo	JPY	10.0 m	100%
Novartis Pharma K.K., Tokyo	JPY	6.0 bn	100%
Ciba-Geigy Japan Limited, Tokyo	JPY	8.5 m	100%
Sandoz K.K., Tokyo	JPY	100.0 m	100%
Alcon Japan Ltd., Tokyo	JPY	500.0 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%
Mexico			
Novartis Farmacéutica, S.A. de C.V., Mexico City	MXN	205.0 m	100%
Sandoz, S.A. de C.V., Mexico City	MXN	468.2 m	100%
Alcon Laboratorios, S.A. de C.V., Mexico City	MXN	5.9 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%
Sandoz B.V., Almere	EUR	907 560	100%
Alcon Nederland B.V., Arnhem	EUR	18 151	100%
New Zealand			
Novartis New Zealand Ltd, Auckland	NZD	820 000	100%

As at December 31, 2017		Share capital [1]	Equity interest
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%
Sandoz Philippines Corporation, Manila	PHP	30.0 m	100%
Poland			
Novartis Poland Sp. z o.o., Warszawa	PLN	44.2 m	100%
Sandoz Polska Sp. z o.o., Warszawa	PLN	25.6 m	100%
Lek S.A., Strykow	PLN	11.4 m	100%
Alcon Polska Sp. z o.o., Warszawa	PLN	750 000	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%
Sandoz Farmacêutica Lda., Porto Salvo	EUR	499 900	100%
Alcon Portugal-Produtos e Equipamentos Oftalmológicos Lda., Porto Salvo	EUR	4.5 m	100%
Romania			
Novartis Pharma Services Romania S.R.L., Bucharest	RON	3.0 m	100%
Sandoz S.R.L., Targu-Mures	RON	105.2 m	100%
Alcon Romania S.R.L., Bucharest	RON	10.8 m	100%
Russian Federation			
Novartis Pharma LLC, Moscow	RUB	20.0 m	100%
Novartis Neva LLC, St. Petersburg	RUB	1.3 bn	100%
ZAO Sandoz, Moscow	RUB	57.4 m	100%
Alcon Farmacevtika LLC, Moscow	RUB	44.1 m	100%
Saudi Arabia			
Saudi Pharmaceutical Distribution Co. Ltd., Riyadh	SAR	26.8 m	75%
Singapore			
Novartis (Singapore) Pte Ltd., Singapore	SGD	100 000	100%
Novartis Singapore Pharmaceutical Manufacturing Pte Ltd, Singapore	SGD	45.0 m	100%
Novartis Asia Pacific Pharmaceuticals Pte Ltd, Singapore	SGD	39.0 m	100%
Novartis Institute for Tropical Diseases Pte Ltd, Singapore	SGD	2 004	100%
Alcon Pte Ltd, Singapore	SGD	164 000	100%
Alcon Singapore Manufacturing Pte Ltd, Singapore	SGD	101 000	100%
CIBA Vision Asian Manufacturing and Logistics Pte Ltd., Singapore	SGD	1.0 m	100%
Slovakia			
Novartis Slovakia s.r.o., Bratislava	EUR	2.0 m	100%
Slovenia			
Lek Pharmaceuticals d.d., Ljubjana	EUR	48.4 m	100%
Sandoz Pharmaceuticals d.d., Ljubjana	EUR	1.5 m	100%
South Africa			
Novartis South Africa (Pty) Ltd, Midrand	ZAR	86.3 m	100%
Sandoz South Africa (Pty) Ltd, Kempton Park	ZAR	3.0 m	100%
Alcon Laboratories (South Africa) (Pty) Ltd., Midrand	ZAR	201 820	100%
South Korea			
Novartis Korea Ltd., Seoul	KRW	24.5 bn	98.55%
Sandoz Korea Ltd., Seoul	KRW	17.8 bn	100%
Alcon Korea Ltd., Seoul	KRW	33.8 bn	100%
Spain			
Novartis Farmacéutica S.A., Barcelona	EUR	63.0 m	100%
Sandoz Farmacéutica S.A., Madrid	EUR	270 450	100%
Sandoz Industrial Products S.A., Les Franqueses del Vallés / Barcelona	EUR	9.3 m	100%
Alcon Cusi S.A., Barcelona	EUR	11.6 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 Investment AG, Basel	CHF	100 000	100%
Novartis Bioventures AG, Basel	CHF	100 000	100%
Novartis Forschungsstiftung, Basel	--	--	100%
Novartis Stiftung für Kaderausbildung, Basel	--	--	100%
Novartis Mitarbeiterbeteiligungsstiftung, Basel	--	--	100%
Novartis Stiftung für Mensch und Umwelt, Basel	--	--	100%
Stiftung der Novartis AG für Erziehung, Ausbildung und Bildung, Basel	--	--	100%
Novartis Pharma AG, Basel	CHF	350.0 m	100%
Novartis International Pharmaceutical AG, Basel	CHF	100 000	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%
Sandoz AG, Basel	CHF	5.0 m	100%
Sandoz Pharmaceuticals AG, Risch	CHF	100 000	100%
Alcon Switzerland SA, Risch	CHF	100 000	100%
Alcon Pharmaceuticals Ltd., Fribourg	CHF	200 000	100%
Roche Holding AG, Basel	CHF	160.0 m	33/6 [2]

As at December 31, 2017		Share capital [1]	Equity interest
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%
Farmanova Saglik Hizmetleri Ltd. Sti., Istanbul	TRY	6.7 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., Istanbul	TRY	46.0 m	100%
Sandoz Grup Saglik Ürünleri Ilaçlari Sanayi ve Ticaret A.S., Gebze – Kocaeli	TRY	50.0 m	100%
Alcon Laboratuvarlari Ticaret A.S., Istanbul	TRY	25.2 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%
Ziarco Group Limited, Frimley/Camberley	GBP	3 904	100%
Sandoz Limited, Frimley/Camberley	GBP	2.0 m	100%
Alcon Eye Care UK Limited, Frimley/Camberley	GBP	550 000	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 Services, Inc., East Hanover, NJ	USD	1	100%
Novartis US Foundation, New York, NY	--	--	100%
Novartis Pharmaceuticals Corporation, East Hanover, NJ	USD	5.2 m	100%
Novartis Institutes for BioMedical Research, Inc., Cambridge, MA	USD	1	100%
Corthera, Inc., San Mateo, CA	USD	1	100%
CoStim Pharmaceuticals Inc., Cambridge, MA	USD	1	100%
Encore Vision, Inc., New York, NY	USD	1	100%
Navigate BioPharma Services, Inc., Wilmington, NC	USD	100	100%
Reprixys Pharmaceuticals Corporation, Oklahoma City, OK	USD	1	100%
Spinifex Pharmaceuticals, Inc., Wilmington, NC	USD	1	100%
Novartis Institute for Functional Genomics, Inc., San Diego, CA	USD	1 000	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%
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	1	100%
Alcon Laboratories Holding Corporation, Fort Worth, TX	USD	10	100%
Novartis Vaccines and Diagnostics, Inc., Cambridge, MA	USD	3	100%
ClarVista Medical, Inc., Aliso Viejo, CA	USD	1	100%
Transcend Medical, Inc., Menlo Park, CA	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, Kenya, Latvia, the Former Yugoslav Republic of Macedonia, Nigeria, Peru, Puerto Rico, Ukraine and Uruguay

[1] Share capital may not reflect the taxable share capital and does not include any paid-in surplus

[2] Approximately 33% of voting shares; approximately 6% of total net income and equity attributable to Novartis

m = million; bn = billion


NOVARTIS