US Securities & Exchange Commission Form 20-F 2022

NOVARTIS

As filed with the Securities and Exchange Commission on May 15, 2023

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington D.C. 20549

Form 20-F/A

(Amendment No. 1)

☐ 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, 2022

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

Date of event requiring this shell company report……

For the transition period from _____ to _____

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

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
American Depositary Shares each representing 1 share	NVS	New York Stock Exchange
Ordinary shares, nominal value CHF 0.50 per share*	NOVN	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:

2 119 609 057 ordinary 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 every Interactive Data File required to be submitted 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 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 whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

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.

Explanatory note

Novartis AG (the "Company") is filing this Amendment No. 1 ("Amendment No. 1") to the Annual Report on Form 20-F for the year ended December 31, 2022 (the "Original Form 20-F"), as filed with the United States Securities and Exchange Commission (the "SEC") on February 1, 2022 (the "Original Filing Date"), solely to correct certain inadvertent typographical errors in Exhibits 13.1 and 13.2. Pursuant to Rule 12b-15 under the Securities Exchange Act of 1934, this Amendment No. 1 also includes, as Exhibits 12.1 and 12.2, the certifications of the Principal Executive Officer and Principal Financial Officer of the Company pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.

Except as described above, no changes have been made to the Original Form 20-F, and this Amendment No. 1 does not modify, amend or update the financial or other information contained in the Original Form 20-F. This Amendment No. 1 does not reflect any events that have occurred on or after the Original Filing Date. Among other things, the Company has not revised forward-looking statements made in the Original Form 20-F to reflect events that occurred or facts that became known to the Company after the Original Filing Date. Therefore, this Amendment No. 1 should be read in conjunction with the Original Form 20-F and any other documents that the Company has filed with the SEC on or after the Original Filing Date.

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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 (Annual Report) are prepared in accordance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB). "Item 5. Operating and Financial Review and Prospects," together with the sections on products in development and key development projects of our businesses (see "Item 4. Information on the Company—Item 4.B. Business overview"), constitute the Operating and Financial Review ("Lagebericht"), as defined by the Swiss Code of Obligations.

Unless the context requires otherwise, the words "we," "our," "us," "Novartis," "Group," "Company," and similar words or phrases in this Annual Report 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 Annual Report reports directly to other executives of the Group company that employs the executive, or to that Group company's board of directors.

In this Annual Report, references to "US dollars," "USD" or "$" are to the lawful currency of the United States of America, references to "CHF" are to Swiss francs, and references to "euro" or "EUR" are to the lawful currency of 27 member states participating in the European Union; 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 27 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 "SEC" are to the US Securities and Exchange Commission; references to the "FDA" are to the US Food and Drug Administration; references to the "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 "SIX" are to the SIX Swiss Exchange; references to "ECN" are to the Executive Committee of Novartis; references to "GSK" are to GlaxoSmithKline plc; references to "Roche" are to Roche Holding AG; references to "Gyroscope Therapeutics" are to Gyroscope Therapeutics Holdings plc; references to "AAA" are to Advanced Accelerator Applications S.A., references to "Novartis Gene Therapies" are to Novartis Gene Therapies, Inc., and references to "Endocyte" are to Endocyte, Inc.

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 Annual Report contains certain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and the United States Private Securities Litigation Reform Act of 1995, as amended. Other written materials filed with or furnished to the 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," "may," "could," "would," "anticipate," "seek," 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 any of the transactions described; or regarding the potential impact of share buybacks; or regarding potential future sales or earnings of the Group or any of its divisions or potential shareholder returns; or regarding potential future credit ratings of the Group; or by discussions of strategy, plans, expectations or intentions. 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. You should not place undue reliance on these statements.

In particular, our expectations could be affected by, among other things:

- Uncertainties regarding the success of key products and commercial priorities;
- Uncertainties in the research and development of new healthcare products, including clinical trial results and additional analysis of existing clinical data;
- Global trends toward healthcare cost-containment, including ongoing government, payer and general public pricing and reimbursement pressures and requirements for increased pricing transparency;
- The potential that the strategic benefits, operational efficiencies or opportunities expected from our external business opportunities, our intention to separate our Sandoz Division into a new publicly traded standalone company by way of a 100% spin-off, or the implementation of our new organizational structure and operating model, may not be realized or may take longer to realize than expected;
- 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 that commenced in prior years and is expected to continue this year;
- Our performance on environmental, social and governance matters;
- Uncertainties in the development or adoption of potentially transformational digital technologies and business models;
- Uncertainties regarding potential significant breaches of information security or disruptions of our information technology systems;
- Uncertainties surrounding the implementation of our new Enterprise Resource Planning system and other IT projects;
- Our reliance on outsourcing key business functions to third parties;
- Uncertainties regarding actual or potential legal proceedings, including, among others, litigation and other legal disputes with respect to our recent transactions, product liability litigation, litigation and investigations regarding sales and marketing practices, intellectual property disputes and government investigations generally;
- Safety, quality, data integrity or manufacturing issues;
- Our ability to attract, integrate and retain key personnel and qualified individuals;
- Regulatory actions or delays or government regulation generally, including potential regulatory actions or delays with respect to the development of the products described in this Annual Report;

- Our ability to comply with data privacy laws and regulations, and uncertainties regarding potential significant breaches of data privacy;
- Our ability to adapt to major geopolitical and macroeconomic developments, including the effects of and efforts to mitigate pandemic diseases such as COVID-19, and the impact of the war in Ukraine;
- Uncertainties involved in predicting shareholder returns;
- Uncertainties regarding the effects of recent and anticipated future changes in tax laws and their application to us;
- Uncertainties regarding future global exchange rates; and
- Uncertainties regarding future demand for our products.

Some of these factors are discussed in more detail in this Annual Report, including under "Item 3. Key Information—Item 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 Annual Report as anticipated, believed, estimated or expected. We provide the information in this Annual Report 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 Annual Report 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 [Reserved]

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 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 reputation, financial condition, results of operations, and share price, 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.

Strategic risks

Key products and commercial priorities

Risk description
Failure to deliver key commercial priorities and successfully launch new products

Context and potential impact
Our ability to maintain and grow our business and to replace revenue and income lost to generic, biosimilar and other competition depends heavily on the commercial success of our new or existing key products. The commercial success of these products could be impacted at any time by a number of factors, including pressure from new or existing competitive products, changes in the prescribing habits of healthcare professionals, unexpected side effects or safety signals, supply chain issues or other product shortages, pricing pressure, regulatory proceedings, changes in labeling, loss of intellectual property protection, and global pandemics. In addition, our revenue and margins could be significantly impacted by the timing and rate of commercial acceptance of new products.

Healthcare professionals, patients and payers may choose competitor products instead of ours for various reasons, including if they perceive them to be better in terms of efficacy, safety, cost, convenience or other reasons. The commercial success of our key products and launches in the face of increasing competition requires significant attention and management focus. Such competition could significantly affect the revenue from our products and our results of operations. This impact could also be compounded to the extent that such competition results in us making significant additional investments in research and development, marketing or sales.

Research and development

Risk description
Failure to successfully prioritize, integrate and execute our research and development programs for new products or new indications for existing products, given our focus on innovative medicines

Context and potential impact
We engage in extensive and costly research and development activities, both through our own internal resources and through collaborations with third parties, in an effort to identify and develop new products and new indications for existing products that address unmet and changing medical needs, and that are commercially successful. Our ability to grow our business and our product pipeline; to replace sales lost due to branded competition, entry of generics, or other reasons; and to bring to market products that take advantage of new and potentially disruptive technologies, including cell, gene and radioligand therapies, depends in significant part on the success of these efforts.

Failure to successfully develop our pipeline products is typically the result of the inherent uncertainty of science, suboptimal internal execution, or both. Key elements of internal execution include our ability to prioritize our investments on our highest potential value assets, optimize the transition of assets from research to

development, integrate externally acquired assets in an efficient way, and execute the steps in our drug development process that enable our assets to be approved and reimbursed in a timely manner to positively impact clinical practice. See also "Item 4. Information on the Company— Item 4.B Business overview—Innovative Medicines—Research and development" with regards to the research and development efforts of our Innovative Medicines Division.

Our new products must undergo intensive preclinical and clinical testing and are approved by means of a highly complex, lengthy, and expensive approval process that varies substantially from country to country and may have very specific requirements for the recruitment of patients for clinical trials. We face increasing and evolving regulatory approval and reimbursement requirements. If we fail to successfully progress late-stage assets and the core elements of drug development for key programs, this could have a negative impact on the development of our product pipeline, and ultimately on the success of our business and our financial results.

In addition, in the US it is becoming increasingly challenging to adequately recruit a sufficient number of US patients in clinical trials due to new and changing requirements for recruitment of patients into such trials. As a result, we may be unable to develop the necessary clinical evidence to support the desired indications and product profile for a particular disease that is needed to drive clinical adoption of our new products, and thereby achieve the full potential of our assets (also known as the "target product profile"). Similarly, the post-approval regulatory burden has also increased. These requirements make the maintenance of regulatory approvals for our products increasingly expensive, and further heighten the risk of recalls, product withdrawals, change to product specifications, loss of market share, and loss of revenue and profitability.

The clinical testing, regulatory processes and post-approval activities described above become more difficult during pandemics, such as the COVID-19 pandemic, as well as during periods of geopolitical and economic uncertainty. This is due to challenges related to recruiting, enrolling and treating patients in clinical trials, as well as ensuring the supply of trial materials. For a further description of the research and development of, and approval processes for, the products of our Innovative Medicines Division, see the sections headed "Research and development" and "Regulation" included in the description of our Innovative Medicines Division under "Item 4. Information on the Company—Item 4.B Business overview—Innovative Medicines."

Our Sandoz Division has made, and expects to continue to make, significant investments in the development of biotechnology-based, "biologic" medicines that are intended for sale as bioequivalent or "biosimilar" versions of currently marketed biotechnology products. While the development of such products is typically significantly less costly and complex than the development of the equivalent originator medicines, it is nonetheless significantly more costly and complex than that for typical small-molecule generic products. For more information about the research and development efforts of our Sandoz Division, see "Item 4. Information on the Company—Item 4.B Business overview— Sandoz—Development and registration." In addition, many countries do not yet have fully developed legislative or regulatory pathways to facilitate the development of biosimilars, and to permit their sale in such a way that they are readily substitutable alternatives to the originator product. Further delays or difficulties in the development or marketing of biosimilars could put at risk the significant investments that Sandoz has made, and will continue to make, in its Biopharmaceuticals business. Failure to successfully develop and market biosimilars could have a material adverse effect on the success of the Sandoz Division and the Group as a whole. For more information about the approval processes that must be followed to market Sandoz Division products, see "Item 4. Information on the Company—Item 4.B Business overview—Sandoz—Regulation."

Furthermore, our research and development activities must be conducted in an ethical and compliant manner. Among other things, we are concerned with patient safety (both pre- and post-product approval), data privacy, current Good Clinical Practices (cGCP) requirements, data integrity, the fair treatment of patients, diversity and inclusion in the recruitment of patients to clinical trials, and animal welfare. 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 investments in research and development activities may not bring the expected benefits to the Group.

Pricing, reimbursement and access

Risk description

Pricing and reimbursement pressure, including pricing transparency and access to healthcare

Context and potential impact

Our business has continuously experienced 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 payers. These pressures have many sources, including growth of healthcare costs as a percentage of gross domestic product; funding restrictions and policy changes; and public controversies, political debate, investigations and legal proceedings regarding pharmaceutical pricing. Pressures on pricing may negatively impact both our product pricing and the availability of our products.

In addition, we face numerous cost-containment measures imposed by governments and other payers. These include government-imposed industrywide price reductions, mandatory pricing systems, reference pricing systems, payers limiting access to treatments based on cost-benefit analyses, the importation of drugs from lower-cost countries to higher-cost countries, the shifting of the payment burden to patients through higher co-payments and co-pay accumulator programs, the limiting of physicians' ability to choose among competing medicines, the mandatory substitution of generic drugs for the patented equivalent, pressure on physicians to reduce the prescribing of patented prescription medicines, increasing pressure on intellectual property

protections, and growing requirements for increased transparency on pricing. For more information on price controls, see "Item 4. Information on the Company—Item 4.B Business overview—Innovative Medicines—Price controls."

Recent trends in the external environment may have an impact on the likelihood of these pricing and reimbursement pressures occurring. A worldwide slowdown in economic growth following the COVID-19 pandemic and the war in Ukraine (contributing to challenges such as high energy costs and inflation) has led to increased strain on fiscal budgets in many major economies. In addition, legislative developments such as those in the US (e.g., the Inflation Reduction Act) and in Europe (e.g., the EU Joint Health Technology Assessment) pose potential further pressures on pricing and timelines for reimbursement in these countries. These external factors may materially affect our ability to achieve value-based prices; to achieve and maintain an acceptable return on our investments in the research and development of our products; and may impact our ability to research and develop new products.

In addition, our Sandoz Division has faced and may continue to face intense competition from other generic and biosimilar pharmaceutical companies that aggressively compete for market share, including through significant price competition. Such competitive actions may increase the costs and risks associated with our efforts to introduce and market generic and biosimilar products, may delay the introduction or marketing of such products, and may further limit the prices at which we are able to sell these products. In particular, in the US in past years, industrywide price competition among generic pharmaceutical companies and consolidation of buyers caused significant declines in sales and profits of Sandoz.

Alliances, acquisitions and divestments

Risk description

Failure to identify, execute, and/or realize the expected benefits from our external business opportunities

Context and potential impact

As part of our strategy, from time to time we acquire and divest products or entire businesses and enter into strategic alliances and collaborations. For example, in February 2022, we closed the acquisition of Gyroscope Therapeutics. This strategy is partly dependent on our ability to identify strategic external business opportunities and to close transactions with third parties on acceptable terms.

Once the terms of a strategic transaction have been agreed with a third party, we may not be able to complete the transaction in a timely manner or at all, nor can we be sure that pre-transaction due diligence will identify all possible issues that might arise during and after the transaction. Our efforts on such transactions can also divert management's attention from our existing businesses.

After a transaction is closed, efforts to develop and market acquired or licensed products, to integrate the acquired business or to achieve expected synergies may fail or may not fully meet expectations. This may occur due to difficulties in retaining key personnel, customers and suppliers; failure to obtain marketing approval or reimbursement within expected time frames or at all; differences in corporate culture, standards, controls, processes and policies; or other factors. Transactions can also result in liabilities being incurred that were not known at the time of acquisition, or the creation of tax or accounting issues. Acquired businesses are not always in full compliance with legal, regulatory or Novartis standards, including, for example, Current Good Manufacturing Practices (cGMP) or cGCP standards, which can be costly and time-consuming to remediate. Furthermore, our strategic alliances and collaborations with third parties may not achieve their intended goals and objectives within expected time frames, or at all.

Similarly, we cannot ensure that we will be able to successfully divest or spin off businesses or other assets that we have identified for this purpose, or that any completed divestment or spin-off will achieve the expected strategic benefits, operational efficiencies or opportunities, or that the divestment or spin-off will ultimately maximize shareholder value.

Intellectual property

Risk description

Expiry, assertion or loss of intellectual property protection

Context and potential impact

Many products of our Innovative Medicines Division are protected by intellectual property rights, which may provide us with exclusive rights to market those products for a limited time, and to enable our purpose of reimagining medicine by sustainably financing our research and development. However, the strength and duration of those rights can vary significantly from product to product and from country to country, and they may be successfully challenged by third parties or governmental authorities.

Loss of intellectual property protection and the introduction of generic or biosimilar competition for a patented branded medicine in a country typically result in a significant and rapid reduction in net sales and operating income for the branded product. Such competition can occur after successful challenges to intellectual property rights or the regular expiration of the patent term or other intellectual property rights. Such competition can also result from the entry of generic or biosimilar versions of another medicine in the same therapeutic class as one of our drugs or in a competing therapeutic class, from a Declaration of Public Interest or the compulsory licensing of our intellectual property by governmental authorities, or as a result of a general weakening of intellectual property and governing laws in certain countries around the world. In addition, generic or biosimilar manufacturers may sometimes conduct so-called "launches at risk" of products that are still under legal challenge for infringement, or whose patents are still under legal challenge for validity, 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 had 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.

We may also be subject to assertions of intellectual property rights against our innovative medicines by third parties. If successful, these actions may involve payment of future royalties or damages, for example for patent infringement, and may also involve injunctive relief requiring the removal of one or more dosage strengths of a product from the market (or removal of a therapeutic indication from the product's approved labeling) for some period of time or throughout the life of the asserted intellectual property right. Such damages or such an injunction may have a material impact on our operating income and net sales.

In any given year, we may experience a potentially significant impact on our net sales from products that have already lost intellectual property protections, as well as products that may lose protection during the year. Because we may have substantially reduced marketing and research and development expenses related to products that are in their final years of exclusivity, the initial loss of protection for a product during a given year could also have an impact on our operating income for that year in an amount corresponding to a significant portion of the product's lost sales. The magnitude of the impact of generic or biosimilar competition on our income could depend on a number of factors. These include, with respect to income in a given year, the time of year at which the generic or biosimilar competitor is launched; the ease or difficulty of manufacturing a competitor product and obtaining regulatory approval to market it; the number of generic or biosimilar competitor products approved, including whether, in the US, a single competitor is granted an exclusive marketing period; whether an authorized generic is launched; the geographies in which generic or biosimilar competitor products are approved, including the strength of the market for generic or biosimilar pharmaceutical products in such geographies, and the comparative profitability of branded pharmaceutical products in such geographies; and our ability to successfully develop and launch new products for patients that may also offset the income lost to generic or biosimilar competition. For more information on the patent and generic competition status of our Innovative Medicines Division products, see "Item 4. Information on the Company—Item 4.B Business overview—Innovative Medicines—Intellectual property."

Strategic transformations

Risk description

Failure to meet organizational transformation programs objectives and/or unintended adverse impacts on our business

Context and potential impact

From time to time, we reassess our business organization to ensure we have the optimal structure with which to execute our strategy. In April 2022, we announced a new organizational structure and operating model designed to support our innovation, growth, and productivity ambitions as a focused medicines company. See "Item 4. Information on the Company—Item 4.B Overview."

In addition, in October 2021 we announced the commencement of a strategic review of our Sandoz Division. After exploring all options, ranging from retaining the business to separation, on August 25, 2022, we announced our intention to separate our Sandoz Division into a new publicly traded standalone company, by way of a 100% spin-off in order to maximize shareholder value. See "Item 4. Information on the Company—Item 4.B Sandoz."

Our inability to successfully implement our new organizational structure and operating model or to successfully complete the spin-off of our Sandoz Division could have a material adverse effect on the success of the Group as a whole, and could have a material adverse effect on our results of operations and financial condition. The overall extent and pace of these organizational changes, and the additional workload and complexity for our employees in some areas, could trigger uncertainty, stress and fatigue among employees, potentially resulting in instability within the organization that could lead to failure of these organizational changes to succeed or to achieve the desired benefits. As a result, the expected benefits of these organizational changes may never be fully realized or may take longer to realize than expected.

Environmental, social and governance matters

Risk description

Failure to meet environmental, social and governance expectations

Context and potential impact

Increasingly, in addition to financial results, companies are being judged by performance on a variety of environmental, social and governance (ESG) matters, which can contribute to the long-term sustainability of our company's performance. An inability to successfully perform on ESG matters and to meet societal expectations can result in negative impacts on our recruitment, retention, operations, financial results, reputation, and share price.

Topics related to large societal changes such as social inequity, access to medicines and climate change are increasingly important to a wide range of our stakeholders. For example, a variety of organizations measure the performance of companies on ESG topics, and the results of these assessments are widely publicized. In addition, investments in funds that specialize in companies that perform well in such assessments are increasingly popular, and major institutional investors have publicly emphasized the importance of such ESG measures in making their investment decisions. Our actions related

to ESG topics may in the long-term therefore impact our operations and ability to achieve our strategic goals, and ultimately could have a potential negative impact on the value of Novartis. For this reason, the role of our Board of Directors and executive officers in supervising various sustainability issues is becoming increasingly important.

We actively manage a broad range of ESG matters, taking into consideration their expected impact on the sustainability of our business over time, and the potential impact of our business on society and the environment. We have created a Sustainability & ESG Office, which, in coordination with the ESG Committee of the Executive Committee of Novartis, is tasked with developing our ESG strategy and tracking our performance against our ESG targets. However, considering investors' increasing focus on ESG matters, the fast pace of change of external expectations, and a range of upcoming regulations, there can be no certainty that we will manage such issues successfully, that the ESG standards we currently use to measure our performance against will remain the same, or that we will successfully meet society or investors' expectations.

Operational risks

Cybersecurity and IT systems

Risk description

Cybersecurity breaches, data loss and catastrophic loss of IT systems

Context and potential impact

We are heavily dependent on critical, complex and interdependent information technology (IT) systems, including internet-based systems to support our business processes. We have also outsourced significant parts of our IT infrastructure to third-party providers, and we currently use these providers to perform business-critical IT services for us. We are therefore vulnerable to cybersecurity attacks and incidents on such networks and systems, whether our own or those of the third-party providers we contract, and we have experienced and may in the future experience such cybersecurity threats and attacks. Cybersecurity threats and attacks take many forms, and the size, age and complexity of our IT systems make them potentially vulnerable to external and internal security threats; outages; malicious intrusions and attacks; cybercrimes, including state-sponsored cybercrimes; malware; misplaced data, lost data or data errors; programming or human errors; or other similar events. In the context of the COVID-19 pandemic, the risk of such threats and attacks has increased, as virtual and remote working has become more widely used, and sensitive data is accessed by employees working in less secure, home-based environments. In addition, due to our reliance on third-party providers, we have experienced and may in the future experience interruptions, delays or outages in IT service availability due to a variety of factors outside of our control, including technical failures, natural disasters, fraud, or security attacks experienced by or caused by third-party providers. Interruptions in the service provided by these third parties could affect our ability to perform critical tasks.

A significant information security or other event, such as a disruption or loss of availability of one or more of our IT systems, whether managed by us or a third-party service provider, has previously and could in the future negatively impact important business processes, such as the conduct of scientific research and clinical trials, the submission of data and information to health authorities, our manufacturing and supply chain processes, our shipments to customers, our compliance with legal obligations, and communication between employees and with third parties. IT issues have previously led to, and could in the future lead to, the compromise of trade secrets or other intellectual property that could be sold and used by competitors to accelerate the development or manufacturing of competing products; to the compromise of personal financial and health information; and to the compromise of IT security data such as usernames, passwords and encryption keys, as well as security strategies and information about network infrastructure, which could allow unauthorized parties to gain access to additional systems or data. In addition, malfunctions in software or medical devices that make significant use of IT could lead to a risk of direct harm to patients.

Although we have experienced some of the events described above, to date they have not had a material impact on our operations. Nonetheless, the occurrence of any of the events described above in the future could disrupt our business operations and result in enforcement actions or liability, including potential government fines and penalties, claims for damages, and shareholder litigation or allegations that the public health, or the health of individuals, has been harmed.

Any significant events of this type could require us to expend significant resources beyond those we already invest to remediate any damage, to further modify or enhance our protective measures, and to enable the continuity of our business.

Fragmented IT landscape and strategic technology programs implementation

Risk description

Failure to address fragmented business processes, unclear data ownership, and IT applications and infrastructure nearing their end-of-life, may disrupt our core business processes

Context and potential impact

We rely on various IT systems to operate our complex global business. Historically, while highly overlapping data strategy and architectural needs exist across our businesses, in the past we built distinct solutions across both prior business units and our various geographies, which have led to a fragmented and complex landscape of IT systems. Additionally, several of our current IT systems are reaching the end of their useful life, which, together with our fragmented IT landscape, may cause disruptions to our operational stability. As a result, we started to implement several companywide IT programs with a view toward replacing and consolidating outdated IT systems. For example, we have completed the conceptual design phase and started to build a new global Enterprise Resource Planning (ERP) system that seeks to simplify, standardize and digitize processes in our

commercial, finance and operations functions, thereby helping to ensure efficient and compliant business operations across our businesses and geographies, as well as the availability of high-quality data necessary to aid our decision-making. We expect the first implementation of our new ERP system to begin in the first quarter of 2024, with full implementation by 2028. In addition, we are also implementing other IT projects, seeking to simplify and standardize our processes, systems and tools, and create a unified data marketplace. Implementation and operation of the new ERP system and other IT projects involves certain risks, including a failure of the new ERP system and other IT projects to operate as expected, a failure to properly integrate with other systems we use, potential loss of data or information, compliance issues, or cost overruns and delays. Any disruptions or malfunctions of the new ERP system and other IT projects could cause critical information to be delayed, lost, defective, corrupted, or rendered inadequate or inaccessible, which could negatively impact our operations and the effectiveness of our internal controls.

Talent management

Risk description
Inability to attract, retain and motivate qualified individuals in key roles and markets

Context and potential impact
We rely on attracting and retaining a diverse, highly skilled workforce across our businesses and functions to achieve our business objectives. If we are unable to sustain our supply of key personnel – including senior members of our scientific and management teams, high-quality researchers and development specialists and skilled employees in key markets – our ability to achieve our major business objectives may be adversely affected. In addition, our brand and reputation could be negatively impacted, and the diversity of our workforce may decline.

The market for skilled talent has become increasingly competitive, and we anticipate this trend will persist long-term. We face a challenge to attract and retain top talent in several areas, including biology, chemistry, clinical development, drug manufacturing, IT, oncology, and advanced therapy platforms (i.e., gene and cell therapy, radioligand therapy and "xRNA"). In addition, many biotechnology companies have received significant inflows of capital and are not only competing with us to attract the same skilled talent but are also aggressively pursuing our experienced talent.

In recent years, we have adopted new ways of working that include location flexibility and increasingly recruiting from a global pool of talent. However, the success of our business continues to depend on having employees who possess local knowledge of, and experience in, our key markets. The external talent supply is especially limited in many of the geographies that are expected to be sources of growth for Novartis. In the United States, China and several other markets, the geographic mobility of talent is decreasing, as they find ample career opportunities available closer to home.

In addition, in April 2022 we announced a new, integrated organizational structure and operating model. The corporate reorganization undertaken to implement this new organizational structure has resulted in significant redundancies and senior leadership changes that may reduce morale, increase employee distraction and prompt higher voluntary turnover, any of which could negatively impact our competitiveness and ability to achieve strategic objectives. For more information on this new organizational structure see "Item 4. Information on the Company—Item 4.B Overview."

The risks associated with the challenging external talent market and the implementation of our new organizational structure will be exacerbated if we are unable to retain and effectively develop employees and maintain an internal pipeline with critical skills, experiences, and leadership to deliver our business priorities. As a result, development, engagement, motivation, succession planning and performance rewards for our critical talent are essential to achieve our business priorities.

Third-party management

Risk description
Failure to maintain adequate governance and oversight over third-party relationships, and failure of third parties to meet their contractual, regulatory or other obligations

Context and potential impact
We outsource the performance of certain key business functions and services to third parties. Such activities include research and development collaborations, manufacturing operations, warehousing and distribution, certain finance functions, sales and marketing activities, data management and others. Some third parties, particularly those in developing countries, do not have internal compliance systems or resources comparable to those of Novartis. As a result, our investment and efforts in relation to third party management include focusing on risk management and the oversight of such third parties.

Our reliance on third parties poses certain risks, including the misappropriation of our intellectual property, the failure of the third party to comply with regulatory and quality assurance requirements, the failure of the third party to comply with environmental, anti-bribery and human rights standards and regulations, unexpected supply disruptions, breach of our agreement by the third party, and the unexpected termination or non-renewal of our agreement by the third party.

In addition, governments require, and the public expects, Novartis to take responsibility for and report on compliance with various human rights, responsible sourcing and environmental practices, as well as other actions of our third-party contractors around the world.

Ultimately, if third parties fail to meet their obligations to us, we may lose our investment in the relationship with the third parties or fail to receive the expected benefits of our agreements with such third parties. In addition, should any of these third parties fail to comply with the law or our standards, or should they otherwise act inappropriately while performing 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 on us.

Legal, ethics and compliance

Risk description
Challenges posed by evolving legal and regulatory requirements and societal expectations regarding ethical behavior

Context and potential impact
We must comply with the laws of all countries in which we operate, and we sell products with respect to a wide and growing range of activities. Such legal requirements are extensive and complex.

The laws and regulations relevant to the healthcare industry and applicable to us are broad in scope, are subject to change, and have evolving interpretations, which could require us to incur substantial costs associated with compliance or to alter one or more of our business practices. For example, we have been, are currently, and may in the future be, subject to various significant legal proceedings, such as private party litigation, government investigations and law enforcement actions worldwide. These types of matters may take various forms based on evolving government enforcement and private party litigation priorities, and could include, for example, matters pertaining to pricing; bribery and corruption; trade regulation and embargo legislation; product liability; commercial disputes; employment and wrongful discharge; antitrust and competition; securities; government benefit programs; reimbursement; rebates; healthcare fraud; sales and marketing practices; insider trading; occupational health and safety; environmental regulations; tax; cybersecurity; data privacy; regulatory interactions; and intellectual property. Such matters can involve civil and/or criminal proceedings and can retroactively challenge practices previously considered to be legal.

There is also a risk that governance for our medical and patient support activities, and our interactions with governments, public officials/institutions, healthcare professionals, healthcare organizations and patient organizations may be inadequate or fail, or that we may undertake activities based on improper or inadequate scientific justification.

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 in which we believe the relevant patents are invalid or 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 make the business decision to market a generic product even though patent infringement actions are still pending. Should we elect to do so and conduct a so-called "launch at risk," we could face substantial damages if the final court decision is adverse to us.

Legal proceedings and investigations are inherently unpredictable, and large judgments sometimes occur. Consequently, we may in the future incur judgments that could involve large payments, including the potential repayment of amounts allegedly obtained improperly, and other penalties, including treble damages. In addition, such legal proceedings and investigations, even if meritless, may affect our reputation, may create a risk of potential exclusion from government reimbursement programs in the US and other countries, and may lead to civil litigation and/or criminal exposure. As a result, having considered 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, 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 extended periods.

For information on significant legal matters pending against us, see "Item 18. Financial Statements—Note 20. Provisions and other non-current liabilities" and "Item 18. Financial Statements—Note 28. Commitments and contingent liabilities."

New requirements may also be imposed on us due to changing government and societal expectations regarding the healthcare industry, and acceptable corporate behavior generally. For example, we are faced with laws and regulations requiring changes in how we do business, including with respect to disclosures concerning our interactions with healthcare professionals, healthcare organizations and patient 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 information relating to the costs and prices for our products, which represent evolving standards of acceptable corporate behavior. These requirements may incur significant costs, including substantial time and additional resources, that are necessary to bring our interactions with healthcare professionals and organizations into compliance with these evolving standards.

In addition to legal and regulatory requirements, we aim to meet the evolving societal expectations of the public and our investors regarding ethical behavior and the increasing importance placed on ESG matters.

To support 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 we conduct business in a lawful manner, and in line with society's expectations. Despite our efforts, an actual or alleged failure to comply with the law or with heightened public expectations could lead to substantial liabilities that may not be covered by insurance, or to other significant losses.

Manufacturing and product quality

Risk description
Inability to ensure proper controls in product development and product manufacturing, and failure to comply with applicable regulations and standards

Context and potential impact
The development and manufacture of our products is complex and heavily regulated by governmental health authorities around the world. Whether or not our products and the related raw materials are developed and manufactured at our own manufacturing sites or by third

parties, we must ensure that all development and manufacturing processes comply with regulatory requirements, as well as our own quality standards in order to deliver novel therapies to patients with unmet needs while ensuring patient safety. Failure to comply with regulatory requirements has resulted in, and may in the future result in, warning letters, suspension of manufacturing, seizure of products, injunctions, product recalls, failure to secure product approvals, or debarment.

In recent years, global health authorities have substantially intensified their scrutiny of manufacturers' compliance with regulatory requirements. Any significant failure by us or our third-party suppliers to comply with regulatory requirements, or with health authorities' expectations, may create the need to suspend clinical trials, shut down production facilities or production lines, and recall commercial products. A failure to fully comply with regulatory requirements could also lead to a delay in the approval of new products, an inability to ship or import our products, and significant penalties and reputational harm.

In addition, the technically complex manufacturing processes required to manufacture many of our products increase the risk of both production failures and product recalls and can increase the cost of producing our goods. Some of our products require a supply of highly specialized raw materials, such as cell lines, tissue samples, bacteria, viral strains and radioisotopes. In addition, we manufacture and sell a number of sterile products, biologic products and products that involve advanced therapy platforms, such as CAR-T therapies, gene therapies and radioligand therapy products, all of which are particularly complex and involve highly specialized manufacturing technologies. As a result, even slight deviations at any point in their production processes or in material used have led to, and may in the future lead to, production failures or recalls. See "Item 4. Information on the Company—Item 4.B. Business overview—Sandoz—Production."

Supply chain

Risk description
Inability to maintain continuity of product supply

Context and potential impact
Many of our products are produced using technically complex manufacturing processes and 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. In addition, we manufacture and sell a number of sterile products, biologic products, and products that involve advanced therapy platforms, such as gene and cell therapy, radioligand therapy, and "xRNA", all of which are particularly complex and involve highly specialized manufacturing technologies. Due to this complexity, there is a risk of production and supply of critical raw materials failures, which may result in supply interruptions or product recalls due to manufactured products not meeting required specifications.

In addition, due to the inherent complexities of our manufacturing processes and the supply chains for advanced therapy platforms, we are required to plan our production activities and purchase of materials well in advance. If we suffer from third-party raw material shortages, underestimate market demand for a product, or fail to accurately predict when a new product will be approved for sale, then we may not be able to produce sufficient product to meet demand. These issues could be made worse during a pandemic, such as the COVID-19 pandemic, or geopolitical events, such as the war in Ukraine, and could lead to (i) a sudden increase in demand for selected medicinal products, resulting in the short-term unavailability of critical materials; (ii) logistical and supply challenges that may lead to our inability to ship products from one place to another due to restrictions imposed as a result of a pandemic or geopolitical events and any related sanctions, which can also impact transportation and warehousing costs; or (iii) our inability to properly operate a manufacturing site due to restrictions imposed as the result of a pandemic or any issues arising from geopolitical events.

Our or our third-party suppliers' inability to manage such issues could lead to shutdowns, product shortages, or to us being entirely unable to supply products to patients for an extended period of time. Furthermore, as our products are intended to promote the health of patients, such shortages or shutdowns could endanger our reputation and have led to, and could continue to lead to, significant losses of sales revenue, potential litigation or allegations that the public health, or the health of individuals, has been harmed.

Data privacy

Risk description
Noncompliance with personal data protection laws and regulations

Context and potential impact
We operate in an environment that relies on the collection, processing, analysis and interpretation of large sets of patients and other individuals' personal information, including via social media and mobile technologies. In addition, the operation of our business requires data to flow across the borders of numerous countries in which there are different, potentially conflicting, and frequently changing, data privacy laws in effect. Examples of such laws include: the EU General Data Protection Regulation (GDPR), which took effect in May 2018; the California Consumer Privacy Act, which took effect in January 2020; Brazil's General Personal Data Protection Law, which entered into force in September 2020; and the Personal Information Protection Law in China, which took effect in November 2021. Such laws impose stringent requirements on how we and third parties with whom we contract collect, share, export or otherwise process personal information, and provide for significant penalties for noncompliance. Breaches of our systems or those of our third-party contractors, or other failures to protect the data we collect from misuse or breach by third parties, could expose such personal information to unauthorized persons.

Events involving the substantial loss of personal information, use of personal information without a legal basis, or other privacy violations could give rise to significant liability, reputational harm, damaged relationships with business partners, and potentially substantial monetary

penalties and other sanctions under laws enacted or being enacted around the world. Such events could also lead to restrictions on our ability to use personal information and/or transfer personal information across country borders. In addition, there is a trend of increasing divergence of data privacy legal frameworks, not only across these frameworks but also within individual legal frameworks themselves. This divergence may constrain the implementation of global business processes and may lead to different approaches on the use of health data for scientific research, which may have a negative impact on our business and operations.

Falsified medicines

Risk description
Impact of falsified medicines on patient safety, and reputational and financial harm to Novartis and our products

Context and potential impact
We continue to be challenged by the vulnerability of distribution channels to falsified medicines, which include counterfeit, stolen, tampered and illegally diverted medicines as defined by the World Health Organization.

Falsified medicines pose patient safety risks and can be seriously harmful or life-threatening. Reports of adverse events related to falsified medicines and increased levels of falsified medicines in the healthcare system affect patient confidence in genuine medicines and in healthcare systems in general. These events could also cause us substantial reputational and financial harm, and potentially lead to litigation if the adverse event from the falsified medicine is mistakenly attributed to the genuine one. Stolen or illegally diverted medicines that are not properly stored and later sold through unauthorized channels, could adversely impact patient safety, our reputation and our business. Furthermore, there is a direct financial loss when, for example, falsified medicines replace sales of genuine medicines, or genuine medicines are recalled following the discovery of falsified products.

Emerging risks

Geopolitical developments

Risk description
Impact of geo- and socio-political threats

Context and potential impact
Challenging political conditions currently exist in various parts of the world, including an economic downturn; risk of direct conflicts between nations, such as the war in Ukraine; a global pandemic; resistance in certain areas against free trade; anti-corporate sentiment; and social unrest.

The imposition of tariffs, including those imposed by the US and China, and the possibility of additional tariffs or other trade restrictions relating to trade could have a material negative impact on our business. Given that the outcome of ongoing trade negotiations remains uncertain, we cannot yet determine the nature or extent of the potential impact on our business. For example, if tariffs on pharmaceutical products or active pharmaceutical ingredients (APIs) were increased, this could impact the profitability of our products and disrupt our supply chain. Increasing opposition to free trade may increase the risks we face in our efforts to improve and harmonize standards in regulation and intellectual property.

Furthermore, significant conflicts continue in certain parts of the world. Collectively, such unstable conditions could, among other things, disturb the international flow of goods and increase the costs and difficulties of international transactions, which could in turn significantly impact time to market and our ability to supply our products to patients in an undisrupted fashion, and further erode reimbursement levels for innovative therapies.

Macroeconomic developments

Risk description
Impact of macroeconomic developments

Context and potential impact
Our business may be impacted by deteriorating macroeconomic and financial conditions directly affecting consumers. Given that patients, in many countries, directly pay a sizable portion of their own healthcare costs, there is a risk that consumers may cut back on prescription drugs due to financial constraints.

Negative macroeconomic developments may also adversely affect the ability of payers, 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 the financial condition and liquidity of these third parties, 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. These risks may be elevated with respect to our interactions with fiscally challenged government payers, or with third parties with substantial exposure to such payers.

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

Asset price corrections in financial markets may also result in lower returns on our financial investments. In addition, pricing pressures in developed markets resulting from efforts to reduce the cost of healthcare (e.g., the Inflation Reduction Act in the US, which targets drug prices) may have a negative impact on our revenue and our net sales. In addition, inflation has an impact on our operating costs due to the increased cost of supplies. Higher costs for energy, raw materials, wages, and capital will increase our operating costs, potentially reducing our net sales.

Uncertainties around future central bank and other economic policies in the US and EU, as well as high debt levels in some countries could also impact world trade. Sudden increases in economic, currency or financial market volatility in different countries, such as the recent appreciation of the US dollar, have also impacted, and may continue to have an unpredictable impact on our business, or 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.

For a discussion on the effect of price controls on our business, see "Item 4. Information on the Company—Item 4.B—Business overview—Innovative Medicines—Price controls." See also "Item 5. Operating and Financial Review and Prospects—Item 5.B Liquidity and capital resources—Effects of currency fluctuations," "Item 5. Operating and Financial Review and Prospects—Item 5.B Liquidity and capital resources—Condensed consolidated balance sheets," "Item 18. Financial Statements—Note 15. Trade receivables" and "Item 18. Financial Statements—Note 29. Financial instruments – additional disclosures."

Climate change

Risk description

Impact of climate change and increased risk of major natural disasters

Context and potential impact

Novartis is exposed to a broad range of climate risks such as transition risks (e.g., regulatory frameworks, carbon pricing, and the cost of and access to capital) and physical risks (e.g., heat, water scarcity, sea level rise, and flooding from severe weather events), which could vary in magnitude and impact across different countries.

Climate change has triggered, and may continue to trigger, the adoption of new regulatory requirements across the globe. To comply with such legislation, we may be required to increase our investment in technology to reduce our energy use, water use and greenhouse gas emissions. In addition, legislative and regulatory action, both current and in the future, includes or could include carbon pricing, climate risk related disclosures, and changes in zoning or building codes to increase climate resilience. As a result, the combined impact of these transition risks could increase our direct operating costs and impact our supply chain. We have also committed to incorporating the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) framework into our business, which includes providing qualitative and quantitative disclosures on climate-related topics on a recurring basis. As a result of these transition risks, we are committed to becoming carbon neutral in our own operations by 2025, and carbon neutral across our value chain by 2030. In addition, we are committed to achieving net zero across our value chain by 2040. Any failure to achieve these commitments in the expected time frame, or at all, could result in negative impacts on our reputation, our operations, and the price of our shares.

Climate change has created, and will continue to create, physical risks to our business. Some of our production facilities that depend on the availability of significant water supplies are located in areas where water is increasingly scarce. Other facilities are located in areas that, due to increasingly violent weather events, rising sea levels, or both, are increasingly at risk of substantial flooding. In regions where such a risk is present, this has an impact not only on our own operations but also our distributed supply chain. Such events may result in the loss of life, increased costs, business interruptions, destruction of facilities, and disruption to healthcare systems that patients use to access our medicines.

Furthermore, our corporate headquarters, the headquarters of our Innovative Medicines and Sandoz Divisions, and a number of 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. A major earthquake could result in loss of life, business interruptions and the destruction of our facilities.

Tax laws and developments

Risk description

Changes in tax laws or their application

Context and potential impact

Our multinational operations are taxed under the laws of the countries and other jurisdictions in which we operate. Changes in tax laws or in their application could lead to an increased risk of international tax disputes and an increase in our effective tax rate, which could adversely affect our financial results. 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 potential disputes relating to the prices our subsidiaries charge one another for intercompany transactions, known as transfer pricing. Most 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. Accruals for tax contingencies are made based on experience, interpretations of tax law, and judgments about potential actions by tax authorities. However, due to the complexity of tax contingencies, the ultimate resolution of any tax matter may result in payments materially different from the amounts accrued.

In 2019, the Organization for Economic Co-operation and Development (OECD) launched a new initiative on behalf of the G20 to minimize profit shifting by working toward a global tax framework that ensures that corporate income taxes are paid where consumption takes place, in addition to introducing a global standard on minimum taxation combined with new tax dispute resolution processes. This project achieved OECD political consensus in October 2021, and the detailed principles are still under discussion by the OECD and political leaders. The OECD expects that the implementation of these new principles will begin globally in 2024. Once changes to the tax laws in any jurisdiction in which the Group

operates are enacted or substantially enacted, the Group may be subject to the OECD top-up tax, the aim of which is to bring the total amount of taxes paid on our profit in a jurisdiction up to a minimum rate of 15%. In 2020, the EU announced that it would introduce new centralized taxation powers (which have not yet been introduced) to address the financial impact of the COVID-19 pandemic. In addition, the European Commission continues to extend the application of its policies seeking to limit fiscal aid by member states to particular companies, together with the related investigation into member states' practices regarding the issuance of rulings on tax matters relating to individual companies. Although we have taken steps to comply with evolving initiatives such as these of the OECD and the EU, and we will continue to do so, significant uncertainties remain as to the outcome of our efforts. For more information, see "Item 18. Financial Statements—Note 6. Income taxes" and "Item 18. Financial Statements—Note 12. Deferred tax assets and liabilities."

General risks

Indebtedness

Risk description
Our indebtedness could adversely affect our operations

Context and potential impact
As of December 31, 2022, we had USD 20.2 billion of non-current financial debt, and USD 5.9 billion of current financial debt. Our current and long-term debt requires us to dedicate a portion of our cash flow to service interest and principal payments and, if interest rates rise, this amount may increase. As a result, our existing debt may limit our ability to use our cash flow to fund capital expenditures, to engage in transactions, or to meet other capital needs, or otherwise may place us at a competitive disadvantage relative to competitors that have less debt. Our debt could also limit our flexibility to plan for and react to changes in our business or industry, and increase our vulnerability to general adverse economic and industry conditions, including changes in interest rates or a downturn in our business or the economy. 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.

Goodwill and intangible assets

Risk description
Goodwill and intangible assets resulting in significant impairment charges

Context and potential impact
We carry a significant amount of goodwill and other intangible assets on our consolidated balance sheet, including, in particular, substantial goodwill and other intangible assets obtained through acquisitions, including most recently through our acquisitions of Gyroscope Therapeutics, The Medicines Company, *Xiidra*, Endocyte, Novartis Gene Therapies, and AAA. 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 intangible and tangible assets for impairment, including identifiable intangible assets and goodwill. Any significant impairment charges could have a material adverse effect on our results of operations and financial condition. In 2022, for example, we recorded intangible asset impairment charges of USD 1.3 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 18. Financial Statements—Note 1. Significant accounting policies" and "Item 18. Financial Statements—Note 11. Goodwill and intangible assets."

Foreign currency exchange rates

Risk description
Negative effect on financial results due to foreign currency exchange rate fluctuations

Context and potential impact
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. Currency exchange controls and sanctions could limit our ability to distribute retained earnings from our local affiliates, or to pay intercompany payables due from those countries.

Despite measures undertaken to reduce or hedge against foreign currency exchange risks, as 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 our 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. Furthermore, depending on the movements of particular foreign exchange rates, we 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" and "Item 18. Financial Statements—Note 29. Financial instruments – additional disclosures."

Key customers

Risk description
Ongoing consolidation among our distributors and retailers, and the concentration of credit risk

Context and potential impact
A significant portion of our global sales is made to a relatively small number of drug wholesalers, retail chains and other purchasing organizations. For example, our three most important customers globally accounted for approximately 16%, 11% and 7%, respectively, of net sales in 2022. The largest trade receivables outstanding were for these three customers, amounting to 16%, 14% and 7%, respectively, of the Group's trade receivables at December 31, 2022. The trend has been toward further consolidation among some distributors and retailers. As a result, we may be affected by fluctuations in the buying patterns of such customers. Furthermore, these customers are gaining additional purchasing leverage, increasing the pricing pressures facing our businesses. These pressures can impact our Sandoz Division in particular, the generic products of which can often be obtained from numerous competitors. 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 substantial, and could include a substantial loss of sales and an inability to collect amounts owed to us.

Environmental matters

Risk description
Impact of environmental liabilities

Context and potential impact
The environmental laws of various jurisdictions impose actual and potential obligations on us to investigate and remediate contaminated sites, including in connection with activities in the past by businesses that are no longer part of Novartis. In some cases, these remediation efforts may take many years. While we have set aside provisions for known worldwide environmental liabilities that are probable and estimable, 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 resulting from our facility operations, business activities or products adversely impacts third parties or if we fail to properly manage the safety of our facilities, including the safety of our employees and contractors, and the environmental risks, we may face substantial one-time and recurring costs and other penalties, and be required to increase our provisions for environmental liabilities.

See also "Item 4. Information on the Company—Item 4.D Property, plants and equipment" and "Item 18. Financial Statements—Note 20. Provisions and other non-current liabilities."

Pension plans

Risk description
Inaccuracies in the assumptions and estimates used to calculate our pension plan and other post-employment obligations

Context and potential impact
We sponsor pension and other post-employment benefit plans in various forms that cover a significant portion of our current and former employees. 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 discount 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 that we use 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. Depending on events, such differences could have a material effect on our total equity, and may require us to make additional contributions to our pension funds.

For more information on obligations under retirement and other post-employment benefit plans and underlying actuarial assumptions, see "Item 18. Financial Statements—Note 25. Post-employment benefits for employees."

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: +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 innovative pharmaceuticals and cost-saving generic medicines. 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 "Item 18. Financial Statements—Note 31. Principal Group subsidiaries and associated companies."

For a description of important corporate developments since January 1, 2020, see "Item 18. Financial Statements—Note 2. Significant transactions." For information regarding the Company's material commitments for capital expenditures, see "Item 5. Operating and Financial Review and Prospects—Liquidity and Capital Resources—Material short- and long-term cash requirements."

The SEC maintains an internet site at http://www.sec.gov that contains reports, information statements, and other information regarding issuers that file electronically with the SEC.

4.B Business overview

Overview

Our purpose is to reimagine medicine to improve and extend people's lives. We use innovative science and technology to address some of society's most challenging healthcare issues. We discover and develop breakthrough treatments and find new ways to deliver them to as many people as possible. We also aim to reward those who invest their money, time and ideas in our Company. Our vision is to become the most valued and trusted medicines company in the world. Our strategy is to deliver high-value medicines that alleviate society's greatest disease burdens through technology leadership in research and development (R&D) and novel access approaches. To support this strategy, we have clear focus areas and priorities, ensuring we deliver on our purpose and continue to create value for both stakeholders and society. See, "Item 5. Operating and Financial Review and Prospects—Item 5.A Operating Results—Overview—Our strategy."

In 2022, Novartis achieved net sales from continuing operations of USD 50.5 billion, and total net income amounted to USD 7.0 billion. Headquartered in Basel, Switzerland, our Group companies employed approximately 102 000 full-time equivalent employees as of December 31, 2022. Our products are sold in approximately 140 countries around the world.

The Group comprises two global operating divisions:

- Innovative Medicines: innovative patent-protected prescription medicines
  For a description of our Innovative Medicines Division, see "—Innovative Medicines—Overview" below.

- Sandoz: generic pharmaceuticals and biosimilars
  For a description of our Sandoz Division, see "—Sandoz" below.

In April 2022, we announced a new, integrated organizational structure and operating model designed to support our innovation, growth, and productivity ambitions as a focused medicines company. As part of this new organizational structure, we have integrated our former Pharmaceuticals and Oncology business units and created two separate commercial organizations—Innovative Medicines US and Innovative Medicines International. The Innovative Medicines Division focuses on five core therapeutic areas—cardiovascular, immunology, neuroscience, solid tumor, and hematology—as well as other promoted brands (in the therapeutic areas of ophthalmology and respiratory) and established brands. For more information, see "Item 4. Information on the Company—Item 4.B Innovative Medicines." We have also created a new Strategy and Growth function that combines corporate strategy, R&D portfolio strategy and business development. The purpose of our Strategy and Growth function is to help drive the company's growth strategy

end-to-end and look across internal and external opportunities to strengthen the Novartis pipeline with medicines that are both transformational and can make significant contributions to growth. Finally, we have combined our former Novartis Technical Operations and Customer & Technology Solutions units to create a new operations unit called Operations. This new unit seeks to provide a stronger and simpler operational backbone that can accelerate multiple technology transformation initiatives more efficiently, create novel digital solutions at scale, and increase productivity, while maintaining industry-leading quality and service levels.

Under this new organizational structure, our divisions are supported by the following organizational units: the Novartis Institutes for BioMedical Research (NIBR), Global Drug Development (GDD), and Operations. The financial results of these organizational units are included in the results of the divisions for which their work is performed. For more information about NIBR, see "—Innovative Medicines—Research and development—Research program" below. For more information about GDD, see "—Innovative Medicines—Research and development—Development program" below. For more information about Operations, see "—Item 4.D Property, plants and equipment" and "Item 18. Financial Statements—Note 3. Segmentation of key figures 2022, 2021 and 2020."

Corporate activities

We separately report the results of Corporate activities. The financial results of our 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.

Innovative Medicines

Overview

Our Innovative Medicines Division is a world leader in offering patent-protected medicines to patients and physicians. The Innovative Medicines Division researches, develops, manufactures, distributes and sells patented pharmaceuticals. The Innovative Medicines Division is organized into two commercial organizational units—Innovative Medicines US and Innovative Medicines International. These units were created in April 2022 as part of our new, integrated organizational structure. Prior to April 2022, the Innovative Medicines Division was organized into two global business units: Novartis Oncology and Novartis Pharmaceuticals. See "Item 4. Information on the Company—Item 4.B Overview."

The Innovative Medicines Division focuses on core therapeutic areas—cardiovascular, immunology, neuroscience, solid tumor, and hematology—as well as other promoted brands (in the therapeutic areas of ophthalmology and respiratory) and established brands.

The Innovative Medicines Division is the larger of our two divisions in terms of consolidated net sales. It reported consolidated net sales of USD 41.3 billion in 2022, which represented 81.7% of the Group's net sales. The product portfolio of the Innovative Medicines Division includes a significant number of key marketed products, many of which are among the leaders in their respective therapeutic areas.

Innovative Medicines Division products

The following summaries describe certain key marketed products in our Innovative Medicines Division, listed according to year-end net sales within each therapeutic area or reporting category. Some of the products described 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 more information on the status of patents and exclusivity for Innovative Medicines Division products.

While we typically seek to sell our marketed products throughout the world, not all products and indications are available in every country. The indications described in these summaries may therefore vary by country. In addition, a product may be available under different brand names depending on country and indication.

Key marketed products

Cardiovascular

- *Entresto* (sacubitril/valsartan) is an oral, first-in-class angiotensin receptor neprilysin inhibitor. *Entresto* enhances the protective effects of a hormone system called the natriuretic peptide system, and simultaneously suppresses the harmful effects of a hormone system called the renin-angiotensin-aldosterone system. It is approved:
  - In the US, the EU and other countries to treat adults who have symptomatic heart failure with reduced ejection fraction (HFrEF). HFrEF is a disease in which the heart cannot pump enough blood.
  - In the US and other countries to treat most heart failure patients with preserved ejection fraction (HFpEF). HFpEF is another disease in which the heart cannot pump enough blood.
  - In the US and other countries to treat children aged 1 year and older who have symptomatic heart failure with systemic left ventricular systolic dysfunction

- In China and Japan to treat patients with essential hypertension (a type of high blood pressure)

- *Leqvio* (inclisiran) is the first and only small-interfering RNA therapy to reduce LDL cholesterol, a risk factor for atherosclerotic cardiovascular disease (ASCVD), which is caused by plaque buildup in the arteries. *Leqvio* is administered by a healthcare professional twice a year as an injection, following an initial dose and a dose at three months. It is approved:
  - In the EU and other countries to treat adults with primary hypercholesterolemia (heterozygous familial and non-familial) or mixed dyslipidemia. In patients unable to reach LDL cholesterol goals, *Leqvio* is used in combination with the maximum tolerated dose of a statin, or alone or in combination with other lipid-lowering therapies in patients who are statin-intolerant or for whom a statin is contraindicated. Primary hypercholesterolemia and mixed dyslipidemia are disorders characterized by high levels of fats in the blood.
  - In the US to treat adults with clinical ASCVD or heterozygous familial hypercholesterolemia (HeFH), as an adjunct to diet and maximally tolerated statin therapy, who require additional lowering of LDL cholesterol. HeFH is an inherited disorder that causes dangerously high levels of LDL cholesterol. (The effect of *Leqvio* on cardiovascular morbidity and mortality has not yet been determined).

  Novartis obtained global rights to develop, manufacture and commercialize *Leqvio* under a license and collaboration agreement with Alnylam Pharmaceuticals, Inc.

Immunology

- *Cosentyx* (secukinumab) is an injectable, fully human monoclonal antibody that selectively inhibits interleukin-17A (IL-17A), a cytokine involved in several immunological diseases. It is approved in the US, the EU and other countries to treat:
  - Adults and children aged 6 years and older with moderate-to-severe plaque psoriasis. Psoriasis is a debilitating systemic inflammatory disease that is characterized by the appearance of raised, red patches on the skin.
  - Adults with active ankylosing spondylitis (AS). AS is a progressive inflammatory disease that is characterized by chronic back pain, is generally visible on X-rays, and can cause structural damage to the bones and joints.
  - Adults with active non-radiographic axial spondyloarthritis (nr-axSpA). This is a long-term inflammatory disease that is characterized by chronic back pain and is not visible on X-rays.
  - Adults and children (aged 2 years and older in the US and 6 years and older in the EU) with active psoriatic arthritis (PsA). PsA is a type of progressive inflammatory arthritis that results in swollen and painful joints and tendons, which can cause structural damage to the bones and joints.
  - Children (aged 4 years and older in the US and 6 years and older in the EU) with enthesitis-related arthritis (ERA) and children (aged 2 years and older in the US and 6 years and older in the EU) with juvenile psoriatic arthritis (JPsA). ERA and JPsA are subtypes of juvenile idiopathic arthritis. If left untreated, they can lead to high levels of pain and disability.

- *Xolair* (omalizumab) is an injectable prescription medicine and the only approved antibody designed to target and block immunoglobulin E (IgE). It is approved in the US, the EU and other countries to treat:
  - Adults and children aged 6 years and older with moderate-to-severe, or severe, persistent allergic asthma
  - Adults and children aged 12 years and older with chronic spontaneous urticaria/chronic idiopathic urticaria (hives)
  - Adults with nasal polyps or severe chronic rhinosinusitis with nasal polyps (CRSwNP). CRSwNP is a chronic inflammation of the nose and the sinuses with the presence of benign lesions (nasal polyps) on the lining of the nasal sinuses or nasal cavity.

  Approved indications vary by country. *Xolair* is provided as lyophilized powder for reconstitution, and as liquid formulation in a pre-filled syringe. Novartis co-promotes *Xolair* with Genentech in the US and shares a portion of operating income, but Novartis does not record any US sales. Novartis records all sales of *Xolair* outside the US. For more information, see "Item 18. Financial Statements—Note 27. Transactions with related parties—Roche Holding AG."

- *Ilaris* (canakinumab) is an injectable, selective, high-affinity, fully human monoclonal antibody that inhibits interleukin-1 beta (IL-1 beta), a key cytokine in the inflammatory pathway. It is approved in the US, the EU and other countries to treat patients with certain debilitating autoinflammatory disorders, including:
  - Adults and children with periodic fever syndromes. Periodic fever syndromes are a set of rare disorders characterized by recurrent episodes of illness, with fever as the main symptom.
  - Patients with Still's disease, including systemic juvenile idiopathic arthritis and adult-onset Still's disease. Still's disease is a disorder that causes fevers, rash and joint pain.
  - Adults with acute gouty arthritis. Gouty arthritis is a type of arthritis characterized by pain, redness, tenderness and swelling in one or more joints.

  Approved indications vary by country.

Neuroscience

- *Gilenya* (fingolimod) is an oral sphingosine-1-phosphate (S1P) receptor modulator that inhibits the movement of lymphocytes (a type of white blood cell) out of the lymph nodes into the central nervous system, thereby preventing nerve inflammation and nervous tissue damage. It is approved:
  - In the US to treat adults and children aged 10 years and older with relapsing forms of multiple sclerosis, including clinically isolated syndrome, relapsing-remitting multiple sclerosis (RRMS) and active secondary progressive multiple sclerosis (SPMS). Multiple

sclerosis is a disease in which the immune system attacks the protective covering of nerves (known as myelin).
- In the EU to treat adults and children aged 10 years and older who have highly active RRMS despite treatment with at least one disease-modifying agent, or who have rapidly evolving severe RRMS

Gilenya is licensed from Mitsubishi Tanabe Pharma Corporation.

- *Zolgensma* (onasemnogene abeparvovec) is a one-time intravenous gene therapy designed to address the genetic root cause of spinal muscular atrophy (SMA) by replacing the function of the missing or nonworking SMN1 gene. *Zolgensma* delivers a new working copy of the SMN1 gene into a patient's cells. It is approved in the US, the EU and other countries to treat:
  - Babies and young children who have SMA with biallelic mutations in the SMN1 gene. SMA is a rare, genetic neuromuscular disease resulting in the progressive and irreversible loss of motor neurons, which causes muscle weakness and atrophy.

- *Kesimpta* (ofatumumab) is an anti-CD20 monoclonal antibody that enables the targeted depletion of B-cells, specifically in lymph nodes. *Kesimpta* is self-administered as a once-monthly injection via the *Sensoready* autoinjector pen. It is approved:
  - In the US to treat adults with relapsing forms of multiple sclerosis, including clinically isolated syndrome, relapsing-remitting multiple sclerosis (RRMS) and active secondary progressive multiple sclerosis (SPMS). Multiple sclerosis is a disease in which the immune system attacks the protective covering of nerves (known as myelin).
  - In the EU to treat adults with relapsing forms of multiple sclerosis with active disease defined by clinical or imaging features (i.e., relapse, disability, or lesions detected by MRI scans)

  Approved indications vary across other countries. Ofatumumab was originally developed by Genmab and licensed to GlaxoSmithKline (GSK). Novartis obtained the rights to ofatumumab from GSK across all indications.

Solid Tumor

- *Tafinlar* + *Mekinist* (dabrafenib + trametinib) is an oral combination therapy. *Tafinlar* and *Mekinist* are kinase inhibitors of the BRAF and MEK1/2 proteins, respectively, approved in combination in the US, the EU and other countries to treat patients who have certain types of cancer with a change in the BRAF gene (called a BRAF V600 mutation), including:
  - Adults with unresectable or metastatic melanoma with a BRAF V600 mutation. Melanoma is a form of skin cancer; unresectable melanoma cannot be removed with surgery and metastatic melanoma has spread to other parts of the body. *Tafinlar* and *Mekinist* are also approved as single agents for this indication.
  - Adults with stage III melanoma with a BRAF V600 mutation as an adjuvant treatment (following surgery)
  - Adults with advanced non-small cell lung cancer (NSCLC) with a BRAF V600 mutation. NSCLC is the most common type of lung cancer.
  - Adults with locally advanced or metastatic anaplastic thyroid cancer (ATC) with a BRAF V600 mutation whose cancer has progressed following treatment, and who have no satisfactory alternative treatment options (US). ATC is a rare and aggressive form of thyroid cancer.

  Approved indications vary by country. Novartis has worldwide exclusive rights to develop, manufacture and commercialize trametinib granted by Japan Tobacco Inc.

- *Kisqali* (ribociclib) is a selective oral cyclin-dependent inhibitor of kinases 4 and 6 (CDK4/6) with somewhat greater inhibitory activity against CDK4 vs CDK6 – the two enzymes involved in the control of cell cycle progression. *Kisqali* is approved in the US, the EU and other countries to treat:
  - Pre-, peri- and postmenopausal women, and men (US), with hormone receptor-positive (HR+)/human epidermal growth factor receptor 2-negative (HER2-) locally advanced or metastatic breast cancer, in combination with an aromatase inhibitor as initial endocrine-based therapy. HR+/HER2- breast cancer is the most common subtype of breast cancer.
  - Pre-, peri- (EU) and postmenopausal women, and men (US), with HR+/HER2- locally advanced or metastatic breast cancer, in combination with fulvestrant, as first- or second-line therapy

  Kisqali was developed by the Novartis Institutes for BioMedical Research under a research collaboration with Astex Pharmaceuticals.

- *Piqray* (alpelisib) is an oral kinase inhibitor that specifically targets the PIK3CA gene. This is the most commonly mutated gene in HR+/HER2- breast cancer, the most common subtype of breast cancer. *Piqray* is approved in the US, the EU and other countries to treat:
  - Postmenopausal women, and men, with hormone receptor-positive (HR+)/human epidermal growth factor receptor 2-negative (HER2-) locally advanced or metastatic breast cancer with a PIK3CA mutation. It is used in combination with fulvestrant after disease progression while on or following an endocrine-based regimen (US), or after disease progression following endocrine therapy as monotherapy (EU).

- *Pluvicto* (lutetium (^{177}Lu) vipivotide tetraxetan) is an intravenous radioligand therapy combining a targeting compound (a ligand) with a therapeutic radionuclide (a radioactive particle, in this case lutetium-177). *Pluvicto* delivers radiation selectively to PSMA-positive cells and the surrounding cells. It is approved in the US, the EU and other countries to treat:
  - Adults with a type of advanced cancer that has spread to other parts of the body (metastatic) called prostate-specific membrane antigen–positive

metastatic castration-resistant prostate cancer (PSMA-positive mCRPC) who have already been treated with other anticancer treatments (androgen receptor pathway inhibition and taxane-based chemotherapy)

Hematology

- *Promacta/Revolade* (eltrombopag) is a once-daily oral thrombopoietin receptor agonist that works by stimulating bone marrow cells to produce platelets. It is approved in the US, the EU and other countries to treat:
  - Immune thrombocytopenia (ITP) in patients who have had an insufficient response to or have failed previous therapies. ITP is a bleeding disorder caused by an unusually low number of platelets.
  - Thrombocytopenia in patients with chronic hepatitis C to allow them to initiate and maintain interferon-based therapy
  - Patients with severe aplastic anemia (SAA). SAA is a condition in which the body does not produce enough blood cells

  Promacta/Revolade is marketed under a research, development and license agreement between Novartis and RPI Finance Trust (dba Royalty Pharma), as assignee of Ligand Pharmaceuticals.

- *Tasigna* (nilotinib) is a twice-daily oral tyrosine kinase inhibitor that acts by blocking the BCR-ABL protein. It is approved in the US, the EU and other countries to treat:
  - Patients with Philadelphia chromosome-positive chronic myeloid leukemia (Ph+ CML) in the chronic and/or accelerated phase who are resistant or intolerant to existing treatment. Ph+ CML is a cancer that starts in the blood-forming cells of bone marrow.
  - Newly diagnosed adults and children with Ph+ CML in the chronic phase

- *Jakavi* (ruxolitinib) is an oral inhibitor of the JAK1 and JAK2 tyrosine kinases. It is the first therapy approved in the EU and other countries to treat:
  - Adults with myelofibrosis (MF), including primary myelofibrosis, post-polycythemia vera myelofibrosis and post-essential thrombocythemia myelofibrosis. MF is a rare blood cancer characterized by abnormal blood cell production and scarring in the bone marrow, which can lead to an enlarged spleen.
  - Adults with polycythemia vera (PV) who are resistant or intolerant to a medication called hydroxyurea. PV is a rare blood cancer in which the bone marrow produces too many red blood cells, resulting in serious problems like clots.
  - Patients aged 12 years and older with acute or chronic graft-versus-host disease (GvHD) and who have had an inadequate response to corticosteroids or other systemic therapies. GvHD occurs in stem-cell transplant patients when donor cells see the recipient's healthy cells as foreign and attack them.

  Novartis licensed ruxolitinib from Incyte Corporation for development and commercialization in the indications of oncology, hematology and graft-versus-host disease outside the US. Incyte Corporation markets ruxolitinib as Jakafi® in the US.

- *Scemblix* (asciminib) is an oral kinase inhibitor that works by binding to the ABL myristoyl pocket. It is approved:
  - In the US, the EU and other countries to treat adults with Philadelphia chromosome-positive chronic myeloid leukemia (Ph+ CML) in chronic phase who have previously been treated with two or more tyrosine kinase inhibitors (TKIs). CML is a type of cancer that starts in the blood-forming cells of the bone marrow and invades the blood. There are three phases of CML: chronic phase, accelerated phase and blast phase.
  - In the US and other countries to treat adults with Ph+ CML in chronic phase with the T315I mutation. Some patients with CML develop mutations that cause resistance to TKI therapy, including the T315I mutation, which confers resistance to most available TKIs. As a result, patients with this mutation have limited treatment options.

Other Promoted Brands

- *Lucentis* (ranibizumab) is a humanized, high-affinity antibody fragment that binds to vascular endothelial growth factor A (VEGF-A), a protein that can cause the growth of blood vessels in the eye, potentially leading to vision loss. *Lucentis* is an anti-VEGF therapy that is injected into the eye. It is approved in the EU and other countries to treat patients with certain eye conditions, including:
  - Adults with neovascular (wet) age-related macular degeneration (AMD). Wet AMD develops when abnormal blood vessels grow under the macula and leak blood and other fluids in the back of the eye, which damages the macula.
  - Adults with proliferative diabetic retinopathy, moderately severe to severe non-proliferative diabetic retinopathy, and/or diabetic macular edema. These conditions are complications of diabetes.
  - Adults with visual impairment due to macular edema secondary to retinal vein occlusion (branch RVO or central RVO). Retinal vein occlusion is a blockage of the branch or central retinal veins, which carry blood away from the retina.

  Approved indications vary by country. *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 more information, see "Item 18. Financial Statements—Note 27. Transactions with related parties—Roche Holding AG."

- *Xiidra* (lifitegrast 0.5%), an LFA-1 antagonist, is a prescription eye drop designed to block the interaction of two key proteins called ICAM-1 and LFA-1, thereby reducing inflammation. It is approved in the US and other countries to treat:
  - The signs and symptoms of dry eye disease in adults

Established Brands

- *Sandostatin* SC (octreotide acetate for injection) and *Sandostatin* LAR (octreotide acetate for injectable suspension) are somatostatin analogs approved in the US, the EU and other countries to treat:
  - Adults with acromegaly that is inadequately controlled by surgery or radiotherapy. Acromegaly is a chronic disease caused by the oversecretion of growth hormone.
  - Patients with certain symptoms associated with carcinoid tumors and other types of functional gastrointestinal and pancreatic neuroendocrine tumors

  Sandostatin LAR is also approved in the EU and other countries to treat patients with advanced neuroendocrine tumors of the midgut or of unknown primary tumor origin.

Compounds in development

The following table provides an overview of the key Innovative Medicines Division projects currently in the Confirmatory Development stage and may also describe certain projects in the Exploratory Development stage. Projects typically enter Confirmatory Development and become the responsibility of our Global Drug Development organization during Phase II testing. (For more information about our drug development program, see "—Research and development—Development program.") Projects are listed in alphabetical order by compound code, or by product name where applicable. Projects include those seeking to develop potential uses of new molecular entities as well as potential additional indications or new formulations for already marketed products. The table below, entitled "Projects removed from the development table since 2021," highlights changes to the table entitled "Selected development projects" from the previous year.

The year that each project entered the current phase of development refers to the year of the first patient's first visit in the first clinical trial of that phase. For projects in Phase II, the year refers to the first patient's first visit in the first Phase II trial, which can occur before the Confirmatory Development stage. Prior to 2020, we reported the current phase based on the year in which the decision to enter the phase was made. To maintain continuity, we have included certain previously disclosed projects, noted below, that have not yet achieved "first patient, first visit" in any Phase I-III study for the reported indication and route of administration. We have disclosed these projects using our previous reporting criteria.

A reference to a project being in registration means that an application has been submitted to a health authority for marketing approval. 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 more information on the approval process.

Selected development projects

Compound/ product	Common name	Mechanism of action	Potential indication	Category	Formulation/ route of administration	Year project entered current development phase	Planned filing dates/current phase
AVXS-101 (OAV101)	onasemno-gene abepar-vovec	Survival motor neuron (SMN) gene therapy	Spinal muscular atrophy (IT formulation)	Neuroscience	Intrathecal injection	2021	2025/III
Beovu	brolucizumab	VEGF inhibitor	Diabetic retinopathy	Ophthalmology	Intravitreal injection	2020	2025/III
CFZ533	iscalimab	CD40 inhibitor	Sjögren's syndrome	Immunology	Subcutaneous injection	2019	≥2026/II
Coartem	artemether + lumefantrine	PGH-1 (artemisinin combination therapy)	Malaria, uncomplicated (<5 kg patients)	Global Health	Oral	2020	2024/III
Cosentyx	secukinumab	IL-17A inhibitor	Hidradenitis suppurativa	Immunology	Subcutaneous injection	2022	US/EU registration
			Giant cell arteritis	Immunology	Subcutaneous injection	2021	2025/III
			Lupus nephritis	Immunology	Subcutaneous injection	2020	≥2026/III
			Psoriatic arthritis (IV formulation)	Immunology	Intravenous infusion	2022	US registration
			Ankylosing spondylitis (IV formulation)	Immunology	Intravenous infusion	2022	US registration
JDQ443	TBD	KRAS inhibitor	Non-small cell lung cancer, 2/3L [1]	Solid Tumor	Oral	2022	2024/III
KAE609	cipargamin	PfATP4 inhibitor	Malaria, uncomplicated	Global Health	Oral	2017	≥2026/II
			Malaria, severe	Global Health	Oral	2022	≥2026/II
KAF156	ganaplacide	Non-artemisinin plasmodium falciparum inhibitor	Malaria, uncomplicated	Global Health	Oral	2017	≥2026/II
Kisqali	ribociclib	CDK4 inhibitor	Hormone receptor-positive (HR+)/human epidermal growth factor receptor 2-negative (HER2-) early breast cancer (adjuvant)	Solid Tumor	Oral	2018	2023/III
Leqvio	inclisiran	siRNA (regulation of LDL-C)	Secondary prevention of cardiovascular events in patients with elevated levels of LDL-C	Cardiovascular	Subcutaneous injection	2018	≥2026/III
LNA043	TBD	ANGPTL3 agonist	Knee osteoarthritis	Immunology	Intra-articular	2021	≥2026/II
LNP023	iptacopan	CFB inhibitor	IgA nephropathy	Cardiovascular	Oral	2021	2024/III
			C3 glomerulopathy	Cardiovascular	Oral	2021	2024/III
			Paroxysmal nocturnal hemoglobinuria	Hematology	Oral	2021	2023/III
			Atypical hemolytic uremic syndrome	Hematology	Oral	2021	≥2026/III
LOU064	remibrutinib	BTK inhibitor	Chronic spontaneous urticaria	Immunology	Oral	2021	2024/III
			Sjögren's syndrome	Immunology	Oral	2019	≥2026/II
			Multiple sclerosis	Neuroscience	Oral	2021	≥2026/III
Lutathera	lutetium Lu 177 dotatate/ lutetium (^{177}Lu) oxodotreotide	Radioligand therapy targeting SSTR	Gastroenteropancreatic neuroendocrine tumors, 1st line in G2/3 tumors	Solid Tumor	Intravenous infusion	2020	2023/III
LXE408	TBD	Proteasome inhibitor	Visceral leishmaniasis	Global Health	Oral	2022	≥2026/II
MBG453	sabatolimab	TIM-3 antagonist	Myelodysplastic syndrome	Hematology	Intravenous infusion	2020	2024/III
			Unfit acute myeloid leukemia	Hematology	Intravenous infusion	2020	≥2026/II
MIJ821	onfasprodil	NR2B negative allosteric modulator	Major depressive disorder	Neuroscience	Intravenous infusion	2021	≥2026/II
NIS793	TBD	TGF-beta 1 inhibitor	Pancreatic cancer, 1st line	Solid Tumor	Intravenous infusion	2021	2025/III
Piqray	alpelisib	PI3K-alpha inhibitor	Ovarian cancer	Solid Tumor	Oral	2021	2023/III
Pluvicto	lutetium Lu 177 vipivotide tetraxetan/ lutetium (^{177}Lu) vipivotide tetraxetan	Radioligand therapy targeting PSMA	Metastatic castration-resistant prostate cancer, pre-taxane	Solid Tumor	Intravenous infusion	2021	2023/III
			Metastatic hormone-sensitive prostate cancer	Solid Tumor	Intravenous infusion	2021	2024/III

[1] Project added to selected development projects table in 2022 – entered Confirmatory Development

Compound/ product	Common name	Mechanism of action	Potential indication	Category	Formulation/ route of administration	Year project entered current development phase	Planned filing dates/current phase
PPY988[2]	TBD	Gene therapy - complement factor I modulation	Geographic atrophy	Ophthalmology	Subretinal injection	2022	≥2026/II
QGE031	ligelizumab	IgE inhibitor	Food allergy	Immunology	Subcutaneous injection	2021	≥2026/III
SAF312	libvatrep	TRPV1 antagonist	Chronic ocular surface pain	Ophthalmology	Topical	2016	≥2026/II
Scemblix	asciminib	BCR-ABL inhibitor	Chronic myeloid leukemia, 1st line	Hematology	Oral	2021	2025/III
SKO136[3]	ensovibep	Multispecific DARPin	Coronavirus infection	Global Health	Intravenous infusion	Not applicable (N/A)	TBD[4]/II
TQJ230	pelacarsen	ASO targeting lipoprotein(a)	Secondary prevention of cardiovascular events in patients with elevated levels of lipoprotein(a)	Cardiovascular	Subcutaneous injection	2019	2025/III
VAY736	ianalumab	BAFF-R inhibitor	Autoimmune hepatitis	Immunology	Subcutaneous injection	2018	≥2026/II
			Lupus nephritis[5]	Immunology	Subcutaneous injection	2022	≥2026/III
			Sjögren's syndrome	Immunology	Subcutaneous injection	2022	≥2026/III
			Warm autoimmune hemolytic anemia[5] (wAIHA)	Hematology	Intravenous infusion	2022	≥2026/III
VDT482	tislelizumab	Anti-PD-1 monoclonal antibody	Esophageal cancer, 2nd line	Solid Tumor	Intravenous infusion	N/A	US/EU registration
			Non-small cell lung cancer	Solid Tumor	Intravenous infusion	N/A	EU registration
			Nasopharyngeal carcinoma, 1st line	Solid Tumor	Intravenous infusion	N/A	2023/III
			Gastric cancer, 1st line	Solid Tumor	Intravenous infusion	N/A	2023/III
			Esophageal cancer, 1st line	Solid Tumor	Intravenous infusion	N/A	2023/III
			Localized esophageal cancer	Solid Tumor	Intravenous infusion	N/A	2024/III
			Hepatocellular carcinoma, 1st line	Solid Tumor	Intravenous infusion	N/A	2023/III
			Small cell lung cancer, 1st line	Solid Tumor	Intravenous infusion	N/A	2024/III
			Urothelial cell carcinoma, 1st line[6]	Solid Tumor	Intravenous infusion	N/A	≥2026/III
VPM087	gevokizumab	IL-1 beta antagonist	Colorectal cancer, 1st line	Solid Tumor	Intravenous infusion	2019	≥2026/I
Xolair	omalizumab	IgE inhibitor	Food allergy	Immunology	Subcutaneous injection	2019	2023/III
XXB750[5]	TBD	NPR1 agonist	Hypertension	Cardiovascular	Subcutaneous injection	2022	≥2026/II

[2] Entered confirmatory development following the acquisition of Gyroscope Thereapeutics.
[3] In-licensed from Molecular Partners in 2021 (option deal)
[4] No definite submission date can be provided at this time
[5] Project added to selected development projects table in 2022 – entered Confirmatory Development
[6] Formerly "bladder urothelial cell carcinoma". Indication language updated in 2022 to reflect latest development plan

Projects removed from the development table since 2021

Compound/product	Potential indication	Change	Reason
ACZ885 (canakinumab)	Non-small cell lung cancer, adjuvant	Removed	Development discontinued
Beovu	Diabetic macular edema	Commercialized	
CFZ533 (iscalimab)	Liver transplantation	Removed	Development discontinued
Cosentyx	Ankylosing spondylitis head-to-head study versus Sandoz biosimilar Hyrimoz (adalimumab)	Removed	Development discontinued
Cosentyx	Lichen Planus	Removed	Development discontinued
CSJ117	Asthma	Removed	Development discontinued
Jakavi	Acute graft-versus-host disease	Commercialized	
Jakavi	Chronic graft-versus-host disease	Commercialized	
Kymriah	Relapsed/refractory follicular lymphoma	Commercialized	
LJN452	Nonalcoholic steatohepatitis	Removed	Development discontinued
LMI070	Huntington's disease	Removed	Development discontinued
LNP023	Membranous nephropathy	Removed	Development discontinued
Vijoice [1]	PIK3CA-related overgrowth spectrum	Commercialized	
Piqray	Triple negative breast cancer	Removed	Development discontinued
Piqray	Human epidermal growth factor receptor 2-positive (HER2+) advanced breast cancer	Removed	Development discontinued
Pluvicto	Metastatic castration-resistant prostate cancer, post-taxane	Commercialized	
QBW251 (icenticaftor)	Chronic obstructive pulmonary disease	Removed	Development discontinued
QGE031 (ligelizumab)	Chronic spontaneous urticaria	Removed	Development discontinued
QGE031 (ligelizumab)	Chronic inducible urticaria	Removed	Development discontinued
Scemblix	Chronic myeloid leukemia, 3rd line	Commercialized	
UNR844	Presbyopia	Removed	Development discontinued

[1] Formerly listed as BYL719

Principal markets

The Innovative Medicines Division sells products in approximately 130 countries worldwide. Net sales are primarily concentrated in the US and Europe. The following table sets forth the aggregate 2022 net sales of the Innovative Medicines Division by region:

Innovative Medicines

	2022 net sales to third parties	
	USD millions	%
United States	15 899	39
Europe	13 554	33
Asia, Africa, Australasia	8 929	22
Canada and Latin America	2 914	6
Total	**41 296**	**100**
Of which in Established Markets [1]	30 548	74
Of which in Emerging Growth Markets [1]	10 748	26

[1] 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 products are used for chronic conditions that require patients to consume the product over long periods of time, ranging from months to years. However, certain of our marketed products and development projects, such as cell and gene therapies, are administered only once. Net sales of the vast majority of our products are not subject to material changes in seasonal demand.

Production

Our primary goal is to ensure the uninterrupted and timely supply of medicines that meet all product specifications and quality standards, and that are produced in the most cost-effective and sustainable manner. The manufacturing of our products is highly regulated by governmental health authorities around the world, including the US Food and Drug Administration (FDA) and European Medicines Agency (EMA). In addition to regulatory requirements, many of our products involve technically complex manufacturing processes or require highly specialized raw materials.

In 2022, we began to integrate Advanced Accelerator Applications (AAA), a Novartis company that focuses on radioligand therapies, into our existing manufacturing and supply structure. We manufacture our products across the following technologies at facilities worldwide: large molecules, small molecules, cell and gene therapy, RNA therapy and radioligand therapy (see also "—Item 4.D Property, plants and equipment"). In our manufacturing network, we maintain state-of-the-art processes, with quality as a priority, and require our suppliers to adhere to the same high standards we expect from our own people and processes. These processes include: chemical and biological syntheses; radioisotope handling, which relates to our radioligand therapies; sterile processing, including CAR-T cell processing; and formulation and packaging. We are constantly working to improve our existing manufacturing processes, develop new and innovative technologies, and review and adapt our manufacturing network to meet our needs and those of our patients and customers.

We produce raw materials for manufacturing in-house or purchase them 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 applicable regulations and Novartis quality standards.

Because the manufacturing of our products is complex and highly 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 disruption to 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. However, we have implemented a global manufacturing strategy to maximize business continuity in case of such events.

Marketing and sales

The Innovative Medicines Division serves customers with 21 564 field force representatives, as of December 31, 2022, including supervisors and administrative personnel. These trained representatives present the therapeutic benefits and risks of our products to physicians, pharmacists, hospitals, insurance groups, managed care organizations and other healthcare professionals. In the US, Novartis advertises certain products via digital and traditional media channels, including the internet, television, newspapers and magazines. Novartis also pursues co-promotion or co-marketing opportunities as well as licensing and distribution agreements with other companies in various markets.

The marketplace for healthcare is evolving. Customer groups beyond prescribers have increasing influence on treatment decisions and guidelines, while patients continue to become more informed stakeholders in their healthcare decisions and look for solutions to meet their changing needs. Novartis is responding by adapting our business practices to engage appropriately with patients, customer groups and other stakeholders, including by delivering innovative solutions to drive education, access and improved patient care.

The COVID-19 pandemic has accelerated additional changes related to marketing and sales techniques in the healthcare industry. For example, many healthcare professionals have increased their use of virtual platforms when interacting with pharmaceutical companies, and prefer to receive information in a more convenient and personalized way. In response, Novartis is working to implement a new customer engagement model that combines traditional face-to-face visits with digital and other methods of engaging healthcare professionals to improve the efficiency and effectiveness of every interaction. We are similarly changing our approach to engaging healthcare systems, payers and other healthcare providers.

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, the US Centers for Medicare & Medicaid Services (CMS) is the largest single payer for healthcare services as a result of continuing changes in healthcare economics and an aging population. In addition, both commercial and government-sponsored managed care organizations continue to be among the largest groups of payers for healthcare services in the US. In other countries, national health services are often the only significant payer 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 use 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 to determine whether or not to continue to reimburse existing drugs. We have dedicated teams that actively seek to optimize patient access, including formulary positions, for our products.

The trend toward consolidation among distributors and retailers of Innovative Medicines Division products continues in the US and internationally, both within and across countries. 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.

Drug pricing is an increasingly prominent issue in many countries as healthcare spending continues to rise. This issue has received significant attention in the US, especially with the recent passage of the Inflation Reduction Act (please see "—Price controls" for more information). At Novartis, we are increasing our efforts to enable patient access through innovative pricing and access initiatives in the US, Europe and other markets. These include contract structures such as pay-over-time and outcome-based agreements.

In 2021, Novartis reached an agreement with the National Health Service (NHS) in England to implement a first-of-its-kind population health management approach designed to provide faster and broader access to *Leqvio* for certain high-risk patients with atherosclerotic cardiovascular disease. Novartis is engaging in similar collaborations with other countries.

Additionally, following conditional approval of *Zolgensma* in Europe in 2020, Novartis Gene Therapies established "Day One" early access agreements in multiple European countries. These agreements support early patient access by allowing a variety of customizable options, including retroactive rebates, deferred payments, installment options, outcome-based rebates, and collaborations with healthcare systems to optimize disease management. These efforts have expanded globally, and we now have multiple early access agreements and pay-for-performance agreements (i.e., outcome-based arrangements) in place in various markets around the world. *Zolgensma* is approved in 45 countries.

Competition

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

Like other companies selling patented pharmaceuticals, Novartis faces challenges from companies selling competing patented products. Generic forms of our products may follow the expiry of intellectual property protection or regulatory exclusivities, and generic companies may also gain entry to the market through successfully challenging our intellectual property rights and exclusivities. We use appropriate, legally permissible measures to defend those rights and exclusivities. (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.

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 seeking to benefit from the increasing importance of data and data management in our industry.

Research and development

The discovery and development of a new drug usually requires approximately 10 to 15 years from the initial research to bringing a drug to market. This includes

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 (i.e., drug or biologic) or other therapeutic candidate will not meet the requirements to progress further. In such an event, we may be required to abandon the development of a potential therapy 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. These include 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.

Research program

Our research program is conducted by the Novartis Institutes for BioMedical Research (NIBR), which is the research and early development innovation engine of Novartis. NIBR is responsible for the discovery of new medicines for diseases with unmet medical need. We focus our work in areas where we believe we can have the most impact for patients. This requires the hiring and retention of highly talented employees, a focus on fundamental disease mechanisms that are relevant across different disease areas, continuous improvement in technologies for drug discovery and potential therapies, working with patients to understand their diseases and the potential benefits of therapies, close alliances with clinical and commercial colleagues, and the establishment of strategic external alliances.

Approximately 5 500 full-time-equivalent scientists, physicians and business professionals work at NIBR sites in Basel, Switzerland; Cambridge, Massachusetts; East Hanover, New Jersey; San Diego, California; and Emeryville, California. They contribute to research into disease areas such as cardiovascular, renal and metabolic diseases; neuroscience; oncology; hematology; muscle disorders; ophthalmology; autoimmune diseases; and respiratory and allergic diseases. Research at the Friedrich Miescher Institute focuses on basic genetic and genomic research, and the Novartis Institute for Tropical Diseases (NITD), in Emeryville, California, focuses on discovering new medicines to fight tropical diseases, including malaria and cryptosporidiosis.

All drug candidates go through 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 2022, we integrated the Genomics Institute of the Novartis Research Foundation (GNF), which is based in San Diego, US, into NIBR. This enables closer collaboration with colleagues across NIBR and gives greater access to biological, therapeutic, and translational platforms to researchers across Novartis. The NIBR San Diego site is focused on developing novel technology to drive drug discovery research, including regenerative medicine, small interfering RNA therapy and covalent drug discovery.

Development program

Our Global Drug Development (GDD) organization oversees and executes drug development activities, working collaboratively with NIBR, our commercial organization and other parts of the Company on our overall pipeline strategy. The GDD organization includes centralized global functions such as Regulatory Affairs and Global Development Operations, and global Development Units, and has approximately 12 800 full-time equivalent employees worldwide.

The traditional model of clinical development consists of three phases:

Phase I: 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 safety and efficacy of a potential new drug or indication.

Although we use this traditional model, we have tailored the development process to be simpler, more flexible and more efficient. We divide the development process into two stages: Exploratory Development to establish proof of concept, followed by Confirmatory Development to confirm the concept in large numbers of patients. Exploratory Development consists of clinical proof-of-concept (PoC) studies, which are small clinical trials (typically involving between five and 15 patients) that combine elements of traditional Phase I/II testing. NIBR conducts these customized trials, which are designed to give early insights into issues such as safety, efficacy and toxicity for a drug in a given indication. 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. This stage can also include trials that compare the drug to the current standard of care for the disease in order to evaluate the drug's overall benefit-risk profile. Further, with new treatment approaches such as gene therapy for rare diseases, elements of Exploratory and Confirmatory Development may be combined and suffice for registration under certain conditions such as high unmet medical need and clinical data showing highly favorable benefit-risk. In these cases, additional post-approval studies may be required by the regulatory authorities to continue to gather important data to further support approval.

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."

Our Innovation Management Board (IMB) is responsible for all strategic aspects of our development portfolio and oversees our drug development budget as well as major project phase transitions and milestones following a positive proof-of-concept outcome, including transitions to Confirmatory Development and the decision to submit a regulatory application to the health authorities. The IMB is also responsible for the endorsement of overall development strategy, the endorsement of development project priorities, and decisions on project discontinuations. Our Chief Executive Officer chairs the IMB, and other representatives from Novartis senior management, with expertise spanning multiple fields, are among its core 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 to develop new products and access new markets. We license products that complement our current product line and are appropriate to our business strategy. We focus on strategic alliances and acquisition activities for key disease areas and indications that we expect to be growth drivers in the future. We review products and compounds we are considering licensing, using the same criteria that we use for our own internally discovered drugs.

In February 2022, Novartis completed the acquisition of Gyroscope Therapeutics Holdings Plc. Through the acquisition, Novartis added PPY988 (GT005), an investigational one-time gene therapy for geographic atrophy, to its portfolio.

For more information about recent business acquisitions, see "Item 18. Financial Statements—Note 2. Significant transactions."

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 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 and the EU, 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. Even if a drug is registered and marketed in one country, the registration authority in another country may request additional information from the pharmaceutical company prior to registration or even reject the product. 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, the US and the EU have made efforts 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 payers 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 that it believes sufficiently demonstrates a drug's safety, efficacy and quality, the company may file a New Drug Application (NDA) or Biologics License Application (BLA), as applicable, for the compound. The NDA or BLA must contain all the scientific information that has been gathered about the compound. This typically includes information regarding the clinical experiences of patients tested in the drug's clinical trials. A Supplemental New Drug Application (sNDA) or Supplemental Biologics License Application (sBLA) must be filed for new indications and dosage forms 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 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 that 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 sBLA, the company can make the new drug available for physicians and other healthcare providers 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 more than one EU member state at the same time: 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. The procedure used for first authorization must continue to be followed for subsequent changes, e.g., to add an indication for a licensed product.

Under the centralized procedure, applications are made to the EMA for an authorization that is valid for the European Union (all member states). The centralized procedure is mandatory for all biotechnology products; new chemical entities in cancer, neurodegenerative disorders, diabetes, AIDS, autoimmune diseases and other immune dysfunctions; advanced therapy medicines, such as gene therapy, somatic cell therapy and tissue-engineered medicines; and orphan medicines (medicines for rare diseases). It is optional for other new chemical entities, innovative medicinal products, and medicines for which authorization would be in the interest of public health. When a pharmaceutical company has gathered data that it believes sufficiently demonstrates a drug's safety, efficacy and quality, the company may submit an application to the EMA. The EMA then receives and validates the application, and the specialized committee for human medicines, the CHMP, appoints a rapporteur and co-rapporteur to review it. They use experts from their countries to carry out the assessment but can also draw on expertise from other member states ("multinational teams"). The entire review cycle must be completed within 210 days, although there are "clock stops" to allow the company to respond to questions set forth in the rapporteur and co-rapporteur's assessment report and agreed with the CHMP. The first clock stop is at Day 120 and the clock restarts on Day 121, when the company's complete response is received by the EMA. If there are further aspects of the dossier requiring clarification, the CHMP will issue further questions at Day 180, and may also request an oral explanation, in which case the sponsor must not only respond to the further questions but also appear before the committee to justify its responses. On Day 210, the CHMP will take a vote to recommend the approval or non-approval of the application, and their opinion is transferred to the EC. The final EC decision under this centralized procedure is a single decision that is applicable to all member states. This decision occurs 60 days, on average, after a positive CHMP recommendation.

Under both the mutual recognition procedure (MRP) and the decentralized procedure (DCP), the assessment is led by one member state, called the reference member state (RMS) which then liaises with other member states, known as the concerned member states. In the MRP, the company first obtains a marketing authorization in the RMS, which is then recognized by the concerned member states in 90 days. In the DCP, the application is done simultaneously in the RMS and all concerned member states. During the DCP, the RMS drafts an assessment report within 120 days. Within an additional 90 days, the concerned member states review the application and can issue objections or requests for additional information. On Day 90, each concerned member state must be assured that the product is safe and effective, and that it will cause no undue risks to the public health. Once an agreement has been reached, each member state grants national marketing authorizations for the product.

After receiving the marketing authorizations, the company must submit periodic safety reports to the relevant health authority (EMA for the centralized procedure, national health authorities for DCP or MRP). In addition, pharmacovigilance measures must be implemented

and monitored, including the collection, evaluation and expedited reporting of adverse events, and updates to risk management plans. For some medications, post-approval studies (Phase IV) may be imposed 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 performs 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, unless it is determined that the product must be further monitored for safety reasons. In this case, the authority may require another renewal at 10 years. If the holder does not apply for renewal, the marketing authorization automatically lapses. Any marketing authorization that 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.

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 remain robust – and potentially even strengthened – and to have a continued negative influence on the prices we are able to charge for our products.

Direct governmental efforts to control prices

United States: The Inflation Reduction Act of 2022 (the "Act") was signed into law, which mandates the negotiation of eligible Medicare Part B and Part D drugs; redesigns the Medicare Part D benefit, including a USD 2 000 out-of-pocket cap for Medicare beneficiaries; and imposes penalties for Medicare drugs that increase in price faster than the rate of inflation. Under the Act, the US government is required to negotiate the Medicare prices of single-sourced small molecule drugs that have been on the market for seven years following FDA approval as well as single-sourced biologics that have been on the market for 11 years after FDA approval.

Medicare drugs with the highest total cost to the US government will be selected for negotiation once they become eligible. Exemptions include orphan drugs with an indication for one rare disease or condition, drugs with a total cost to the US government of less than USD 200 million, and plasma-derived drugs.

The negotiated price will be publicly available and will become effective for selected drugs nine years after FDA approval for eligible small molecules and 13 years after approval for eligible biologics. The negotiated price will be implemented as follows:

- 10 eligible Medicare Part D drugs in 2026;
- an additional 15 eligible Medicare Part D drugs in 2027;
- an additional 15 eligible combined Medicare Part B and Part D drugs in 2028;
- an additional 20 eligible combined Medicare Part B and Part D drugs in 2029; and
- an additional 20 eligible combined Medicare Part B and Part D drugs each year after 2029

Novartis will participate in the Medicare negotiation process if Novartis drugs are selected. Pharmaceutical manufacturers that choose not to participate in the negotiation process will be subject to an excise tax of up to 95% of sales. Novartis may also be affected by other provisions of the Act, such as price increase penalties for Medicare Part D drugs starting in 2022 and for Medicare Part B drugs in 2023, and rebates on eligible Medicare Part D sales starting in 2025.

In addition, by December 31, 2022, 20 US states had passed legislation intended to impact pricing or requiring manufacturer price transparency reporting, with eight of these states also allowing for drug affordability (i.e., price control) review boards. The disclosure requirements vary by state. Many states require multiple types of reporting, including for new drug applications, new drug launches, prior notice of price increases, and quarterly or annual reporting. It is expected that state legislatures will continue to focus on drug pricing in 2023 and that similar bills will be passed in more states.

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 some member states, these include reforms to permit the reimbursed use of off-label medicines, despite the presence of licensed alternatives on the market. 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, is 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 international borders, further impacting individual EU member state pricing. Member states also collaborate to enhance pricing transparency and have started conducting joint health technology assessments, joint pricing negotiations and/or joint purchasing. 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 may lack transparency in some cases and can be difficult to predict.

Regulations favoring generics and biosimilars

In response to rising healthcare costs, most governments and private medical care providers have established reimbursement schemes that favor the substitution of generic pharmaceuticals for more expensive

brand-name pharmaceuticals. All US states have generic substitution statutes. These statutes permit or require the dispensing pharmacist to substitute a less expensive generic drug instead of an original drug. Other countries, including many European countries, have similar laws. We expect that the pressure for generic substitution will continue to increase. In addition, the US, the EU and other jurisdictions are increasingly introducing 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 have an impact in other countries as a result of cross-border sales. In the EU, products that we have sold to customers in countries with stringent price controls can be legally resold to customers in other EU countries at a lower price than the price at which the product is otherwise available in the importing country (known as parallel trade). In North America, products that we have sold to customers in Canada – which has relatively stringent price controls – are sometimes resold 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 in most states. However, six US states (Colorado, Florida, Minnesota, New Hampshire, New Mexico, and Vermont) have enacted laws allowing the import of pharmaceutical drugs from select foreign countries. The Secretary of the US Department of Health and Human Services (HHS) must certify that each state's importation plan is safe and cost-effective before it can be implemented.

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 (IP) rights – including patents, trademarks, copyrights, know-how, trade secrets and regulatory data protection – as essential to our purpose of reimagining medicine to improve and extend people's lives, and to protect our investment in research and development, manufacturing and marketing. The IP system provides a means to attract the investments needed to conduct and sustainably finance innovative R&D, and to manage the risks inherent in our work. For example, we seek IP 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 tests for certain diseases or biomarkers – which can improve patient outcomes when administered with certain drugs – as well as assays, research tools and other techniques used to identify new drugs. The protection afforded, which may vary from country to country, depends upon the type of patent, its duration and its scope of coverage.

In the US and other countries, the law recognizes that product development and review by the FDA and other health authorities can take an extended period, and provides an extension of 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 and can only be determined after the product is approved. In practice, it is not uncommon for patent term extensions (PTEs) or supplementary protection certificates (SPCs) to not fully account for the time it took to develop the product and receive marketing authorization. As a result, it is rarely the case, for example, that a `product's active ingredient(s) will have a full patent term at the time the product is approved by the FDA and other health authorities.

In addition to patent protection, various countries provide regulatory-based protection, including regulatory data protection (RDP) and/or other market exclusivities, for a prescribed period of time. RDP is a distinct type of IP right providing exclusivity that precludes a potential competitor from filing a regulatory application that relies on the sponsor's clinical trial data, or that precludes the regulatory authority from approving the application for a set period of time. The RDP period can vary depending on the type of data included in the sponsor's application. When it is available, market exclusivity, unlike RDP, may preclude a competitor from obtaining marketing approval for a product even if a competitor's application relies on its own data. RDP and market 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 and exclusivity has been granted by the relevant authorities.

United States

Patents

In the US, a patent issued from an application filed today will receive a term of 20 years from the earliest 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 that claims a product, method of treatment using a product, or method of manufacturing a product may also be eligible for a PTE. This type of extension may only extend the patent term for a maximum of five years, and may not extend the patent term beyond 14 years from regulatory approval. Only one patent may be extended for a product based on FDA review.

RDP and market exclusivity

Separate from patent exclusivities, the FDA may provide regulatory-based protection, which runs in parallel to any patent protection.

- A new small-molecule active pharmaceutical ingredient receives five years of RDP, during which time a competitor generally may not obtain final approval of an

application to the FDA based on a sponsor's clinical data.
- A new biologic active pharmaceutical ingredient receives 12 years of regulatory-based market exclusivity, during which time a competitor generally may not market the same or similar drug.
- The FDA may also request that a sponsor conduct pediatric studies and, in exchange, it will grant an additional six-month period of pediatric market exclusivity if the sponsor makes a timely submission of the reports of the pediatric studies in response to the FDA's Written Request. The sponsor must also have a patent-based and/or regulatory-based exclusivity period for the product to which the pediatric market exclusivity is appended.
- Orphan drug exclusivity provides seven years of market exclusivity for drugs designated by the FDA as orphan drugs, meaning drugs that treat rare diseases. During this period, a potential competitor generally may not market the same or similar drug for the same indication even if the competitor's application does not rely on data from the sponsor.

European Union

Patents

Patent applications in Europe may be filed in the European Patent Office (EPO) or in a particular country or countries. The EPO system permits a single application to be granted for the EU plus other non-EU countries such as Switzerland, Turkey and the UK. 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 20 years from the earliest application filing date. Pharmaceutical patents can be granted a further period of exclusivity under the SPC system. SPCs are designed, in part, to account for the time taken to receive marketing authorization of a product 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 five years. The SPC duration may be extended by a further six months if the product is the subject of an agreed and successfully completed 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 that, while differing, are intended to (but do not always) have the same effect.

RDP and market exclusivity

Separate from patent exclusivities, the EU provides a system of regulatory data protection for authorized human medicines that runs in parallel to any patent protection. The system for new drugs being approved today is usually referred to as "8+2+1" because it provides an initial period of eight years of data protection, during which a competitor cannot rely on the relevant data; a further period of two years of market exclusivity, during which the data can be used to support applications for marketing authorization but a competitive product cannot be launched; and a possible one-year extension of the market exclusivity period if, during the initial eight-year data exclusivity period, the sponsor registered a new therapeutic indication with "significant clinical benefit." This system generally applies both to national and centralized authorizations in the EU plus other non-EU countries such as the UK.

The EU also has an orphan drug exclusivity system for medicines. 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 an application for the same or similar medicine for the same indication will not generally be accepted or granted. Under certain circumstances, this exclusivity can be extended with a two-year pediatric extension.

Third-party patents and challenges to intellectual property

Third parties can challenge our IP, including patents, patent term extensions, RDP and marketing exclusivities (such as pediatric extensions and orphan drug exclusivity), through various proceedings. For example, patents in the US can be challenged in the United States Patent and Trademark Office (USPTO) through various proceedings, including Inter Partes Review (IPR) and Post-Grant Review (PGR) proceedings. They may also be challenged through patent infringement litigation under the Abbreviated New Drug Application (ANDA) provisions of the Hatch-Waxman Act or under the Biologics Price Competition and Innovation Act (BPCIA). In the EU, patents may be challenged through oppositions in the EPO, or national patents may be challenged in national courts or national patent offices. The outcomes of such challenges can be difficult to predict.

In addition to directly challenging our IP 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 patents or marketing the generic product for non-patent-protected indications, or filing a separate New Drug Application (NDA) under the Hatch-Waxman Act (typically referred to as a 505(b)(2) application). Despite RDP, a competitor could opt to incur the costs of conducting its own clinical trials and preparing its own regulatory application, and avoid our RDP altogether. There is a risk that some countries may seek to impose limitations on or seek not to recognize the availability of IP rights for pharmaceutical products, or limit the extent to which such rights may be enforced. Also, even though we may own, co-own or in-license patents protecting our products, and conduct freedom-to-operate analyses, a third party may nevertheless assert that one of our products infringes a third-party patent for which we do not have a license, seeking remedies such as monetary damages or an injunction against our continued marketing of the product.

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

Intellectual property protection for certain key marketed products and compounds in development

We present additional details below regarding certain IP protection for the listed Innovative Medicines Division products. For each, we identify issued, unexpired

patents by their general subject matter and, in parentheses, years of expiry, if relevant, in the US and the EU. The identified patents are owned, co-owned or exclusively in-licensed by Novartis and relate to at least one dosage strength of the product or to the method of treatment or its use as it is currently approved and marketed or, in the case of a compound in development, as it is currently submitted to the FDA and/or the EMA for approval. 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. Novartis may own, co-own, control or have rights to additional patents, for example, relating to compound forms, methods of treatment or use, formulations, devices, processes, product-by-process, synthesis, purification and detection.

We identify unexpired RDP periods and, in parentheses, years of expiry if the relevant marketing authorizations have been authorized or granted. We identify certain unexpired patent term extensions and marketing exclusivities and, in parentheses, years of expiry if they are granted; their subject matter scope may be limited and is not specified. Marketing exclusivities and patent term extensions include orphan drug exclusivity (ODE), pediatric exclusivity (PE), patent term extension (PTE) and supplementary protection certificate (SPC). We designate these as "pending" if they have been applied for but not granted and include years of expiry if estimable. Such pending applications ultimately may or may not be granted.

In the case of the EU, identification of a patent, supplementary protection certificate, marketing exclusivity or regulatory data protection means grant, authorization and maintenance in at least one EU country or the UK. However, it could be pending, not granted, expired or found invalid in others.

For each product below, we indicate whether there is current generic or biosimilar competition for one or more product versions in one or more approved indications in either the US or one or more EU countries, if IP is otherwise disclosed. We identify certain enforcement actions, or ongoing challenges to the disclosed IP, including IPRs or PGRs if instituted by the USPTO, that have not been finally resolved (including appeals) unless noted. 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 IP, which in the EU may involve IP in 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 IP. 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.

In the event that a product listed below does not have identified patents as described above, we provide information only on generic competition.

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

Cardiovascular

- *Entresto.* US: Four patents on combination (2023 (4)), PTE (2025), four PEs (2023, 2023, 2024, 2025); two patents on complex (2026, 2027), two PEs (2027, 2027); three patents on methods of treatment (2033 (3)); patent on dosage regimen (2036); RDP for new pediatric patient population (2022), PE (2023); RDP for labeling changes related to new clinical investigation (2024). EU: Patent on combination (2023), SPC (2028); two patents on complex (2026, 2026), two SPCs (2030, 2030); patent on formulation (2028); patent on method of use (2034); RDP (2025). There is no generic competition in the US or the EU. In the US, two combination patents, the two complex patents, and the dosage regimen patent are being challenged in ANDA proceedings against generic manufacturers. In the EU, one complex patent and the use patent are being opposed in the EPO. In some EU countries, the combination patent or its associated SPC is being challenged by generic manufacturers.

- *Leqvio*. US: Two patents on composition of matter (2027, 2034), PTE pending (2035); two patents on method of treatment and dosing regimen (2027, 2036); RDP (2026). EU: One patent on composition of matter (2033), SPC (2035); RDP (2030). There is no generic competition in the US or the EU.

Immunology

- *Cosentyx*. US: Five patents on composition of matter (2025 (4), 2026), PTE (2029); patent on psoriatic arthritis use (2031); patent on psoriasis use (2032); two patents on ankylosing spondylitis use (2032, 2033); RDP (2027). EU: Four patents on composition of matter (2025 (4)), SPC (2030), PE (2030); patent on psoriasis use (2031); patent on ankylosing spondylitis use (2031); RDP (2026). There is no generic competition in the US or the EU. In the EU, the patent on ankylosing spondylitis use is being opposed in the EPO.

- *Xolair*. US: Two patents on syringe formulation (2024, 2025). EU: Three patents on syringe formulation (2024, 2024, 2025). There is no generic competition in the US or the EU.

- *Ilaris*. US: Patent on composition of matter (2024); patent on cryopyrin-associated periodic syndromes use (2026); patent on familial Mediterranean fever (FMF) use (2026); patent on systemic onset juvenile idiopathic arthritis (SJIA) use (2028); patent on hyperimmunoglobulin D syndrome and tumor necrosis factor receptor-associated periodic syndrome use (2029); patent on formulation (2029). EU: Patent on composition of matter (2021), SPC (2024), PE (2025); patent on SJIA use (2026); patent on FMF use (2026); two patents on formulation (2029, 2029). There is no generic competition in the US or the EU.

Neuroscience

- *Gilenya*. US: Patent on dosage regimen (2027), PE (2027); patent on 0.25 mg formulation (2032), PE (2032); patent on method of treatment (2027). EU: Patent on formulation (2024), SPC (2026); patent on

0.25 mg formulation (2032); patent on dosing regimen (2027). There is generic competition in the US and in most EU countries. In the US, the dosage regimen patent was challenged in ANDA proceedings against a generic manufacturer and was found invalid by the US Court of Appeals for the Federal Circuit in June 2022. Novartis has filed a petition seeking further review with the US Supreme Court. Novartis is also enforcing the method of treatment patent against a generic manufacturer. In the EU, Novartis is enforcing the dosing regimen patent against generic manufacturers. The dosing regimen patent is being opposed in the EPO.

- *Zolgensma*. US: Four patents on composition of matter (2024, 2024, 2026, 2033), PTE pending (2029); three patents on methods of treatment (2028, 2028, 2029); ODE for spinal muscular atrophy (SMA) in patients less than 2 years old with biallelic mutations in the SMN1 gene (2026); RDP (2031). EU: Three patents on composition of matter (2024, 2024, 2028), SPC (2029); two patents on methods of use (2028, 2028), SPC (2033), SPC pending (2033); ODE for SMA in patients with a biallelic mutation in the SMN1 gene and a clinical diagnosis of SMA type 1, or patients with a biallelic mutation in the SMN1 gene and up to three copies of the SMN2 gene (2030); RDP (2030). There is no generic competition in the US or the EU.

- *Kesimpta*. US: Patent on compound (2031); patent on dosing regimen (2037). EU: Patent on compound (2023); patent on use (2023), SPC (2028); patent on formulation (2028), patent on formulation and use (2028), SPC (2033); patent on dosing regimen (2037). There is no generic competition in the US or the EU.

Solid Tumor

- *Tafinlar* and *Mekinist*.

  Tafinlar. US: Two patents on compound (2030, 2030); patent on method of treatment (2029). EU: Patent on compound (2029); RDP (2024). There is no generic competition in the US or the EU.

  Mekinist. US: Patent on compound (2025), PTE (2027); patent on method of treatment (2025); four patents on formulation (2032 (4)). EU: Patent on compound (2025), SPC (2029); patent on formulation (2031); RDP (2025). There is no generic competition in the US or the EU. In the EU, the formulation patent is being opposed in the EPO.

  Use of *Mekinist* with *Tafinlar* or *Tafinlar* with *Mekinist*. US: Patent on combination (2030); four patents on method of use of combination (2025, 2030, 2030, 2033); ODE on non-small cell lung cancer (2024); ODE on adjuvant treatment of melanoma (2025); ODE on anaplastic thyroid cancer (2025); ODE on metastatic solid tumors (2025). EU: Patent on combination (2030); patent on adjuvant for melanoma use (2033). There is no generic competition in the US or the EU. In the EU, the adjuvant use patent is being opposed in the EPO.

- *Kisqali*. US: Three patents on compound (2028, 2030, 2031), PTE (2031); three patents on methods of treatment (2029, 2029, 2031); patent on salt form (2031); patent for tablet formulation (2036). EU: Patent on compound (2027); patent on compound (2029), SPC (2032); patent on salt form (2031); patent on methods of use with letrozole (2034); patent on formulation (2036); RDP (2027). There is no generic competition in the US or the EU. In the US, the three compound patents, the three method of treatment patents, the salt patent and the formulation patent are being challenged in ANDA proceedings against generic manufacturers. In the EU, the method of use patent is being opposed in the EPO.

- *Piqray*. US: Patent on compound (2029); patent on compound and use (2029), PTE pending (2033); RDP (2024). EU: Patent on compound and use (2029), SPC (2034); RDP (2030). There is no generic competition in the US or the EU.

- *Pluvicto*. US: Three patents on composition of matter (2028, 2028, 2034); RDP (2027). PTE pending. EU: RDP (2032). There is no generic competition in the US or the EU.

Hematology

- *Promacta/Revolade*. US: Patent on compound (2021), PTE (2022), PE (2023); patent on method of enhancing platelet production using salt (2023), PE (2023); patent on salt form and thrombocytopenia use (2025), PE (2026); five patents on tablet formulations of different dose strengths (2027 (5)), five PEs (2028 (5)); ODE on severe aplastic anemia patients in combination with standard immunosuppressive therapy (2025). EU: Patent on compound (2021), SPC (2025), PE (2025); patent on salt form (2023); patent on severe aplastic anemia use (2028). There is no generic competition in the US or the EU. In the US, generic manufacturers have filed ANDAs challenging certain patents other than the compound patent. In the EU, the severe aplastic anemia use patent is being opposed in the EPO.

- *Tasigna*. US: Patent on compound (2023), PE (2024); two patents on salt forms (2026, 2028), two PEs (2027, 2029); patent on polymorph compound form (2026), PE (2027); two patents on capsule form (2026, 2027), two PEs (2027, 2028); patent on method of treatment (2032), PE (2032). EU: Patent on compound (2023); patent on salt form (2026); patent on polymorph compound form (2026); patent on capsule form (2027); patent on method of treatment (2030). There is no generic competition in the US or the EU. In the US, generic manufacturers have filed ANDAs challenging certain patents other than the compound patent.

- *Jakavi*. EU: Patent on compound (2026), SPC (2027); two patents on salt form (2028, 2028); patent on compound for polycythemia vera (PV) use (2026); patent on salt form for graft-versus-host disease (GvHD) use (2028). There is no generic competition in the EU.

- *Scemblix*. US: Patent on compound (2033), PTE pending (2035); Patent on polymorph compound form (2040); RDP (2026); ODE (2028). EU: Patent on compound (2033), SPC pending (2037); RDP (2032); ODE (2032). There is no generic competition in the US or the EU.

Other Promoted Brands

- *Lucentis*. EU: There is generic competition in some EU markets.

- *Xiidra*. US: Four patents on compound (2024, 2024, 2025, 2026); two patents on formulation (2024, 2033); five patents on method of treatment (2024, 2024, 2026, 2029, 2029); one patent on polymorph compound form (2029). PTE pending. There is no generic competition in the US. *Xiidra* is not marketed in the EU. In the US, the compound, compound and use, formulation, method of treatment, and polymorph compound form patents are being challenged in ANDA proceedings against generic manufacturers.

Established Brands

- *Sandostatin* SC and *Sandostatin* LAR:

  Sandostatin SC: There is generic competition in the US and the EU.

  Sandostatin LAR: There is generic competition in most EU countries but no generic competition in the US.

Compounds in development

We provide certain patent information for non-marketed compounds in development that have been submitted to the FDA and/or the EMA for registration but have not yet been approved by either agency. For these products, Novartis will seek all appropriate RDP, will continue to seek additional intellectual property protection for significant product developments, and will apply for PTEs and SPCs in keeping with the great importance we attach to intellectual property.

- VDT482 (tislelizumab). US: Patent on composition of matter (2033). EU: Patent on composition of matter (2033).

Sandoz

Our Sandoz Division is a global leader in generic pharmaceuticals and biosimilars, and sells products in well over 100 countries. In 2022, the Sandoz Division achieved consolidated net sales of USD 9.2 billion, representing 18.3% 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 into three franchises: Retail Generics, Anti-Infectives and Biopharmaceuticals. In Retail Generics, Sandoz develops, manufactures and markets finished dosage forms of small-molecule pharmaceuticals for sale to third parties across a broad range of therapeutic areas, including 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- and other biotechnology-based products, including biosimilars.

The Sandoz strategic ambition is to be the world's leading and most valued generics and biosimilars company . Our divisional strategy focuses on three areas: developing a broad and consistent pipeline of generic and biosimilar launches across key geographies and across a broad range of therapeutic areas; positioning Sandoz to be "first in" by having a strong pipeline with a focus on being first to market and "last out" by way of competitive costs and stable supply; and instilling a true "generic mindset," with a focus on priorities, simple and rapid decision-making, and focused resource allocation.

Sandoz is a global market leader in biosimilars, with a total of eight approved and marketed products, and a pipeline of over 15 molecules. In addition to internally developed projects, our biosimilar portfolio comprises publicly announced commercialization agreements with BioCon, Gan & Lee, EirGenix, Polpharma Biologics and Bio-Thera Solutions Ltd. Availability of our biosimilars varies by country.

Sandoz is also the global market leader in generic antibiotics. Its Kundl, Austria, manufacturing site is the hub of the last fully vertically integrated penicillin production chain in Europe, which offers certain competitive advantages including added supply chain resilience.

In January 2020, we closed the previously announced acquisition of the Japanese business of Aspen Global Incorporated, consisting of off-patent branded medicines with a focus on anesthetics and specialty brands.

In July 2020, Sandoz and the Austrian government announced a planned combined investment of more than EUR 150 million to enhance the long-term competitiveness and supply resilience of European production for key antibiotics.

In May 2021, Sandoz confirmed details of a previously announced investment of EUR 100 million in antibiotic manufacturing technology for its Kundl, Austria, manufacturing site, and announced an additional EUR 50 million investment in a new sterile production line in Palafolls, Spain. In November 2022, Sandoz announced an additional EUR 50 million investment to support increased manufacturing capacity for finished dosage form penicillin at its Kundl, Austria, manufacturing site.

In October 2021, Sandoz announced that its planned acquisition of GSK's global cephalosporin antibiotics business, first announced in February 2021, had been successfully closed.

On October 1, 2021, Sandoz Inc., the US subsidiary of Sandoz, entered into a settlement agreement with the Civil Division of the US Department of Justice (DOJ) concerning the department's years-long pricing investigation into the US generic drug industry. This settlement

was an expected outcome of the resolution the company reached in March 2020 with the DOJ Antitrust Division regarding the same investigation and underlying conduct. As part of the settlement, Sandoz agreed to certain corporate integrity obligations as part of a corporate integrity agreement with the Office of Inspector General of the US Department of Health and Human Services, which have now been implemented. The settlement contains no new factual allegations against Sandoz and, in 2020, the Group fully provisioned for this settlement and disclosed the agreement in principle as part of the March 2020 resolution. For more information, see "Item 18. Financial Statements—Note 20. Provisions and other non-current liabilities."

In August 2022, Novartis announced its intention to separate the Sandoz business to create a standalone company by way of a 100% spin-off, concluding the Strategic Review announced in October 2021. The Strategic Review determined that a 100% spin-off would be in the best interests of shareholders as it would create two standalone companies focused on their respective growth strategies. The new company is planned to be incorporated in Switzerland and to be listed on the SIX Swiss Exchange, with an American Depositary Receipt (ADR) program in the US. Completion of the transaction is subject to certain conditions, including consultation with works councils and employee representatives (as required), general market conditions, tax rulings and opinions, final Board of Directors endorsement and shareholder approval in line with Swiss corporate law. The transaction is expected to be generally tax neutral to Novartis, with completion expected in the second half of 2023.

Key marketed products

The Sandoz global portfolio covers a wide range of therapeutic areas. 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
Acetylcysteine	Various	Mucolytic agent
Tacrolimus	Various	Immunosuppressive agent

Anti-Infectives

Active ingredients	Description
Oral and sterile penicillins	Anti-infectives
Oral and sterile cephalosporins	Anti-infectives
Clavulanic acid and mixtures with clavulanic acid	Beta-lactam inhibitors
Classical and semisynthetic macrolides	Anti-infectives

Intermediates	Description
Various cephalosporin intermediates	Anti-infectives
Macrolide base intermediates	Anti-infectives
Various crude compounds produced by fermentation	Cyclosporine, ascomycin, rapamycin, mycophenolic acid, etc.

Biopharmaceuticals

Product	Originator drug	Description
Omnitrope	Genotropin®	Recombinant human growth hormone to treat growth disorders and growth hormone deficiency
Binocrit and Epoetin alfa *Hexal*	Eprex®/Erypo®	Recombinant protein (erythropoiesis-stimulating) agent to treat anemia
Zarzio, *Zarxio* and Filgrastim *Hexal*	Neupogen®	Recombinant protein (granulocyte colony-stimulating factor, short-acting) used in oncology
Glatopa	Copaxone®	Treatment for relapsing forms of multiple sclerosis
Erelzi[1]	Enbrel®	Fusion protein (TNF-alpha receptor) to treat multiple immune-mediated inflammatory diseases
Rixathon	MabThera®	Chimeric monoclonal antibody (directed against CD20 protein on B-cells) to treat blood cancers and immunological diseases
Hyrimoz	Humira®	Monoclonal antibody (TNF-alpha antibody) to treat multiple immune-mediated inflammatory diseases
Zessly	Remicade®	Monoclonal antibody (TNF-alpha antibody) to treat multiple immune-mediated inflammatory diseases
Ziextenzo	Neulasta®	PEGylated form of a recombinant human granulocyte colony-stimulating factor (long-acting) to reduce duration of chemotherapy-induced neutropenia and incidence of chemotherapy-induced febrile neutropenia

[1] Approved in the US in 2016. In patent litigation with Amgen, which markets Enbrel®, the US District Court of New Jersey ruled against Sandoz in August 2019, which was upheld on appeal. The decision is final and Sandoz cannot launch its *Erelzi* product in the US until 2029.

Selected development projects – biosimilars in Phase III development and registration

The following table describes Sandoz biosimilar projects that are in registration trial or in registration with a regulatory agency (including filing preparation):

Project/ product	Common name (INN)	Mechanism of action	Potential indication/indications	Therapeutic areas	Route of administration	Current phase
GP2411	denosumab	Anti-RANKL monoclonal antibody	Osteoporosis (same as originator)	Endocrinology, Neurology	Subcutaneous	Phase III
SOK583	aflibercept	Recombinant fusion protein that blocks VEGF-A	Ophthalmology indication (same as originator)	Ophthalmology	Intravitreal	Phase III
EGI014A1[1]	trastuzumab	Anti-HER2 recombinant IgG1, humanized monoclonal antibody	HER2+ cancer tumors	Oncology	Intravenous	Registration
DST356A1[2]	natalizumab	Anti-alpha4 integrin monoclonal antibody	Multiple sclerosis and Crohn's disease	Neurology, Immunology (US only)	Intravenous	Registration
HFT896, SMQ969, PYB106[3]	insulin glargine, lispro, aspart	Long-acting (HFT896)/ rapid-acting insulin	Diabetes	Endocrinology, Diabetology	Subcutaneous	Phase III/ Phase I
VVF379[4]	bevacizumab	Recombinant humanized monoclonal antibody that blocks VEGF	Solid tumors	Oncology	Intravenous	Registration

[1] Development in collaboration with EirGenix, Inc.
[2] Development in collaboration with Polpharma Biologics
[3] Development in collaboration with Gan & Lee
[4] Development in collaboration with Bio-Thera Solutions

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 2022 net sales of Sandoz by region:

Sandoz

	2022 net sales to third parties	
	USD millions	%
Europe	4 913	53
United States	1 754	19
Asia, Africa, Australasia	1 613	17
Canada and Latin America	969	11
Total	**9 249**	**100**
Of which in Established Markets [1]	6 460	70
Of which in Emerging Growth Markets [1]	2 789	30

[1] 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 and over-the-counter cough and cold products are subject to material changes in seasonal demand, while sales of the vast majority of our other products are not. The COVID-19 pandemic has substantially impacted seasonal variation in recent years.

Production

For information on the production of our products, see "—Item 4.B Business overview—Innovative Medicines—Production."

In September 2020, as part of a broader reorganization of Novartis Technical Operations (NTO), we established the Sandoz Technical Operations (STO) platform within NTO. STO focuses on producing generic medicines for Sandoz, as well as related external supply operations and supply chain. In October 2021, Sandoz created a new position, Global Head, Sandoz Operations. This new, broader role, includes full operational and financial accountability for manufacturing and supply as of January 1, 2023, and was established in anticipation of the intended Sandoz 100% spin-off.

Due to impurities found in the active ingredient batches sourced from third-party manufacturers, we recalled Sandoz valsartan, losartan and irbesartan products in the second half of 2018 and the first quarter of 2019, and ranitidine film-coated tablets in the second half of 2019, from several markets, in line with our quality standards for all of our marketed products. The discovery of nitrosamines in some types of drug products led several health regulators (e.g., EMA, FDA and others) to conduct a detailed analysis of these impurities in affected medicinal products. Novartis works with health authorities around the world to continuously review all chemical and biological human medicines for the possible presence of nitrosamines. The EMA, FDA and other health authorities have provided guidance to the pharmaceutical industry to prevent unacceptable levels of nitrosamines in medicines. The EMA review concluded in March 2021 for chemical human medicines and in July 2021 for biological human medicines. Based on guidance from health authorities, any chemical and/or biological human medicines products identified with a potential risk for nitrosamines will undergo further testing. For these products, we have provided initial testing and potential control strategy updates to the EMA and other health authorities. Due to constant and rapidly evolving health authority requirements, the risk assessment and related testing that we may be required to perform may increase. We will submit and communicate the final outcome of any risk assessment and related testing to the relevant health authorities within their expected time frame, and make changes to the control strategy update, if necessary.

Beginning in September 2021, we initiated a voluntary recall of all finished product batches of losartan and losartan HCT products exceeding or potentially exceeding acceptable regulatory limits of the losartan azide impurity in the losartan drug substance. This impurity, which is viewed as an industrywide issue, was initially considered a mutagen that may increase the risk of cancer over time if allowed to rise above certain levels. This recall was unrelated to the nitrosamine-related recalls described above, and supply was re-established in March 2022. Since the voluntary recall, further information has been provided to the EMA by Novartis and other companies in the industry, and the EMA has concluded that the losartan azide impurity is to be classified as a non-mutagenic impurity.

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 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.

Legislative or regulatory changes can have a significant impact on our business in a country. For more information on such changes, see "—Item 4.B Business overview—Innovative Medicines—Price controls."

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 already mature market framework in Europe and some other markets, while the business environment is rapidly evolving in the US and many international markets. Regulatory pathways for approving biosimilar products are at various stages of maturity by market, but in some cases are still relatively new or still in development. Policies have not yet been fully defined or implemented regarding the substitution and reimbursement of biosimilars in many markets, including the US.

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 expenditure 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 industrywide 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 industrywide US sales that began in 2017 and continued through 2022.

Development and registration

Development of Sandoz Biopharmaceuticals is jointly overseen by Sandoz and GDD, and is governed by the IMB. Development and registration activities for Retail Generics products, and registration activities for Biopharmaceuticals products, are also overseen 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 are generally much lower than those of the originator pharmaceuticals, as no original drug discovery, preclinical studies or clinical trials on dose finding, safety and efficacy are typically performed by the generics company. As a result, the different focus and lower costs of the generic pharmaceutical model ultimately allow generic pharmaceutical products to be offered at lower prices, which support and contribute to the cost containment goals of healthcare systems.

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 small-molecule pharmaceutical. While generic pharmaceuticals normally do not require clinical studies in patients, regulators worldwide do still require such targeted studies for biosimilar products. International regulators are nonetheless increasingly discussing the potential for "tailored development" (which refers to proposals that seek to implement a more efficient and expedited biosimilar development process that eliminates the current need for comparative clinical efficacy and safety studies of biosimilars, without any resulting compromise on quality, safety or efficacy) for certain molecules. 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 at facilities in Holzkirchen, Germany; Hyderabad, India; Kundl, Austria; Ljubljana, Slovenia; and Rudolstadt, Germany. In November 2020, Sandoz completed (i) the previously announced closure of the Holzkirchen, Germany, development and registration site, with the exception of patch development and the project management group, and (ii) the closure of the product development and registration site as well as the maintenance and development regulatory centers in Unterach, Austria. We conduct an ongoing review of our global development and regulatory network to consolidate and streamline operations and optimize our network structure to enable Sandoz to compete sustainably in an increasingly challenging generics environment. In 2021, Sandoz completed the previously announced closures of its maintenance regulatory center in Barleben, Germany, its Fougera development center located in

Melville, New York, as well as its product development center in Boucherville, Canada.

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 to be therapeutically equivalent to the reference product.

In the US, the decision on whether a generic pharmaceutical is therapeutically equivalent to the original product is made by the FDA based on an Abbreviated New Drug Application (ANDA) filed by the generic product's manufacturer. An ANDA is generally permitted to be filed four years after the initial approval of the reference product and generally cannot be fully approved by the FDA until any regulatory exclusivity of the reference product has expired. The process typically takes nearly two years from the filing of the ANDA until FDA approval. However, delays can occur if issues arise, for example, 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. This certification often results in a patent infringement lawsuit being brought against the generics company. In the event of such a lawsuit, the Hatch-Waxman Act imposes an automatic 30-month stay in the approval of the ANDA 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 generally provides those applicants with 180 days of marketing exclusivity, enabling such generic applicants to exclusively market their product alongside the reference product at a certain point in time, which is generally after any intellectual property issues have been resolved. However, after such point in time, the 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 generics 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 is generally protected for 10 years after the first grant of marketing authorization in all member states, and can be extended for an additional year if, during the initial eight-year data exclusivity period, the innovator company registers a new therapeutic indication with "significant clinical benefit." In the case of orphan drugs, it may be extended with a two-year pediatric extension. See "—Item 4.B Business overview—Innovative Medicines—Intellectual property."

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 World Health Organization (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 that 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; an efficacy study; and possibly a pharmacodynamics study. 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.

Intellectual property

We take all reasonable steps to ensure that our products do not infringe valid intellectual property rights held by others, including taking steps to proactively challenge intellectual property rights that we believe should not have been granted. 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.

4.C Organizational structure

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."

Significant subsidiaries

See "Item 18. Financial Statements—Note 31. Principal Group subsidiaries and associated companies."

4.D Property, plants and equipment

Our principal executive offices are located in Basel, Switzerland. Our divisions operate through a number of affiliates that have offices, research and development 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 certain debts.

Novartis Operations manages the production, supply chains and quality of our Innovative Medicines and Sandoz Division products through a network of 55 manufacturing sites, as well as through external suppliers, and warehouse and distribution centers. In addition, Novartis Operations also manages non-production real estate owned or leased by Novartis around the world.

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" and "—Item 4.B Business overview—Sandoz—Production" for a discussion of our manufacturing processes.

Major facilities

Location	Size of site (in square meters)	Major activity
Basel, Switzerland – St. Johann	589 000	Global Group headquarters; global Innovative Medicines Division headquarters; global Sandoz Division headquarters; research and development; production of drug substances and drug intermediates
Kundl and Schaftenau, Austria	480 000	Production of biotechnological products, drug products and finished products, anti-infectives, active drug substances and nucleic acids; 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 generics finished dosage forms
Cambridge, Massachusetts	201 800	Research and development
Menges, Slovenia	133 763	Production of drug substances and drug intermediates
Shanghai, China	106 500	Research and development
Stein, Switzerland	64 700	Production of sterile vials, pre-filled syringes and ampoules; inhalation capsules, tablets and transdermals; active pharmaceutical ingredients; and cell and gene therapies
Holzkirchen, Germany	64 200	Sandoz Division production of transdermal delivery systems and certain international and global service functions.
Huningue, France	35 000	Production of drug substances for clinical and commercial supply
Durham, North Carolina	15 794	Manufacture, package and release commercial Zolgensma product and certain clinical development activities
Princeton, New Jersey	14 300	Sandoz Division US headquarters
Schweizerhalle, Switzerland	8 880	Manufacture of small-interfering RNA (siRNA) drug substance for Leqvio

As our product portfolio evolves, Novartis Operations is adapting our manufacturing capacity and capabilities to meet our changing needs, shifting from high-volume products toward lower-volume, customized and personalized medicines. As of December 31, 2022, we have closed, exited or sold 19 manufacturing sites since 2019 and have announced the closure, exit or sale of seven additional manufacturing sites. We have continued to invest in new technologies implemented at our sites, such as the new targeted radioligand therapy production facility in Indianapolis, Indiana, which is currently under construction (with an expected size of approximately 67 thousand square meters), the FDA-approved *Zolgensma* production site in Durham, North Carolina, and the small-interfering RNA (siRNA) oligonucleotide manufacturing facility in Schweizerhalle, Switzerland. We are leveraging innovation to increase the reliability and productivity of our manufacturing network, including using data and digital technologies. We continue to seek opportunities to manage our production facilities as efficiently as possible, optimize external spend, and simplify and standardize across our manufacturing network to help us increase our cost competitiveness and optimize the value of our products. At the same time, we are working to improve our environmental sustainability, for example by reducing energy, waste disposal and water consumption at our sites by making our manufacturing processes more efficient, introducing new technologies, and switching to clean and renewable energy solutions.

For a description of the impact of environmental matters, see "Item 3. Key Information—Item 3.D Risk factors—Environmental, social and governance matters—Failure to meet increasingly challenging environmental, social and governance expectations," "Item 3. Key Information—Item 3.D Risk factors—Environmental matters—Impact of environmental liabilities," and "Item 3. Key Information—Item 3.D Risk factors—Climate change—Climate change and increased risk of major natural disasters." See also "Item 18. Financial Statements—Note 20. Provisions and other non-current liabilities."

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 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 (see "Item 18. Financial Statements"). "Item 5. Operating and Financial Review and Prospects" with the sections on compounds in development and selected development projects of our divisions (see "Item 4. Information on the Company—Item 4.B Business overview") constitute the Operating and Financial Review (Lagebericht), as defined by the Swiss Code of Obligations.

The discussion and analysis of the financial condition and results of operations of certain items from fiscal year ended December 31, 2020, and year-to-year comparison between fiscal year ended December 31, 2021, and December 31, 2020, that are not included in this Form 20-F can be found in "Item 5. Operating and Financial Review and Prospects" of our Form 20-F for the fiscal year ended December 31, 2021, which is incorporated by reference herein.

Overview

Our purpose is to reimagine medicine to improve and extend people's lives. We use innovative science and technology to address some of society's most challenging healthcare issues. We discover and develop breakthrough treatments and find new ways to deliver them to as many people as possible. We also aim to reward those who invest their money, time and ideas in our Company. Our vision is to become the most valued and trusted medicines company in the world.

The businesses of Novartis are divided operationally on a worldwide basis into two identified reporting segments:

- Innovative Medicines: innovative patent-protected prescription medicines
- Sandoz: generic pharmaceuticals and biosimilars

In addition, we separately report the results of Corporate activities. The financial results of our Corporate activities include the costs of the Group headquarters and those of corporate coordination functions in major countries. Corporate also 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 April 2022, we announced a new, integrated organizational structure and operating model designed to support our innovation, growth, and productivity ambitions as a focused medicines company. For information about this new organizational structure, see "Item 4. Information on the Company—Item 4.B Overview." Under this new organizational structure, our divisions are supported by the following organizational units: the Novartis Institutes for BioMedical Research, Global Drug Development, and Novartis Operations. The financial results of these organizational units are included in the results of the divisions for which their work is performed.

Significant transactions are discussed in "Item 18. Financial Statements—Note 2. Significant transactions," and "Item 18. Financial Statements—Note 3. Segmentation of key figures 2022, 2021 and 2020."

Our business environment

Medical technology continues to accelerate, with new advanced treatments emerging to meet the growing need for high-quality healthcare. At the same time, aging populations are putting pressure on healthcare resources, while access to healthcare remains a challenge around the world. As a result, we see challenges and opportunities in our business environment: the need for continuous innovation in healthcare, increasing access to medicines, the adoption of new working practices and the growing use of data science and technology. The following are some major trends currently shaping our business environment.

- *Spending on healthcare continues to grow*. The need for high-quality healthcare is more critical than ever. Over the next five years, global spending on medicines is forecast to rise faster than GDP in many developed countries. The price of medicines remains a key issue as increased healthcare spending and a more uncertain economic outlook weigh on government budgets.
- *Aging populations are fueling a rise in chronic illness*. Aging and lifestyle changes are triggering an increase in noncommunicable diseases, such as cancer, heart disease and diabetes, causing millions of preventable deaths and putting further pressure on healthcare resources.
- *Medical science continues to accelerate*. Scientific innovation is advancing at an unprecedented pace. In recent years, new types of treatments have been approved, including RNA therapies, gene and cell therapies, and radioligand therapies, which offer targeted approaches to treating serious diseases. Because these medicines are complex, they require focused investment and expertise to bring them to reality for patients.
- *Access to healthcare remains a formidable challenge*. Worldwide, millions of patients struggle to access the medicines they need. This may be because of cost, inequity, or structural issues in healthcare systems. While access to medicines remains an acute issue in lower-income countries, it is a problem in developed

countries too, where the COVID-19 pandemic highlighted that deep health inequities remain entrenched.

- *Patients are moving to the center of healthcare*. Patients are demanding more say over their treatment through patient representative groups and other means. In response, healthcare systems and pharmaceutical companies are adapting, moving toward a more integrated, end-to-end approach, with an increased focus on patient engagement in drug development and other areas. At the same time, patients are becoming more important as data owners – as personal data allows more targeted treatments and supports development of new medicines.
- *Economic uncertainty is growing, post-COVID-19 pandemic*. The global economy is facing considerable uncertainty, driven by concerns over rising energy prices and geopolitical instability. Forecasts suggest the current economic slowdown is likely to continue in 2023. In our own industry, the COVID-19 pandemic put strain on supply chains and highlighted the importance of resilient supplies of active pharmaceutical ingredients – the raw materials used to make finished medicines. See "Item 3. Key Information—Item 3.D Risk factors—Pricing, reimbursement and access—Pricing and reimbursement pressure, including pricing transparency and access to healthcare," and "Item 3. Key Information—Item 3.D Risk factors—Macroeconomic developments—Impact of macroeconomic developments."
- *Biopharma searches for more efficiency*. At a time of growing economic uncertainty, investors are looking for sustainable growth in margins and earnings. To remain competitive, pharmaceutical companies are moving to more agile, cost-efficient business models, particularly as they invest to build specialized capabilities in research and development (R&D) and manufacturing. Meanwhile, rates of return on R&D are increasing for the first time in several years, largely because of emergency approvals during the COVID-19 pandemic and faster innovation cycles.
- *New technologies are reshaping our industry*. The use of data science and technology is increasing across the industry in everything from R&D to manufacturing and marketing. This has brought greater efficiency, but it also requires new investment and skills. Importantly, new technologies are helping close gaps between companies, healthcare systems and patients – for example, by providing insights into the social determinants of heart health enabling the development of new prevention measures.
- *Working practices are changing*. Working practices are changing in many countries. Demand for new skills is increasing, especially in areas such as data science. Workforces are becoming more flexible and more diverse, allowing companies to tap into new talent pools – important at a time of skills shortages in many parts of the economy.
- *Climate change is increasingly affecting human health*. Climate change could undermine decades of progress in improving human health at a time when antimicrobial resistance is also rising. At the same time, more governments are looking to decarbonize their economies over the long-term, while companies also face increased scrutiny over the sustainability of their operations and supply chains. See "Item 3. Key Information—Item 3.D Risk factors—Climate change—Impact of climate change and increased risk of major natural disasters."

Our strategy

Our strategy as a focused medicines company is to deliver high-value medicines that alleviate society's greatest disease burdens through technology leadership in R&D and novel access approaches.

We have made significant progress in transforming Novartis from a diversified healthcare conglomerate into a focused medicines company. In doing so, we have divested or spun off non-core businesses and made targeted acquisitions to focus on our core business: discovering and developing new medicines and finding new ways to deliver them to as many people as possible.

In 2022, we continued to execute on our strategy by putting in place a new organizational structure to support innovation, growth and productivity. We also updated our strategic priorities and announced our intention to spin-off our Sandoz business, which paves the way for Novartis to advance as a company focused fully on innovative medicines. See "Item 4. Information on the Company—Item 4.B Overview" and "Item 4. Information on the Company—Item 4.B Sandoz."

Our strategy has clear focus areas and priorities to meet the challenges and opportunities we see in our business environment, and ensure we continue to create value for our stakeholders and society.

Our focus areas determine where we invest most of our time, energy and resources and include:

- **Core therapeutic areas** with high unmet patient needs: cardiovascular; immunology; neuroscience; solid tumors; and hematology.
- **Technology platforms** where we have the depth and scale to discover, develop and commercialize new therapies: Chemistry; biotherapeutics; xRNA; radioligand therapy; and gene and cell therapy.
- **Priority geographies** which, taken together, account for the majority of the forecast growth in global healthcare spending: US, China, Germany and Japan. While these are our priority countries, we will continue to invest in other markets worldwide.

Our focus areas are supported by three strategic priorities, which determine how we implement our strategy. These three strategic priorities are:

- ***Deliver high-value medicines to accelerate growth***. Delivering new medicines for major diseases is at the core of our purpose and value creation as a company. We focus on high-value innovative medicines with the potential to transform the treatment of diseases across our five core therapeutic areas. To do this, we seek to maximize the potential of our key in-market and launch medicines, while finding new ways to deliver them to as many people as possible and investing in R&D to deliver the next generation of high-value therapies for patients over the longer term. As part of our efforts, we continue our longstanding commitment to reduce the burden of infectious and tropical diseases that predominantly affect underserved populations in low- and middle-income countries.

- ***Embed operational excellence to deliver returns***. We aim to drive efficiency and free up resources to invest in innovation for patients. This also underpins our financial performance and makes us more agile; better able to take quick decisions and scale the use of new technologies, with effective cooperation across our business. In everything we do, we maintain high standards of product quality and patient safety, while also working to reduce our environmental footprint.
- ***Strengthen our foundations by***:
  Unleashing the power of our people. We continue to focus on culture as a key enabler of our strategy to drive innovation and long-term performance. For us, this is about building an agile, diverse workforce and making sure we attract and retain the right talent for the future.
  Scaling data science and technology. We are investing in data science and technology to increase efficiency, support innovation, better respond to the needs of patients and healthcare professionals, and ultimately improve the way we develop and deliver our medicines.
  Building trust with society. We aim to increase access to our medicines for underserved populations around the world and follow high standards of ethical behavior wherever we operate.

Results of operations

Financial year 2022 compared with 2021

Key figures[1]

(USD millions unless indicated otherwise)	**Year ended Dec 31, 2022**	Year ended Dec 31, 2021	Change in USD %	Change in constant currencies %[1]
Net sales to third parties	**50 545**	**51 626**	**– 2**	**4**
Other revenues	1 283	1 251	3	4
Cost of goods sold	– 15 486	– 15 867	2	– 4
Gross profit	**36 342**	**37 010**	**– 2**	**4**
Selling, general and administration	– 14 253	– 14 886	4	– 1
Research and development	– 9 996	– 9 540	– 5	– 9
Other income	805	1 852	– 57	– 54
Other expense	– 3 701	– 2 747	– 35	– 43
Operating income	**9 197**	**11 689**	**– 21**	**– 13**
% of net sales to third parties	18.2	22.6		
(Loss)/income from associated companies	– 9	15 339	nm	nm
Interest expense	– 837	– 811	– 3	– 5
Other financial income and expense	20	– 80	nm	nm
Income before taxes	**8 371**	**26 137**	**– 68**	**– 64**
Income taxes	– 1 416	– 2 119	33	25
Net income	**6 955**	**24 018**	**– 71**	**– 67**
Attributable to:				
Shareholders of Novartis AG	*6 955*	*24 021*	*– 71*	*– 67*
Non-controlling interests	*0*	*– 3*	*nm*	*nm*
Basic earnings per share (USD)	**3.19**	**10.71**	**– 70**	**– 66**
Net cash flows from operating activities	**14 236**	**15 071**	**– 6**	
Free cash flow [1]	**11 945**	**13 282**	**– 10**	

[1] For an explanation of non-IFRS measures and reconciliation tables, see "—Non-IFRS measures as defined by Novartis."
nm = not meaningful

Group overview

Net sales to third parties for Novartis were USD 50.5 billion, down 2% in USD reported terms and up 4% measured in constant currencies (cc) to remove the impact of exchange rate movements. Sales growth was driven by volume growth of 11 percentage points, mainly driven by continued strong growth from *Entresto*, *Kesimpta*, *Kisqali, Pluvicto* and *Cosentyx*. Generic competition had a negative impact of 3 percentage points, mainly due to *Gilenya, Afinitor/Votubia, and Gleevec/Glivec*. Pricing had a negative impact of 4 percentage points. Sales in the US were USD 17.7 billion (+5%) and in the rest of the world USD 32.8 billion (–6%, +4% cc).

By division, Innovative Medicines delivered net sales of USD 41.3 billion (–2%, +4% cc) and Sandoz net sales were USD 9.2 billion (–4%, +4% cc).

In Emerging Growth Markets, which comprise all markets excluding the US, Canada, Western Europe, Japan, Australia and New Zealand, sales to third parties were USD 13.5 billion (+2%, +9% cc) driven by China (USD 3.1 billion) growing 2% (+6% cc).

Operating income was USD 9.2 billion (–21%, –13% cc), mainly due to higher restructuring costs (USD 1.2 billion) primarily related to the implementation of the previously announced streamlined organizational model, higher impairments (USD 1.0 billion), and lower divestment gains (USD 0.6 billion). Operating income margin was 18.2% of net sales, decreasing by 4.4 percentage points (-3.8 percentage points cc).

Net income was USD 7.0 billion compared with USD 24.0 billion in the prior year, impacted by Roche income in the prior year. Excluding the impact of Roche income, net income declined –9% (cc). Earnings per share were USD 3.19 compared with USD 10.71 in the prior year. Excluding the impact of Roche income, EPS declined –7% (cc).

Net cash flows from operating activities amounted to USD 14.2 billion, compared with USD 15.1 billion in 2021. This decrease was mainly due to unfavorable changes in working capital and lower dividends from associated companies (2021 included the USD 0.5 billion dividends received from our investment in Roche, which was divested in the fourth quarter of 2021), partly offset by lower income taxes paid and favorable hedging results.

Free cash flow amounted to USD 11.9 billion (–10% USD), compared with USD 13.3 billion in 2021, mainly due to a decrease in net cash flows from operating activities and lower divestment proceeds, partly offset by lower purchases of property, plant and equipment.

We also present our core results[1], 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 USD 16.7 billion (0%, +8% cc), benefiting from higher sales, partly offset by higher research and development (R&D) investments. Core operating income margin was 33.0% of net sales, increasing by 0.9 percentage points (+1.3 percentage points cc).

Core net income was USD 13.4 billion (–5%, +3% cc) as growth in core operating income was partly offset by the loss of Roche core income. Excluding the impact of Roche core income, core net income grew +11% (cc).

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

Net sales to third parties by segment

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

(USD millions)	**Year ended Dec 31, 2022**	Year ended Dec 31, 2021	Change in USD %	Change in constant currencies %
Innovative Medicines	41 296	41 995	– 2	4
Sandoz	9 249	9 631	– 4	4
Net sales to third parties	**50 545**	**51 626**	**– 2**	**4**

Innovative Medicines

The Innovative Medicines Division delivered net sales of USD 41.3 billion (–2%, +4% cc) with volume contributing 12 percentage points to growth. Generic competition had a negative impact of 4 percentage points. Pricing had a negative impact of 4 percentage points. Sales in the US were USD 15.9 billion (+6%) and in the rest of the world USD 25.4 billion (–6%, +3% cc).

Sales growth was mainly driven by continued strong growth from *Entresto* (USD 4.6 billion, +31%, +37% cc), *Kesimpta* (USD 1.1 billion, +194%, +200% cc), *Kisqali* (USD 1.2 billion, +31%, +38% cc), *Pluvicto* (USD 271 million) and *Cosentyx* (USD 4.8 billion, +1%, +5% cc), partly offset by generic competition mainly for *Gilenya*, *Afinitor*/*Votubia* and *Gleevec*/*Glivec*.

In the US (USD 15.9 billion +6%), sales growth was mainly driven by *Entresto*, *Kesimpta* and *Pluvicto*, partly offset by the impact of generic competition on *Afinitor*/*Votubia* and *Gilenya*. In Europe (USD 13.6 billion, –9%, +1% cc) sales growth was driven by *Entresto*, *Kisqali* and *Kesimpta*, partly offset by increased generic competition for *Gilenya*. Emerging Growth Markets grew +2% (+9% cc), with China sales USD 2.9 billion (+3%, +7% cc) driven by *Cosentyx*.

The following table provides an overview of net sales to third parties by core therapeutic area; other promoted brands; and established brands in the Innovative Medicines Division:

(USD millions)	**Year ended Dec 31, 2022**	Year ended Dec 31, 2021[1]	Change in USD %	Change in constant currencies %
Cardiovascular	4 756	3 560	34	40
Immunology	7 287	7 205	1	7
Neuroscience	5 051	5 007	1	5
Solid Tumors	4 723	4 101	15	21
Hematology	6 452	6 430	0	7
Other Promoted Brands	3 127	3 451	– 9	– 1
Total Promoted Brands	**31 396**	**29 754**	**6**	**12**
Established Brands	9 900	12 241	– 19	– 13
Total Innovative Medicines	**41 296**	**41 995**	**– 2**	**4**

[1] Reclassified to reflect the new Innovative Medicines divisional structures announced on April 4, 2022

The following table provides the top 20 Innovative Medicines Division product net sales to third parties in 2022 as well as the change compared with 2021:

			US		Rest of world			**Total**		
Brands	**Brand classification by therapeutic area, other promoted brands or established brands**	**Key indications**	USD m	% change USD/cc[2]	USD m	% change USD	% change cc[2]	USD m	% change USD	% change cc[2]
Cosentyx	Immunology	Psoriasis (PsO), ankylosing spondylitis (AS), psoriatic arthritis (PsA), non-radiographic axial spondyloarthritis (nr-axSPA)	2 770	– 4	2 018	10	20	4 788	1	5
Entresto	Cardiovascular	Chronic heart failure, hypertension	2 354	38	2 290	25	37	4 644	31	37
Promacta/Revolade	Hematology	Immune thrombocytopenia (ITP), severe aplastic anemia (SAA)	1 083	14	1 005	– 6	5	2 088	4	9
Gilenya	Neuroscience	Relapsing multiple sclerosis (RMS)	1 153	– 19	860	– 37	– 29	2 013	– 28	– 24
Tasigna	Hematology	Chronic myeloid leukemia (CML)	877	– 1	1 046	– 11	– 2	1 923	– 7	– 1
Lucentis	Other Promoted Brands	Age-related macular degeneration (AMD), diabetic macular edema (DME), retinal vein occlusion (RVO)			1 874	– 13	– 4	1 874	– 13	– 4
Tafinlar + Mekinist	Solid Tumors	BRAF V600+ metastatic adjuvant melanoma, advanced non-small cell lung cancer (NSCLC), tumor agnostic with BRAF mutation indication	678	12	1 092	0	10	1 770	5	11
Jakavi	Hematology	Myelofibrosis (MF), polycytomia vera (PV), graft-versus-host disease (GvHD)			1 561	– 2	9	1 561	– 2	9
Zolgensma	Neuroscience	Spinal muscular atrophy (SMA)	434	– 7	936	6	12	1 370	1	5
Xolair[1]	Immunology	Severe allergic asthma (SAA), chronic spontaneous urticaria (CSU), nasal polyps			1 365	– 4	6	1 365	– 4	6
Sandostatin	Established Brands	Carcinoid tumors, acromegaly	800	– 5	438	– 23	– 16	1 238	– 12	– 10
Kisqali	Solid Tumors	HR+/HER2- metastatic breast cancer	472	39	759	27	38	1 231	31	38
Ilaris	Immunology	Auto-inflammatory (CAPS, TRAPS, HIDS/MKD, FMF, SJIA, AOSD, gout)	570	14	563	1	16	1 133	7	15
Kesimpta	Neuroscience	Relapsing-remitting multiple sclerosis (RRMS)	921	165	171	nm	nm	1 092	194	200
Galvus Group	Established Brands	Type 2 diabetes			859	– 21	– 12	859	– 21	– 12
Gleevec/Glivec	Established Brands	Chronic myeloid leukemia (CML), gastrointestinal stromal tumors (GIST)	205	– 22	540	– 29	– 23	745	– 27	– 22
Exforge Group	Established Brands	Hypertension	14	0	729	– 18	– 12	743	– 18	– 12
Diovan Group	Established Brands	Hypertension	55	8	597	– 17	– 10	652	– 16	– 9
Kymriah	Hematology	r/r pediatric and young adults acute lymphoblastic leukemia (ALL), diffuse large B-cell lymphoma (DLBCL), follicular lymphoma (FL)	196	– 15	340	– 5	7	536	– 9	– 2
Afinitor/Votubia	Established Brands	Breast cancer/ tuberous sclerosis complex (TSC)	171	– 67	341	– 18	– 8	512	– 45	– 41
Top 20 brands total			**12 753**	**6**	**19 384**	**– 5**	**5**	**32 137**	**– 1**	**5**
Rest of portfolio			3 146	6	6 013	– 9	0	9 159	– 4	2
Total division net sales to third parties			**15 899**	**6**	**25 397**	**– 6**	**3**	**41 296**	**– 2**	**4**

[1] Net sales to third parties reflect *Xolair* sales for all indications.

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

nm = not meaningful

For the table providing the top 20 Innovative Medicines Division product net sales to third parties in 2021, see "Item 18. Financial statements—Note 3. Segmentation of key figures 2022, 2021 and 2020."

For information about the approved indications for certain products described, see "Item 4. Information on the Company—Item 4.B Business overview—Innovative Medicines— Innovative Medicines Division products."

CARDIOVASCULAR

Sales in the Cardiovascular therapeutic area were USD 4.8 billion (+34%, +40% cc), sales growth mainly driven by *Entresto*.

Entresto (USD 4.6 billion, +31%, +37% cc) sustained robust demand-led growth, with increased patient share across all geographies. Guidelines position *Entresto* as the first choice RASi versus ACEi/ARB in patients with HFrEF. *Entresto* benefits from the adoption of guideline directed medical therapy for these patients in all geographies. In the US, *Entresto* benefits from being added to guidelines for patients with HFpEF (with LVEF below normal). In China, *Entresto* has been listed in the National Reimbursement Drug List (NRDL) for both HFrEF and hypertension, effective January 2022. In China and Japan, *Entresto* volume growth is fueled by increased penetration in hypertension in addition to growth in heart failure. It is estimated that around 10 million patients are on treatment with *Entresto*.

Leqvio (USD 0.1 billion) launch in the US and other markets is ongoing, with focus on patient on-boarding, removing access hurdles and enhancing medical education. *Leqvio* is the first and only small interfering RNA (siRNA) therapy to lower low-density lipoprotein cholesterol approved in the US and was launched in January 2022. In the US, *Leqvio* is covered at or near label for 76% of patients eleven months after launch. *Leqvio* in the US has been assigned a unique Healthcare Common Procedure Coding System code (J-code) and average sales price. *Leqvio* is now approved in 70 countries. Novartis obtained global rights to develop, manufacture and commercialize *Leqvio* under a license and collaboration agreement with Alnylam Pharmaceuticals.

IMMUNOLOGY

Sales in the Immunology therapeutic area reached USD 7.3 billion (+1%, +7% cc), sales growth was mainly driven by *Cosentyx* and *Ilaris*.

Cosentyx (USD 4.8 billion, +1%, +5% cc) sales grew in Emerging Growth Markets, Europe and Japan, partly offset by decline in the US due to higher revenue deductions. In China, *Cosentyx* growth was fueled by increased biologic uptake and inclusion in approximately 1,900 hospital listings. Since initial approval in 2015, *Cosentyx* has proven its sustained efficacy and consistent safety profile across five systemic inflammatory conditions and has treated more than 960,000 patients worldwide.

Xolair (USD 1.4 billion, –4%, +6% cc) sales grew (cc) in Emerging Growth Markets, Europe and Japan. Novartis co-promotes *Xolair* with Genentech in the US and shares a portion of revenue as operating income but does not record any US sales.

Ilaris (USD 1.1 billion, +7%, +15% cc) showed continued growth across all geographies. Contributors to growth include the adult-onset Still's disease indication, together with the other adult rheumatology indications in the US and Europe, as well as strong performance for the Periodic Fevers Syndrome indications in Japan.

NEUROSCIENCE

Sales in the Neuroscience therapeutic area were USD 5.1 billion (+1%, +5% cc), sales growth (cc) mainly driven by *Kesimpta*, which was partly offset by sales decline of *Gilenya*.

Gilenya (USD 2.0 billion, –28%, –24% cc) sales declined mainly in Europe and in the US due to generic pressure.

Zolgensma (USD 1.4 billion, +1%, +5% cc) has been approved in 47 countries to date. As this represents most major markets, sales growth is now mainly driven by the Incident patient population where we've seen double digit growth in 2022. Access pathways are now in place in 35 countries with negotiations ongoing in additional markets.

Kesimpta (USD 1.1 billion, +194%, +200% cc) showed strong sales growth driven by launch momentum across all geographies. *Kesimpta* is a targeted B-cell therapy that can deliver powerful and sustained high efficacy, with a favorable safety and tolerability profile and the flexibility of an at home self-administration for a broad population of RMS patients. *Kesimpta* is now approved in 80 countries with more than 36,000 patients treated.

Mayzent (USD 0.4 billion, +27%, +32% cc) sales grew across all geographies in MS patients showing signs of progression despite being on other treatments. *Mayzent* is the first and only oral disease-modifying therapy studied and proven to delay disease progression in a broad SPMS patient population.

Aimovig (USD 0.2 billion, +1%, +11% cc) sales grew in Europe and Emerging Growth Markets. *Aimovig* is reimbursed in 32 markets and has been prescribed to over 759,000 patients worldwide. Earlier this year, *Aimovig* was submitted for approval in China. In October 2022, Novartis reached an agreement in Germany by which *Aimovig* is reimbursed as a 1st line prophylactic migraine treatment based on the HER-MES trial.

SOLID TUMORS

Sales in the Solid Tumors therapeutic area were USD 4.7 billion (+15%, +21% cc), sales growth mainly driven by *Kisqali*, *Pluvicto* and *Tafinlar + Mekinist*.

Tafinlar + Mekinist (USD 1.8 billion, +5%, +11% cc) sales grew across all geographies, driven by demand in BRAF+ adjuvant melanoma and NSCLC indications, while maintaining demand in the highly competitive BRAF+ metastatic melanoma market. *Tafinlar + Mekinist* remains the worldwide targeted therapy leader in BRAF+ melanoma. Following FDA approval in late June, *Tafinlar + Mekinist* is the first and only therapy with a tumor-agnostic indication for adult and pediatric patients with solid tumors that have a BRAF V600E mutation, which drives tumor growth in more than 20 different tumor types.

Kisqali (USD 1.2 billion, +31%, +38% cc) sales grew strongly across all geographies, based on increasing recognition of its overall survival and quality of life benefits in HR+/HER2- advanced breast cancer. It is a CDK4/6

inhibitor with proven overall survival benefit across all three Phase III trials of the MONALEESA program regardless of menopausal status, line of therapy, site and number of metastases, endocrine resistance, or endocrine partner.

Votrient (USD 0.5 billion, –18%, –13% cc) declined due to increased competition, especially from immuno-oncology agents in metastatic renal cell carcinoma.

Lutathera (USD 0.5 billion, –1%, +3% cc) sales grew (cc) in Europe and Japan, partly offset by decline in the US. There are approximately 500 centers actively treating patients globally. In the second quarter of 2022, there was a temporary suspension in manufacturing during the quarter; production and deliveries of patient doses resumed in early June.

Piqray (USD 0.4 billion, +13%, +14% cc) sales grew mainly in the US, benefiting from indication expansion into PIK3CA-related overgrowth spectrum (PROS). *Piqray* is the first and only therapy specifically developed for the approximately 40% of HR+/HER2- advanced breast cancer patients who have a PIK3CA mutation, which is associated with a worse prognosis.

Pluvicto (USD 0.3 billion) launch is progressing well, with more than 160 active centers ordering. *Pluvicto* is the first and only radioligand therapy approved by the FDA for the treatment of progressive, PSMA-positive metastatic castration-resistant prostate cancer, who have already been treated with other anticancer treatments (ARPI and taxane-based chemotherapy).

Tabrecta (USD 0.1 billion, +48%, +48% cc) sales grew across all geographies, as the first therapy approved by the FDA to specifically target metastatic NSCLC with a mutation that leads to MET exon 14 skipping (METex14).

HEMATOLOGY

Sales in the Hematology therapeutic area were USD 6.5 billion (0%, +7% cc), sales growth (cc) mainly driven by *Promacta/Revolade*, *Jakavi* and *Scemblix*.

Promacta/Revolade (USD 2.1 billion, +4%, +9% cc) growth was driven by the US, Europe and Emerging Growth Markets, partly offset by decline in Japan. Sales growth was driven by increased use in second-line persistent and chronic immune thrombocytopenia and as first-line and/or second-line treatment for severe aplastic anemia.

Tasigna (USD 1.9 billion, –7%, –1% cc) sales declined in Europe, Japan and the US, partly offset by growth in Emerging Growth Markets.

Jakavi (USD 1.6 billion, –2%, +9% cc) sales grew (cc) in Europe, Emerging Growth Markets, Japan, driven by strong demand in both the myelofibrosis and polycythemia vera indications. In May, EC approved *Jakavi* for the treatment of patients aged 12 years and older with acute or chronic GvHD who have inadequate response to corticosteroids or other systemic therapies.

Kymriah (USD 0.5 billion, –9%, –2% cc) sales declined in the US and Europe due to lower DLBCL demand in both geographies and was partly offset by growth in Emerging Growth Markets and Japan. In May, EC and FDA approved *Kymriah* for the treatment of adult patients with relapsed or refractory (r/r) follicular lymphoma (FL) after two or more lines of systemic therapy.

Adakveo (USD 0.2 billion, +18%, +19% cc) continued to grow worldwide, reaching more than 11,800 patients with vaso-occlusive crises caused by sickle cell disease to date.

Scemblix (USD 0.1 billion) continued its strong launch uptake in the US, with launches underway in EU and Japan, demonstrating the high unmet need in CML, particularly patients previously treated with 2 or more tyrosine kinase inhibitors, or with the T315I mutation. In October 2022, US FDA converted the accelerated approval of *Scemblix* to a full approval, confirming the clinical benefit after longer exposure.

OTHER PROMOTED BRANDS

Sales for Other Promoted Brands were USD 3.1 billion (–9%, –1% cc).

Lucentis (USD 1.9 billion, –13%, –4% cc) sales declined in Japan and Europe mainly due to competition, which was partly offset by growth in Emerging Growth Markets.

Xiidra (USD 0.5 billion, +4%, +4% cc) sales grew mainly in the US.

Ultibro Group (USD 0.5 billion, –18%, –9% cc) sales declined in Europe and Emerging Growth Markets due to competition and was partly offset by growth in Japan. *Ultibro* Group consists of *Ultibro Breezhaler*, *Seebri Breezhaler* and *Onbrez Breezhaler*.

Beovu (USD 0.2 billion, +9%, +18% cc) sales grew in Europe, Emerging Growth Markets and Japan, partly offset by decline in the US. *Beovu* received approval for diabetic macular edema (DME) in the EU in the first quarter of 2022, and in the US in the second quarter of 2022.

ESTABLISHED BRANDS

The Established Brands had sales of USD 9.9 billion (–19%, –13% cc).

Sandostatin (USD 1.2 billion, –12%, –10% cc) declined across all geographies due to ongoing competitive pressure, including generic competition ex-US.

Galvus Group (USD 0.9 billion, –21%, –12% cc) declined in Japan, Europe and Emerging Growth Markets.

Gleevec/Glivec (USD 0.7 billion, –27%, –22% cc) declined due to increased generic competition.

Exforge Group (USD 0.7 billion, –18%, –12% cc) declined across all geographies.

Diovan Group (USD 0.7 billion, –16%, –9% cc) declined in Emerging Growth Markets, Japan and Europe.

Afinitor/Votubia (USD 0.5 billion, –45%, –41% cc) declined in the US and Europe driven by generic competition.

Voltaren/Cataflam (USD 0.3 billion, –10%, 0% cc) sales were stable (cc).

Zortress/Certican (USD 0.3 billion, –24%, –14% cc) declined in the US and Japan.

Exjade/Jadenu (USD 0.3 billion, –43%, –38% cc) declined due to pressure from generic competition.

Neoral/Sandimmun(e) (USD 0.3 billion, –16%, –8% cc) declined across all geographies.

Sandoz

Sandoz net sales were USD 9.2 billion (–4%, +4% cc) with volume contributing 10 percentage points to growth. Pricing had a negative impact of 6 percentage points.

Sales in Europe were USD 4.9 billion (–7%, +4% cc), in the US USD 1.8 billion (–4%) in Asia/Africa/Australasia USD 1.6 billion (–3%, +6% cc) and in Canada and Latin America USD 969 million (+11%, +15% cc) driven by volume increases and tender wins.

The following table provides an overview of net sales to third parties by business franchise in the Sandoz Division:

(USD millions)	**Year ended Dec 31, 2022**	Year ended Dec 31, 2021	Change in USD %	Change in constant currencies %
Retail Generics[1]	6 776	7 092	– 4	4
Biopharmaceuticals	2 093	2 116	– 1	9
Anti-Infectives (partner label/API)[1]	380	423	– 10	– 5
Total Sandoz	**9 249**	**9 631**	**– 4**	**4**

[1] Sandoz total anti-infectives net sales to third parties amounted to USD 1.2 billion (2021: USD 1.1 billion; 2020: USD 1.2 billion), of which USD 777 million (2021: USD 707 million; 2020: USD 694 million) is sold through the Retail Generics business franchise and USD 380 million (2021: USD 423 million; 2020: USD 474 million) is sold to other third-party companies through the Anti-Infectives business franchise.

Retail Generics

In Retail Generics, Sandoz develops, manufactures and markets finished dosage forms of small molecule pharmaceuticals for sale to third parties across a broad range of therapeutic areas, including finished dosage form of anti-infectives sold to third parties.

Retail sales were USD 6.8 billion (–4%, +4% cc), growing across all regions ex-US.

Biopharmaceuticals

In Biopharmaceuticals, Sandoz develops, manufactures and markets protein- and other biotechnology-based products, including biosimilars, and provides biotechnology manufacturing services to other companies. The Biopharmaceuticals business also includes *Glatopa*, a generic version of Copaxone®, which treats relapsing forms of multiple sclerosis and is marketed in the US.

Global sales of Biopharmaceuticals (biosimilars, biopharmaceutical contract manufacturing and *Glatopa*) grew to USD 2.1 billion (–1%, +9% cc), growing across all regions.

Anti-Infectives

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.

Total Anti-Infectives sales were USD 1.2 billion (+2%, +10% cc) of which USD 777 million were sold through the Retail Generics business franchise and USD 380 million were sold to other third-party companies through the Anti-Infectives business franchise. The sales of the Anti-Infectives business franchise declined mainly due to product discontinuations and supply challenges.

Operating income

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

(USD millions)	Year ended Dec 31, 2022	% of net sales to third parties	Year ended Dec 31, 2021	% of net sales to third parties	Change in USD %	Change in constant currencies %
Innovative Medicines	**8 786**	**21.3**	**10 688**	**25.5**	**– 18**	**– 9**
Sandoz	**1 448**	**15.7**	**1 600**	**16.6**	**– 10**	**– 2**
Corporate	– 1 037		– 599		– 73	– 84
Operating income	**9 197**	**18.2**	**11 689**	**22.6**	**– 21**	**– 13**

Operating income was USD 9.2 billion (–21%, –13% cc), mainly due to higher restructuring (USD 1.2 billion) primarily related to the implementation of the previously announced streamlined organizational model, higher impairments (USD 1.0 billion) and lower divestment gains (USD 0.6 billion). Operating income margin was 18.2% of net sales, decreasing by 4.4 percentage points (-3.8 percentage points cc).

Core operating income key figures[1]

(USD millions unless indicated otherwise)	Year ended Dec 31, 2022	Year ended Dec 31, 2021	Change in USD %	Change in constant currencies %
Core gross profit	**40 392**	**41 097**	**– 2**	**4**
Selling, general and administration	– 14 190	– 14 815	4	– 1
Research and development	– 9 088	– 9 041	– 1	– 5
Other income	384	421	– 9	– 2
Other expense	– 833	– 1 074	22	17
Core operating income	**16 665**	**16 588**	**0**	**8**
As % of net sales to third parties	33.0	32.1		

[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 USD 7.5 billion (compared with USD 4.9 billion in the prior year). For details, please see "—Non-IFRS measures as defined by Novartis—2022 and 2021 reconciliation from IFRS results to core results."

Core operating income was USD 16.7 billion (0%, +8% cc) benefiting from higher sales, partly offset by higher R&D investments. Core operating income margin was 33.0% of net sales, increasing by 0.9 percentage points (+1.3 percentage points cc).

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

(USD millions)	Year ended Dec 31, 2022	% of net sales to third parties	Year ended Dec 31, 2021	% of net sales to third parties	Change in USD %	Change in constant currencies %
Innovative Medicines	**15 237**	**36.9**	**15 215**	**36.2**	**0**	**8**
Sandoz	**1 903**	**20.6**	**2 064**	**21.4**	**– 8**	**– 1**
Corporate	– 475		– 691		31	28
Core operating income	**16 665**	**33.0**	**16 588**	**32.1**	**0**	**8**

Innovative Medicines

Operating income was USD 8.8 billion (–18%, –9% cc), driven by higher impairments, restructuring, lower divestment gains and higher R&D expenses, partly offset by higher gross margin. Operating income margin was 21.3% of net sales, decreasing 4.2 percentage points (-3.4 percentage points in cc).

Core adjustments were USD 6.5 billion, mainly due to amortization, impairments and restructuring, compared to USD 4.5 billion in prior year. Core adjustments increased compared to prior year, mainly due to higher impairments and restructuring.

Core operating income was USD 15.2 billion (0%, +8% cc), mainly driven by higher gross margin, partly offset

by higher R&D investments. Core operating income margin was 36.9% of net sales, increasing 0.7 percentage points (+1.3 percentage points cc). Revenues as a percentage of sales increased by 0.1 percentage points (cc). Core cost of goods sold as a percentage of sales was in line with the prior year. Core R&D expenses as a percentage of net sales increased by 0.2 percentage points (cc). Core selling, general and administration (SG&A) expenses as a percentage of net sales decreased by 1.4 percentage points (cc). Core other income and expense as a percentage of net sales was in line with the prior year.

Sandoz

Operating income was USD 1.4 billion (–10%, –2% cc), with the decline mainly due to higher SG&A investments to drive higher sales and inflationary pressures on input costs, which were partly offset by higher sales. Operating income margin was 15.7% of net sales, decreasing by 0.9 percentage points (-1.0 percentage points in cc).

Core adjustments were USD 455 million, including USD 221 million of amortization. Prior year core adjustments were USD 464 million, including USD 236 million of amortization.

Core operating income was USD 1.9 billion (–8%, –1% cc), with the decline mainly due to higher SG&A, partly offset by higher sales. Core operating margin was 20.6% of net sales, decreasing by 0.8 percentage points (-1.1 percentage points cc). Core gross margin as a percentage of sales decreased by 0.3 percentage points (cc), due to higher inflation and input costs. Core R&D expenses as a percentage of net sales decreased by 0.5 percentage points (cc). Core SG&A expenses increased by 0.9 percentage points (cc). Core other income and expense decreased the margin by 0.4 percentage points (cc).

Corporate income and expense, net

Corporate income and expense, which includes the cost of Group headquarter and coordination functions, amounted to an expense of USD 1.0 billion, compared to an expense of USD 599 million in 2021, mainly driven by higher restructuring costs, lower contributions from the Novartis Venture Fund and prior year income from a fair value adjustment on contingent receivables related to intellectual property rights, partly offset by prior year adjustments to provisions on M&A transactions.

Innovative Medicines Division research and development

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

(USD millions unless indicated otherwise)	**Year ended Dec 31, 2022**	Year ended Dec 31, 2021	Change in USD %	Change in constant currencies %
Research and exploratory development	– 2 938	– 3 209	8	6
Confirmatory development	– 6 234	– 5 432	– 15	– 20
Total Innovative Medicines Division research and development expense	**– 9 172**	**– 8 641**	**– 6**	**– 10**
As % of Innovative Medicines net sales to third parties	22.2	20.6		
Core research and exploratory development[1]	– 2 784	– 2 809	1	– 1
Core confirmatory development[1]	– 5 483	– 5 341	– 3	– 7
Total core Innovative Medicines Division research and development expense	**– 8 267**	**– 8 150**	**– 1**	**– 5**
As % of Innovative Medicines net sales to third parties	20.0	19.4		

[1] Core results exclude impairments, amortization and certain other items. For an explanation of non-IFRS measures and reconciliation tables, see "—Non-IFRS measures as defined by Novartis."

Innovative Medicine Division research and exploratory development expense decreased by 8% (+6% cc) to USD 2.9 billion. Confirmatory development expense amounted to USD 6.2 billion, increasing by 15% (–20% cc) versus prior year mainly due to higher impairment charges and higher investments in development to support recently acquired assets.

Total core research and development expense in the Innovative Medicine Division as a percentage of sales increased by 0.6 percentage points (+0.2 percentage points cc) to 20.0% of net sales, mainly driven by higher investments in recently acquired assets.

Non-operating income and expense

The term "non-operating income and expense" includes all income and expense items outside operating income. The following table provides an overview of non-operating income and expense:

(USD millions unless indicated otherwise)	**Year ended Dec 31, 2022**	Year ended Dec 31, 2021	Change in USD %	Change in constant currencies %
Operating income	**9 197**	**11 689**	**– 21**	**– 13**
(Loss)/income from associated companies	– 9	15 339	nm	nm
Interest expense	– 837	– 811	– 3	– 5
Other financial income and expense	20	– 80	nm	nm
Income before taxes	**8 371**	**26 137**	**– 68**	**– 64**
Income taxes	– 1 416	– 2 119	33	25
Net income	**6 955**	**24 018**	**– 71**	**– 67**
Attributable to:				
Shareholders of Novartis AG	*6 955*	*24 021*	*– 71*	*– 67*
Non-controlling interests	*0*	*– 3*	*nm*	*nm*
Basic earnings per share (USD)	**3.19**	**10.71**	**– 70**	**– 66**

nm = not meaningful

Income from associated companies

Income from associated companies was a loss of USD 9 million compared to an income of USD 15.3 billion in prior year. This decrease was due to the divestment of our investment in Roche that closed in the fourth quarter of 2021 where a gain of USD 14.6 billion was recognized.

Interest expense and other financial income and expense

Interest expense amounted to USD 837 million, broadly in line with prior year.

Other financial income and expense amounted to an income of USD 20 million compared to an expense of USD 80 million in the prior year, as higher interest income was partly offset by financial expenses and currency losses.

Income taxes

The tax rate was 16.9% compared to 8.1% in the prior year period. In the prior year, the tax rate was impacted by the Roche income from associated companies (including the divestment gain recognized on the sale of our investment in Roche in December 2021), the impact of increases in uncertain tax positions and prior-year items. For comparability, excluding these impacts, the prior year tax rate would have been 16.8%, broadly in line with 16.9% in the current year.

Net income

Net income was USD 7.0 billion (–71%, –67% cc), impacted by Roche income in the prior year. Excluding the impact of Roche income, net income declined –9% (cc).

Earnings per share

Basic earnings per share were USD 3.19 compared with USD 10.71 in the prior year, mainly due to prior year Roche income. Excluding the impact of Roche income, EPS declined –7% (cc).

Core non-operating income and expense[1]

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

(USD millions unless indicated otherwise)	**Year ended Dec 31, 2022**	Year ended Dec 31, 2021	Change in USD %	Change in constant currencies %
Core operating income	**16 665**	**16 588**	**0**	**8**
Core (loss)/income from associated companies	– 9	993	nm	nm
Core interest expense	– 837	– 811	– 3	– 5
Core other financial income and expense	141	– 41	nm	nm
Core income before taxes	**15 960**	**16 729**	**– 5**	**3**
Core income taxes	– 2 608	– 2 635	1	– 7
Core net income	**13 352**	**14 094**	**– 5**	**3**
Core basic earnings per share (USD)	**6.12**	**6.29**	**– 3**	**6**

nm = not meaningful

Core income from associated companies

Core income from associated companies was a loss of USD 9 million compared with an income of USD 993 million in prior year. This decrease was due to the divestment of our investment in Roche that closed in the fourth quarter of 2021.

Core interest expense and other financial income and expense

Core interest expense amounted to USD 837 million, broadly in line with prior year.

Core other financial income and expense amounted to an income of USD 141 million compared to an expense of USD 41 million in the prior year as higher interest income was only partly offset by currency losses.

Core income taxes

The core tax rate (core taxes as a percentage of core income before tax) was 16.3% compared to 15.8% in the prior year. For comparability, excluding Roche Income from associated companies (divested in December 2021), the prior year core tax rate would have been 16.7% compared to 16.3% in the current year, decreasing mainly as a result of a change in core profit mix.

Core net income

Core net income was USD 13.4 billion (–5%, +3% cc) as growth in core operating income was partly offset by the loss of Roche core income. Excluding the impact of Roche core income, core net income grew +11% (cc).

Core earnings per share

Core EPS was USD 6.12 (–3%, +6% cc), benefiting from lower weighted average number of shares outstanding. Excluding the impact of Roche core income, core EPS grew +14% (cc).

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

Results of operations excluding Roche investment impacts

To enhance investors' understanding of the Group's performance in comparison with the prior year, the following table provides a comparison of our 2022 published IFRS results and non-IFRS measures core results and free cash flow with the 2021 results, excluding the impacts related to our Roche investment, due to its divestment.

		Excluding Roche investment impacts[2]		
	Year ended Dec 31, 2022	Year ended Dec 31, 2021	% change USD	% change cc[1]
Operating income	**9 197**	**11 689**	**– 21**	**– 13**
Loss from associated companies	– 9	– 2	nm	nm
Interest expense	– 837	– 811	– 3	– 5
Other financial income and expense	20	– 96	nm	nm
Income taxes	– 1 416	– 2 119	33	25
Net income	**6 955**	**8 661**	**– 20**	**– 9**
Basic earnings per share (USD)	**3.19**	**3.86**	**– 17**	**– 7**
Net cash flows from operating activities	**14 236**	**14 549**	**– 2**	
Free cash flow [1]	**11 945**	**12 760**	**– 6**	
Core [1]				
Core operating income	**16 665**	**16 588**	**0**	**8**
Core net income	**13 352**	**13 099**	**2**	**11**
Core basic earnings per share (USD)	**6.12**	**5.84**	**5**	**14**

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

[2] For a reconciliation of 2021 IFRS results and non-IFRS measures core results and free cash flow to exclude the impacts of the 2021 divestment of our Roche investment, see "—Non-IFRS measures as defined by Novartis."

nm = not meaningful

Factors affecting comparability of year-on-year results of operations

Significant transactions in 2022 and 2021

The comparability of the year-on-year results of our operations for the total Group can be significantly affected by acquisitions and divestments. As part of our long-term strategy to focus Novartis as a leading medicines company, we announced and/or completed several acquisitions and divestments during 2022 and 2021.

A detailed description of significant transactions in 2022 and 2021, can be found in "Item 18. Financial Statements—Note 2. Significant transactions."

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, 2022. For more details, see "Item 15. Controls and Procedures."

Approach to risk management

See "Item 6. Directors, Senior Management and Employees—Item 6.C Board practices—Corporate governance—Information and control systems—Risk management" and "Item 18. Financial Statements—Note 29. Financial instruments – additional disclosures."

Non-IFRS measures as defined by Novartis

Novartis uses certain non-IFRS metrics when measuring performance, especially when measuring current-year results against prior periods, including core results, constant currencies and free cash flow.

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, and should be viewed in conjunction with IFRS financials.

As an internal measure of Group performance, these non-IFRS measures have limitations, and the Group's performance management process is not solely restricted to these metrics.

Core results

The Group's core results – including core operating income, core net income and core earnings per share – exclude fully the amortization and impairment charges of intangible assets, excluding software, net gains and losses on fund investments and equity securities valued at fair value through profit and loss, and certain acquisition- and divestment-related items. The following items that exceed a threshold of USD 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, software, and financial assets, and income and expense items that management deems exceptional and that are or are expected to accumulate within the year to be over a USD 25 million threshold.

Novartis believes that investor understanding of the Group's performance is enhanced by disclosing core measures of performance, since core measures exclude items that can vary significantly from year to year, they 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 International Financial Reporting Standards (IFRS), senior management receives a monthly analysis incorporating these core measures.
- Annual budgets are prepared for both IFRS and core measures.

As an internal measure of Group performance, the core results measures have limitations, and the Group's performance management process is not solely restricted to these metrics. A limitation of the core results 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, divestment, or amortization/impairments of purchased intangible assets, impairments to property, plant and equipment and restructurings and related items.

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 exchanges rates:

- The impact of translating the income statements of consolidated entities from their non-USD functional currencies to USD
- 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 USD (excluding the IAS 29 "Financial Reporting in Hyperinflationary Economies" adjustments to the local currency income statements of subsidiaries operating in hyperinflationary economies), using the average exchange rates from the prior year and comparing them to the prior year values in USD.

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 with the prior year is shown as a positive growth.

Free cash flow

Novartis defines free cash flow as net cash flows from operating activities and cash flows from investing activities associated with purchases and sales of property, plant and equipment, of intangible assets, of financial assets and of other non-current assets. Excluded from free cash flow are cash flows from investing activities associated with acquisitions and divestments of businesses and of interests in associated companies, purchases and sales of marketable securities, commodities, time deposits and net cash flows from financing activities.

Free cash flow is a non-IFRS measure and is not intended to be a substitute measure for net cash flows from operating activities as determined under IFRS. 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 investment in strategic opportunities, returning to shareholders and for debt repayment. Free cash flow is a non-IFRS measure, which means it should not be interpreted as a measure determined under IFRS.

Additional information

NET DEBT

Novartis calculates net debt as current financial debts and derivative financial instruments plus non-current financial debt less cash and cash equivalents and marketable securities, commodities, time deposits and derivative financial instruments.

Net debt is presented as additional information because it sets forth how management monitors net debt or liquidity and 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.

For the table that shows the Group's net debt, see "— Item 5.B Liquidity and capital resources — Group liquidity, financial debts and net debt."

EBITDA

Novartis defines earnings before interest, tax, depreciation and amortization (EBITDA) as operating income, excluding depreciation of property, plant and equipment, depreciation of right-of-use assets, amortization of intangible assets, and impairments of property, plant and equipment, right-of-use assets and of intangible assets.

(USD millions)	**2022**	2021
Operating income	**9 197**	**11 689**
Depreciation of property, plant and equipment	1 163	1 208
Depreciation of right-of-use assets	300	318
Amortization of intangible assets	3 982	3 903
Impairments of property, plant and equipment, right-of-use assets and intangible assets [1]	1 736	684
EBITDA	**16 378**	**17 802**

[1] There were no impairments of right-of-use assets in 2021.

ENTERPRISE VALUE

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

(USD millions)	**Dec 31, 2022**	Dec 31, 2021
Market capitalization	191 530	196 107
Non-controlling interests	81	167
Non-current financial debts	20 244	22 902
Current financial debts and derivative financial instruments	5 931	6 295
Marketable securities, commodities, time deposits and derivative financial instruments	– 11 413	– 15 922
Cash and cash equivalents	– 7 517	– 12 407
Enterprise value	**198 856**	**197 142**

Reconciliation from IFRS results to core results

The following tables provide an overview of the reconciliation from IFRS results to core results:

2022 and 2021 reconciliation from IFRS results to core results

	Innovative Medicines		Sandoz		Corporate		Group	
(USD millions unless indicated otherwise)	**2022**	2021	**2022**	2021	**2022**	2021	**2022**	2021
IFRS operating income	**8 786**	**10 688**	**1 448**	**1 600**	**– 1 037**	**– 599**	**9 197**	**11 689**
Amortization of intangible assets	**3 585**	**3 528**	**221**	**236**			**3 806**	**3 764**
Impairments								
Intangible assets	1 291	360	25	27	2		1 318	387
Property, plant and equipment related to the Group-wide rationalization of manufacturing sites	286	219	– 2	7			284	226
Other property, plant and equipment	85	40					85	40
Total impairment charges	**1 662**	**619**	**23**	**34**	**2**		**1 687**	**653**
Acquisition or divestment of businesses and related items								
- Income		– 2			– 4	– 64	– 4	– 66
- Expense	8	1				106	8	107
Total acquisition or divestment of businesses and related items, net	**8**	**– 1**			**– 4**	**42**	**4**	**41**
Other items								
Divestment gains	– 161	– 649		– 4	– 5	– 75	– 166	– 728
Financial assets – fair value adjustments	134	– 43			126	5	260	– 38
Restructuring and related items								
- Income	– 33	– 32	– 14	– 36	– 1	– 6	– 48	– 74
- Expense	1 572	833	167	193	449	32	2 188	1 058
Legal-related items								
- Income	– 51			– 11			– 51	– 11
- Expense	364	170	56	53			420	223
Additional income	– 692	– 139	– 6	– 1	– 6	– 138	– 704	– 278
Additional expense	63	241	8		1	48	72	289
Total other items	**1 196**	**381**	**211**	**194**	**564**	**– 134**	**1 971**	**441**
Total adjustments	**6 451**	**4 527**	**455**	**464**	**562**	**– 92**	**7 468**	**4 899**
Core operating income	**15 237**	**15 215**	**1 903**	**2 064**	**– 475**	**– 691**	**16 665**	**16 588**
as % of net sales	*36.9%*	*36.2%*	*20.6%*	*21.4%*			*33.0%*	*32.1%*
(Loss)/income from associated companies	– 2	5	2	2	– 9	15 332	– 9	15 339
Core adjustments to income from associated companies, net of tax						– 14 346		– 14 346
Interest expense							– 837	– 811
Other financial income and expense							20	– 80
Core adjustments to other financial income and expense							121	39
Income taxes, adjusted for above items (core income taxes)							– 2 608	– 2 635
Core net income							**13 352**	**14 094**
Core net income attributable to shareholders of Novartis AG							**13 352**	**14 097**
Core basic EPS (USD) [1]							**6.12**	**6.29**

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

2022 and 2021 reconciliation from IFRS results to core results – Group

2022 (USD millions unless indicated otherwise)	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment of businesses and related items[3]	Other items[4]	Core results
Gross profit	**36 342**	**3 648**	**338**		**64**	**40 392**
Operating income	**9 197**	**3 806**	**1 687**	**4**	**1 971**	**16 665**
Income before taxes	**8 371**	**3 806**	**1 687**	**4**	**2 092**	**15 960**
Income taxes[5]	– 1 416					– 2 608
Net income	**6 955**					**13 352**
Basic EPS (USD)[6]	**3.19**					**6.12**
The following are adjustments to arrive at core gross profit						
Other revenues	1 283				– 86	1 197
Cost of goods sold	– 15 486	3 648	338		150	– 11 350
The following are adjustments to arrive at core operating income						
Selling, general and administration	– 14 253				63	– 14 190
Research and development	– 9 996	158	954		– 204	– 9 088
Other income	805		– 3	– 4	– 414	384
Other expense	– 3 701		398	8	2 462	– 833
The following are adjustments to arrive at core income before taxes						
Other financial income and expense	20				121	141

[1] Amortization of intangible assets: cost of goods sold includes the amortization of acquired rights to currently marketed products and other production-related intangible assets; research and development includes the amortization of acquired rights for technologies

[2] Impairments: cost of goods sold, research and development and other expense include impairment charges related to intangible assets; other income and other expense include net impairment charges 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 transitional service fee income and charges related to divestments; other income also includes adjustments to provisions; other expense includes stamp duties related to an acquisition

[4] Other items: other revenues includes a net income from an outlicensing agreement; cost of goods sold, selling, general and administration, research and development, other income and other expense include restructuring income and charges related to the restructuring initiative to implement a new streamlined organizational model, the Sandoz strategic review, the Group-wide rationalization of manufacturing sites and other net restructuring charges and related items; cost of goods sold, selling, general and administration, research and development and other expense include adjustments to provisions and related items; cost of goods sold and research and development also include contingent consideration adjustments; other income and other expense include fair value adjustments and divestment gains and losses on financial assets and legal-related items; other income also includes gains from the divestment of products and property, curtailment gains and an adjustment to an environmental provision; other expense includes a reversal of an accrual and other costs and items; other financial income and expense includes the monetary loss on the restatement of non-monetary items for subsidiaries in hyperinflationary economies and a revaluation impact of a financial liability incurred through the Alcon distribution

[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 USD 7.6 billion to arrive at the core results before tax amounts to USD 1.2 billion. The average tax rate on the adjustments is 15.7% since the full year core tax charge of 16.3% has been applied to the pre-tax income of the period.

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

2021 (USD millions unless indicated otherwise)	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment of businesses and related items[3]	Other items[4]	Core results
Gross profit	**37 010**	**3 655**	**18**		**414**	**41 097**
Operating income	**11 689**	**3 764**	**653**	**41**	**441**	**16 588**
Income before taxes	**26 137**	**3 974**	**653**	**– 14 531**	**496**	**16 729**
Income taxes[5]	– 2 119					– 2 635
Net income	**24 018**					**14 094**
Basic EPS (USD)[6]	**10.71**					**6.29**
The following are adjustments to arrive at core gross profit						
Cost of goods sold	– 15 867	3 655	18		414	– 11 780
The following are adjustments to arrive at core operating income						
Selling, general and administration	– 14 886				71	– 14 815
Research and development	– 9 540	109	369		21	– 9 041
Other income	1 852		– 100	– 66	– 1 265	421
Other expense	– 2 747		366	107	1 200	– 1 074
The following are adjustments to arrive at core income before taxes						
Income from associated companies	15 339	210		– 14 556		993
Other financial income and expense	– 80			– 16	55	– 41

[1] Amortization of intangible assets: cost of goods sold includes the amortization of acquired rights to currently marketed products and other production-related intangible assets; research and development includes the amortization of acquired rights for technologies; income from associated companies includes USD 210 million for the Novartis share of the estimated Roche core items

[2] Impairments: cost of goods sold and research and development include impairment charges related to intangible assets; other income and other expense include reversals of impairment charges and impairment charges related to property, plant and equipment

[3] Acquisition or divestment of businesses and related items, including restructuring and integration charges: other income includes adjustments to portfolio transformation and Alcon spin-off accruals; other income and other expense include transitional service-fee income and expenses related to the Alcon distribution; other expense also includes adjustments to provisions; income from associated companies includes the gain related to the divestment of our investment in Roche; other financial income and expense includes other financial gains related to the divestment of our investment in Roche

[4] Other items: cost of goods sold, research and development, other income and other expense include net restructuring and other charges related to the Group-wide rationalization of manufacturing sites; cost of goods sold, selling, general and administration, other income and other expense include other restructuring income and charges and related items; cost of goods sold, research and development, other income and other expense also include adjustments to contingent consideration; selling, general and administration, research and development, other income and other expense include adjustments to provisions; other income and other expense also include gains and losses from the divestment of products and financial assets and fair value adjustments on financial assets, adjustments to environmental provisions and legal-related items; other financial income and expense includes a charge related to the monetary loss due to hyperinflation in Argentina and Venezuela and a revaluation impact of a financial liability incurred through the Alcon distribution

[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 USD 9.4 billion to arrive at the core results before tax amounts to USD 516 million. Excluding the gain on the divestment of our investment in Roche, the tax on the total adjustments of USD 5.2 billion to arrive at the core results before tax amounts to USD 516 million and the average tax rate on the adjustments was 10.0%.

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

2022 and 2021 reconciliation from IFRS results to core results – Innovative Medicines

2022 (USD millions)	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment of businesses and related items[3]	Other items[4]	Core results
Gross profit	**31 801**	**3 427**	**314**		**– 29**	**35 513**
Operating income	**8 786**	**3 585**	**1 662**	**8**	**1 196**	**15 237**
The following are adjustments to arrive at core gross profit						
Other revenues	1 249				– 86	1 163
Cost of goods sold	– 11 569	3 427	314		57	– 7 771
The following are adjustments to arrive at core operating income						
Selling, general and administration	– 11 679				50	– 11 629
Research and development	– 9 172	158	953		– 206	– 8 267
Other income	531		– 1		– 311	219
Other expense	– 2 695		396	8	1 692	– 599

[1] Amortization of intangible assets: cost of goods sold includes the amortization of acquired rights to currently marketed products and other production-related intangible assets; research and development includes the amortization of acquired rights for technologies

[2] Impairments: cost of goods sold, research and development and other expense include impairment charges related to intangible assets; other income and other expense include net impairment charges related to property, plant and equipment

[3] Acquisition or divestment of businesses and related items, including restructuring and integration charges: other expense includes stamp duties related to an acquisition and transitional service fee charges related to divestments

[4] Other items: other revenues includes a net income from an outlicensing agreement; cost of goods sold, selling, general and administration, research and development, other income and other expense include restructuring income and charges related to the initiative to implement a new streamlined organizational model, the Group-wide rationalization of manufacturing sites and other net restructuring charges and related items; cost of goods sold and research and development also include contingent consideration adjustments and adjustments to provisions and related items; other income and other expense include fair value adjustments and divestment gains and losses on financial assets and legal-related items; other income also includes gains from the divestment of products and property, curtailment gains and an adjustment to an environmental provision; other expense includes a reversal of an accrual and other costs and items

2021 (USD millions)	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment of businesses and related items[3]	Other items[4]	Core results
Gross profit	**32 218**	**3 419**			**344**	**35 981**
Operating income	**10 688**	**3 528**	**619**	**– 1**	**381**	**15 215**
The following are adjustments to arrive at core gross profit						
Cost of goods sold	– 11 751	3 419			344	– 7 988
The following are adjustments to arrive at core operating income						
Selling, general and administration	– 12 306				71	– 12 235
Research and development	– 8 641	109	360		22	– 8 150
Other income	1 149		– 45	– 2	– 837	265
Other expense	– 1 732		304	1	781	– 646

[1] Amortization of intangible assets: cost of goods sold includes the amortization of acquired rights to currently marketed products and other production-related intangible assets; research and development includes the amortization of acquired rights for technologies

[2] Impairments: research and development includes impairment charges related to intangible assets; other income and other expense include reversals of impairment charges and impairment charges 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 transitional service fee income and expenses related to the Alcon distribution

[4] Other items: cost of goods sold, research and development, other income and other expense include net restructuring and other charges related to the Group-wide rationalization of manufacturing sites; cost of goods sold, selling, general and administration, other income and other expense include other restructuring income and charges and related items; cost of goods sold, research and development and other expense include adjustments to contingent consideration; selling, general and administration, research and development and other expense include adjustments to provisions; other income and other expense include gains and losses from the divestment of products and financial assets and fair value adjustments on financial assets; other expense also includes legal-related items and adjustments to environmental provisions

2022 and 2021 reconciliation from IFRS to core results – Sandoz

2022 (USD millions)	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment of businesses and related items	Other items[3]	Core results
Gross profit	**4 504**	**221**	**24**		**93**	**4 842**
Operating income	**1 448**	**221**	**23**		**211**	**1 903**
The following are adjustments to arrive at core gross profit						
Cost of goods sold	– 4 978	221	24		93	– 4 640
The following are adjustments to arrive at core operating income						
Selling, general and administration	– 2 062				9	– 2 053
Research and development	– 824		1		2	– 821
Other income	103		– 2		– 14	87
Other expense	– 273				121	– 152

[1] Amortization of intangible assets: cost of goods sold includes the amortization of acquired rights to currently marketed products and other production-related intangible assets
[2] Impairments: cost of goods sold and research and development include impairment charges related to intangible assets; other income includes a reversal of an impairment charge related to property, plant and equipment
[3] Other items: cost of goods sold, selling, general and administration, research and development, other income and other expense include charges related to the Sandoz strategic review, the Group-wide rationalization of manufacturing sites and other net restructuring charges and related items; other expense also includes legal-related items; cost of goods sold and selling, general and administration include adjustments to provisions and related items

2021 (USD millions)	IFRS results	Amortization of intangible assets[1]	Impairments[2]	Acquisition or divestment of businesses and related items	Other items[3]	Core results
Gross profit	**4 725**	**236**	**18**		**70**	**5 049**
Operating income	**1 600**	**236**	**34**		**194**	**2 064**
The following are adjustments to arrive at core gross profit						
Cost of goods sold	– 5 147	236	18		70	– 4 823
The following are adjustments to arrive at core operating income						
Research and development	– 899		9		– 1	– 891
Other income	233		– 55		– 51	127
Other expense	– 397		62		176	– 159

[1] Amortization of intangible assets: cost of goods sold includes the amortization of acquired rights to currently marketed products and other production-related intangible assets
[2] Impairments: cost of goods sold and research and development include impairment charges related to intangible assets; other income and other expense include reversals of impairment charges and 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; research and development includes adjustments to provisions; other income includes net gains from the divestment of a product; other income and other expense include legal-related items

2022 and 2021 reconciliation from IFRS results to core results – Corporate

2022 (USD millions)	IFRS results	Amortization of intangible assets	Impairments[1]	Acquisition or divestment of businesses and related items[2]	Other items[3]	Core results
Gross profit	**37**					**37**
Operating loss	**– 1 037**		**2**	**– 4**	**564**	**– 475**
The following are adjustments to arrive at core operating loss						
Selling, general and administration	– 512				4	– 508
Other income	171			– 4	– 89	78
Other expense	– 733		2		649	– 82

[1] Impairments: other expense includes impairment charges related to intangible assets

[2] Acquisition or divestment of businesses and related items, including restructuring and integration charges: other income includes adjustments to provisions and transitional service fee income related to divestments

[3] Other items: selling, general and administration, other income and other expense include restructuring income and charges related to the initiative to implement a new streamlined organizational model, the Sandoz strategic review and other net restructuring charges and related items; other income and other expense also include fair value adjustments and divestment gains and losses on financial assets; other income also includes a curtailment gain

2021 (USD millions)	IFRS results	Amortization of intangible assets	Impairments	Acquisition or divestment of businesses and related items[1]	Other items[2]	Core results
Gross profit	**67**					**67**
Operating loss	**– 599**			**42**	**– 134**	**– 691**
The following are adjustments to arrive at core operating loss						
Other income	470			– 64	– 377	29
Other expense	– 618			106	243	– 269

[1] Acquisition or divestment of businesses and related items, including restructuring and integration charges: other income includes adjustments to portfolio transformation and Alcon spin-off accruals; other income and other expense include transitional service fee income and expenses related to the Alcon distribution; other expense also includes adjustments to provisions

[2] Other items: other income includes an adjustment to a contingent consideration receivable; other income and other expense include fair value adjustments and divestment gains and losses on financial assets, adjustments to environmental provisions and restructuring income and charges and related items

Reconciliation of 2021 IFRS results and non-IFRS measures core results and free cash flow to exclude the impacts of the 2021 divestment of our Roche investment

To enhance investor understanding of the Group's performance in comparison with the prior year, we presented the 2021 IFRS results and non-IFRS measures core results and free cash flow excluding the impacts related to our Roche investment, due to its divestment in the fourth quarter of 2021.

The following tables provide a reconciliation of our 2021 published IFRS results and non-IFRS measures core results and free cash flow to the 2021 results, excluding the impacts related to our Roche investment, due to its divestment.

	2021			
(USD millions unless indicated otherwise)	Results as published	Our Roche investment impacts excluding the divestment gain	Gain on divestment of our investment in Roche	Results excluding impacts from the divestment of our Roche investment
Operating income	**11 689**			**11 689**
Income from associated companies	15 339	– 785	– 14 556	– 2
Interest expense and other financial income and expense	– 891		– 16	– 907
Income before tax	**26 137**	**– 785**	**– 14 572**	**10 780**
Income taxes	– 2 119			– 2 119
Net income	**24 018**	**– 785**	**– 14 572**	**8 661**
Basic earnings per share (USD)	**10.71**	**– 0.35**	**– 6.50**	**3.86**
Effective tax rate [1]	*8.1%*			*19.7%*
Core operating income	**16 588**			**16 588**
Core income from associated companies	993	– 995		– 2
Core interest expense and core other financial income and expense	– 852			– 852
Core income before tax	**16 729**	**– 995**		**15 734**
Core income taxes	– 2 635			– 2 635
Core net income	**14 094**	**– 995**		**13 099**
Core basic earnings per share (USD)	**6.29**	**– 0.45**		**5.84**
Core effective tax rate [2]	*15.8%*			*16.7%*
Free cash flow [3]	**13 282**	**– 522**		**12 760**

[1] Effective tax rate is calculated as Income taxes divided by Income before tax.
[2] Core effective tax rate is calculated as Core income taxes divided by Core income before tax.
[3] The free cash flow impact represents the dividend received in Q1 2021 from Roche in relation to the distribution of its 2020 net income.

(USD millions)	2021 Free cash flow as published	2021 Dividends received from Roche in relation to the distribution of its 2020 net income[1]	2021 Free cash flow excluding dividends received from Roche
Operating income	**11 689**		**11 689**
Adjustments for non-cash items	7 030		7 030
Operating income adjusted for non-cash items	**18 719**		**18 719**
Dividends received from associated companies and others	525	– 522	3
Interest and other financial payments, net	– 953		– 953
Income taxes paid	– 2 342		– 2 342
Other operating cash flow items, net	– 878		– 878
Net cash flows from operating activities	**15 071**	**– 522**	**14 549**
Net purchases of property, plant and equipment, intangible assets, financial assets and other non-current assets	– 1 789		– 1 789
Free cash flow	**13 282**	**– 522**	**12 760**

[1] In 2021, the dividend received from Roche in relation to the distribution of its 2020 net income was received in Q1 2021.

The following table provides a summary of the percentage point impact from excluding the effect of the divestment of our investment in Roche (in the fourth quarter of 2021) on the USD and constant currencies % change on key Group figures.

	In USD			In constant currencies		
	% change as published 2022	% change excluding impacts from the divestment of our Roche investment 2022	Percentage point impact 2022	% change as published 2022	% change excluding impacts from the divestment of our Roche investment 2022	Percentage point impact 2022
Net income	– 71	– 20	– 51	– 67	– 9	– 58
Basic earnings per share (USD)	– 70	– 17	– 53	– 66	– 7	– 59
Free cash flow	– 10	– 6	– 4			
Core net income	– 5	2	– 7	3	11	– 8
Core basic earnings per share (USD)	– 3	5	– 8	6	14	– 8

5.B Liquidity and capital resources

The following tables summarize the Group's cash flows and net debt:

(USD millions)	2022	2021
Net cash flows from operating activities	14 236	15 071
Net cash flows from investing activities	1 468	4 208
Net cash flows used in financing activities	– 20 562	– 16 264
Effect of exchange rate changes on cash and cash equivalents	– 32	– 266
Net change in cash and cash equivalents	**– 4 890**	**2 749**
Change in marketable securities, commodities, time deposits and derivative financial instruments	– 4 509	14 017
Change in current and non-current financial debts and derivative financial instruments	3 022	6 847
Change in net debt	**– 6 377**	**23 613**
Net debt at January 1	– 868	– 24 481
Net debt at December 31	**– 7 245**	**– 868**

Cash flow

Financial year 2022 compared with 2021
Net cash flows from operating activities amounted to USD 14.2 billion, compared with USD 15.1 billion in 2021. This decrease was mainly due to unfavorable changes in working capital and lower dividends from associated companies (2021 included the USD 0.5 billion dividends received from our investment in Roche, which was divested in the fourth quarter of 2021), partly offset by lower income taxes paid and favorable hedging results.

Net cash inflows from investing activities amounted to USD 1.5 billion, compared with USD 4.2 billion in 2021.

The current year cash inflows were driven by net proceeds of USD 4.7 billion from the sale of marketable securities, commodities and time deposits; USD 0.5 billion from the sale of intangible assets, financial assets and property, plant and equipment. These cash inflows were partly offset by cash outflows of USD 1.5 billion for purchases of intangible assets; USD 1.2 billion for purchases of property, plant and equipment; USD 0.1 billion for purchases of financial assets; and USD 0.9 billion for acquisitions and divestments of businesses, net (primarily the acquisition of Gyroscope Therapeutics Holdings plc for USD 0.8 billion).

In 2021, net cash inflows from investing activities of USD 4.2 billion were driven by proceeds of USD 20.7 billion from the divestment of our investment in Roche; USD 2.3 billion from the sale of marketable securities, commodities and time deposits; and USD 1.4 billion from the sale of intangible assets, financial assets and property, plant and equipment. These cash inflows were partly offset by USD 16.4 billion cash outflows for purchases of marketable securities and time deposits, mainly due to the investment of a portion of the proceeds from the divestment of our investment in Roche; USD 1.6 billion for purchases of intangible assets (including the upfront payment to in-license tislelizumab from an affiliate of BeiGene, Ltd); USD 1.4 billion for purchases of property, plant and equipment; USD 0.6 billion for acquisitions and divestments of businesses, net (including the acquisition of GSK's cephalosporin antibiotics business for USD 351 million); and USD 0.2 billion for purchases of financial assets.

Net cash outflows used in financing activities amounted to USD 20.6 billion, compared with USD 16.3 billion in 2021.

The current year cash outflows were mainly driven by USD 10.6 billion for net treasury share transactions; USD 7.5 billion for the dividend payment; USD 2.5 billion in aggregate for the repayment of two US dollar bonds; and USD 0.3 billion payments of lease liabilities. These cash outflows were partly offset by cash inflows of USD 0.3 billion from the net increase in current financial debts.

In 2021, net cash outflows used in financing activities of USD 16.3 billion were driven by USD 7.4 billion for the dividend payment; USD 3.0 billion for net treasury share transactions; USD 3.5 billion net decrease in current financial debts; and USD 2.2 billion for the repayment of two bonds denominated in euro (notional amount of EUR 1.25 billion and of EUR 0.6 billion) at maturity. Payments of lease liabilities and other financing cash flows resulted in a net cash outflow of USD 0.2 billion.

Free cash flow

Free cash flow is a non-IFRS measure, see "—Item 5.A Operating results—Non-IFRS measures as defined by Novartis—Free cash flow" for further information.

The following table is a reconciliation of the three major categories of the IFRS consolidated statements of cash flows to free cash flow:

	2022			2021		
(USD millions)	IFRS cash flow	Adjustments	Free cash flow	IFRS cash flow	Adjustments	Free cash flow
Net cash flows from operating activities	**14 236**		**14 236**	15 071		15 071
Net cash flows from/(used in) investing activities [1]	**1 468**	**– 3 759**	**– 2 291**	4 208	– 5 997	– 1 789
Net cash flows used in financing activities [2]	**– 20 562**	**20 562**	**0**	– 16 264	16 264	0
Free cash flow			**11 945**			13 282

[1] Excluded from the free cash flow are cash flows from investing activities associated with acquisitions and divestments of businesses and of interest in associated companies, purchases and sales of marketable securities, commodities and time deposits.
[2] Net cash flows used in financing activities are excluded from the free cash flow.

The following table is a summary of the free cash flow:

(USD millions)	2022	2021
Operating income	**9 197**	**11 689**
Adjustments for non-cash items		
Depreciation, amortization and impairments	7 441	6 075
Change in provisions and other non-current liabilities	1 403	896
Other	460	59
Operating income adjusted for non-cash items	**18 501**	**18 719**
Dividends received from associated companies and others	1	525
Interest and other financial receipts	325	13
Interest and other financial payments	– 728	– 966
Income taxes paid	– 1 975	– 2 342
Payments out of provisions and other net cash movements in non-current liabilities	– 885	– 1 119
Change in inventories and trade receivables less trade payables	– 1 467	– 329
Change in other net current assets and other operating cash flow items	464	570
Net cash flows from operating activities	**14 236**	**15 071**
Purchases of property, plant and equipment	– 1 198	– 1 378
Proceeds from sale of property, plant and equipment	167	240
Purchases of intangible assets	– 1 473	– 1 593
Proceeds from sale of intangible assets	202	748
Purchases of financial assets	– 121	– 191
Proceeds from sale of financial assets	133	442
Purchases of other non-current assets	– 1	– 61
Proceeds from sale of other non-current assets		4
Free cash flow	**11 945**	**13 282**

Financial year 2022 compared with 2021

Free cash flow amounted to USD 11.9 billion (–10% USD), compared with USD 13.3 billion in 2021, mainly due to a decrease in net cash flows from operating activities and lower divestment proceeds, partly offset by lower purchases of property, plant and equipment.

Condensed consolidated balance sheets

(USD millions)	Dec 31, 2022	Dec 31, 2021
Assets		
Property, plant and equipment	10 764	11 545
Right-of-use assets	1 431	1 561
Goodwill	29 301	29 595
Intangible assets other than goodwill	31 644	34 182
Investments in associated companies	143	205
Deferred tax assets	3 739	3 743
Financial assets and other non-current assets	3 521	5 246
Total non-current assets	**80 543**	**86 077**
Inventories	7 175	6 666
Trade receivables	8 066	8 005
Other current assets and income tax receivables	2 739	2 718
Marketable securities, commodities, time deposits and derivative financial instruments	11 413	15 922
Cash and cash equivalents	7 517	12 407
Total current assets	**36 910**	**45 718**
Total assets	**117 453**	**131 795**
Equity and liabilities		
Total equity	**59 423**	**67 822**
Liabilities		
Financial debts	20 244	22 902
Lease liabilities	1 538	1 621
Deferred tax liabilities	2 686	3 070
Provisions and other non-current liabilities	4 906	6 172
Total non-current liabilities	**29 374**	**33 765**
Trade payables	5 146	5 553
Financial debts and derivative financial instruments	5 931	6 295
Lease liabilities	251	275
Provisions and other current liabilities and current income tax liabilities	17 328	18 085
Total current liabilities	**28 656**	**30 208**
Total liabilities	**58 030**	**63 973**
Total equity and liabilities	**117 453**	**131 795**

Assets

Total non-current assets of USD 80.5 billion at December 31, 2022, decreased by USD 5.5 billion compared to December 31, 2021.

Intangible assets other than goodwill decreased by USD 2.5 billion as additions (including the acquisition of Gyroscope Therapeutics Holdings plc) were more than offset by amortization, impairments and unfavorable currency translation adjustments.

Goodwill decreased by USD 0.3 billion, mainly due to unfavorable currency translation adjustments.

Property, plant and equipment decreased by USD 0.8 billion, as net additions were more than offset by depreciation, unfavorable currency translation adjustments and impairments.

Financial and other non-current assets decreased by USD 1.7 billion, driven by the decrease of the prepaid post-employment benefit plans of USD 0.9 billion, resulting mainly from the pension accounting effects from increases in actuarial discount rates and of USD 0.6 billion from fair value losses on listed equity and fund investments.

Right-of-use assets, investments in associated companies and deferred tax assets were broadly in line with December 31, 2021.

Total current assets of USD 36.9 billion at December 31, 2022, decreased by USD 8.8 billion compared to December 31, 2021.

Cash and cash equivalents decreased by USD 4.9 billion, mainly due to the dividend payment, the purchase of treasury shares and net repayments of financial debt, partly offset by the cash generated from operating activities and from investing activities, which includes the net proceeds from the sales of marketable securities, commodities and time deposits.

Marketable securities, commodities, time deposits and derivative financial instruments decreased by USD 4.5 billion mainly driven by the net sales of marketable securities, commodities and time deposits.

Inventories increased by USD 0.5 billion and trade receivables and other current assets and income tax receivables were broadly in line with December 31, 2021.

We consider our provisions for doubtful trade receivables to be adequate. We particularly monitor the level of trade receivables in countries deemed to have an

elevated credit risk. We consider macroeconomic environment, historical experience, country and political risk, in addition to other relevant information when assessing risk. These risk factors are monitored regularly to determine any adjustments in risk classification. The majority of the past due trade receivables from elevated credit risk countries are due from local governments or from government-funded entities. Deteriorating credit and economic conditions as well as other factors in these elevated credit risk 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 the Group to re-evaluate the expected credit loss amount of these trade receivables in future periods. At December 31, 2022, amounts past due for more than one year were not significant in elevated credit risk countries.

For a table showing 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, 2022, and 2021, see "Item 18. Financial Statements—Note 15. Trade receivables."

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

Liabilities

Total non-current liabilities of USD 29.4 billion decreased by USD 4.4 billion compared to December 31, 2021.

Non-current financial debts decreased by USD 2.7 billion, mainly due to the reclassification of USD 2.3 billion from non-current to current financial debts of two EUR denominated bonds with notional amounts of EUR 750 million and EUR 1.25 billion maturing in 2023 and favorable currency translation adjustments of USD 0.4 billion.

Provisions and other non-current liabilities decreased by USD 1.3 billion, mainly driven by decreases in accrued liabilities for employee benefits of USD 1.2 billion (primarily due to a decrease in accrued liabilities for defined benefit pension plans of USD 0.9 billion, resulting from the pension accounting effects from increases in actuarial discount rates), and in contingent consideration of USD 0.3 billion, a reclassification of non-current legal matters provisions to current portion of USD 0.2 billion, partly offset by the increase in other non-current liabilities of USD 0.4 billion.

Deferred tax liabilities decreased by USD 0.4 billion and non-current lease liabilities were broadly in line with December 31, 2021.

Total current liabilities of USD 28.7 billion decreased by USD 1.6 billion compared to December 31, 2021.

Provisions and other current liabilities and current income tax liabilities decreased by USD 0.8 billion, mainly driven by the decrease in the commitment for repurchase of own shares liability of USD 2.8 billion, partly offset by increases in restructuring provisions of USD 0.8 billion (primarily due to the initiative announced in April 2022, to implement a new streamlined organizational model), in provisions for legal matters of USD 0.5 billion, including a USD 0.2 billion reclassification from non-current provisions for legal matters, and in provisions for revenue deductions of USD 0.3 billion.

Current financial debts and derivative financial instruments decreased by USD 0.4 billion, mainly due to the repayment of two US dollar bonds of USD 1.0 billion and USD 1.5 billion, the closure during the third quarter of 2022 of the interest-bearing accounts of employees payable on demand, which amounted to USD 1.8 billion at December 31, 2021, and favorable currency translation adjustments, partly offset by the reclassification from non-current to current financial debts of USD 2.3 billion and an increase of USD 1.9 billion in commercial paper.

Trade payables decreased by USD 0.4 billion and current lease liabilities were broadly in line with December 31, 2021.

In our key countries, Switzerland and the United States, assessments have been agreed by the tax authorities up to 2017 in Switzerland and up to 2014 in the United States, with the exception of one open United States position related to the 2007 tax filing. Uncertainties also exist on the application of a taxing right based on a German non-resident tax regulation for specific revenues derived from German registered intellectual property rights.

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.

Equity

The Group`s equity decreased by USD 8.4 billion to USD 59.4 billion at December 31, 2022, compared to December 31, 2021.

This decrease was mainly due to the cash-dividend payment of USD 7.5 billion, purchase of treasury shares of USD 10.9 billion, unfavorable currency translation differences of USD 0.5 billion and fair value adjustments on equity securities of USD 0.4 billion. This was partially offset by the net income of USD 7.0 billion, decrease of the treasury share repurchase obligation of USD 2.8 billion, and equity-based compensation of USD 0.9 billion.

Summary of equity movements attributable to Novartis AG shareholders

	Number of outstanding shares (in millions)		Equity attributable to Novartis AG shareholders	
	2022	2021	**2022 USD millions**	2021 USD millions
Balance at beginning of year	**2 234.9**	**2 256.8**	**67 655**	**56 598**
Shares acquired to be canceled	– 126.2	– 30.7	– 10 787	– 2 775
Other share purchases	– 1.4	– 1.5	– 123	– 145
Exercise of options and employee transactions	1.9	0.6	88	39
Equity-based compensation	10.4	9.6	854	745
Shares delivered to Alcon employees as a result of the Alcon spin-off	0.0	0.1	5	17
Taxes on treasury share transactions			14	1
Decrease/(increase) of treasury share repurchase obligation under a share buyback trading plan			2 809	– 1 040
Transaction costs, net of taxes				12
Dividends			– 7 506	– 7 368
Net income of the year attributable to shareholders of Novartis AG			6 955	24 021
Other comprehensive income attributable to shareholders of Novartis AG			– 839	– 2 493
Impact of change in ownership of consolidated entities				– 5
Other movements [1]			217	48
Balance at end of year	**2 119.6**	**2 234.9**	**59 342**	**67 655**

[1] Impact of hyperinflationary economies (see "Item 18. Financial Statements—Note 1. Significant accounting policies").

In 2022, Novartis repurchased a total of 126.2 million shares for USD 10.8 billion on the SIX Swiss Exchange second trading line, including 115.3 million shares (USD 9.9 billion) under the up-to USD 15 billion share buyback announced in December 2021 and 10.9 million shares (USD 0.9 billion) to mitigate dilution related to participation plans of associates. In addition, 1.4 million shares (USD 0.1 billion) were repurchased from associates. In the same period, 12.3 million shares (for an equity value of USD 0.9 billion) were delivered as a result of option exercises and share deliveries related to participation plans of associates. Consequently, the total number of shares outstanding decreased by 115.3 million versus December 31, 2021. These treasury share transactions resulted in a decrease in equity of USD 10.0 billion and a net cash outflow of USD 10.6 billion.

In 2021, Novartis repurchased a total of 30.7 million shares for USD 2.8 billion on the SIX Swiss Exchange second trading line, including 19.6 million shares (USD 1.8 billion) under the up-to USD 2.5 billion share buyback announced in November 2020, 8.6 million shares (USD 0.8 billion) to mitigate dilution related to participation plans of associates and 2.5 million shares (USD 0.2 billion) under the up-to USD 15 billion share buyback announced in December 2021. In addition, 1.5 million shares (USD 0.1 billion) were repurchased from associates. In the same period, 10.3 million shares (for an equity value of USD 0.8 billion) were delivered as a result of options exercised and share deliveries related to participation plans of associates. Consequently, the total number of shares outstanding decreased by 21.9 million versus December 31, 2020. These treasury share transactions resulted in a decrease in equity of USD 2.1 billion and a net cash outflow of USD 3.0 billion.

Treasury shares

At December 31, 2022, our holding of treasury shares amounted to 284.1 million shares, or approximately 12% of the total number of issued shares. Approximately 99.0 million treasury shares were held in entities that restrict their availability for use.

At December 31, 2021, our holding of treasury shares amounted to 199.5 million shares, or approximately 8% of the total number of issued shares. Approximately 102.5 million treasury shares were held in entities that restrict their availability for use.

Effects of currency fluctuations

We transact our business in many currencies other than the US dollar, our reporting currency.

The following table provides an overview of net sales and operating expenses based on IFRS values for 2022 and 2021, for currencies most important to the Group:

	2022		2021	
Currency	Net sales %	Operating expenses %[1]	Net sales %	Operating expenses %[1]
US dollar (USD)	37	36	35	35
Euro (EUR)	27	24	29	26
Swiss franc (CHF)	2	20	2	18
Chinese yuan (CNY)	6	4	6	3
Japanese yen (JPY)	4	2	5	3
Canadian dollar (CAD)	3	1	3	2
British pound (GBP)	2	2	3	2
Russian ruble (RUB)	2	1	2	1
Brazilian real (BRL)	2	1	1	1
Australian dollar (AUD)	1	1	1	1
Other currencies	14	8	13	8

[1] Operating expenses include cost of goods sold; selling, general and administration; research and development; 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 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 expenditure in Swiss francs is significantly higher than our revenue 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.

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. In 2022 and 2021, 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 "Item 18. Financial Statements—Note 1. Significant accounting policies," "Item 18. Financial Statements—Note 5. Interest expense and other financial income and expense," "Item 18. Financial Statements—Note 15. Trade receivables," "Item 18. Financial Statements—Note 28. Commitments and contingent liabilities" and "Item 18. Financial Statements—Note 29. Financial instruments – additional disclosures."

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:

	Average for year			Year-end		
USD per unit	**2022**	2021	Change in %	**2022**	2021	Change in %
Australian dollar (AUD)	0.695	0.752	– 8	0.678	0.726	– 7
Brazilian real (BRL)	0.194	0.186	4	0.189	0.180	5
Canadian dollar (CAD)	0.769	0.798	– 4	0.738	0.785	– 6
Swiss franc (CHF)	1.048	1.094	– 4	1.081	1.093	– 1
Chinese yuan (CNY)	0.149	0.155	– 4	0.144	0.157	– 8
Euro (EUR)	1.054	1.183	– 11	1.065	1.131	– 6
British pound (GBP)	1.237	1.376	– 10	1.207	1.351	– 11
Japanese yen (JPY (100))	0.766	0.912	– 16	0.757	0.868	– 13
Russian ruble (RUB (100))	1.481	1.357	9	1.380	1.336	3

The following table provides a summary of the currency impact on key Group figures due to their conversion into US dollars, the Group's reporting currency. For additional information on the constant currency calculation ("cc"), see "—Item 5.A Operating results—Non-IFRS measures as defined by Novartis—Constant currencies".

Currency impact on key figures

	Change in USD % 2022	Change in constant currencies % 2022	Percentage point currency impact 2022	Change in USD % 2021	Change in constant currencies % 2021	Percentage point currency impact 2021
Total Group						
Net sales to third parties	– 2	4	– 6	6	4	2
Operating income	– 21	– 13	– 8	15	13	2
Net income	– 71	– 67	– 4	198	195	3
Basic earnings per share (USD)	– 70	– 66	– 4	202	200	2
Core operating income	0	8	– 8	8	6	2
Core net income	– 5	3	– 8	7	5	2
Core basic earnings per share (USD)	– 3	6	– 9	9	7	2
Innovative Medicines						
Net sales to third parties	– 2	4	– 6	8	6	2
Operating income	– 18	– 9	– 9	17	15	2
Core operating income	0	8	– 8	12	10	2
Sandoz						
Net sales to third parties	– 4	4	– 8	0	– 2	2
Operating income	– 10	– 2	– 8	53	48	5
Core operating income	– 8	– 1	– 7	– 12	– 14	2
Corporate						
Operating loss	– 73	– 84	11	nm	nm	nm
Core operating loss	31	28	3	– 23	– 20	– 3

nm = not meaningful

For additional information on the effects of currency fluctuations, see "Item 18. Financial Statements—Note 29. Financial instruments – additional disclosures."

Group liquidity, financial debts and net debt

The following table shows Group liquidity, financial debts and net debt:

(USD millions)	2022	2021
Non-current financial debts	– 20 244	– 22 902
Current financial debts and derivative financial instruments	– 5 931	– 6 295
Total financial debts	**– 26 175**	**– 29 197**
Less liquidity		
Cash and cash equivalents	7 517	12 407
Marketable securities, commodities, time deposits and derivative financial instruments	11 413	15 922
Total liquidity	**18 930**	**28 329**
Net debt at December 31 [1]	**– 7 245**	**– 868**

[1] For further information about the net debt measure, which is a non-IFRS measure, see "—Item 5.A Operating results—Non-IFRS measures as defined by Novartis—Net debt."

Financial year 2022

Group net debt at December 31, 2022, increased to USD 7.2 billion, compared with USD 0.9 billion at December 31, 2021.

Total financial debts amounted to USD 26.2 billion at December 31, 2022, compared with USD 29.2 billion at December 31, 2021. Non-current financial debts decreased by USD 2.7 billion, mainly due to the reclassification of USD 2.3 billion from non-current to current financial debts of two EUR denominated bonds with notional amounts of EUR 750 million and EUR 1.25 billion maturing in 2023 and favorable foreign currency translation adjustments of USD 0.4 billion.

Current financial debts and derivative financial instruments decreased by USD 0.4 billion, mainly due to the repayment of two US dollar bonds of USD 1.0 billion and USD 1.5 billion, the closure during the third quarter of 2022 of the interest-bearing accounts of employees payable on demand, which amounted to USD 1.8 billion at December 31, 2021, and favorable currency translation adjustments, partly offset by the reclassification from non-current to current financial debts of USD 2.3 billion and an increase of USD 1.9 billion in commercial paper.

Novartis has two US commercial paper programs under which it can issue up to USD 9.0 billion in the aggregate of unsecured commercial paper notes. Novartis also has a Japanese commercial paper program under which it can issue up to JPY 150 billion (approximately USD 1.1 billion) of unsecured commercial paper notes. Commercial paper notes totaling USD 2.8 billion under these three programs were outstanding as per December 31, 2022 (2021: USD 0.9 billion).

Novartis also has a committed credit facility of USD 6.0 billion, which was extended in 2022. 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. The extended facility matures in September 2025 and was undrawn as per December 31, 2022, and December 31, 2021.

Total liquidity decreased to USD 18.9 billion compared with USD 28.3 billion at December 31, 2021.

As of year-end 2022, Moody's Investors Service rated the Company A1 for long-term maturities and P-1 for short-term maturities and S&P Global Ratings rated the company AA- for long-term maturities and A-1+ for short-term maturities.

For the tables showing the maturity schedule of our current financial assets, current and non-current financial debts and net debt at December 31, 2022 and December 31, 2021, see "Item 18. Financial Statements—Note 29. Financial instruments – Additional disclosures—Nature and extent of risks arising from financial instruments—Liquidity risk."

For a description of risks and restrictions on the ability of subsidiaries to transfer funds to the Company via cash dividends, loan or advances, please see "—Liquidity/short-term funding" and "Item 18. Financial Statements—Note 29. Financial instruments – Additional disclosures—Nature and extent of risks arising from financial instruments."

Information regarding the Company's material commitments for capital expenditures as of the end of 2022 and 2021 and an indication of the general purpose of such commitments and the anticipated sources of funds needed to fulfill such commitments are provided in "—Material short- and long-term cash requirements."

Liquidity and financial debt by currency

The following table provides a breakdown of liquidity and financial debt by currency as of December 31:

	Liquidity in % 2022[1]	Liquidity in % 2021[1]	**Financial debt in % 2022**[2]	Financial debt in % 2021[2]
USD	85	92	62	57
CHF	4	4	6	12
EUR	7	2	29	27
JPY			1	1
Other	4	2	2	3
	100	**100**	**100**	**100**

[1] Liquidity includes cash and cash equivalents and marketable securities, including debt securities, commodities and time deposits.
[2] Financial debt includes non-current and current financial debt.

Bonds

In April 2022, a 5-year USD denominated bond of USD 1.0 billion with a coupon of 2.40% was repaid, in advance of its maturity date at no additional cost.

In September 2022, a 10-year USD denominated bond of USD 1.5 billion with a coupon of 2.40% was repaid at maturity.

In March 2021, a 4-year EUR denominated bond of EUR 1.25 billion with a coupon of 0.00% was repaid at maturity.

In November 2021, a 7-year EUR denominated bond of EUR 0.6 billion with a coupon of 0.75% was repaid at maturity.

Liquidity/short-term funding

The Group's liquidity amounted to USD 18.9 billion at December 31, 2022, compared with USD 28.3 billion at December 31, 2021. Total non-current and current financial debts, including derivatives, amounted to USD 26.2 billion at December 31, 2022, compared with USD 29.2 billion at December 31, 2021.

The debt/equity ratio increased to 0.44:1 at December 31, 2022, compared with 0.43:1 at December 31, 2021. The net debt increased to USD 7.2 billion at December 31, 2022, compared with USD 0.9 billion at December 31, 2021.

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 confident that we have sufficient liquidity to support our normal business activities for the foreseeable future.

Certain countries have legal or economic restrictions on the ability of subsidiaries to transfer funds to the Group in the form of cash dividends, loans or advances, but these restrictions do not have an impact on the ability of the Group to meet its cash obligations.

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 and raised funds through our commercial paper programs.

The maturity schedule of our net debt can be found in "Item 18. Financial Statements—Note 29. Financial instruments – Additional disclosures—Nature and extent of risks arising from financial instruments—Liquidity risk."

Material short- and long-term cash requirements

The following table summarizes the Group's material short- and long-term cash requirements:

		Payments due by period			
(USD millions)	Total	Less than 1 year	2–3 years	4–5 years	After 5 years
Non-current financial debt, including current portion	**22 485**	2 241	5 428	3 547	11 269
Interest on non-current financial debt, including current portion	**5 532**	476	821	611	3 624
Lease liabilities, non-current and current portion	**1 789**	251	357	259	922
Interest on lease liabilities, non-current and current portion	**1 416**	46	76	67	1 227
Commitments for leases not yet commenced	**83**	10	14	15	44
Unfunded pensions and other post-employment benefit plans	**1 281**	115	215	204	747
Research and development potential milestone commitments	**5 814**	420	1 256	969	3 169
Contingent consideration liabilities	**835**	131	339	98	267
Property, plant and equipment purchase commitments	**549**	441	93	15	
Total contractual cash obligations	**39 784**	**4 131**	**8 599**	**5 785**	**21 269**

The Group intends to fund the research and development; property, plant and equipment; intangible asset purchase commitments with internally generated resources, and the acquisition of business commitment through available cash and short- and long-term borrowings.

For other contingent liabilities, see "Item 8. Financial Information—Item 8.A Consolidated statements and other financial information," "Item 18. Financial Statements—Note 10. Right-of-use assets and lease liabilities," "Item 18. Financial Statements—Note 20. Provisions and other non-current liabilities," and "Item 18. Financial Statements—Note 28. Commitments and contingent liabilities."

5.C Research and development, patents and licenses

Our research and development spending totaled USD 10.0 billion and USD 9.5 billion (Core research and development USD 9.1 billion and USD 9.0 billion) for the years 2022 and 2021, respectively.

Each of our divisions has its own research and development and patents. 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—Item 4.B Business overview."

As described in the risk factors section and elsewhere in this Annual Report, 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 preclinical 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 programs, or of the development of any particular development compound (see "Item 3. Key Information—Item 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", "—Item 5.B Liquidity and capital resources" and "Item 4. Information on the Company—Item 4.B Business overview" for trend information.

5.E Critical accounting estimates

Our consolidated financial statements are prepared in accordance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB). The preparation of financial statements requires management to make certain estimates and assumptions, either at the balance sheet date or during the year, which affect the reported amounts of revenues, expenses, assets, liabilities and contingent amounts. Our significant accounting policies that are set out in "Item 18. Financial Statements—Note 1. Significant accounting policies" include a description of the estimates, assumptions and judgments applied in the preparation of the consolidated financial statements of the Group.

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.

Management believes that the estimation uncertainties described below did not have or are not reasonably likely to have a material impact on the Group's financial condition but could be material to the results of operations or cash flows in a given period.

Deductions from revenues

As is typical in the pharmaceutical industry, the consideration we receive in exchange for goods and services maybe fixed or variable. The most common elements of variable consideration are primarily composed of rebates and discounts granted to wholesalers, retailers, government agencies, government supported healthcare systems, private health systems, pharmacy benefit managers, managed healthcare organizations and other customers. Variable consideration is recognized when it is highly probable that a significant reversal will not occur. These elements of variable consideration represent estimates of the related obligations, requiring the use of judgment when estimating the effect of these considerations for a reporting period.

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 use of estimates and interpreting relevant regulations, which are subject to challenge or change in interpretative

guidance by government authorities. Provisions for estimated 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 aged 65 and older, and to people with certain disabilities, provides prescription drug benefits under the Part D section of the program. This benefit is provided and administered through private prescription drug plans. Calculating the rebates to be paid related to this program involves use of estimates and interpreting relevant regulations, which are subject to challenge or change in interpretative guidance by government authorities. Provisions for estimated Medicare Part D rebates are calculated based on the terms of individual plan agreements, product sales and population growth, product pricing, including inflation impacts, and the mix of contracts.

We offer rebates to key managed healthcare and private plans in an effort to ensure patient access to our products and to sustain and increase the market share of our products. These programs provide a rebate after the plans have demonstrated they have met all terms and conditions set forth in their contract with us.

These rebates and discounts, applied using provision rates, are estimated based on the specific terms in the individual states and plans agreements, historical experience, product pricing and projected product growth rates, as appropriate to the individual rebate and discount arrangements, and are recorded as a deduction from revenue at the time the related revenues are recorded.

These provisions are adjusted based on established processes and experiences from filing data with individual states and plans. There is often a time lag between recording of revenue deductions and the 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. These rebates, applied using provision rates, are estimated based on government regulations, laws and terms of individual rebate arrangements, historical experience and other relevant factors, and are recorded as a deduction from revenue at the time the related revenue is recorded. These estimates are adjusted periodically to reflect actual experience. There is often a time lag between the recording of revenue deductions and the final accounting for them.

Innovative pay-for-performance arrangements

We enter into innovative pay-for-performance arrangements (i.e. outcome based arrangements) with certain healthcare providers and governments. Under these agreements, we may be required to make refunds, defer a portion of the sales price until anticipated treatment outcomes meet predefined targets, or to provide additional medicines free of charge if anticipated treatment outcomes do not meet predefined targets.

The impact of potential refunds or a deferral of a portion of the sales price are estimated and recorded as a deduction from revenue at the time the related sales are recorded. The impact of the future delivery of additional medicines at no cost is estimated and recorded as a contract liability at the time the related revenues are recorded. Estimates are based on historical experience and clinical data available for the product, as well as specific terms of 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 the uncertainty is resolved, until such history is available or the period of the refund right has expired.

These provisions for revenue deductions are adjusted periodically based on established processes and actual experience, including the products' actual outcomes achieved compared with the anticipated predefined targets.

There is often a time lag between recording of the revenue deductions and the 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 sales growth rates.

Chargebacks occur where our subsidiaries have arrangements with indirect customers to sell products at prices that are lower than the price charged to wholesalers. A chargeback represents the difference between the invoice price to the wholesaler and the indirect customer's contract price. We account for chargebacks by reducing revenue by the estimate of chargebacks attributable to a sales transaction. Provisions for estimated chargebacks are calculated using a combination of factors, such as historical experience, product growth rates, product pricing, level of inventory in the distribution channel, and the terms of individual agreements.

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 2021, 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

provisioned at the time of revenue recognition 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. Shelf stock adjustments are generally granted to customers, primarily of the Sandoz Division, to cover the inventory held by them at the time a price decline becomes effective. Revenue deduction provisions for shelf stock adjustments are recorded when the price decline is anticipated, based on the impact of the price decline on the customer's estimated inventory levels.

Other sales discounts, such as consumer coupons, vouchers and copay 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.

In addition, we offer global patient assistance programs.

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.

For the table showing the worldwide extent of our revenue deductions provisions and related payment experiences for the Group see "Item 18. Financial Statements—Note 22. Provisions and other current liabilities."

Impairment of goodwill, intangible assets and property, plant and equipment

We review 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 and other intangible assets that are not yet amortized, are reviewed for impairment at least annually.

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 cash generating units (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 as indicated in "Item 18. Financial Statements—Note 1. Significant accounting policies." Due to these factors, 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 is 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 on impairment charges recognized and reversed by divisions, see "Item 18. Financial Statements—Note 1. Significant accounting policies—Impairment of goodwill and intangible assets" and "Item 18. Financial Statements—Note 11. Goodwill and intangible assets."

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 based on our impairment assessment and review of reasonable possible changes in key assumptions to the respective impairment assessment, future impairment evaluation could lead to material impairment charges in the future.

For more information, see "Item 18. Financial Statements—Note 11. Goodwill and intangible assets."

For net impairment charges for property, plant and equipment see "Item 18. Financial Statements—Note 9. Property, plant and equipment."

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 employees. 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.

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 "Item 18. Financial

Statements—Note 25. Post-employment benefits for employees."

Income 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. Uncertain (income) tax positions are periodically (re)assessed by the Company based on management's best judgment given any changes in the facts, circumstances and information available and applicable tax laws. When it is probable that the tax authorities will not accept the position taken, the Group recognizes income tax liabilities based on the most likely amount of the liability (recovery) or weighted average of various possible outcomes to reflect the effect of the uncertainty in determining the related taxable profit (tax loss), tax bases, unused tax losses, unused tax credits or tax rates, to the extent that a reliable estimate can be made.

For more information, see "Item 18. Financial Statements—Note 6. Income taxes" and "Item 18. Financial Statements—Note 12. Deferred tax assets and liabilities."

Provisions and contingent liabilities

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.

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.

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.

For more information, see "Item 18. Financial Statements—Note 20. Provisions and other non-current liabilities" and "Item 18. Financial Statements—Note 28. Commitments and contingent liabilities."

Item 6. Directors, Senior Management and Employees

6.A Directors and senior management

The information set forth under "Item 6. Directors, Senior Management and Employees—Item 6.C Board practices—Corporate governance—Board of Directors" and "Item 6. Directors, Senior Management and Employees—Item 6.C Board practices—Corporate governance—Executive Committee" is incorporated by reference.

6.B Compensation

Dear shareholder,

I am pleased to share with you the Novartis Compensation Report for 2022.

We believe that our compensation system supports our strategy and motivates our executives to deliver sustainable growth, successful outcomes on our financial and strategic targets, and value creation for our shareholders. Over the course of 2022, we engaged with shareholders and proxy advisors to share how our compensation system is aligned with short and long-term performance, and to secure their continued support for our compensation system design. Based on the feedback from these interactions and the positive response to our 2021 Compensation Report, which received a 90.7% vote in favor, we will retain the current design of our executive compensation system, with small enhancements as explained later in this letter.

2022 performance highlights

2022 was a year of solid financial performance, with growth in constant currencies (cc) across sales, core profits and core margins. Sales growth drivers were *Entresto* (USD 4.6 billion), *Kesimpta* (USD 1.1 billion), *Kisqali* (USD 1.2 billion), *Cosentyx* (USD 4.8 billion), along with the *Pluvicto* launch. Our six in-market growth drivers with multi-billion sales potential (*Cosentyx*, *Entresto*, *Zolgensma*, *Kisqali*, *Kesimpta* and *Leqvio*) grew 26% (cc) in 2022, and now represent 32% of total Innovative Medicines sales, up from 26% in 2021. Overall sales were broadly in line with target.

In April 2022, we announced the introduction of a new organizational model designed to support the company's innovation, growth, and productivity ambitions as a focused medicines company. The restructuring will simplify the organization and our processes, and is expected to deliver USD 1.5 billion in savings by 2024 with a proportion of these savings already delivered in 2022, enabling us to raise our long-term core operating income margin guidance. These savings are expected to help us progress towards our aspiration of achieving ~40%+ core margin beyond 2027 and further invest in our pipeline, as a pure-play medicines company (after the planned Sandoz spin-off which is subject to approval of the Novartis AG Board of Directors and shareholders). Nonetheless, there was an immediate impact on Operating Income as we incorporated related costs in the latter part of the year, that, along with higher legal settlements and unfavorable fair market value adjustments on financial assets, impacted operating income growth.

In 2022, we continued to deliver high value medicines to patients. We received 23 approvals in our key focus markets US, EU, China and Japan, including US and EU approvals for *Pluvicto*, a novel radioligand therapy for advanced prostate cancer. We advanced our focused pipeline of investigational medicines, with several important clinical data readouts paving the way for further launches in 2023 and beyond, a significant one being iptacopan, our investigational monotherapy in the treatment of paroxysmal nocturnal hemoglobinuria (PNH). However, we also had disappointments as some clinical trials of experimental compounds did not meet their primary endpoints, including ACZ885 (canakinumab) in lung cancer, and UNR844 in presbyopia.

We are proud that Novartis also continued to deliver on its commitments to broaden access to medicines and tackle major global health challenges. We pledged further investment in research into malaria and neglected tropical diseases, increased access to our innovative medicines for low- and middle-income countries and formed new collaborations with governments and other partners to strengthen healthcare systems. More details on our ESG efforts can be found in our Novartis in Society Integrated Report 2022.

2022 CEO compensation

As a result of the above performance, the CEO was awarded a 2022 Annual Incentive of 100%, having overall met the financial targets and strategic objectives set at the beginning of the cycle. When determining performance against the operating income metric, the Board of Directors approved adjustments to exclude restructuring costs arising from the implementation of the new organizational model and costs related to the planned Sandoz spin-off, which are investments in the future of the company in terms of both sales and margin growth. These adjustments ensured that the performance assessment was consistent with the basis on which the original targets were set.

The 2020-2022 Long-Term Performance Plan (LTPP) vested at 57% of target. The LTPP outcome was heavily affected by the relative Total Shareholder Return (rTSR) performance over the period, as well as reduced sales growth during 2020 and 2021, which was substantially impacted by the COVID-19 pandemic. No adjustments were made for the COVID-19 impact, or for any other factors. (For more information, please see "—LTPP performance outcomes").

Despite a solid 2022 performance, as outlined above, the CEO's 2022 total realized compensation was CHF 8 452 176, a decrease of 24.7% compared with prior year, driven mainly by the 2020-2022 LTPP outcome.

Changes to Executive Committee compensation system and disclosures

During the year, we reviewed our Executive Committee compensation system, with the aim of simplification and increased transparency of our performance assessment measures and strengthening our focus on key strategic priorities, while also considering developments in compensation best practices.

Effective the 2022-2024 cycle of the LTPP, we strengthened the assessment of research and early development performance under the Innovation metrics,

to ensure that targets are focused more directly on activities that create long-term value, and are measurable over a three-year performance period. For the innovation performance measure, the Science & Technology Committee sets targets that take into account the expected Net Present Value (eNPV) of programs transitioning to late-stage clinical development rather than the previous approach to set targets related to early-stage milestones.

Effective from performance year 2023, we will remove "Share of Peers" as a financial performance measure for the Annual Incentive plan, to simplify the metrics and focus on targets that provide greater transparency. The weighting of the three remaining financial measures, Group Net Sales, Group Operating Income and Group Free Cash Flow, will be 40%, 30% and 30%, respectively. In addition, we will fold division specific financial targets, where applicable, into individual strategic objectives (40% weighting) of the related Executive Committee member. All Executive Committee members will be evaluated, with a 60% weighting, against the performance of Group financial measures mentioned above.

During the year, we announced our intention to separate our Sandoz generics and biosimilars Division into a new publicly traded standalone company, by way of a 100% spin-off, subject to approval of the Novartis AG Board of Directors and shareholders. Based on the planned completion of the spin-off in 2023, the Compensation Committee made some initial decisions on the 2023 compensation elements related to the spin-off.

Finally, the 2023 Compensation Report will also include additional disclosures following the reform of Swiss corporate law that came into effect on January 1, 2023. For more information, please see "—2023 Executive Compensation Changes".

Inflation and cost-of-living impact on broader employee group

The Board and the Executive Committee are mindful of the cost-of-living challenges that are impacting many of our associates in different markets. The Executive Committee has considered these as part of its pay decisions and outcomes, and where appropriate, it has initiated local level initiatives to support associates.

In most countries, our 2023 salary budgets are higher than in previous years, reflecting the overall higher market forecasts driven by inflation. In some of our larger markets we are making a one-time payment to certain employee populations. Where legally possible, we have tried to target these one-time payments to our lower paid employees, who are most impacted. We will continue to monitor our compensation against the Living Wage, and regularly monitor and adjust wages in hyperinflation markets to support our local associates.

These actions reflect our commitment to pay market-competitive and sustainable salaries, rather than to fully match the current volatile inflation environment.

2023 base salary increases for ECN members, including the CEO, are made in line with policy, and no ECN member will receive any inflation related one-time payments.

2023 Annual General Meeting (AGM)

At the 2023 AGM, shareholders will be asked to vote on both the maximum aggregate amount of compensation for the Board of Directors from the 2023 AGM to the 2024 AGM, and the maximum aggregate amount of compensation for the Executive Committee for the financial year 2024. Furthermore, we will request an advisory vote on this Compensation Report.

We welcome your feedback, which is invaluable in driving improvements in our compensation system and practices. On behalf of the Compensation Committee, I would like to thank you for your continued support and trust.

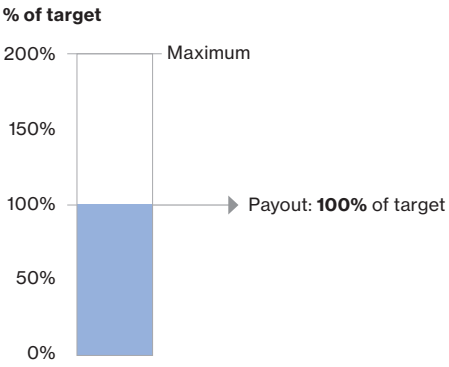
Simon Moroney, D.Phil.
Chair of the Compensation Committee

Compensation at a glance

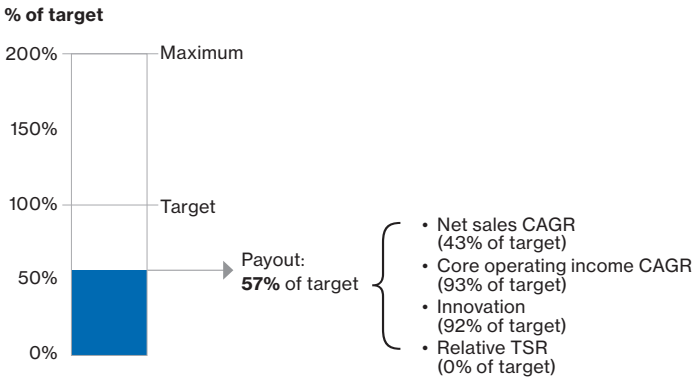
2022 outcomes

CEO pay for performance

2022 Annual Incentive

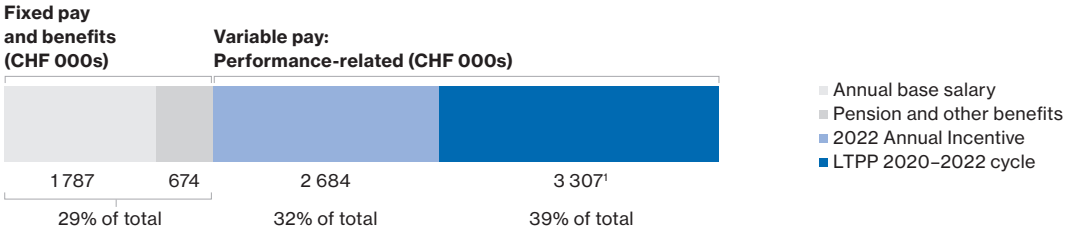


Long-Term Performance Plan (2020–2022 performance)



CEO total realized compensation

The 2022 total realized compensation for the CEO was CHF 8 452 176. It includes payouts of the Annual Incentive and LTPP based on actual performance assessed for the cycles concluding in 2022. More information on the assessment of the CEO by the Board of Directors can be found in "—2022 CEO balanced scorecard" and "—LTPP performance outcomes".



Total realized compensation: CHF 8 452 176

[1] The amounts shown represent the underlying share value of the total number of shares vested (including dividend equivalents of CHF 317 316) to the CEO for the 2020-2022 LTPP performance cycle.

Board compensation

The total actual compensation earned by Board members in the 2022 financial year is shown in the table below.

CHF 000s	2022 total compensation[1]
Board Chair	3 804
Other members of the Board	4 703
Total	**8 506**

[1] Includes an amount of CHF 29 250 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 453 083 and provides a right to the maximum future insured government pension benefit for the Board members.

2023 compensation systems

An overview of the 2023 compensation systems for the Executive Committee and the Board of Directors is provided below.

Executive Committee compensation system

Effective 2023, financial measures of the Annual Incentive plan comprise Group Net Sales (40%), Group Operating Income (30%) and Group Free Cash Flow (30%) for all Executive Committee members. Additionally, "Share of Peers" will be removed from the financial measures.

	2023 fixed pay and benefits		Performance-related variable pay	
	Annual base salary	**Pension and other benefits**	**2023 Annual Incentive**	**Long-Term Incentive awards cycle 2023-2025 LTPP[1]**
Purpose	Reflects responsibilities, experience and skill sets	Provide retirement and risk insurances (tailored to local market practices/ regulations)	Rewards performance against short-term financial and strategic objectives, and Values and Behaviors	Rewards long-term shareholder value creation and innovation in line with our strategy
Form of payment	Cash	Country/individual-specific and aligned with other employees	50% cash 50% equity[2] deferred for three years[3]	Equity, vesting following a three-year performance period
Performance measures	–	–	Balanced scorecard comprising: • Financial measures[4] (60%) • Strategic objectives[5] (40%)	• Net sales CAGR (25%) • Core operating income CAGR (25%) • Innovation (25%) • Relative TSR (25%)

[1] LTPP = Long-Term Performance Plan
[2] Executive Committee members may elect to receive more of their Annual Incentive in equity instead of cash
[3] The Annual Incentive deferred in equity is granted under the Deferred Share Bonus Plan (DSBP)
[4] Financial Measures are Group Net Sales (40%), Group Operating Income (30%) and Group Free Cash Flow (30%)
[5] Strategic objectives are aligned with our transformation to become a pure-play Innovative Medicines company: Strategy, Growth / Launches, Innovation, Operational excellence, Build trust with society

Board compensation system

There are no changes to the Board compensation system for 2023.

CHF 000s	AGM 2023-2024 annual fee
Board Chair	3 800
Board membership	280
Vice-Chair	50
Lead Independent Director	20
Chair of the Audit and Compliance Committee	130
Chair of the Compensation Committee	90
Chair of the following committees: • Governance, Sustainability and Nomination Committee • Science & Technology Committee • Risk Committee	70
Membership of the Audit and Compliance Committee	70
Membership of the following committees: • Compensation Committee • Governance, Sustainability and Nomination Committee • Science & Technology Committee • Risk Committee	40

Executive Committee compensation philosophy and principles

Novartis compensation philosophy

Our compensation philosophy aims to ensure that we attract and retain outstanding Executive Committee members and reward them according to their success in implementing the Company strategy, and their contribution to Company performance and long-term value creation. The main elements of our compensation philosophy are set out in the table below.

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 Incentive plans 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, strategic objectives, and performance versus our competitors
Business ethics	• The Novartis Values and Behaviors are an integral part of our compensation system • They underpin the assessment of overall performance 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

Executive compensation is strongly connected to business strategy. In 2022, we refocused our strategy to deliver high-value medicines that alleviate society's greatest disease burdens through technology leadership in research and development, and novel access approaches. Our strategy focuses on five core therapeutic areas with high unmet patient needs, two core and three emerging technology platforms, and four priority geographies, which together account for the majority of expected growth in global healthcare spending.

In line with this refocused strategy, we updated our strategic priorities to target innovation power, sales growth, delivering both margin and total shareholder returns, and sector leadership in material ESG factors. The Long-Term Incentive Plan was adapted, with greater emphasis now on the delivery of high value programs in our research and early development targets. The Annual Incentive plan has been simplified effective 2023, with three key financial metrics: Net Sales, weighted 40%; Operating Income, weighted 30%; and Free Cash Flow, weighted 30%.

Approach to market benchmarking

There continues to be significant competition for top executive talent with deep expertise, the requisite competencies and proven performance within the pharmaceutical and biotechnology industries. As such, external peer compensation data is one of a number of key reference points considered by the Board of Directors and the Compensation Committee when making decisions on executive pay, so as to help ensure that the compensation system and compensation levels at Novartis remain competitive. Novartis is committed to confirming benchmarking practices, including the peer group, to shareholders on an annual basis.

The Compensation Committee believes in a rigorous approach to peer group construction and maintenance. Furthermore, it believes that using a consistent set of peers that is similar in size and scope enables shareholders to evaluate the compensation year on year and make pay-for-performance comparisons. In 2022, the Compensation Committee decided to maintain the same primary peer group of **14 global healthcare companies**, as presented in the table below.

GLOBAL HEALTHCARE PEER GROUP

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

The companies in this peer group reflect our industry and are similar to Novartis in terms of both size and scope of operations. Although Novartis is headquartered in Switzerland, more than a third of its sales come from the US market, and the US remains a significant talent pool for the recruitment of executives by the Company. It is therefore critical that Novartis is able to attract and retain key talent globally, especially from the US.

To ensure European and local practices were fully taken into account, in 2022 the Compensation Committee also reviewed a cross-industry peer group of Europe-headquartered multinational companies, selected based on comparability to Novartis in terms of industry, size, global scope of operations, and economic influence. Based on this review, the Committee retained the same group of **European peers** as in 2021: Anheuser-Busch InBev, AstraZeneca, Bayer, BMW, GlaxoSmithKline, L'Oréal, Merck KGaA, Nestlé, Novo Nordisk, Reckitt Benckiser, Roche, Siemens, Sanofi, and Unilever.

Executive Committee appointments compensation policy

ELEMENT OF COMPENSATION	POLICY
Level	The overall package should be market-competitive to enable the recruitment of global executive talent with deep expertise and competencies.
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 increase this toward market level over a period of three to four years as an individual develops in the role. If the scope of an existing Executive Committee member's role changes significantly during the year, the Compensation Committee may make adjustments to the individual's base salary (and/or incentives) in consideration of the benchmark of the new role and the Executive Committee appointments compensation policy. 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 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 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 the local country pension plan and other benefits in line with the wider employee group.
Buyouts	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 an appointment at Novartis, the Compensation Committee may offer replacement awards to compensate the commercial equivalent value or fair value of payments and awards forfeited by the individual, in such form as the Compensation Committee considers appropriate, taking into account relevant factors. Relevant factors include the expected value of the forfeited award, 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 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.
International mobility	If individuals are required to relocate or be assigned away 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). This includes ongoing US state income tax liabilities on behalf of US citizens locally employed outside the US who have US workdays and therefore, US state taxable compensation that generates a US state tax liability.

Treatment of variable compensation for Executive Committee leavers

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, i.e., "good leavers"** Pro-rata Annual Incentive is paid to reflect the portion of the year the individual was employed. **Voluntary resignation or termination by the Company for misconduct or poor performance** Annual Incentive is fully forfeited.
Annual Incentive – mandatory deferral into restricted shares/ restricted share units (RSUs)	**Retirement, termination by the Company for reasons other than performance or conduct, and change of control** Awards are released on the original blocking end date. There is no accelerated vesting. All awards are subject to forfeiture in the event that a leaver joins a competitor company as defined in the applicable plan rules, before the end of the three-year blocking date, starting from the date of grant. **Death or long-term disability** Accelerated vesting is applied. **Voluntary resignation or termination by the Company for misconduct or poor performance** Unvested restricted shares and restricted share units (RSUs) are forfeited.
Annual Incentive – voluntary restricted shares/RSUs/American Depository Receipts (ADRs) (ADRs applicable for US employees only)	Awards are not subject to forfeiture during the deferral period.
Long-Term Incentive – mandatory performance share units (PSUs)	**Retirement, termination by the Company for reasons other than performance or conduct, and change of control** 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. All awards are subject to forfeiture in the event that a leaver joins a competitor company as defined in the applicable plan rules, until the vesting date. **Death or long-term disability** Accelerated vesting at target is applied. **Voluntary resignation or termination by the Company for misconduct or poor performance** All of the award is forfeited.

Malus and clawback

Any incentive compensation paid to Executive Committee members is subject to malus and clawback rules. This means that the Board of Directors for the CEO, 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 vested in the past (clawback). This applies in cases where the payout has resulted from a violation of laws or conflicts with internal management standards, including Company and accounting policies.

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

The Compensation Committee is assessing the impact of the final clawback rule in the Federal Register published by the US Securities and Exchange Commission in 2022, and any required changes to the policy will be disclosed in the 2023 Compensation Report.

Executive Committee performance management process

To foster a high-performance culture, the Company applies a performance management process based on quantitative and qualitative criteria. The CEO and the other Executive Committee members are subject to a formal three-step process: objective setting, performance evaluation and compensation determination. This process is explained in the chart below.

Performance targets are generally set before the start of the relevant performance cycle. A rigorous framework is 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:

- Internal and external market expectations
- Novartis strategic priorities
- 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 of Directors. In line with good governance practices, the Compensation Committee works to set targets that are ambitious and challenging but do not encourage undue risk-taking.

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

Objective setting

- The CEO proposes their targets to the Board Chair; they are then reviewed and approved by the Board of Directors, based on input from the Compensation Committee.
- For other Executive Committee members, targets for their division or unit are initially discussed with the CEO and subsequently approved by the Board of Directors and the Compensation Committee.

Performance evaluation

- The CEO's performance against the individual balanced scorecard is assessed by the Board of Directors.
- For Executive Committee members, the CEO discusses each member's performance (assessed against his or her individual balanced scorecard) with the Board Chair before making recommendations to the Board of Directors for final determination.
- Periodic assessments, including at the mid-year stage, ensure progress is suitably tracked.

Compensation determination

- A recommendation for the CEO's variable pay is made by the Compensation Committee to the Board of Directors for final determination.
- For the Long-Term Incentive financial measures' payout schedules, a formulaic approach applies, and the Compensation Committee can also exercise judgment to ensure there is appropriate alignment between payout levels and overall performance achieved. The same principle of discretion applies to the relative TSR and innovation performance measures.
- The CEO's recommendations for other Executive Committee members are considered and approved by the Compensation Committee, after which the Board of Directors is notified of the outcomes.

2022 Executive Committee compensation

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.
2022 annual base salaries	The 2022 annual base salaries were as follows: • **CEO** (effective March 1, 2022): CHF 1 789 500. • **OTHER EXECUTIVE COMMITTEE MEMBERS** (effective March 1, 2022): All other members of the Executive Committee were awarded increases in line with the average of all Novartis employees, with the exception of five individuals as disclosed in Item 6.B of the 2021 Annual Report.

Pension and other benefits

Overview	• Pension and other benefits do not constitute a significant proportion of total compensation and are provided to the Executive Committee on the same terms as all other employees based on local country practices and regulations. • The CEO and all other Swiss-based members of the Executive Committee are members of the Novartis Swiss pension funds, which provide Company contributions on the base salary and Annual Incentive up to the legal cap on the insured salary of CHF 860 400. No supplementary pension plans or savings plans are provided. The CEO's employer pension contributions represent 9.77% of his base salary. • Globally the Company operates both defined benefit and defined contribution pension plans (see also Note 25 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.

2022 Annual Incentive

PLAN OVERVIEW

Target Annual Incentive

Annual base salary **x** Target incentive (% of base salary) **=** Target Annual Incentive

On-target opportunities

- CEO: 150% of annual base salary
- Other Executive Committee members: 80% to 120% of annual base salary

Performance measures

- An Annual Incentive balanced scorecard containing:
  - Financial performance measures (60% weighting) related to Group, division or business unit, where relevant
  - Strategic objectives (40% weighting) are aligned with our transformation to become a pure-play Innovative Medicines company: Strategy, Growth / Launches, Innovation, Operational excellence, Build trust with society
- The balanced scorecard targets and achievements of the CEO are detailed on the next page.
- The balanced scorecards for other Executive Committee members include Group financial targets as well as financial or other quantitative targets that relate to their division or business unit, if applicable.
- Values and Behaviors are 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 standards.

Target setting

- Financial targets are set at the beginning of each financial year and align with the strategic plan proposed by management to the Board of Directors for approval.
- The strategic objectives are aligned with the most important priorities in any performance year.

Payout ranges

- The payout schedule for the Annual Incentive incorporates performance against financial and strategic objectives. The payout range is 0% to 200% of on-target opportunity based on performance, as shown below:

PERFORMANCE	PAYOUT (% of on-target)
Outstanding	170% – 200%
Exceeds expectations	130% – 160%
Meets expectations	80% – 120%
Partially meets expectations	40% – 70%
Below expectations	0%

Payout formula

Annual base salary **x** Target incentive (% of base salary) **x** Payout factor (% of target: 0%–200%) **=** Realized Annual Incentive

Payout vehicle

- At the end of the performance period, 50% is paid in cash, and the remaining 50% is delivered in Novartis restricted shares or RSUs, deferred for three years (see "—Executive Committee compensation system").
- 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.

Dividend rights, voting rights and settlement

- Novartis restricted shares and ADRs carry voting rights and dividends during the vesting period. RSUs are of equivalent value but do not carry voting rights and dividends during the vesting period.
- Following the vesting period, settlement of RSUs is made in unrestricted Novartis shares or ADRs.

2022 CEO BALANCED SCORECARD

This section presents the balanced scorecard for the CEO. Balanced scorecard performance is measured in constant currencies (cc) to reflect operational performance that can be influenced. The Board of Directors uses a stringent process to set ambitious financial targets to incentivize superior performance. In addition to the financial targets, the CEO also has ambitious strategic objectives across key priority areas, including targets related to ESG matters.

CEO achievements – 2022	Target	Achievement versus target
Financial measures – 60% of total Annual Incentive, comprising:		
Group net sales (cc) (30%)	54 360 million	Met
Group operating income (cc) (30%)	11 630 million	Met*
Group free cash flow as a % of sales (cc) (20%)	24.8%	Below
Share of peers for Novartis Group (20%)	7.3%	Met
Overall assessment of Group financial targets in constant currencies		**Met**

*The Board concluded that the achievement for Group operating income versus target was "Met" after approving adjustments mainly to exclude restructuring costs arising from the implementation of the new organizational model announced to investors on April 4, 2022 (and were not available at the time of target setting in January 2022), and costs related to the planned Sandoz spin-off, to transform Novartis into a focused medicines company.

Strategic objectives – 40% of total Annual Incentive, comprising:	
Strategy (15%) In 2022, the CEO launched a new strategy and laid the foundation to improve our growth profile via a strong focus on our five core therapeutic areas (cardiovascular, immunology, neuroscience, solid tumors, and hematology), two established (chemistry and biotherapeutics) and three emerging (gene & cell therapy, radioligand therapy, and xRNA) technology platforms, and four key geographies (China, Germany and Japan, and a particular priority in the US market). This strategy will transform Novartis into a pure-play Innovative Medicines business, with multiple in-market brands of multi-billion dollar peak sales potential, and prioritize our pipeline to focus on high-value assets that address high disease burden and have substantial growth potential. Sandoz separation analysis was completed with spin-off being the preferred separation path given potential future value upside for shareholders. Substantial progress was also made on the preparation for the planned spin-off, which is expected to take place in the second half of 2023.	**Met**
Growth/Launches (15%) Recent launch products *Pluvicto* (USD 271 million), *Kesimpta* (USD 1.1 billion), and *Scemblix* (USD 149 million) achieved higher than target sales. However, lower uptake for *Leqvio* resulted in sales behind target. In-market growth drivers (including *Cosentyx*, *Entresto*, *Zolgesma*, *Kisqali*, *Kesimpta*, and *Leqvio*) delivered combined sales of USD 13.2 billion, which was slightly behind target. This was largely due to the below target performance of *Cosentyx* (total sales of USD 4.8 billion, impacted by US payer pressures, China business and Inflation Reduction Act headwinds). This was partly offset by strong performance of *Entresto* (USD 4.6 billion) and *Kisqali* (USD 1.2 billion).	**Met**
Innovation (15%) In 2022, we received 23 approvals in our top four markets (US, EU, China and Japan). Major approvals included *Pluvicto* (US, EU), *Scemblix* (EU), and further indication expansions for *Kymriah* and *Cosentyx*. 24 submissions were made across the top four markets. We advanced our focused pipeline of investigational medicines, with several important clinical data readouts including Iptacopan for patients with paroxysmal nocturnal hemoglobinuria (PNH), a rare and deadly blood disorder, and *Pluvicto* in earlier lines of prostate cancer. *Cosentyx* was submitted to the US FDA for an additional indication, ahead of planned timelines. Among our early-stage development activities, we secured ten proofs of concept (POCs) / proofs of mechanisms (POMs). Additionally, we achieved First Patient First Visit in six pivotal trial-enabling studies against our Research and Development target of five. The year also experienced some disappointments, with important trials not meeting primary goals (such as canakinumab for lung cancer and UNR844 in presbyopia).	**Met**

2022 CEO BALANCED SCORECARD – CONTINUED

Operational excellence (15%) — **Met**

In April 2022, we introduced a new operating model to make our organization more agile and efficient in support of our strategy. This simplified and leaner organization is expected to deliver identified cost savings of approximately USD 1.5 billion by 2024, and help drive mid-term Innovative Medicines margin to the low 40s.

Financial performance for 2022 improved from prior year in constant currencies on core operating income and core margin to USD 16.7 billion and 33.0% respectively.

The Operations unit, comprising our legacy Technical Operations unit and the legacy Customer and Technology Solutions unit, achieved savings of USD 998 million against a combined target of USD 785 million. However, these savings were partially offset by external headwinds, driven mainly by inflation, of approximately USD 350 million.

Build trust with society (40%) — **Above**

INNOVATION AND ACCESS

In 2022, we achieved a 26% increase in patient reach with our strategic innovative therapies, reaching 1.2 million patients, compared with the previous year (0.95 million).

All our product launches in 2022 included a tiered pricing strategy based on national income level and value-based pricing, in line with target.

With our commitment to diversity in clinical trials, 100% of our US Phase 3 studies evaluated Diversity & Inclusion principles in feasibility planning, in line with our target.

Through our Novartis Global Health flagship programs, we reached 31 million patients in 2022, beating our Sustainability-linked Bond target of 22.6 million patients by 2025.

In 2022, we renewed our commitment to the research and development of new medicines for malaria and neglected tropical diseases, pledging to invest USD 250mn over five years (2021-2025), and we advanced the clinical development of next-generation malaria medicines.

PEOPLE AND CULTURE

We progressed towards a “Performance Culture” mindset with the implementation of a new “high support / high challenge” approach.

We remain committed in our efforts to increase workforce diversity. The percentage of women in management increased to 47%, slightly behind our target of 48%.

ENVIRONMENTAL SUSTAINABILITY

In 2022, we reduced our Scope 1 and 2 carbon emissions by 49%, our water consumption by 42%, and our waste sent for disposal by 59%, compared with our 2016 baseline. This was broadly in line or ahead of our 50%, 41% and 50% targets, respectively. To advance on our Scope 3 emissions target, environmental sustainability criteria have been integrated into supply contracts covering more than a third of our Scope 3 supplier emissions.

ETHICAL BUSINESS PRACTICES

We assessed 100% of our applicable policies & controls in the areas of Access to Medicine & Artificial Intelligence and categorized them as either “aligned with Human Right standards” or “needs update with defined scope to meet Human Rights standards”, in line with our target.

Overall assessment of strategic objectives	**Met**
Overall assessment of CEO balanced scorecard	**Met**

ANNUAL INCENTIVE PAYOUT

Payout	The 2022 CEO performance showed solid financial results, including sales and operating income performance at target and most strategic objectives were achieved or exceeded. The launch of a new focused strategy transforming Novartis into a pure-play medicines company, performance of launch products and preparation for planned Sandoz spin-off were key highlights. However, Free Cash Flow performance was impacted by decrease in net cash flows from operating activities and lower divestment proceeds. On balance, based on the overall assessment, the Board of Directors decided on an Annual Incentive payout for the CEO amounting to **CHF 2 684 321**, which is 100% of target, within the range of 0–200%.

Long-Term Performance Plan, 2020-2022 cycle

OVERVIEW OF LONG-TERM PERFORMANCE PLAN

Award vehicle

Performance share units (PSUs) are granted at the beginning of the three-year performance cycle and vest at the end of the cycle to the extent that performance conditions have been met. At the time of vesting, they are converted into Novartis shares.
PSUs carry dividend equivalents that are paid in shares at the end of the cycle.

Grant formula

At the start of the performance cycle, PSUs are granted under the Long-Term Incentive plan, as follows:

Step 1	Annual base salary	x	Target incentive %	=	Grant value
Step 2	Grant value	/	Share price	=	Target number of PSUs

Target opportunity

- CEO: 325% of annual base salary
- Other Executive Committee members: between 180% and 260% of annual base salary

Performance measures

- Net sales CAGR (25%)
- Core operating income CAGR (25%)
- Innovation (25%)
- Relative TSR (25%)

Target setting

Financial targets: Targets for net sales CAGR and core operating income CAGR are set based on the strategic plan of the Company.
Innovation: Global Drug Development (GDD) targets are based on targeted filings communicated at the start of each performance cycle, weighted 70%. The Science & Technology Committee determines the most important Novartis Institutes for BioMedical Research (NIBR) milestones, weighted 30%. Effective the 2022-2024 LTPP cycle, NIBR targets set by the Science & Technology Committee take into account the expected Net Present Value (eNPV) of programs transitioning to late-stage clinical development.

Payout range

Financial targets: When assessing performance, achievements for threshold, target and maximum payout are defined for each metric, and a payout curve is applied to determine the corresponding payout between 0–200% against target.
Innovation: At the end of the cycle, the Compensation Committee determines the payout factor in the range of 0–150% based on the performance assessment made by the Science & Technology Committee. A payout between 150–200% of target is only delivered for truly exceptional performance.
Relative TSR: Performance on TSR is assessed relative to a global healthcare peer group, as outlined below. A three-month averaging method is used for both the start and the end of the performance cycle. Companies are then ranked in order of highest to lowest TSR in USD.

Global healthcare peer group			Novartis position in the peer group	Payout range (% of target)
Abbvie	Amgen	AstraZeneca	Position 1 – 2	170% – 200%
Biogen	Bristol-Myers Squibb	Eli Lilly & Co	Position 3 – 5	130% – 160%
GlaxoSmithKline	Gilead Sciences	Johnson & Johnson	Position 6 – 8	80% – 120%
Novo Nordisk	Merck & Co.	Pfizer	Position 9 – 15	0%
Roche	Sanofi			

The Compensation Committee may use its discretion on each metric, including deciding on the payout within the ranges where appropriate. In doing so, it takes into consideration factors such as the underlying assumptions of the targets set at the beginning of the cycle, overall economic conditions, currency fluctuations and other unforeseeable situations.

Payout formula

Target number of PSUs	x	Performance factor	+	Dividend equivalents	=	Realized PSUs

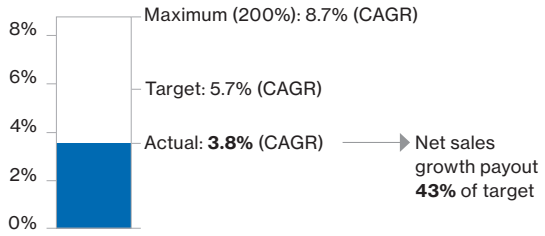
LTPP performance outcomes

The charts below illustrate the performance of the 2020-2022 LTPP against target.

NET SALES CAGR

(25% weighting)

Vesting range 0–200% of target



Notes:
A minimum achievement of 3.7% CAGR was required to receive a payout under this performance measure

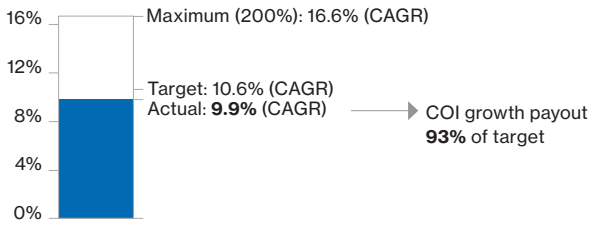
Novartis achieved a net sales CAGR of 3.8% (in constant currencies – cc) against the 5.7% target set at the beginning of the performance cycle. The lower than target performance was mainly due to the negative and unexpected impact of COVID-19 in 2020 and 2021, the Beovu safety update, and the slower uptake of Zolgensma.

Following the application of the payout curve, the net sales CAGR (cc) achievement generates a payout factor of 43% (maximum 200%) for this metric.

CORE OPERATING INCOME (COI) CAGR

(25% weighting)

Vesting range 0–200% of target



Notes:
A minimum achievement of 6.6% CAGR was required to receive a payout under this performance measure
Actual performance was adjusted for mergers and acquisitions as well as business development and licensing projects not included in the target

Novartis achieved a COI CAGR of 9.9% (cc) against the 10.6% target set at the beginning of the performance cycle. This was mainly due to lower than target Innovative Medicines sales over the three-year cycle, which was partly offset by lower spend in selling, general and administrative expenses (SG&A). In 2022, the Company took organizational transformative measures, delivering savings reflected in COI improvement for the year.

Following the application of the payout curve, the COI CAGR (cc) achievement generates a payout factor of 93% (maximum 200%) for this metric.

INNOVATION

(25% weighting)

The following developments were considered in our 2020-2022 LTPP innovation performance:

- US and EU approvals for *Pluvicto*
- EU approval for *Scemblix* for adult patients with chronic myeloid leukemia
- US approval for *Kymriah* in the treatment of adult patients with relapsed or refractory follicular lymphoma
- Filing of *Cosentyx* for Hidradenitis suppurativa with both the US FDA and the European Medicines Agency(EMA)
- Submission of *Cosentyx* for an additional indication ahead of planned timelines
- Tislelizumab's acceptance by the EMA for regulatory review in esophageal and lung cancers
- CANOPY trials, Ligelizumab PEARL studies in chronic spontaneous urticaria (CSU), and Sabatolimab STIMULUS MDS-1 where important trial milestones were delayed/not submitted
- In NIBR, advancement of multiple development candidates including two novel radioligand therapies

Based on input from the Science & Technology Committee, the Board of Directors approved an innovation performance factor of **92%** of target.

RELATIVE TOTAL SHAREHOLDER RETURN (TSR)

(25% weighting)

Novartis position in the peer group	Payout range (% of target)
Position 1 – 2	170% – 200%
Position 3 – 5	130% – 160%
Position 6 – 8	80% – 120%
Position 9 – 15	0%

→ Actual ranking **12th = 0%** of target

TSR for the 2020-2022 cycle was 5.5%. As a result, Novartis ranked No. 12 out of 15 healthcare companies (including Novartis). Considering that the relative TSR rank is below median, there was a zero payout for this metric.

2020-2022 LTPP PAYOUT

Overall, the Board of Directors approved a 2020-2022 LTPP payout at **57%** of target, within the range of 0–200%. No adjustments, pandemic-related or otherwise, were made in the evaluation of performance, despite the substantial shortfall in sales growth caused by Covid-19. This resulted in an LTPP payout of **CHF 3 307 422** for the CEO, including dividend equivalents of CHF 317 316.

Net sales CAGR 43% x 25% + **COI CAGR** 93% x 25% + **Innovation** 92% x 25% + **Relative TSR** 0% x 25% → **Final vesting** 57% of target

Compensation for joining and departing Executive Committee members in 2022

2022 Executive Committee member appointments

In 2022, four new appointments were made to the Executive Committee, which comprise an internal promotion and three external appointments.

Victor Bulto was promoted internally as President, Innovative Medicines US, and joined the Executive Committee on May 1, 2022.

In line with our compensation policy, externally appointed Executive Committee members were granted buyout awards to compensate for entitlements forfeited by them as a result of joining Novartis, as described in the table below (see "—Executive Committee appointments compensation policy"). Further details on the vesting of the awards below will be provided in relevant future compensation reports.

Name	Date of appointment	Currency	Cash payments	Equity awards	Total value at grant
Shreeram Aradhye, President, Global Drug Development and Chief Medical Officer	May 16, 2022	CHF	No cash buyout	5 708 RSUs, vesting over the period 2023-2026	491 915
Aharon Gal, Chief Strategy & Growth Officer	July 18, 2022	CHF	818 202	43 253 RSUs, vesting over the period 2022-2023	4 353 702
Fiona Marshall, President, Novartis Institutes for BioMedical Research	November 1, 2022	USD	522 000 to be paid out in March 2023	31 861 RSUs and 9 649 PSUs, vesting over the period 2023-2026	3 886 801

2022 Executive Committee member departures

In determining the compensation arrangements for departing Executive Committee members, the Compensation Committee ensures that contractual entitlements are respected, and all payments are in line with our plan rules and the Swiss Ordinance against Excessive Compensation in Listed Companies.

All Executive Committee members have a 12-month notice period during which they are entitled to their contractual base salary, pension, Annual Incentive and other benefits. No new LTPP grants are made during the notice period. In line with the new regulations arising from the reform of Swiss corporate law, any compensation payments toward non-competition agreements from 2023 onwards, will not exceed the average annual compensation of the previous three financial years.

Equity plan rules state that malus and clawback as well as non-compete restrictions will continue to apply. No severance payments are made to departing Executive Committee members. Further details on the policy treatment of variable compensation for departing Executive Committee members can be found in "—Treatment of variable compensation for Executive Committee leavers."

Former President of Novartis Oncology, Susanne Schaffert, stepped down from her role following the Company's decision to integrate the Pharmaceuticals and Oncology business units and create separate US and International commercial organizations under the Innovative Medicines (IM) Division, and started her notice period on May 1, 2022.

Former Head of Customer & Technology Solutions (CTS), Robert Weltevreden, stepped down from his role following the Company's decision to combine Novartis Technical Operations (NTO) and CTS into a new Operations unit, and started his notice period on May 1, 2022.

Former Head of Global Drug Development and Chief Medical Officer, John Tsai, stepped down from his role effective May 15, 2022, and started his notice period on the same day.

Former President of the Novartis Institutes for BioMedical Research (NIBR), James Bradner, stepped down from his role effective October 31, 2022, and started his notice period on November 1, 2022.

All four executives departed under good leaver conditions. Outstanding LTI grants will vest at the end of the relevant performance cycles on a pro-rata basis, as per their contractual agreements and in line with the said plan rules.

To avoid a conflict of interest, Richard Saynor, Chief Executive Officer of Sandoz, stepped down from the Executive Committee with effect from October 25, 2022, following his appointment as CEO designate of the Sandoz standalone company that is planned to be created in the second half of 2023. He will continue to report directly to the CEO and to lead the Sandoz division.

Realized compensation

To aid shareholders' understanding of the link between pay and performance, the Compensation Committee discloses the realized compensation for the CEO individually, and for the other members of the Executive Committee on an aggregated basis. Disclosing realized compensation means that the Annual Incentive and the LTI 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 a vested LTI), compensation increases, payout of variable compensation based on actual performance, share price fluctuations of the LTI, and dividend equivalents.

2022 realized compensation for the CEO and other Executive Committee members

The table below shows fixed and other compensation for the year, including the Annual Incentive for the 2022 performance year, the realized LTI for the 2020-2022 performance cycle, and any buyouts vesting in 2022. The portion of the Annual Incentive paid in shares for the year 2022 is disclosed using the underlying value of Novartis shares at the date of grant, while the realized values of any other equity awards (including dividend equivalents) are calculated using the share price on the date of vesting.

To determine the appropriateness of the 2022 CEO and executive compensation payouts under the Annual Incentive and LTI plans, the Board of Directors and the Compensation Committee reviewed management's performance and contribution, taking the following into consideration:

- Operational and financial performance against targets
- Progress toward strengthening our global product portfolio
- Accomplishments across all strategic pillars, with careful attention given to ESG performance

The incentive performance outcomes, combined with base salary and other benefits, pension, and dividend equivalents, resulted in 2022 total realized compensation for the CEO of **CHF 8 452 176**.

2022 realized compensation for the CEO and other Executive Committee members

		2022 annual base salary	2022 pension benefits[1]	2022 Annual Incentive		Long-Term Incentives LTPP 2020 – 2022 cycle	Other 2022 compensation	
	Currency	Cash (amount)	Amount	Cash	Equity[2]	Equity (value at vesting date)[3]	Amount[4,5]	Total realized compensation (incl. share price movement)[6]
Executive Committee members								
Vasant Narasimhan (CEO)	CHF	1 786 500	174 488	1 342 125	1 342 196	3 307 422	499 445	8 452 176
Aggregate realized compensation of the other 15 Executive Committee members, including the members who stepped down during the financial year 2022[7,8]	CHF	9 122 792	1 978 304	4 211 841	5 918 318	10 025 047	9 716 294	40 972 595
Total	**CHF**	**10 909 292**	**2 152 792**	**5 553 966**	**7 260 514**	**13 332 469**	**10 215 739**	**49 424 771**

See 2021 realized compensation for the CEO and other Executive Committee members for 2021 comparative figures.

[1] Includes mandatory employer contributions of CHF 4 560 for the CEO and CHF 67 148 for the other current Executive Committee members paid by Novartis to governmental social security systems. This amount is out of total employer contributions of CHF 3 937 537 paid in 2022 for all Executive Committee members, and provides a right to the maximum future insured government pension benefit.

[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 25, 2023) of CHF 85.30 per Novartis share and USD 92.81 per ADR.

[3] The amounts represent the underlying share value of the 97 361 LTPP PSUs vesting on January 25, 2023, to the CEO and other Executive Committee members for the 2020-2022 performance cycle and dividend equivalents for the three-year cycle (for details, see "—LTPP performance outcomes"). The taxable value is determined using the closing share price on the day the Novartis Board of Directors approved the final LTPP performance factor (i.e., January 25, 2023) of CHF 85.30 per Novartis share and USD 92.81 per ADR. Robert Kowalski was promoted to the Executive Committee during the course of the 2021 performance period and Victor Bulto during the course of the 2022 performance period, and as such, the information disclosed reflects their pro-rata LTPP 2020-2022 payout attributable to the period in which they were members of the Executive Committee. Shreeram Aradhye rejoined Novartis and Karen Hale, Aharon Gal and Fiona Marshall joined Novartis after the 2020 LTI awards were made and hence did not receive an LTPP award for the 2020-2022 performance period.

[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). The 2022 tax payments were CHF 221 633 for Richard Saynor, as well as CHF 533 927 for Victor Bulto, CHF 127 980 for Robert Kowalski, CHF 109 966 for Aharon Gal, and CHF 417 826 for Vas Narasimhan.

[5] Includes 696 vested RSUs and 2 765 PSUs (for a total value of CHF 268 158), which vested on March 13, 2022, to John Tsai in lieu of the LTI that he forfeited when leaving his previous employer. Also includes 2 348 vested RSUs and 1 586 vested PSUs (for a total value of CHF 313 815), which vested on February 13, 2022, to Richard Saynor in lieu of the LTI that he forfeited when leaving his previous employer, and 3 675 vested PSUs (CHF 287 238) on January 18, 2022, to Klaus Moosmayer in lieu of the LTI he forfeited when leaving his previous employer as well as 15 448 RSUs (CHF 1 292 225), which vested on December 1, 2022, to Aharon Gal in lieu of the LTI that he forfeited when leaving his previous employer.

[6] All amounts are before deduction of the social security contribution and income tax due from the Executive Committee member.

[7] Includes compensation of the following members who stepped down from the ECN: Richard Saynor, Sandoz CEO designate, James Bradner, former President NIBR, Susanne Schaffert, former CEO Oncology, John Tsai, former Global Head of Drug Development and Chiel Medical Officer and Robert Weltevreden, former Head of Customer and Technology Solutions, including the vesting of their Long-Term Incentives for 2020-2022 performance cycle, as per the plan rules. The compensation and benefits elements related to the period after the step-down dates are reported under the 'other 2022 compensation' column. See "—2022 Executive Committee member departures" for details.

[8] Amounts for Executive Committee members paid in USD were converted at a rate of USD 1.00 = CHF 0.9548, which is the same average exchange rate used in the Group's 2022 consolidated financial statements (a similar rule applies to payments made in other currencies during the year).

The table and information below provide additional details on awards granted as part of the 2020-2022 LTPP performance cycle, including the number of shares awarded and delivered, following the application of the payout factor and the addition of dividend equivalent shares.

2020-2022 LTPP performance cycle

	PSUs at grant			Shares delivered at vesting				
	PSUs (target number)	PSUs (target value at grant date) (CHF)[2]	Payout factor for ECN LTPP (% of target)	Performance shares delivered at vesting (number)	Performance shares delivered at vesting (value at vesting date) (CHF)[3]	Dividend equivalent shares delivered at vesting (number)[4]	Dividend equivalent shares delivered at vesting (value at vesting date) (CHF)	Total shares delivered at vesting (value at vesting date) (CHF)
Executive Committee members[1]								
Vasant Narasimhan	61 498	5 712 549	57%	35 054	2 990 106	3 720	317 316	3 307 422
Other 15 Executive Committee members, including the members who stepped down during the financial year 2022[5]	183 733	17 005 806	57%	105 530	9 058 150	11 156	966 897	10 025 047
Total	**245 231**	**22 718 356**		**140 584**	**12 048 256**	**14 876**	**1 284 213**	**13 332 469**

[1] Robert Kowalski and Victor Bulto joined the Executive Committee during the course of the 2020-2022 performance period. As such, the information disclosed reflects their pro-rata LTPP 2020-2022 attributable to the period in which they were members of the Executive Committee. Karen Hale, Aharon Gal, Fiona Marshall and Shreeram Aradhye joined Novartis after the 2020-2022 LTPP awards were made and hence did not receive an LTPP award for this performance period.

[2] The shown amounts represent the underlying share value of the target number of PSUs granted to each Executive Committee member for the 2020-2022 performance period, based on the closing share price on the grant date (January 21, 2020) of CHF 92.89 per Novartis share and USD 95.19 per ADR.

[3] The shown amounts represent the underlying share value of the number of PSUs vested for the 2020-2022 performance period, based on the closing share price on the day the Novartis Board of Directors approved the final LTPP performance payout factor (i.e., January 25, 2023) of CHF 85.30 per Novartis share and USD 92.81 per ADR.

[4] Dividend equivalent shares are calculated on the dividend each member of the Executive Committee would have received, based on the actual number of shares delivered at the end of the 2020-2022 performance period. At vesting, the dividend equivalents are credited in shares or ADRs.

[5] Includes the LTPP vesting for Richard Saynor, Sandoz CEO Designate, James Bradner, former President NIBR, Susanne Schaffert, former CEO Oncology, John Tsai, former Global Head of Drug Development and Chiel Medical Officer and Robert Weltevreden, former Head of Customer and Technology Solutions for the 2020-2022 performance cycle, as per the plan rules.

The table and information below provide details on the 2021 realized compensation for the CEO and other Executive Committee members, for comparative purposes.

2021 realized compensation for the CEO and other Executive Committee members

		2021 annual base salary	2021 pension benefits[1]	2021 Annual Incentive		Long-Term Incentives LTPP 2019-2021 cycle	Other 2021 compensation	
	Currency	Cash (amount)	Amount	Cash	Equity[2]	Equity (value at vesting date)[3]	Amount[2,4,5]	Total realized compensation (incl. share price movement)[6]
Executive Committee members								
Vasant Narasimhan (CEO)	CHF	1 769 200	176 731	1 328 625	1 328 642	6 356 128	265 401	11 224 727
Aggregate realized compensation of the other 14 Executive Committee members, including the members who stepped down during the financial year 2021[7,8]	CHF	8 983 841	2 065 561	4 174 006	5 400 015	18 770 029	6 021 712	45 415 164
Total	**CHF**	**10 753 041**	**2 242 292**	**5 502 631**	**6 728 657**	**25 126 157**	**6 287 113**	**56 639 891**

[1] Includes mandatory employer contributions of CHF 5 498 for the CEO and CHF 53 693 for the other Executive Committee members paid by Novartis to governmental social security systems. This amount is out of total employer contributions of CHF 4 966 397 paid in 2021 for all Executive Committee members, and provides a right to the maximum future insured government pension benefit.
[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 26, 2022) of CHF 78.16 per Novartis share and USD 84.24 per ADR.
[3] The amounts represent the underlying share value of the 296 741 LTPP PSUs vested on January 22, 2022, to the CEO and other Executive Committee members for the 2019-2021 performance cycle, inclusive of earned Alcon Keep Whole awards and dividend equivalents for the three-year cycle (for details, see ''—LTPP performance outcomes''). The taxable value is determined using the closing share price on the day the Novartis Board of Directors approved the final LTPP performance factor (i.e., January 26, 2022) of CHF 78.16 per Novartis share and USD 84.24 per ADR. Marie-France Tschudin and Robert Kowalski were promoted to the Executive Committee during the course of the 2019-2021 performance period, and as such, the information disclosed reflects their pro-rata LTPP 2019-2021 payout attributable to the period in which they were members of the Executive Committee. Richard Saynor and Karen Hale joined Novartis after the 2019 LTI awards were made and hence did not receive an LTPP award for the 2019-2021 performance period.
[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). The 2021 tax payments were CHF 127 009 for Mr. Saynor, as well as CHF 822 808 for Susanne Schaffert, and CHF 156 788 for Vas Narasimhan.
[5] Includes 6 128 vested RSUs and 3 546 PSUs (for a total value of CHF 782 649), which vested partially on March 13, 2021, and partially on July 28, 2021, to John Tsai in lieu of the LTI that he forfeited when leaving his previous employer. Also includes 2 584 vested RSUs and 2 043 vested PSUs (for a total value of CHF 379 414), which vested on February 14, 2021, to Mr. Saynor in lieu of the LTI that he forfeited when leaving his previous employer, and 4 313 vested PSUs (CHF 370 961) on January 18, 2021, to Klaus Moosmayer in lieu of the LTI he forfeited when leaving his previous employer.
[6] All amounts are before deduction of the social security contribution and income tax due from the Executive Committee member.
[7] Includes the first six weeks of Karen Hale's compensation, before her appointment to the Executive Committee, under other compensation. Comprises the compensation of Bertrand Bodson, former Chief Data Officer and Steven Baert, former Chief People & Organization Officer, including the vesting of their Long-Term Incentives for 2019-2021 performance cycle, as per the plan rules. The compensation and benefits elements related to the period after the step-down dates are reported under the other compensation column. Unvested shares for Shannon Klinger were forfeited upon her departure from the Company. See "—2021 Executive Committee member departures" for details.
[8] Amounts for Executive Committee members paid in USD were converted at a rate of USD 1.00 = CHF 0.9139, which is the same average exchange rate used in the Group's 2021 consolidated financial statements (a similar rule applies to payments made in other currencies during the year).

Realized compensation for the CEO and other Executive Committee members for 2022 compared with 2021

The 2022 total realized compensation for the CEO was CHF 8 452 176. This is a reduction of 24.7% compared with the prior year, mainly due to the lower performance payout of the 2020-2022 LTPP (57% compared with the 107% payout for the 2019-2021 LTPP). At the end of the 2020-2022 LTPP performance cycle, the rTSR ranking for Novartis, which is weighted 25% of the overall LTPP opportunity, was below median, which resulted in zero payout for this measure. Payout for Net Sales CAGR performance, also weighted 25%, was significantly lower (43% compared with 119% in 2019-2021), mainly driven by the impact of Covid-19 on Sales growth during 2020 and 2021. Furthermore, the Alcon "keep-whole" awards, granted at the time of Alcon spin-off in 2019, ended with the 2019-2021 LTPP payout.

The 2022 total realized compensation for the Executive Committee members, including the CEO, was CHF 49 424 771. This decrease of 12.7% compared with the prior year can be attributed to the same reasons mentioned above. For more detail, please refer to "—LTPP performance outcomes".

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 the following information for the CEO and other Executive Committee members:

- Fixed 2022 compensation (base salary and benefits)
- Actual cash portion and the deferred portion granted in equity of the 2022 Annual Incentive
- 2022-2024 LTPP performance cycle awards, which are reported at target grant date value, based on the assumption that the awards will vest at 100% achievement, excluding any share price movement and dividend equivalents that may be accrued over the performance cycle. The future payout will be determined only after the performance cycle concludes in three years (i.e., at the end of 2024), with a payout range of 0% to 200% of the target value
- Other compensation for 2022, which includes other benefits, either paid in cash or granted in equity during the year

The compensation paid, promised or granted to the members of the Executive Committee during financial year 2022 was within the amount approved by shareholders at the 2021 AGM.

To assess CEO actual pay for performance in 2022, including the Annual Incentive payout for the 2022 performance year and the LTI payouts for the 2020-2022 performance cycle, shareholders should refer to the 2022 realized compensation table in "—2022 realized compensation for the CEO and other Executive Committee members."

2022 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 2022				Long-Term Incentive 2022-2024 cycle grants at target		
		2022 annual base salary	2022 pension benefits	2022 Annual Incentive (performance achieved)		LTPP 2022-2024 cycle	Other 2022 compensation	Total compensation paid, promised or granted 2022
	Currency	Cash (amount)	Amount [1]	Cash (amount)	Equity (value at grant date) [2]	PSUs (target value at grant date) [3]	Amount [4]	Amount [5]
Executive Committee members active on December 31, 2022								
Vasant Narasimhan	CHF	1 786 500	174 488	1 342 125	1 342 196	5 815 886	499 445	10 960 639
Shreeram Aradhye (from May 16, 2022) [6]	CHF	538 656	110 041	270 959	270 998	1 629 233	581 328	3 401 215
Victor Bulto (from May 1, 2022) [7, 8]	USD	622 596	49 434	310 445	310 449	873 500	782 443	2 948 867
Aharon Gal (from July 18, 2022) [9]	CHF	363 441	78 083	150 000	150 043	–	4 576 719	5 318 285
Karen Hale	CHF	845 834	215 842	–	935 059	1 700 058	146 154	3 842 946
Harry Kirsch	CHF	1 082 250	177 526	655 820	655 872	2 818 450	36 456	5 426 373
Robert Kowalski	CHF	705 833	207 628	349 965	349 986	1 272 601	307 969	3 193 982
Steffen Lang	CHF	840 833	180 675	165 136	935 826	1 722 021	14 431	3 858 923
Fiona Marshall (from November 1, 2022) [8, 9]	USD	186 154	16 222	101 085	101 163	–	3 961 064	4 365 688
Klaus Moosmayer	CHF	580 000	181 112	313 740	313 819	1 045 859	32 026	2 466 555
Marie-France Tschudin	CHF	951 250	164 480	527 209	527 239	2 220 057	8 804	4 399 040
Total		**8 466 817**	**1 552 567**	**4 167 896**	**5 874 057**	**19 058 209**	**10 732 583**	**49 852 130**
Executive Committee members who stepped down during 2022								
James Bradner (until October 31, 2022) [8, 10]	USD	1 006 294	280 763	605 668	605 771	3 030 029	651 499	6 180 024
Richard Saynor (until October 25, 2022) [11]	CHF	641 721	150 920	383 977	384 021	1 493 403	706 394	3 760 436
Susanne Schaffert (until April 4, 2022) [12]	CHF	292 466	59 180	161 112	161 217	2 138 458	1 306 257	4 118 690
John Tsai (until May 15, 2022) [13]	CHF	321 967	67 322	161 031	161 132	2 192 544	1 396 407	4 300 403
Robert Weltevreden (until April 4, 2022) [14]	CHF	225 479	54 721	101 638	101 678	1 374 053	1 029 246	2 886 815
Subtotal		**2 442 475**	**600 225**	**1 386 070**	**1 386 456**	**10 091 626**	**5 060 376**	**20 967 229**
Total		**10 909 292**	**2 152 792**	**5 553 966**	**7 260 514**	**29 149 836**	**15 792 959**	**70 819 358**

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 2025

See next page for 2021 comparative figures.

[1] Includes mandatory employer contributions of CHF 4 560 for the CEO and CHF 67 148 for the other current Executive Committee members paid by Novartis to governmental social security systems. This amount is out of total employer contributions of CHF 3 937 537 paid in 2022 for all Executive Committee members, and provides a right to the maximum future insured government pension benefit.

[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 25, 2023) of CHF 85.30 per Novartis share and USD 92.81 per ADR.

[3] The amounts represent the underlying share value of the target number of PSUs granted to Executive Committee members for the 2022-2024 performance cycle, based on the closing share price on the grant date (January 26, 2022) of CHF 78.16 per Novartis share and USD 84.24 per ADR for all members.

[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). The compensation and benefits elements related to the period after the step-down dates are also reported under 'other 2022 compensation'.

[5] All amounts are before deduction of the social security contribution and income tax due by the Executive Committee member.

[6] Shreeram Aradhye received a pro-rata LTPP award of 18 905 PSUs on June 1, 2022 (at CHF 86.18 closing share price on grant date) upon joining the organization, as per contractual entitlement.

[7] Victor Bulto received his 2022 LTPP grant before his appointment to Executive Committee, therefore the reported LTPP amount is pro-rated to reflect his time as Executive Committee member over the full performance cycle.

[8] Amounts in USD for Victor Bulto, Fiona Marshall and James Bradner were converted at a rate of CHF 1.00 = USD 1.0473, which is the average rate used in the Group's 2022 consolidated financial statements.

[9] Aharon Gal and Fiona Marshall did not receive a pro-rata LTPP award upon joining the organization, as they received buyout grants for their forfeited awards upon joining.

[10] James Bradner stepped down from the Executive Committee on October 31, 2022 and will end his notice period on October 31, 2023, in line with his contractual notice period (for more details, see "—2022 Executive Committee member departures"). The LTPP grant for the 2022-2024 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis subject to the plan rules.

[11] Richard Saynor left the Executive Committee on October 25, 2022. The LTPP grant for the 2022-2024 performance cycle, included in the table above, will vest at the end of the performance cycle, subject to the plan rules.

[12] Susanne Schaffert stepped down from the Executive Committee on April 4, 2022 and will end her notice period on April 30, 2023, in line with her contractual notice period (for more details, see "—2022 Executive Committee member departures"). The LTPP grant for the 2022-2024 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis subject to the plan rules.

[13] John Tsai stepped down from the Executive Committee on May 15, 2022 and will end his notice period on May 15, 2023, in line with his contractual notice period (for more details, see "—2022 Executive Committee member departures"). The LTPP grant for the 2022-2024 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis subject to the plan rules.

[14] Robert Weltevreden stepped down from the Executive Committee on April 4, 2022 and will end his notice period on April 30, 2023, in line with his contractual notice period (for more details, see "—2022 Executive Committee member departures"). The LTPP grant for the 2022-2024 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis subject to the plan rules.

2021 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 2021.

Executive Committee member compensation at grant for financial year 2021

		Fixed compensation and pension benefits		Variable compensation				
		Actual compensation paid or granted for 2021				Long-Term Incentive 2021-2023 cycle grants at target		
		2021 annual base salary	2021 pension benefits	2021 Annual Incentive (performance achieved)		LTPP 2021-2023 cycle	Other 2021 compensation	Total compensation paid, promised or granted 2021
	Currency	Cash (amount)	Amount [1]	Cash (amount)	Equity (value at grant date) [2]	PSUs (target value at grant date) [3]	Amount [4]	Amount [5]
Executive Committee members active on December 31, 2021								
Vasant Narasimhan	CHF	1 769 200	176 731	1 328 625	1 328 642	5 757 423	265 401	10 626 023
James Bradner [6]	USD	1 184 462	367 246	712 802	712 839	2 970 016	92 286	6 039 652
Karen Hale (from May 15, 2021) [7]	CHF	519 750	85 987	261 062	261 133	1 442 371	542 689	3 112 992
Harry Kirsch	CHF	1 072 084	177 174	354 255	1 062 820	2 791 111	43 617	5 501 060
Robert Kowalski (from September 1, 2021) [8]	CHF	233 333	49 692	105 288	105 360	448 824	180 428	1 122 925
Steffen Lang	CHF	780 833	180 413	508 680	763 076	1 570 027	14 430	3 817 459
Klaus Moosmayer	CHF	566 667	198 992	253 000	253 004	1 035 044	49 850	2 356 557
Richard Saynor	CHF	785 000	190 263	196 500	196 572	1 493 478	416 693	3 278 506
Susanne Schaffert	CHF	881 333	180 837	88 250	794 262	2 118 082	856 650	4 919 415
John Tsai	CHF	875 834	186 807	306 950	307 012	2 192 567	201 307	4 070 477
Marie-France Tschudin	CHF	881 333	164 980	706 000	706 019	2 029 750	–	4 488 083
Robert Weltevreden	CHF	673 333	171 352	299 200	299 275	1 292 042	–	2 735 202
Total		**10 121 211**	**2 098 866**	**5 059 259**	**6 728 657**	**24 885 096**	**2 655 408**	**51 548 498**
Executive Committee members who stepped down during 2021								
Steven Baert (until June 30, 2021) [9]	CHF	400 277	87 753	399 887	–	422 223	1 831 302	3 141 442
Bertrand Bodson (until January 31, 2021) [10]	CHF	54 451	15 240	43 485	–	–	1 339 471	1 452 647
Shannon Thyme Klinger (until March 15, 2021) [11]	CHF	177 102	40 434	–	–	279 791	2 018 161	2 515 487
Subtotal		**631 830**	**143 427**	**443 372**	**0**	**702 014**	**5 188 934**	**7 109 576**
Total		**10 753 041**	**2 242 292**	**5 502 631**	**6 728 657**	**25 587 110**	**7 844 343**	**58 658 074**

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 2024

[1] Includes mandatory employer contributions of CHF 5 498 for the CEO and CHF 53 693 for the other Executive Committee members paid by Novartis to governmental social security systems. This amount is out of total employer contributions of CHF 4 966 397 paid in 2021 for all Executive Committee members, and provides a right to the maximum future insured government pension benefit.
[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 26, 2022) of CHF 78.16 per Novartis share and USD 84.24 per ADR.
[3] The amounts represent the underlying share value of the target number of PSUs granted to Executive Committee members for the 2021-2023 performance cycle, based on the closing share price on the grant date (January 20, 2021) of CHF 86.01 per Novartis share and USD 96.92 per ADR for all members.
[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). The compensation and benefits elements related to the period after the step-down dates are also reported under 'other 2021 compensation'.
[5] All amounts are before deduction of the social security contribution and income tax due by the Executive Committee member.
[6] Amounts in USD for James Bradner were converted at a rate of CHF 1.00 = USD 1.0942, which is the average rate used in the Group's 2021 consolidated financial statements.
[7] Karen Hale received a pro-rata LTPP award of 18 639 PSUs on Apr-2, 2021 (at CHF 81.15 share price at grant) upon joining the organization, as per contractual entitlement. The other compensation amount includes the first six weeks of compensation before her appointment to the Executive Committee.
[8] Robert Kowalski received his 2021 LTPP grant before his appointment to Executive Committee, therefore the reported LTPP amount is pro-rated to reflect his time as Executive Committee member over the full performance cycle.
[9] Steven Baert left the Executive Committee on June 30, 2021 and ended his notice period on September 30, 2021, in line with his reduced contractual notice period (for more details, see "—2021 Executive Committee member departures"). He received his 2021 Annual Incentive 100% in cash on a pro-rata basis, and the LTPP grant for the 2021-2023 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis subject to the plan rules.
[10] Bertrand Bodson left the Executive Committee on January 31, 2021 and ended his notice period on November 30, 2021, in line with his reduced contractual notice period (for more details, see "—2021 Executive Committee member departures"). He received his 2021 Annual Incentive 100% in cash on a pro-rata basis, and no LTPP was granted for the 2021-2023 performance cycle.
[11] Shannon Klinger resigned as Chief Legal Officer as of March 15, 2021, and left the Company on May 31, 2021, in line with her reduced contractual notice period (for more details, see "—2021 Executive Committee member departures"). The 2021 Annual Incentive and LTPP 2021-2023 cycle grant (23 586 PSUs), displayed at pro-rata value for the time she was in her role in 2021, were forfeited in full upon her departure.

Compensation at grant value for the CEO and other Executive Committee members for 2022 compared with 2021

Compensation at grant delivered in 2022 to the CEO and the other Executive Committee members, including those who stepped down, was CHF 70 819 358, which was an increase of 20.7% compared with the prior year. This increase was driven mainly by the change in composition of the Executive Committee during 2022. Compensation at grant for the active Executive Committee members on December 31, 2022 (11 active members versus 12 in prior year) was CHF 49 852 130, which is a reduction of 3.3% from December 31, 2021.

Additional disclosures for the CEO and other Executive Committee members

This section provides additional disclosures, including information about the shareholdings of the CEO and the other Executive Committee members.

Malus and clawback

Consistent with our "—Executive Committee compensation philosophy and principles," in 2022 there was no legal or factual basis on which to exercise malus or clawback for current or former Executive Committee members.

Number of equity instruments granted to the CEO and other Executive Committee members for the financial year 2022

	Variable compensation[1]		
	2022 Annual Incentive (performance achieved)	LTPP 2022-2024 cycle	Other
	Equity (number)[2]	PSUs (target number)[3]	Equity/PSUs (number)
Executive Committee members active on December 31, 2022			
Vasant Narasimhan	15 735	74 410	0
Shreeram Aradhye (from May 16, 2022)	3 177	18 905	5 708
Victor Bulto (from May 1, 2022)	3 345	10 671	0
Aharon Gal (from July 18, 2022)	1 759	0	43 253
Karen Hale	10 962	21 751	0
Harry Kirsch	7 689	36 060	0
Robert Kowalski	4 103	16 282	0
Steffen Lang	10 971	22 032	0
Fiona Marshall (from November 1, 2022)	1 090	0	41 510
Klaus Moosmayer	3 679	13 381	0
Marie-France Tschudin	6 181	28 404	0
Total	**68 691**	**241 896**	**90 471**
Executive Committee members who stepped down during 2022			
James Bradner (until October 31, 2022)[4]	6 527	35 969	0
Richard Saynor (until October 25, 2022)[5]	4 502	19 107	0
Susanne Schaffert (until April 4, 2022)[6]	1 890	27 360	0
John Tsai (until May 15, 2022)[7]	1 889	28 052	0
Robert Weltevreden (until April 4, 2022)[8]	1 192	17 580	0
Subtotal	**16 000**	**128 068**	**0**
Total	**84 691**	**369 964**	**90 471**

See next page for 2021 comparative figures.

[1] The values of the awards are reported in the table "2022 compensation at grant value for the CEO and other Executive Committee members."

[2] Vested shares, restricted shares and/or RSUs granted under the Annual Incentive for the 2022 performance period.

[3] Target number of PSUs granted under the LTPP as applicable for the 2022-2024 performance cycle.

[4] James Bradner stepped down from the Executive Committee on October 31, 2022 and will end his notice period on October 31, 2023, in line with his contractual notice period (for more details, see "—2022 Executive Committee member departures"). The LTPP grant for the 2022-2024 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis subject to the plan rules.

[5] Richard Saynor left the Executive Committee on October 25, 2022. The LTPP grant for the 2022-2024 performance cycle, included in the table above, will vest at the end of the performance cycle, subject to the plan rules.

[6] Susanne Schaffert stepped down from the Executive Committee on April 4, 2022 and will end her notice period on April 30, 2023, in line with her contractual notice period (for more details, see "—2022 Executive Committee member departures"). The LTPP grant for the 2022-2024 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis subject to the plan rules.

[7] John Tsai stepped down from the Executive Committee on May 15, 2022 and will end his notice period on May 15, 2023, in line with his contractual notice period (for more details, see "—2022 Executive Committee member departures"). The LTPP grant for the 2022-2024 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis subject to the plan rules.

[8] Robert Weltevreden stepped down from the Executive Committee on April 4, 2022 and will end his notice period on April 30, 2023, in line with his contractual notice period (for more details, see "—2022 Executive Committee member departures"). The LTPP grant for the 2022-2024 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis subject to the plan rules.

Number of equity instruments granted to the CEO and other Executive Committee members for the financial year 2021 (comparative information)

	Variable compensation[1]		
	2021 Annual Incentive (performance achieved)	LTPP 2021-2023 cycle	Other
	Equity (number)[2]	PSUs (target number)[3]	Equity/PSUs (number)
Executive Committee members active on December 31, 2021			
Vasant Narasimhan	16 999	66 939	0
James Bradner	8 462	30 644	0
Karen Hale (from May 15, 2021)	3 341	17 823	0
Harry Kirsch	13 598	32 451	0
Robert Kowalski (from September 1, 2021)	1 348	5 067	0
Steffen Lang	9 763	18 254	0
Klaus Moosmayer	3 237	12 034	0
Richard Saynor	2 515	17 364	0
Susanne Schaffert	10 162	24 626	0
John Tsai	3 928	25 492	0
Marie-France Tschudin	9 033	23 599	0
Robert Weltevreden	3 829	15 022	0
Total	**86 215**	**289 315**	**0**
Executive Committee members who stepped down during 2021			
Steven Baert (until June 30, 2021)[4]	0	4 909	0
Bertrand Bodson (until January 31, 2021)[5]	0	0	0
Shannon Thyme Klinger (until March 15, 2021)[6]	0	3 253	0
Subtotal	**0**	**8 162**	**0**
Total	**86 215**	**297 477**	**0**

[1] The values of the awards are reported in the table "2021 compensation at grant value for the CEO and other Executive Committee members."
[2] Vested shares, restricted shares and/or RSUs granted under the Annual Incentive for the 2021 performance period.
[3] Target number of PSUs granted under the LTPP as applicable for the 2021-2023 performance cycle.
[4] Steven Baert left the Executive Committee on June 30, 2021 and ended his notice period on September 30, 2021, in line with his reduced contractual notice period (for more details, see "—2021 Executive Committee member departures"). The LTPP grant for the 2021-2023 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis subject to the plan rules.
[5] Bertrand Bodson left the Executive Committee on January 31, 2021 and ended his notice period on November 30, 2021, in line with his reduced contractual notice period (for more details, see "—2021 Executive Committee member departures"). No LTPP was granted for the 2021-2023 performance cycle.
[6] Shannon Klinger resigned as Chief Legal Officer as of March 15, 2021, and left the Company on May 31, 2021, in line with her reduced contractual notice period (for more details, see "—2021 Executive Committee member departures"). The LTPP 2021-2023 cycle grant (23 586 PSUs), displayed at pro-rata value for the time she was in her role in 2021, was forfeited in full upon her departure.

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 RSUs within five years of hire or promotion, as set out in the table here. In addition, the CEO and CFO are required to hold the equity vesting under the LTPP plan (granted since 2022) for a minimum of two years after the vesting date. In the event of a substantial rise or drop in the share price, the Board of Directors may, at its discretion, amend that time period accordingly.

The determination of equity amounts against the share ownership requirements is defined to include vested and unvested Novartis shares or American Depositary Receipts (ADRs), together with RSUs acquired under the Company's compensation plans. Unvested PSUs are, however, excluded. The determination also includes other shares and 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.

FUNCTION	OWNERSHIP LEVEL
CEO	5 x base compensation
Other Executive Committee members	3 x base compensation

Shares, ADRs and other equity rights owned by Executive Committee members as at December 31, 2022[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 at December 31, 2022. As at December 31, 2022, 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 at December 31, 2022, 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[1]	Unvested shares and other equity rights[2]	Equity ownership level as a multiple of annual base salary[3]	Unvested target PSUs (e.g., LTPP)[4]	**Total as at December 31, 2022**
Vasant Narasimhan	228 614	69 687	13x	108 201	406 502
Shreeram Aradhye (from May 16, 2022)	1 241	8 885	0x	4 268	14 394
Victor Bulto (from May 1, 2022)	0	21 292	2x	15 094	36 386
Aharon Gal (from July 18, 2022)	17 948	45 012	6x	0	62 960
Karen Hale	0	9 458	0x	19 110	28 568
Harry Kirsch	312 682	34 816	26x	52 450	399 948
Robert Kowalski	0	17 398	2x	15 097	32 495
Steffen Lang	118 057	27 383	14x	28 797	174 237
Fiona Marshall (from November 1, 2022)	0	32 951	2x	2 029	34 980
Klaus Moosmayer	16 713	12 524	4x	18 184	47 421
Marie-France Tschudin	52 818	28 447	6x	46 699	127 964
Subtotal	**748 073**	**307 853**		**309 929**	**1 365 855**
Executive Committee members who stepped down during 2022					
James Bradner (until October 31, 2022)	0	34 231	2x	70 171	104 402
Richard Saynor (until October 25, 2022)	0	16 843	1x	48 117	64 960
Susanne Schaffert (until April 4, 2022)	142 844	26 245	15x	44 981	214 070
John Tsai (until May 15, 2022)	13 550	21 812	3x	49 826	85 188
Robert Weltevreden (until April 4, 2022)	28 755	14 436	5x	27 317	70 508
Subtotal	**185 149**	**113 567**		**240 412**	**539 128**
Total	**933 222**	**421 420**		**550 341**	**1 904 983**

[1] Includes holdings of "persons closely linked" to Executive Committee members (see the 'persons closely linked' definition).
[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 2022 financial year. The share price on the final trading day of 2022 was CHF 83.59 / USD 90.72 as at December 31, 2022.
[4] The target number of PSUs is disclosed pro-rata to December 31, 2022, unless the award qualified for full vesting under the relevant plan rules.

Fixed and variable compensation

The following table summarizes the annual base salary and variable compensation mix at grant value for the financial year 2022 for the CEO and other Executive Committee members.

	Annual base salary[1]	Variable compensation[2]
Vasant Narasimhan	16.6%	83.4%
Shreeram Aradhye (from May 16, 2022)	16.4%	83.6%
Victor Bulto (from May 1, 2022)	21.5%	78.5%
Aharon Gal (from July 18, 2022)	6.9%	93.1%
Karen Hale	23.3%	76.7%
Harry Kirsch	20.6%	79.4%
Robert Kowalski	23.6%	76.4%
Steffen Lang	22.9%	77.1%
Fiona Marshall (from November 1, 2022)	4.3%	95.7%
Klaus Moosmayer	25.4%	74.6%
Marie-France Tschudin	22.5%	77.5%
Total[3]	**17.5%**	**82.5%**

[1] Excludes pension and other benefits and is pro-rated for ECN time.
[2] See the table "2022 compensation at grant value for the CEO and other Executive Committee members" with regard to the disclosure principles of variable compensation.
[3] Excludes members, who stepped down during the year.

Other payments to Executive Committee members

During 2022, no other payments or waivers of claims other than those set out in the tables (including the footnotes) contained in this Compensation Report were made to Executive Committee members or to "persons closely linked" to them.

Payments to former Executive Committee members

Under the former Executive Committee members' contracts and in line with the Company's LTI plan rules, payments were made to 8 former members. Of this, CHF 993 574 relates to the vesting of LTI awards. In addition, contractual amounts totaling CHF 167 106 were made (comprising the base salary, the Annual Incentive and other benefits), and tax equalization on variable compensation granted during international assignments amounted to a total of CHF 296 627.

No other payments (or waivers of claims) were made to former Executive Committee members or to "persons closely linked" to them during 2022.

Persons closely linked

"Persons closely linked" are (i) their spouse, (ii) their children (under 18 years of age), (iii) any legal entities that they own or otherwise control, and (iv) any legal or natural person who is acting as their fiduciary.

Note 27 to the Group's audited consolidated financial statements

The total expense for the year for compensation awarded to Executive Committee and Board members, using International Financial Reporting Standards (IFRS) measurement rules, is presented in Note 27 to the Group's audited consolidated financial statements.

Award and delivery of equity to Novartis employees

During 2022, 12.7 million unvested restricted shares (or ADRs), RSUs and target PSUs were granted, and 10.4 million Novartis vested shares (or ADRs) were delivered to Novartis employees under various equity-based participation plans. Current unvested equity instruments (restricted shares, RSUs and target PSUs) and outstanding equity options held by employees represent 1.05% of issued shares. Novartis delivers treasury shares to employees to fulfill these obligations and aims to offset the dilutive impact from its equity-based participation plans.

Interim update regarding ongoing LTI performance cycles

Below we report how performance is tracking against our stretch targets for our ongoing LTI performance cycles.

2021-2023 LTPP

After the first two years of the three-year LTPP performance cycle, both net sales CAGR and core operating income CAGR are tracking behind target, driven mainly by the impact of the safety update on Beovu. Innovation is on track. At the end of 2022, the relative TSR for Novartis was below median among our global healthcare peer group.

PERFORMANCE MEASURES	TRACKING
Net sales CAGR (25%)	◑
Core operating income CAGR (25%)	◑
Innovation (25%)	●
Relative TSR (25%)	◑

CAGR = compound annual growth rate

2022-2024 LTPP

After the first year of the three-year LTPP performance cycle, net sales CAGR is on target and core operating income CAGR is ahead of target, while innovation performance is on target. At the end of 2022, the relative TSR for Novartis was below the median among our global healthcare peer group.

PERFORMANCE MEASURES	TRACKING
Net sales CAGR (25%)	●
Core operating income CAGR (25%)	●
Innovation (25%)	●
Relative TSR (25%)	◑

CAGR = compound annual growth rate

● On or ahead of target ◑ Slightly behind or behind target

2023 Executive Committee compensation

2023 Executive Committee compensation changes

The Compensation Committee believes that the compensation system supports the company's strategy and ensures a strong link between pay and performance.

Following a positive vote of 90.6% in favor of our 2021 Compensation Report at the 2022 AGM, the Board and Compensation Committee decided to make evolutionary changes to the compensation system. The aim of these changes is to simplify and increase the transparency of our performance assessment measures, in addition to strengthening our focus on key strategic priorities, while also considering developments in compensation best practices.

There are also changes as a result of the Swiss Corporate Law reform, which came into effect on January 1, 2023.

Assuming that the Sandoz spin-off will occur in 2023, some impact is expected on 2023 Executive Compensation.

Annual Incentive

Following a review, the Compensation Committee decided to adapt the financial performance in the Annual Incentive Plan effective as of performance year 2023 as below:

- Remove "Share of Peers" from the financial performance measures in the Annual Incentive plan. As a result, the Annual Incentive financial performance measures are Group Net Sales (40%), Group Operating Income (30%) and Group Free Cash Flow[1] (30%), thereby retaining a strong link to our key priorities
- Group financial measures will be weighted at 60% for all Executive Committee members. Financial targets that relate to a division or business unit, where applicable, will be part of the individual strategic objectives (40% weight)

Swiss Corporate Law reform

Following the reform of Swiss corporate law, which came into effect on January 1, 2023, the following changes will be made to compensation design and disclosure in the 2023 Compensation Report:

- Contracts of Executive Committee members will be adapted so that any non-compete compensation will not exceed the average annual compensation of the previous three financial years
- In previous years, the Swiss regulations permitted companies to award compensation of up to 40% above the shareholder approved budget for newly appointed members of the Executive Committee, whether that be through internal promotions or external hires. From 2023, this additional budget of 40% will only be made available for external appointments of Executive Committee members

These changes will require adjustments to the Articles of Incorporation of Novartis, which will be submitted to Novartis shareholders for their approval at the 2023 AGM.

Sandoz spin-off

In August 2022, we announced our intention to separate Sandoz, our generics and biosimilars division, into a new publicly traded standalone company, by way of a 100% spin-off, subject to approval of the Novartis AG Board of Directors and shareholders. In view of the planned spin-off, the Compensation Committee made the following decisions.

Sandoz CEO 2023 Annual Incentive

Based on the assumption that the spin-off will be implemented in the second half of 2023, the 2023 Balanced Scorecard for Richard Saynor, CEO designate of Sandoz, will be adapted so that his 2023 Annual Incentive will be based exclusively on the financial and strategic performance of Sandoz.

Equity Restoration principles

If and when the planned spin-off occurs, holders of vested and unvested awards in the form of Novartis shares or ADRs will receive a dividend in kind resulting from the spin-off in the same way as other Novartis shareholders. Holders of unvested RSUs and PSUs will not receive the dividend in kind resulting from the spin-off. To compensate for the expected reduction in shareholder value after the issue of dividend in kind, Novartis will grant equity awards (called "Keep Whole awards") to its employees, including the Executive Committee members, following the spin-off. This will be undertaken in accordance with the Sandoz equity restoration plan, as follows:

- The Keep Whole awards will have a value similar to the value of the dividend in kind resulting from the spin-off that each RSU or PSU would have received had it been a Novartis share or ADR
- The aim of the Keep Whole awards is to ensure that Novartis employees who have been granted RSUs or PSUs, including Executive Committee members, are not disadvantaged by the spin-off relative to Novartis shareholders

More details will be shared at the time of the spin-off.

[1] For the purposes of the 2023 annual incentives, free cash flow is defined as net cash flows from operating activities less purchases of property, plant and equipment.

2023 Executive Committee member compensation increases

Each year, we collaborate with our external advisors to benchmark the compensation levels of the members of the Executive Committee and assess the competitiveness of their total target compensation. 2023 salary increases have been made in line with their demonstrated performance and ability in their respective roles, and commensurate to changes in responsibilities, if any, as outlined in our "—Executive Committee appointments compensation policy".

In general, Executive Committee members (including the CEO) will receive compensation changes applicable to associates in Switzerland or where applicable, the US. The members who will receive an additional increase based on the principles outlined above are mentioned below.

Karen Hale, Chief Legal Officer
Ms. Hale, who has joined the Executive Committee in May 2021, delivered many highlights in 2022, including effectively managing ongoing cases with the SEC/DOJ, creating a new, focused and efficient global legal function, preparing for the Sandoz spin-off effectively, and continuing to improve the governance of the company. Effective March 1, 2023, Ms. Hale will receive a 6% increase in annual base salary increase and a 10% increase LTI target, as a percentage of annual base salary.

Klaus Moosmayer, Chief Ethics, Risk & Compliance Officer
Following the implementation of the new organization structure in 2022, Mr. Moosmayer took over additional management responsibilities in the areas of HSE governance, Data Privacy, and Digital & Artificial Intelligence Compliance. He demonstrated strong leadership across all responsibilities of compliance, risk, ethics, and managing emerging issues including the company's continuing response to the global pandemic, the lockdown in China and crisis management related to the war in Ukraine. Effective March 1, 2023, Mr. Moosmayer will receive a 12% increase in annual base salary increase and a 10% increase LTI target, as a percentage of annual base salary, to recognize these additional responsibilities.

Marie-France Tschudin, President, Innovative Medicines International & Chief Commercial Officer
Following her appointment in April 2022 as the President, Innovative Medicines International & Chief Commercial Officer, Ms. Tschudin effectively executed the creation of our new Innovative Medicines International organization and Chief Commercial Office. During the year, she designed the new organization structure, implementing a large restructuring program and creating new therapeutic areas with clear portfolio focus, while delivering strong commercial performance in Region International and ensuring growth above target for many key brands. Effective March 1, 2022, Ms. Tschudin will receive a 5% increase in annual base salary, and a 10% increase in both her Annual Incentive target and LTI target, as a percentage of annual base salary, to recognize her increased responsibilities as the Chief Commercial Officer.

Following an assessment of their compensation competitiveness and performance, recently appointed Executive Committee members Victor Bulto, Aharon (Ronny) Gal, and Robert Kowalski will receive a 10–20% increase in their Annual Incentive target and/or LTI target, in line with the "—Executive Committee appointments compensation policy". Steffen Lang will also receive a 10% increase in LTI target as a result of his enhanced responsibilities in Operations.

2022 Board compensation

Philosophy and benchmarking

Aligned with market practice in Switzerland, the Board of Directors sets compensation for its members at a level that allows for the attraction of high-caliber individuals, including both Swiss and international members, who have global experience.

Given their focus on corporate strategy, supervision and governance, Board members do not receive variable compensation. Each year at the AGM, shareholders are requested to approve, in a binding vote, the total compensation of the Board of Directors until the following AGM.

The Board of Directors sets the level of compensation for its Chair and the other members to be in line with relevant benchmark companies, including other large Switzerland-based multinational companies such as ABB, Credit Suisse, Holcim, Nestlé, Roche and UBS. This peer group was chosen for Board compensation due to the comparability of Swiss legal requirements, including broad personal and individual liabilities under Swiss law (and 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 of Directors reviews the compensation of its members, including the Board Chair, each year based on a proposal by the Compensation Committee and advice from its independent advisor, including relevant benchmarking information. To ensure independence of decision-making, the peer group used for the Board of Directors is different to that used for the Executive Committee.

The Board Chair's contract and the Board of Directors compensation policy do not provide for any termination-related payments.

Board Chair

As Board Chair, 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 2022, the Board Chair voluntarily waived the increase in compensation to which he is contractually entitled.

Other Board members

The annual fee rates for Board membership and additional functions are included in the table below. These were approved by the Board of Directors with effect from the 2022 AGM. Aggregate Board compensation is aligned with other large Swiss companies.

CHF 000s	2022-2023 AGM annual fee
Board Chair	3 800
Board membership	280
Vice-Chair	50
Lead Independent Director	20
Chair of the Audit and Compliance Committee	130
Chair of the Compensation Committee	90
Chair of the following committees: • Governance, Nomination and Corporate Responsibilities Committee • Science & Technology Committee • Risk Committee	70
Membership of the Audit and Compliance Committee	70
Membership of the following committees: • Compensation Committee • Governance, Nomination and Corporate Responsibilities Committee • Science & Technology Committee • Risk Committee	40

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.

2023 Board compensation

In 2022, the Compensation Committee reviewed, together with its independent advisor, the Board of Directors' compensation system against the Swiss Market Index. They found that the Board Chair fees and retainer fees of the other Board members are well positioned and competitive among the benchmarked companies in relation to the Company's size, operational complexity and corporate headquarter's location. Additional information on our Board benchmarking practices is provided in "—2022 Board compensation." The compensation system and fee levels for the Board of Directors will therefore remain unchanged in 2023.

Board member total compensation earned for the financial year 2022

	Board membership	Audit and Compliance Committee	Compensation Committee	Governance, Sustainability and Nomination Committee	Science & Technology 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, 2022											
Joerg Reinhardt [4]	Board Chair				Chair		23 574	1 900 000	1 900 000	3 670	3 803 670
Simon Moroney	Vice-Chair [6]		Chair		•		2 695	225 834	225 834	4 560	456 228
Patrice Bula	Lead Independent Director [6]		•	Chair [6]			2 259	197 500	197 500	3 670	398 670
Nancy C. Andrews	•				•	•	2 233	180 000	180 000	–	360 000
Ton Buechner	•	•				Chair	2 605	210 000	210 000	4 560	424 560
Elizabeth Doherty	•	Chair				•	2 791	225 000	225 000	–	450 000
Bridgette Heller	•	•	•	• [6]			2 541	211 667	211 667	–	423 334
Daniel Hochstrasser	• [6]						856	116 667	116 667	4 560	237 894
Frans van Houten	•	•			•		4 838	–	390 000	–	390 000
Ana de Pro Gonzalo	• [6]	•				•	1 192	162 500	162 500	4 560	329 560
Andreas von Planta	•			•		•	2 327	182 500	182 500	3 670	368 670
Charles L. Sawyers	•			•	•		2 233	180 000	180 000	–	360 000
William T. Winters	•		•	•			4 466	–	360 000	–	360 000
Subtotal							**54 610**	**3 791 668**	**4 541 668**	**29 250**	**8 362 586**
Board members who stepped down at the 2022 AGM											
Ann Fudge [5]							1 132	30 000	30 000	–	60 000
Enrico Vanni [5]							1 509	40 000	40 000	3 670	83 670
Subtotal							**2 641**	**70 000**	**70 000**	**3 670**	**143 670**
Total							**57 251**	**3 861 668**	**4 611 668**	**32 919**	**8 506 255**

See next page for 2021 comparative figures.

[1] The shown amounts represent the gross number of shares delivered to each Board member in 2022 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 2022 for the services from the 2021 AGM to the 2022 AGM, and (ii) the first of two equity installments delivered in August 2022 for the services from the 2022 AGM to the 2023 AGM. The second and final equity installment for the services from the 2022 AGM to the 2023 AGM will take place in February 2023.

[2] Includes an amount of CHF 29 250 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 453 083 and provides a right to the maximum future insured government pension benefit for the Board members.

[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 Science & Technology Committee were delivered to Joerg Reinhardt.

[5] Until March 4, 2022.

[6] From March 4, 2022.

Board member total compensation earned for the financial year 2021

	Board membership	Audit and Compliance Committee	Compensation Committee	Governance, Sustainability and Nomination Committee	Science & Technology 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, 2021											
Joerg Reinhardt [4]	Chairman				Chair		22 830	1 900 000	1 900 000	4 560	3 804 560
Enrico Vanni	Vice Chairman / Lead Independent Director [7]	•	•	•			3 035	244 167	244 167	3 670	492 004
Nancy C. Andrews	•				•	•	2 162	180 000	180 000	–	360 000
Ton Buechner	•	•				Chair [6]	3 625	175 000	240 000	4 560	419 560
Patrice Bula	•		•				1 922	160 000	160 000	4 560	324 560
Elizabeth Doherty	•	Chair				•	3 391	206 250	243 750	–	450 000
Ann Fudge	•			•	•		2 162	180 000	180 000	–	360 000
Bridgette Heller	•	• [6]	•				2 128	189 167	189 167	–	378 334
Frans van Houten	•	• [6]			•		4 257	–	378 333	–	378 333
Simon Moroney	•		Chair [6]		•		2 187	197 500	197 500	4 560	399 560
Andreas von Planta	•			Chair		•	2 556	200 833	200 833	3 670	405 336
Charles L. Sawyers	•			•	•		2 162	180 000	180 000	–	360 000
William T. Winters	•		•	•			4 325	–	360 000	–	360 000
Subtotal							**56 742**	**3 812 917**	**4 653 750**	**25 580**	**8 492 247**
Board members who stepped down at the 2021 AGM											
Srikant Datar [5]							1 970	23 000	53 667	–	76 667
Subtotal							**–**	**–**	**–**	**–**	**–**
Total							**58 712**	**3 835 917**	**4 707 417**	**25 580**	**8 568 914**

[1] The shown amounts represent the gross number of shares delivered to each Board member in 2021 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 2021 for the services from the 2020 AGM to the 2021 AGM, and (ii) the first of two equity installments delivered in August 2021 for the services from the 2021 AGM to the 2022 AGM. The second and final equity installment for the services from the 2021 AGM to the 2022 AGM will take place in February 2022.
[2] Includes an amount of CHF 25 580 for mandatory employer contributions for all Board members paid by Novartis to governmental social security systems. This amount is out of total employer contributions of CHF 435 204 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 Science & Technology Committee were delivered to Joerg Reinhardt.
[5] Until March 2, 2021.
[6] From March 2, 2021.
[7] No additonal compensation was paid for the Lead Independent Director role.

Additional disclosures

Share ownership requirements for Board members

The Board Chair is required to own a minimum of 30 000 Novartis shares, and other members of the Board of Directors are required to own at least 5 000 Novartis shares within five years after joining the Board of Directors, 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 of Directors. As at December 31, 2022, all current and former members of the Board of Directors who were required to meet the minimum share ownership requirements did so.

Shares, ADRs and share options owned by Board members

The total number of vested Novartis shares and ADRs owned by members of the Board of Directors and "persons closely linked" to them as at December 31, 2022, is shown in the table below. As at December 31, 2022, 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 of Directors held any share options to purchase Novartis shares.

	Number of shares at December 31, 2022 [1,2]
Joerg Reinhardt	632 730
Simon Moroney	4 102
Patrice Bula	8 802
Nancy C. Andrews	8 931
Ton Buechner	20 461
Elizabeth Doherty	12 836
Bridgette Heller	4 296
Daniel Hochstrasser	804
Frans van Houten	14 442
Ana de Pro Gonzalo	823
Andreas von Planta	168 717
Charles L. Sawyers	15 888
William T. Winters	27 659
Sub-Total	**920 491**
Board members who stepped down at the 2022 AGM	
Enrico Vanni	32 078
Ann Fudge	12 751
Sub-Total	44 829
Total	**965 320**

[1] Includes holdings of "persons closely linked" to Board members (see definition "Persons closely linked").

[2] Each share provides entitlement to one vote.

Other payments to Board members

During 2022, no payments (or waivers of claims) other than those set out in the Board member compensation table titled "—Board member total compensation earned for the financial year 2022" (including in the table footnotes) were made to current members of the Board or to "persons closely linked" to them.

Payments to former Board members

During 2022, no payments (or waivers of claims) were made to former Board members or to "persons closely linked" to them.

Board member compensation approved by shareholders

The total compensation earned by Board members from the 2021 AGM to the 2022 AGM was within the amount approved by shareholders at the 2021 AGM.

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, and loans made to them. This Annual Report fulfills that requirement in addition to being in line with the principles of the Swiss Code of Best Practice for Corporate Governance of the Swiss Business Federation (economiesuisse). For more details, please refer to "—Corporate Governance" in Section 6C of this Report.

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 of Directors
- Balanced mix of short-term and long-term variable compensation elements
- Values and Behaviors are a key component of the Annual Incentive and are embedded in our culture
- Clawback and malus principles apply to all elements of the variable compensation
- Performance-vesting Long-Term Incentives only, with three-year cycles
- All variable compensation is capped at 200% of target
- Contractual notice period of 12 months
- Post-contractual non-compete period is limited to a maximum of 12 months from the end of employment. Resulting compensation, if applicable, will not exceed the average annual compensation (annual base salary plus Annual Incentive) of the previous three financial years
- 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
- No loans granted to current or former members of the Executive Committee and the Board of Directors or to "persons closely linked" to them

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 of Directors in line with the Compensation Committee Charter. The discussions and conclusions of each committee meeting are delivered to the full Board of Directors. A summary of the compensation decision-making authorities is set out below.

Compensation authorization levels within the parameters set by the shareholders' meeting

DECISION ON	DECISION-MAKING AUTHORITY
Compensation of Board Chair and other Board members	Board of Directors
Compensation of CEO	Board of Directors
Compensation of other Executive Committee members	Compensation Committee

Committee member independence

The Compensation Committee is composed exclusively of members of the Board of Directors who meet the independence criteria set forth in the Board Regulations. From the 2022 AGM, the Compensation Committee consisted of the following four members: Simon Moroney (as Chair), Patrice Bula, Bridgette Heller, and William Winters.

Role of the Compensation Committee's independent advisor

The independent external compensation advisor supports the committee in determining the design and implementation of compensation and benefits.

The Compensation Committee retained Mercer Limited, which was appointed in July 2017, as its independent external advisor until June 2022. As part of its normal governance practices, and with a view to ensuring the independence of the advisor, the Compensation Committee considered a change in the Committee advisor. To inform this decision, it conducted a market review of compensation advisors, with a focus on companies with extensive experience in European and US markets. Following a tendering process and an analysis to ensure that there were no conflicts of interest, the Compensation Committee appointed Mitul Shah of Deloitte AG as its independent compensation advisor with effect from July 2022. The independent advisors from Mercer Limited and Deloitte AG and their respective teams that advised and supported the committee are not responsible or rewarded for work beyond support provided to the Compensation Committee and the People & Organization function on senior compensation.

Meetings held in 2022 and self-evaluation

In 2022, the Compensation Committee held seven formal meetings. In line with prior years, it collaborated with the Science & Technology Committee to review and endorse, for approval by the Board of Directors, the innovation targets and achievements of the Annual Incentive and LTPP. The Compensation Committee conducted a self-evaluation in 2022.

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6.C Board practices

Corporate governance

Framework

Novartis is committed to effective corporate governance, and our corporate governance framework is intended to support sustainable financial performance and long-term value creation for our shareholders, patients, employees and other stakeholders based on our Values and Behaviors.

The Novartis corporate governance principles are further described in key governance documents, in particular in our Articles of Incorporation and the Regulations of the Board, the Board Committees and the Executive Committee ("Board Regulations") (www.novartis.com/investors/company-overview/corporate-governance).

The Governance, Sustainability and Nomination Committee regularly reviews both the corporate governance principles and the key governance documents against evolving best practice standards and new developments in line with our commitment to maintaining the highest standards.

To better reflect its evolving role and responsibilities in sustainability and environmental, social and governance (ESG) matters, the Board of Directors ("Board") amended, effective as of March 1, 2022, the Board Regulations and renamed the Governance, Nomination and Corporate Responsibilities Committee to the Governance, Sustainability and Nomination Committee (GSNC).

Governance bodies

GENERAL MEETING OF SHAREHOLDERS

Approves operating and financial review, Novartis Group consolidated financial statements, and financial statements of Novartis AG; decides appropriation of available earnings and dividend; approves compensation of Board and Executive Committee; elects Board members, Board Chair, Compensation Committee members, Independent Proxy and external auditor; adopts and modifies Articles of Incorporation

BOARD OF DIRECTORS

AUDIT AND COMPLIANCE COMMITTEE | COMPENSATION COMMITTEE | GOVERNANCE, SUSTAINABILITY AND NOMINATION COMMITTEE | RISK COMMITTEE | SCIENCE & TECHNOLOGY COMMITTEE

Sets strategic direction of Novartis, appoints and oversees key executives, approves major transactions and investments, adopts and modifies Board Regulations

EXECUTIVE COMMITTEE

Responsible for operational management of Novartis

EXTERNAL AUDITOR

Provides opinion on compliance of Novartis Group consolidated financial statements and the financial statements of Novartis AG with applicable standards and Swiss law, on compliance of the Compensation Report with applicable law, on effectiveness of internal controls over financial reporting, and limited assurance on selected performance indicators in the Novartis in Society Integrated Report

Group structure and shareholders

Group structure

Novartis AG and Group companies

Novartis AG, the Group's holding company, is a corporation organized under Swiss law with issued registered shares and registered office at Lichtstrasse 35, CH-4056 Basel, Switzerland.

The principal subsidiaries and associated companies of the Novartis Group are shown in "Item 18. Financial Statements—Note 31. Principal Group subsidiaries and associated companies."

Divisions and business units

Novartis has two operating divisions: Innovative Medicines (IM), which specializes in patent-protected medicines, and Sandoz[1], which sells generics and biosimilars. In 2022, Novartis integrated the Pharmaceuticals and Oncology business units under the IM Division and created two separate commercial organizations with a stronger geographic focus – Innovative Medicines International and Innovative Medicines US. IM is supported by the Novartis Institutes for BioMedical Research (NIBR) and Global Drug Development (GDD). Both operating divisions are supported by Novartis Operations (which combines the former Novartis Technical Operations (NTO) and Customer & Technology Solutions (CTS) units), and corporate functions. The latter includes the newly created Strategy & Growth function, which combines corporate strategy, R&D portfolio strategy and business development. A detailed review of 2022 business results can be found in "Item 18. Financial Statements—Note 3. Segmentation of key figures 2022, 2021 and 2020."

Shareholdings

Majority holdings in publicly traded Group companies

The Novartis Group owns 70.68% of Novartis India Ltd., with registered office in Mumbai, India, and a listing on the BSE (formerly known as the Bombay Stock Exchange) (ISIN INE234A01025, symbol: HCBA). The total market value of the 29.32% free float of Novartis India Ltd. was USD 59.0 million on December 31, 2022, 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 201.2 million, and that of the shares owned by Novartis was USD 142.2 million.

Shareholders

Significant shareholders

According to the Share Register, as of December 31, 2022, the following registered shareholders, including nominees and the American Depositary Share (ADS) depositary, held more than 2% of the total share capital, with the right to vote all their shares based on exemptions granted by the Board (see "—Item 6.C Board practices—Shareholder participation—Voting rights, restrictions and representation—Registration restrictions"):[2]

	% holding of share capital Dec 31, 2022
Shareholders registered for their own account:	
Emasan AG, Basel	3.7
UBS Fund Management (Switzerland) AG, Basel	2.3
Credit Suisse Funds AG, Zurich	2.1

	% holding of share capital Dec 31, 2022
Shareholders registered as nominees:	
Chase Nominees Ltd., London	8.4
Nortrust Nominees Ltd., London	3.8
The Bank of New York Mellon, New York	2.9
Through The Bank of New York Mellon, Everett	*1.6*
Through The Bank of New York Mellon, New York	*0.9*
Through The Bank of New York Mellon, SA/NV, Brussels	*0.4*
Shareholder acting as American Depositary Share (ADS) depositary:	
JPMorgan Chase Bank, N.A., New York	9.4

1 On August 25, 2022, Novartis announced its intention to separate the Sandoz business to create a standalone company by way of a 100% spin-off, with completion expected in the second half of 2023.

2 Excluding 7.7% of the share capital held as treasury shares by Novartis AG or its fully owned subsidiaries. As of the entry into force of the revised Swiss Code of Obligations on January 1, 2023, Novartis ordinary shares held by certain Swiss foundations controlled by Novartis also no longer carry the right to vote and therefore will be treated for this calculation as treasury shares going forward.

According to a disclosure notification filed with Novartis AG, Norges Bank (Central Bank of Norway), Oslo, held 2.3% of the share capital but was not registered in the Share Register as of December 31, 2022.

According to a disclosure notification filed with Novartis AG and the SIX Swiss Exchange Regulation AG, BlackRock, Inc., New York, held between 5% and 10% but was registered with less than 2% of the share capital as of December 31, 2022.

Disclosure notifications pertaining to shareholdings filed with Novartis AG and the SIX Swiss Exchange are published on the latter's electronic publication platform: www.ser-ag.com/en/resources/notifications-market-participants/significant-shareholders.html.

Duty to make an offer

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.

Cross shareholdings

Novartis AG has no cross shareholdings in excess of 5% of capital, or voting rights with any other company.

Overview on shareholder structure

The following tables relate only to registered shareholders and cannot be assumed to represent the entire 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, 2022, Novartis AG had approximately 186 000 registered shareholders.

Number of registered shareholders/shares

As of December 31, 2022 [1]	Number of registered shareholders	% of share capital
1–100	34 085	0.08
101–1 000	110 467	1.86
1 001–10 000	37 732	4.32
10 001–100 000	3 212	3.39
100 001–1 000 000	475	5.85
1 000 001–5 000 000	68	5.39
5 000 001 or more [2]	29	46.14
Total registered shareholders/shares	186 068	67.03
Unregistered shares		32.97
Total		**100.00**

[1] At the record date of the 2022 Annual General Meeting of Shareholders (AGM), unregistered shares amounted to 17.0%.
[2] Including significant registered shareholders as listed above

Registered shareholders by type

As of December 31, 2022	Shareholders in %	Shares in %
Individual shareholders	96.71	15.61
Legal entities [1]	3.25	37.69
Nominees, fiduciaries and ADS depositary	0.04	46.70
Total	**100.00**	**100.00**

[1] Excluding 7.7% of the share capital held as treasury shares by Novartis AG or its fully owned subsidiaries. As of the entry into force of the revised Swiss Code of Obligations on January 1, 2023, Novartis ordinary shares held by certain Swiss foundations controlled by Novartis also no longer carry the right to vote and therefore will be treated for this calculation as treasury shares going forward.

Registered shareholders by country[1]

As of December 31, 2022	Shareholders in %	Shares in %
Belgium	0.11	0.77
France	1.97	0.36
Germany	5.72	1.82
Japan	0.17	0.45
Luxembourg	0.06	0.79
Switzerland [2]	87.14	48.39
United Kingdom	0.63	23.68
United States	0.25	21.29
Other countries	3.95	2.45
Total	**100.00**	**100.00**

[1] Registered shares held by nominees are shown in the country where the company/affiliate entered in the Share Register as shareholder has its registered seat.
[2] Excluding 7.7% of the share capital held as treasury shares by Novartis AG or its fully owned subsidiaries. As of the entry into force of the revised Swiss Code of Obligations on January 1, 2023, Novartis ordinary shares held by certain Swiss foundations controlled by Novartis also no longer carry the right to vote and therefore will be treated for this calculation as treasury shares going forward.

Capital structure

Share capital

As of December 31, 2022, the share capital amounted to CHF 1 201 860 626 fully paid-in and divided into 2 403 721 252 registered shares with a nominal value of CHF 0.50 each.

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 American Depositary Shares (ADSs) (ISIN US66987V1098, symbol: NVS).

No authorized and conditional capital exists as of December 31, 2022.

Shares, participation certificates, non-voting equity securities, profit-sharing certificates

Shares are issued as uncertificated securities (in the sense of the Swiss Code of Obligations) and as book entry securities (in terms of the Swiss Act on Intermediated Securities). All shares have equal voting rights and carry equal entitlements to dividends. No participation certificates, non-voting equity securities (Genussscheine) or profit-sharing certificates have been issued.

Convertible securities and options

Novartis AG has not issued convertible or exchangeable bonds, warrants, options or other securities granting rights to shares, other than options (or similar instruments such as stock appreciation rights) granted under or in connection with equity-based participation plans of employees. Novartis AG does not grant any new stock options under these plans.

Limitation on transferability

No transferability restrictions are imposed on shares (for registration restrictions, see "—Item 6.C Board practices—Shareholder participation—Voting rights, restrictions and representation—Registration restrictions"). The registration of shareholders in the Share Register or in the ADR register kept by JPMorgan Chase Bank, N.A., does not affect the tradability of shares or ADRs.

Changes to share capital

AGM	Shareholder decision	Shares canceled	Average repurchase share price (CHF)[1]
2020	• Capital reduction by CHF 30.16 million (from CHF 1 263 687 410 to CHF 1 233 530 460)	60 313 900	88.18
2021	• Capital reduction by CHF 16.32 million (from CHF 1 233 530 460 to CHF 1 217 210 460) • Authorization of the Board to repurchase shares up to a maximum of CHF 10 billion between the 2021 AGM and the 2024 AGM	32 640 000	80.57
2022	• Capital reduction by CHF 15.35 million (from CHF 1 217 210 460 to CHF 1 201 860 626) • Authorization of the Board to repurchase shares up to a maximum of CHF 10 billion between the 2022 AGM and the 2025 AGM[2]	30 699 668	81.82

AGM	Proposal to the shareholders	Shares to be canceled	Average repurchase share price (CHF)[1]
2023	• Capital reduction by CHF 63.12 million (from CHF 1 201 860 626 to CHF 1 138 738 876) • Authorization of the Board to repurchase shares up to a maximum of CHF 10 billion between the 2023 AGM and the 2026 AGM[3]	126 243 500	81.56

[1] All shares were repurchased on the SIX Swiss Exchange second trading line.
[2] In addition to the remaining authorization from the 2021 AGM
[3] In addition to the remaining authorization from the 2022 AGM

Key Novartis share data

	2022	2021	2020
Issued shares	**2 403 721 252**	**2 434 420 920**	**2 467 060 920**
Treasury shares[1]	284 112 195	199 480 972	210 238 872
Outstanding shares at December 31	**2 119 609 057**	**2 234 939 948**	**2 256 822 048**
Weighted average number of shares outstanding	**2 181 180 341**	**2 242 601 173**	**2 277 041 940**

[1] Approximately 99 million treasury shares (2021: 102 million, 2020: 103 million) are held in Novartis entities that restrict their availability for use.

Per-share information[1]

	2022	2021	2020
Basic earnings per share from continuing operations (USD)	3.19	10.71	3.55
Diluted earnings per share from continuing operations (USD)	3.17	10.63	3.52
Net cash flows from operating activities from continuing operations (USD)	6.53	6.72	5.99
Year-end equity for Novartis AG shareholders (USD)	28.00	30.31	25.07
Dividend (CHF)[2]	3.20	3.10	3.00
Dividend (USD)[3]	3.46	3.33	3.20

[1] Calculated on the weighted average number of shares outstanding, except year-end equity
[2] 2022: proposal to shareholders for approval at the AGM on March 7, 2023.
[3] Translated into US dollars at the December 31, 2022, rate of USD 1.081 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. 2021 and 2020, dividends are translated into US dollars at the Bloomberg Market System Rate on the payment date.

Key ratios – December 31

	2022	2021	2020
Price/earnings ratio[1]	28.3	8.2	26.7
Dividend yield (%)[1]	3.8	3.9	3.6

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

Key data on ADRs issued in the US

	2022	2021	2020
Year-end ADR price (USD)	90.72	87.47	94.43
High[1]	93.75	98.47	99.01
Low[1]	74.61	79.70	70.67
Number of ADRs outstanding[2]	225 435 680	269 891 321	288 755 853

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

Share price (CHF)

	2022	2021	2020
Year-end share price	83.59	80.28	83.65
High[1]	87.82	86.75	95.82
Low[1]	73.98	73.44	69.96
Year-end market capitalization (USD billions)[2]	**191.5**	**196.1**	**214.3**
Year-end market capitalization (CHF billions)[2]	**177.2**	**179.4**	**188.8**

[1] Based on 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.

Shareholder participation

Shareholder engagement

Shareholder engagement is fundamental to our commitment to governance and transparency, and the feedback we receive during these engagements helps us create long-term and sustainable value.

We concentrate our outreach efforts on our largest 100 shareholders – portfolio managers, buy-side professionals, stewardship teams and ESG analysts – who represent 60% of our ownership. While the Board Chair, CEO and CFO, together with Investor Relations, are accountable for ensuring effective shareholder engagement, other senior managers from within and outside the Executive Committee also participate in the meetings. We conduct regular outreach to investors throughout the year.

TYPES OF ENGAGEMENTS (SELECT EXAMPLES):

- AGM and quarterly results teleconferences (TCs)
- Bank conferences and management roadshows
- "Meet Novartis Management" capital markets event
- Governance roadshow and TCs
- Board Chair's TCs for US and UK investors
- ESG roadshows
- Investor Update on Access & Sustainability (formerly known as ESG Investor Day)
- Update on the new organizational model
- Update on the Sandoz business

TOPICS DISCUSSED WITH SHAREHOLDERS DURING 2022:

GROWTH:
- Replacement power
- Growth drivers (*Cosentyx, Entresto, Zolgensma, Kisqali, Kesimpta, Leqvio*)
- Policy and pricing environment
- Life cycle management

INNOVATION:
- Progress and milestones
- Data of pipeline projects
- Return on R&D investments

PRODUCTIVITY:
- Progress on financial, strategic and operational performance
- Long-term sustainability of financial performance
- Capital allocation strategy
- New organization model
- Intention to separate Sandoz business

BUILDING TRUST WITH SOCIETY AND CULTURE:
- Board accountability on ESG, and integration of ESG and compensation
- Strong governance, enhanced process and focus on material ESG factors, leading to improved rating agency scores
- Patient access to innovative medicines
- Learning from *Novartis Access* programs implemented over the decades, including integrated sustainable business models and access principles to help address access and inequities
- ESG targets: full carbon neutrality, patient access targets for strategic innovative therapies, and global health flagship programs
- Progress on culture and other human capital metrics

COMPENSATION AND GOVERNANCE:
- Diversity of the Board, the Executive Committee and the Company
- Board renewal, succession planning and evaluation
- Link of compensation system to key strategic priorities
- Risk oversight
- Stakeholder expectations from the Board on ESG matters

We appreciate the value that shareholders attach to ESG matters. We will continue to integrate ESG into our strategy and to promote transparency through our comprehensive ESG engagement program. We have more than doubled the number of investor engagements on ESG matters in recent years, and in 2022, our CEO led our Investor Update on Access & Sustainability (formerly known as ESG Investor Day) for the fourth time (marking our ninth dedicated ESG event for investors since 2014). We also held virtual roadshows in 2022 as part of our engagement with North American, European and Asian investors.

Voting rights, restrictions and representation

REGISTRATION

Shareholders have the right 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).

Each share registered with the right to vote by the third business day before the General Meeting entitles the holder to one vote at General Meetings. Article 5, paragraph 2 of the Articles of Incorporation provides that 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, the Board may register nominees with the right to vote. The Share Register is an internal, non-public register subject to statutory confidentiality and data privacy.

The Articles of Incorporation are available at www.novartis.com/investors/company-overview/corporate-governance.

REGISTRATION RESTRICTIONS

Article 5, paragraph 2 of the Articles of Incorporation provides that no shareholder shall be registered with the right to vote for more than 2% of the share capital. Given that shareholder representation at General Meetings has traditionally been comparatively low in Switzerland, Novartis AG considers registration restrictions necessary to prevent a minority shareholder from dominating a General Meeting. The Board may, upon request, grant an exemption. Considerations include whether the shareholder supports our goal of creating sustainable value and has a long-term investment horizon. Exemptions are in force for the registered shareholders listed in "—Item 6.C Board practices—Group structure and shareholders—Shareholders—Significant shareholders." Exemptions also apply to the Novartis Foundation for Employee Participation, Basel, which as of December 31, 2022, was registered in the Share Register with less than 2% of the share capital, and to Norges Bank (Central Bank of Norway), Oslo, which as of December 31, 2022, was not registered but held 2.3% according to a disclosure notification filed with Novartis AG. No further exemptions were requested in 2022. The same restrictions indirectly apply to ADR holders.

Article 5, paragraph 3 of the Articles of Incorporation provides 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 persons for whose account it holds 0.5% or more of the registered share capital. Exemptions are in force for the nominees listed in "—Item 6.C Board practices—Group structure and shareholders—Shareholders—Significant shareholders," and for the nominee Citibank, London, which in 2015 requested an exemption, but as of December 31, 2022, was not registered in the Share Register. The same restrictions indirectly apply to ADR holders.

According to article 5, paragraph 4 of the Articles of Incorporation, 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.

The registration restrictions may be changed by resolution of the General Meeting, with approval of at least two-thirds of the votes represented at the meeting.

The Articles of Incorporation are available at www.novartis.com/investors/company-overview/corporate-governance.

ATTENDANCE, REPRESENTATION AND ONLINE PLATFORM

Registered shareholders will receive personal invitations to the General Meetings along with a registration/proxy form as well as a personal one-time password and a QR code to log in to our online platform. By returning the registration/proxy form or using the online platform, shareholders are able to order an admission card for the General Meeting or appoint another shareholder or the Independent Proxy to vote their shares on their behalf.

If the Independent Proxy is appointed, shareholders can also give voting instructions 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) opposing such alternative or additional motions. They can also abstain from voting.

Shareholders choosing not to receive the comprehensive invitation materials will be informed of upcoming General Meetings through a letter containing the login credentials to access the online platform as well as a reference to www.novartis.com/investors/shareholder-information/general-meetings, where all relevant information is available.

In accordance with Swiss legislation passed in response to the COVID-19 pandemic, and as in the previous year, physical attendance at the 2022 Annual General Meeting (AGM) was not possible, and shareholders could exercise their voting rights exclusively through the Independent Proxy.

ADR HOLDERS

ADR holders have 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 shares underlying the ADRs and is registered as a shareholder in the Share Register. An ADR is not a share, and an ADR holder is not a Novartis AG shareholder. Each ADR represents one share. ADR holders exercise their voting rights by instructing the depositary to exercise their voting rights. The ADS depositary 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. Such designee has to be a shareholder.

General Meeting

CONVENING

The AGM must be held within six months after the end of our financial year (December 31), and normally takes place in late February/early March. Extraordinary General Meetings may be requested by the Board, the external auditor, or shareholders representing at least 10% of the share capital.

AGENDA

Shareholders representing 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, specifying the requested item and proposal.

POWERS

According to article 17 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), the following powers are vested exclusively in the General Meeting:

- Adoption and amendment of the Articles of Incorporation
- Election and removal of the Board Chair, the Board and Compensation Committee members, the Independent Proxy and the external auditor
- Approval of the management report and the consolidated financial statements
- Approval of the financial statements of Novartis AG, and the decision on the appropriation of available earnings shown on the balance sheet, including dividends
- Approval of the maximum aggregate compensation of the Board (from an AGM until the next AGM) and of the Executive Committee (for the financial year following the AGM). If the maximum aggregate amount of compensation already approved by the AGM is not sufficient to cover the compensation of newly appointed or promoted Executive Committee members, Novartis may use up to 40% of the amount last approved for the newly appointed or promoted Executive Committee members.
- Discharge of Board and Executive Committee members
- Decision on 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

STATUTORY QUORUMS

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 cancellation of subscription rights
- Change 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 demerger.

Board of Directors

Composition (as per December 31, 2022)[1]

BOARD CHAIR: J. Reinhardt

VICE-CHAIR: S. Moroney
LEAD INDEPENDENT DIRECTOR: P. Bula

N. Andrews
T. Buechner
E. Doherty
B. Heller
D. Hochstrasser[1]
F. van Houten
A. von Planta[2]
A. de Pro Gonzalo
C. Sawyers
W. Winters

AUDIT AND COMPLIANCE COMMITTEE	COMPENSATION COMMITTEE	GOVERNANCE, SUSTAINABILITY AND NOMINATION COMMITTEE	RISK COMMITTEE	SCIENCE & TECHNOLOGY COMMITTEE
E. Doherty (Chair)	S. Moroney (Chair)	P. Bula (Chair)	T. Buechner (Chair)	J. Reinhardt (Chair)
T. Buechner	P. Bula	B. Heller	N. Andrews	N. Andrews
B. Heller	B. Heller	A. von Planta	E. Doherty	F. van Houten
F. van Houten	W. Winters	C. Sawyers	A. von Planta	S. Moroney
A. de Pro Gonzalo		W. Winters	A. de Pro Gonzalo	C. Sawyers

[1] Effective January 1, 2023, Mr. Hochstrasser became a member of the Audit and Compliance Committee and of the Governance, Sustainability and Nomination Committee.
[2] Mr. von Planta will not stand for re-election at the 2023 AGM.

Changes to the Board of Directors

Ana de Pro Gonzalo and Daniel Hochstrasser were elected as new Board members at the 2022 AGM. Ann Fudge, Board member since 2008, and Enrico Vanni, Board member and Vice-Chair since 2011 and Lead Independent Director since 2021, did not stand for re-election at the 2022 AGM. The biographies of Ms. Fudge and Mr. Vanni can be found in the 2021 Annual Report (pages 130 and 133), available at www.novartis.com/news/media-library/novartis-annual-report-2021.

Election and term of office

Board members (including the Board Chair) and Compensation Committee members are elected individually by shareholders at the General Meeting for a one-year term of office. The term of office expires at the end of the next AGM.

According to article 20, paragraph 3 of the Articles of Incorporation, a member shall not serve on the Board for more than 12 years. Under special circumstances and if deemed to be in the best interest of the Company, the Board may recommend exceptions to the shareholders (www.novartis.com/investors/company-overview/corporate-governance).

The term limit supports our commitment to renew the Board on an ongoing basis and also follows international best practice. We believe age is still a relevant factor in Board composition, and the GSNC will consider this and other factors – including gender, nationality and ethnicity – when evaluating candidates and exploring ways to increase Board diversity.

Succession planning

The Board Chair, supported by the GSNC, ensures effective succession plans for the Board, the CEO and the Executive Committee. These plans are discussed by the Board in private meetings. A search for a new Board member is launched – normally with the support of a professional executive search company – with individual selection criteria defined based on the evolving needs of the Company and a continuing focus on diversity. The set of competencies (further explained in "—Item 6.C Board practices—Board of Directors—Board skills") and a balance between continuity of experience and fresh perspectives are also important criteria for the GSNC when evaluating new candidates. Candidates are interviewed by the Board Chair, members of the GSNC, other Board members, and members of the Executive Committee. The GSNC then makes a recommendation to the full Board, and the Board ultimately decides who should be proposed for election at the upcoming AGM.

The Board will propose to the shareholders a new candidate for election at the 2023 AGM. Andreas von Planta already announced in 2021 that he will not stand for re-election at the 2023 AGM.

Independence

All Board members – including the Board Chair – are non-executive and independent, pursuant to applicable corporate governance rules and Novartis independence criteria, which are outlined in Appendix II to the Board Regulations (www.novartis.com/investors/company-overview/corporate-governance). In particular, 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, 2022, or has or had, except for Daniel Hochstrasser, a significant business relationship with Novartis AG or with any other Novartis Group company. Mr. Hochstrasser fulfilled the independence criteria following his resignation from Bär & Karrer, a Swiss law firm that has a business relationship with Novartis, as of December 31, 2022. During 2022, Mr. Hochstrasser did not belong to any Board committee. No separate meetings of independent Board members were held in 2022.

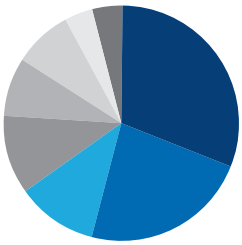
The independence of Board members is assessed annually. Each Board member completes an independence questionnaire that is subject to review by the GSNC. The GSNC then submits a proposal to the full Board, and the Board determines the independence status of each Board member.

Diversity

Diversity of gender, age, nationality, ethnicity, viewpoints, professional backgrounds and expertise is a key factor to success and Board effectiveness in a constantly evolving environment. A diverse Board ensures that the appropriate balance of skills, expertise, experience and cultural background is represented to discharge its responsibilities and to support long-term value creation for shareholders, patients, employees and other stakeholders. Diversity remains a critical area of focus for the Board, and the GSNC is continuously looking for opportunities to further increase the Board's diversity when identifying new Board member candidates.

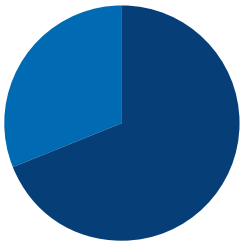
Diversity profile

Nationality[1]



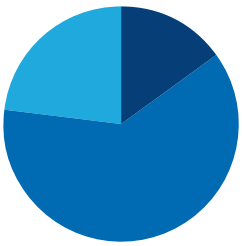
Swiss	31%
American	23%
Dutch	11%
German	11%
British	8%
Spanish	8%
Irish	4%
New Zealander	4%

Gender



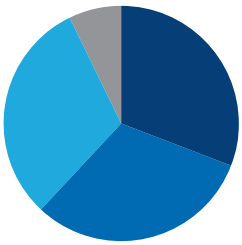
Male	69%
Female	31%

Age



55–60	15%
61–65	62%
>65	23%

Tenure



<3 y	31%
3–6 y	31%
7–9 y	31%
>9 y	7%

[1] Please note that five Board members have dual nationalities. Each of these nationalities is counted as a half in the above chart.

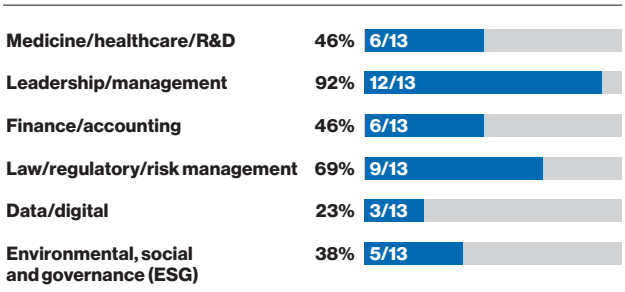
Board skills

Upon proposal by the GSNC, the Board has determined a diverse set of competencies for its members that aligns with our status as a listed company, as well as our business portfolio, geographic reach and culture. Based on this set of competencies, our Board members were asked to identify their most relevant skills highlighted by their educational background, professional experience and personal achievements.

The GSNC assesses the set of competencies as well as the individual skills annually to ensure that an appropriate balance of skills, expertise, experience and diversity is represented on the Board.

To learn more about our Board members and their individual skills, see "—Item 6.C Board practices—Board of Directors—Members of the Board of Directors."

Board skill distribution



Medicine/healthcare/R&D	46%	6/13
Leadership/management	92%	12/13
Finance/accounting	46%	6/13
Law/regulatory/risk management	69%	9/13
Data/digital	23%	3/13
Environmental, social and governance (ESG)	38%	5/13

Members of the Board of Directors

Joerg Reinhardt, Ph.D.

Chair since 2013 | Nationality: German | Year of birth: 1956

Joerg Reinhardt is a healthcare industry veteran whose career spans nearly 40 years. After receiving his doctorate in pharmaceutical sciences, Mr. Reinhardt joined Sandoz Pharma Ltd., a predecessor to Novartis, in 1982. He held a number of senior leadership positions at Novartis, including Chief Operating Officer and Head of the Vaccines and Diagnostics Division. Additionally, he led Bayer HealthCare AG as chair of the board of management and the executive committee from 2010 to 2013.

Professional experience
- Chair of the board of management and the executive committee, Bayer HealthCare AG, Germany (2010–2013)
- Chief Operating Officer, Novartis AG, Switzerland (2008–2010)
- Head of the Vaccines and Diagnostics Division, Novartis AG, Switzerland (2006–2008)
- Various managerial positions at Sandoz Pharma Ltd. and Novartis AG, Switzerland (1982–2006)

Mandates
- Senate member, Helmholtz Association of German Research Centres, Germany
- Chair of the board of trustees, Institute of Molecular and Clinical Ophthalmology Basel (IOB), Switzerland
- Chair of the board of trustees, Novartis Foundation, Switzerland
- Board member, Swiss Re AG, Switzerland
- Member of the European Advisory Panel, Temasek Holdings Private Ltd., Singapore
- Board member, Lonza Group AG, Switzerland (2012–2013)
- Chair, Genomics Institute of the Novartis Research Foundation, US (2000–2010)

Education
- Doctorate in pharmaceutical sciences, Saarland University, Germany

Key skills
Medicine/healthcare/R&D · Leadership/management · Law/regulatory/risk management

Simon Moroney, D.Phil.

Board member since 2020 | Vice-Chair since March 4, 2022 | Nationality: German/New Zealander | Year of birth: 1959

As co-founder and CEO of MorphoSys AG, Simon Moroney played a central role in establishing the company as a force in the field of therapeutic antibodies, with one of the broadest pipelines of drug candidates in the industry. Mr. Moroney holds both a doctorate and a Master of Science in chemistry.

Professional experience
- Co-founder and CEO, MorphoSys AG, Germany (1992–2019)
- Research associate, Department of Pharmacology, University of Cambridge, UK (1991–1992)
- Assistant professor, Department of Chemistry, University of British Columbia, Canada (1989–1990)

Mandates
- Chair of the board of directors and the Remuneration and Nomination Committee, Biotalys NV, Belgium

Education
- Doctorate in chemistry, University of Oxford, UK
- Master of Science in chemistry, University of Waikato, New Zealand

Key skills
Leadership/management · Medicine/healthcare/R&D · Law/regulatory/risk management

Nancy C. Andrews, M.D., Ph.D.

Board member since 2015 | Nationality: American/Swiss | Year of birth: 1958

Nancy C. Andrews has extensive experience as a physician, scientist, professor and senior administrator at leading academic institutions and hospitals. Her distinguished career spans more than 30 years, with leadership roles at both Harvard Medical School and the Duke University School of Medicine. Dr. Andrews currently chairs the board of the American Academy of Arts and Sciences, and is credited with conducting research that led to advances in understanding iron biology and iron diseases.

Professional experience
- Executive vice president and chief scientific officer, Boston Children's Hospital, US (2021–present)
- Dean emerita, Duke University School of Medicine, and vice chancellor emerita for academic affairs, Duke University, US (2017–2021)
- Dean, Duke University School of Medicine, and vice chancellor for academic affairs, Duke University, US (2007–2017)
- Professor of pediatrics, pharmacology and cancer biology, Duke University, US (2007–2021)
- Dean for basic sciences and graduate studies, Harvard Medical School, US (2003–2007)
- Director, Harvard/MIT M.D.-Ph.D. Program, US (1999–2003)
- Biomedical research investigator, Howard Hughes Medical Institute, US (1993–2006)

Mandates
- Board member, Maze Therapeutics Inc., US
- Board member and chair of the Science and Technology Committee, Charles River Laboratories International Inc., US
- Council member, National Academy of Sciences, US
- Former council member (2013–2019) and member, National Academy of Medicine, US
- Chair of the board, American Academy of Arts and Sciences, US
- Member of the Scientific Advisory Board, Dyne Therapeutics Inc., US
- Member of the executive committee of the Corporation, Massachusetts Institute of Technology, US (2019-2022)
- Member of the Scientific Management Review Board, National Institutes of Health, US (2014–2019)
- Board member and former chair, Burroughs Wellcome Fund, US (2011–2019)

Education
- Doctor of medicine, Harvard Medical School, US
- Doctorate in biology, Massachusetts Institute of Technology, US
- Master of Science and Bachelor of Science in molecular biophysics and biochemistry, Yale University, US

Key skills
Medicine/healthcare/R&D · Leadership/management

Ton Buechner

Board member since 2016 | Nationality: Dutch/Swiss | Year of birth: 1965

Ton Buechner is an engineer by training who started his career in the oil and gas construction industry. Before becoming the CEO of Sulzer AG, he held several divisional leadership roles at the company and worked in markets including Asia. Mr. Buechner most recently served as CEO and chair of the executive board of AkzoNobel NV, where he introduced industry-leading ESG policies.

Professional experience
- CEO and chair of the executive board, AkzoNobel NV, Netherlands (2012–2017)
- CEO, Sulzer AG, Switzerland (2007–2011)
- President, Sulzer Pumps, Switzerland (2003–2006)
- President, Sulzer Turbomachinery Services, Switzerland (2000–2002)
- Various managerial positions at Sulzer AG, China and Switzerland (1994–2000)

Mandates
- Chair of the board of directors and the sustainability board, Swiss Prime Site AG, Switzerland
- Chair of the board of directors and the Strategy and Sustainability Committee, Burckhardt Compression AG, Switzerland
- Advisor, Ammega, Switzerland
- Member of the presidential and shareholder committees, Voith GmbH & Co. KGaA, Germany (2014–2020)
- Member of the supervisory board, Voith GmbH & Co. KGaA, Germany (2014–2018)

Education
- Master of Business Administration, IMD business school, Switzerland
- Master of Science in civil engineering, Delft University of Technology, Netherlands

Key skills
Finance/accounting · Leadership/management · Law/regulatory/risk management · Environmental, social and governance (ESG)

Patrice Bula

Board member since 2019 | Lead Independent Director since March 4, 2022 | Nationality: Swiss | Year of birth: 1956

Patrice Bula has 40 years of global management experience and is a leader in the consumer goods industry across established and emerging markets. He has served in various senior roles at Nestlé SA, including as general manager of its businesses in China, Germany and South Africa. Most recently, he successfully led the Nestlé Group's brand strategies, digital marketing transformation and Nespresso business.

Professional experience
- Executive vice president and head of strategic business units, marketing, sales and Nespresso, Nestlé SA, Switzerland (2011–2021)
- Market head of the Greater China region, Nestlé SA, Switzerland (2007–2011)
- Market head of Germany, Nestlé SA, Switzerland (2003–2007)
- Head of the confectionery and biscuits strategic business unit, Nestlé SA, Switzerland (2000–2003)
- Various managerial positions at Nestlé SA, Switzerland (1980–2000)

Mandates
- Chair, Froneri Lux Topco Sarl, Luxembourg
- Board member, Schindler AG, Switzerland
- Board member and chair of the ESG Committee, New Tiger LLC, US
- Co-chair (2020–2021) and board member (2015–2021), Cereal Partners Worldwide SA, Switzerland (Nestlé representative)
- Board member, Froneri Lux Topco Sarl, Luxembourg (Nestlé representative) (2016–2020)
- Board member, Bobst Group SA, Switzerland (2017–2019)
- Chair, Blue Bottle Coffee Inc., US (Nestlé representative) (2017–2019)
- Chair, Nestlé Nespresso SA, Switzerland (Nestlé representative) (2011–2019)
- Board member, Hsu Fu Chi Food Companies, China (Nestlé representative) (2011–2019)

Education
- Program for Executive Development, IMD business school, Switzerland
- Master's degree in economic sciences, HEC Lausanne, Switzerland

Key skills
Finance/accounting · Leadership/management · Data/digital

Elizabeth (Liz) Doherty

Board member since 2016 | Nationality: British/Irish | Year of birth: 1957 | Audit Committee Financial Expert

Elizabeth (Liz) Doherty is an expert in finance and accounting who has broad operational experience in international consumer and retail businesses. She began her career in internal audit at Unilever PLC and has held senior finance and accounting roles there and at other companies including Tesco PLC and Reckitt Benckiser Group PLC.

Professional experience
- CFO (interim), Cognita Schools Ltd., UK (2014–2015)
- CFO and board member, Reckitt Benckiser Group PLC, UK (2011–2013)
- CFO (interim), City Inn, UK (2010)
- CFO, Brambles Ltd., Australia (2007–2009)
- Group international finance director, Tesco PLC, UK (2001–2007)
- Various managerial positions at Unilever PLC, UK (1981–2001)

Mandates
- Board member and chair of the Audit Committee, Corbion NV, Netherlands
- Member of the supervisory board and chair of the Audit Committee, Royal Philips NV, Netherlands
- Advisor, Affinity Petcare SA and GB Foods SA, Spain
- Board member, Dunelm Group PLC, UK (2013–2019)
- Board member, HM Courts & Tribunals Service, UK (2015–2019)
- Board member, Ministry of Justice, UK (2015–2019)
- Board member, Delhaize Group, Belgium (2013–2016)
- Board member, Nokia Corp., Finland (2013–2016)

Education
- Fellow, Chartered Institute of Management Accountants, UK
- Bachelor's degree in liberal studies in science (physics), University of Manchester, UK

Key skills
Leadership/management · Finance/accounting · Law/regulatory/risk management

Bridgette Heller

Board member since 2020 | Nationality: American | Year of birth: 1961

Bridgette Heller has proven experience in the standalone divisions of companies such as Johnson & Johnson, Merck & Co. Inc. and Danone SA, and has served on the audit committees of ADT Corp. and Tech Data Corp. During her career, she has overseen the performance of CFOs and made decisions on strategic R&D priorities. Ms. Heller is an advocate for diversity, equity and inclusion, and traveled globally to reinforce Danone's commitment to infant and maternal health, inclusive diversity, an equitable workforce for women, and sustainable communities. She is co-founder and CEO of the Shirley Proctor Puller Foundation, an education and youth empowerment nonprofit, and devotes much of her time to strengthening education and sustainability in an underserved community in the US.

Professional experience
- Co-founder and CEO, Shirley Proctor Puller Foundation, US (2019–present)
- EVP and president of specialized nutrition, Danone SA, Netherlands (2017–2019)
- EVP of early life nutrition, Danone SA, Netherlands (2016–2019)
- EVP and president of consumer care, Merck & Co. Inc., US (2010–2015)
- Global president of the baby global business unit, Johnson & Johnson, US (2007–2009)
- President of the US baby, kids and wound care business and of global innovation development, Johnson & Johnson, US (2005–2007)
- Managing partner, Heller Associates: Ideas for Growth Inc., US (2004–2005)
- CEO, Chung's Gourmet Foods, US (2003–2004)
- Various managerial positions at Kraft Foods Inc., US (1985–2003)

Mandates
- Board member, Integral Ad Science Inc., US
- Board member, Aramark, US
- Board member, Dexcom Inc., US
- Board member, Newman's Own Inc., US
- Member of the board of trustees, Northwestern University, US
- Member of the advisory board, Kellogg School of Management at Northwestern University, US
- Board member, Shirley Proctor Puller Foundation, US
- Board member, Newman's Own Foundation, US
- Board member, Tech Data Corp., US (2016–2020)
- Board member, ADT Corp., US (2012–2016)
- Board member, Girls Inc., US (2002–2014)

Education
- Master's degree in marketing and management policy, Kellogg School of Management at Northwestern University, US
- Bachelor's degree in economics and computer studies, Northwestern University, US

Key skills
Environmental, social and governance (ESG) · Leadership/management · Medicine/healthcare/R&D · Finance/accounting

Daniel Hochstrasser

Board member since March 4, 2022 | Nationality: Swiss | Year of birth: 1960

Daniel Hochstrasser is an independent dispute resolution specialist practicing in Zurich, Switzerland. Until the end of 2022, he has been leading Bär & Karrer's arbitration practice for 15 years. He frequently represented parties in complex disputes arising from matters such as M&A transactions, industrial and infrastructure projects, and license, distribution and development agreements, particularly in the pharmaceutical industry. In addition, he led the firm as senior partner from 2011 until 2021. He has published extensively on arbitration and litigation, and lectures at the University of Zurich and the University of St. Gallen in Switzerland.

Professional experience
- Attorney-at-law, Daniel Hochstrasser AG, Switzerland (since January 2023)
- Attorney-at-law and partner, Bär & Karrer AG, Switzerland (1993–December 2022)
- Senior partner and chair of the board of directors, Bär & Karrer AG, Switzerland (2011-2021)
- Lawyer, District Court of Affoltern, Court of Appeals/Court of Cassation of Zurich, Switzerland (1987–1992)
- In-house lawyer, Staubli SA, France (1986–1987)

Mandates
- Member (2015–2021) and Vice President (since 2021), ICC Court of Arbitration, France
- Member of the Ethics Court, Zurich Bar Association, Switzerland (since 2004)
- Board member, Finland Arbitration Institute, Finland (since 2020)
- Chair of the board of directors, Bär & Karrer AG, Switzerland (2011-2021)
- Member of the Court, Swiss Arbitration Chambers, Switzerland (2004–2014)

Education
- Master of Laws (LL.M.), Cornell Law School, US
- Bar examination, Switzerland
- Licentiatus iuris, University of Zurich, Switzerland

Key skills
Leadership/management · Law/regulatory/risk management

Frans van Houten

Board member since 2017 | Nationality: Dutch | Year of birth: 1960

Frans van Houten is passionate about purpose-driven innovation, entrepreneurship and business transformation to drive customer value and competitiveness. Under his leadership as CEO of Royal Philips, the company transformed into a leading health technology solutions company, leveraging data and informatics to improve healthcare provider results, and became a forerunner across ESG dimensions, having become carbon neutral in its operations since 2020 and recycling over 90% of its waste. Mr. van Houten was an initiator of the World Economic Forum Compact for Responsive and Responsible Leadership as well as founder and co-chair of the Platform to Accelerate the Circular Economy.

Professional experience
- Advisor, Royal Philips NV, Netherlands (October 2022–April 2023)
- CEO and chair of the executive committee and the board of management, Royal Philips NV, Netherlands (2011–October 2022)
- Interim management, ING Group NV, Netherlands (2009–2010)
- CEO and chair of the management board, NXP Semiconductors NV (formerly Philips Semiconductors NV), Netherlands (2004–2009)
- Various managerial positions at Royal Philips Electronics NV, Netherlands (1986–2004)

Mandates
- Chair of the supervisory board, Erasmus Trust Foundation, Netherlands (2014–February 2023)
- Founder and co-chair of the WEF Platform to Accelerate the Circular Economy (PACE), Netherlands (2016-December 2022)
- Member of the steering committee, European Round Table for Industry (ERT), Belgium (2014-November 2022)
- Chair, Graduate Entrepreneur Foundation, Netherlands
- Chair, NL2025 Foundation, Netherlands
- Vice chair and member of the supervisory board, Philips Lighting, Netherlands (2016–2017)

Education
- Master of Science in economics and business management, Erasmus University Rotterdam, Netherlands
- Bachelor of Science in economics, Erasmus University Rotterdam, Netherlands

Key skills
Environmental, social and governance (ESG) Leadership/management Medicine/healthcare/R&D Data/digital Law/regulatory/risk management

Andreas von Planta, Ph.D.

Board member since 2006 | Nationality: Swiss | Year of birth: 1955

Andreas von Planta is a leading expert in corporate governance, corporate law and stock exchange regulation. He advises boards of public companies on corporate governance matters and is a sought-after speaker and writer on these topics. He has co-authored the Switzerland chapter of the International Comparative Legal Guide to Corporate Governance for many years.

Professional experience
- Senior counsel, Lenz & Staehelin, Switzerland (2017–present)
- Partner, Lenz & Staehelin, Switzerland (1988–2017)

Mandates
- Board member, Helvetia Holding AG, Switzerland
- Member of the board of trustees, Novartis Foundation, Switzerland
- Board member, Helvetia Schweizerische Lebensversicherungsgesellschaft AG, Switzerland
- Board member, Helvetia Schweizerische Versicherungsgesellschaft AG, Switzerland
- Chair, HSBC Private Bank (Suisse) SA, Switzerland
- Chair, HSBC Private Banking Holdings (Suisse) SA, Switzerland
- Board member, Socotab Frana SA, Switzerland
- Chair of the regulatory board, SIX Swiss Exchange AG, Switzerland
- Chair of the Audit Committee, International Road Transport Union, Switzerland
- Board member, Société Immobilière Quai Gustave Ador 50 SA, Switzerland
- Board member, Burberry (Suisse) SA, Switzerland (2001-2022)
- Vice chair of the board of directors, A.P. Moller Finance SA, Switzerland (1997-2022)
- Board member, Raymond Weil SA, Switzerland (2007–2018)
- Board member and former chair, Clinique Générale-Beaulieu SA, Switzerland (2008–2016)
- Board member and former chair, Schweizerische National Versicherungs AG, Switzerland (1997–2015)
- Board member, Holcim AG, Switzerland (2003–2014)

Education
- Master of Laws, Columbia Law School, US
- Bar examination, Switzerland
- Doctorate in law, University of Basel, Switzerland
- Licentiatus iuris, University of Basel, Switzerland

Key skills
Environmental, social and governance (ESG) Law/regulatory/risk management

Ana de Pro Gonzalo

Board member since March 4, 2022 | Nationality: Spanish | Year of birth: 1967 | Audit Committee Financial Expert

Since starting her career at Arthur Andersen, Ana de Pro Gonzalo has worked across a variety of industries, ranging from construction and real estate to engineering and telecommunications. With deep expertise in finance, capital markets and technology, she has held executive positions at several multinational companies. Most recently, she spent 10 years as chief financial officer of Amadeus IT Group, a leading software provider for the global travel and tourism industry.

Professional experience
- Chief financial officer, Amadeus IT Group SA, Spain (2010–2020)
- Corporate general manager, Sacyr Vallehermoso SA, Spain (2002–2010)
- Deputy general manager and finance director, Metrovacesa SA, Spain (1994–2002)
- Senior auditor, Arthur Andersen SA, Spain (1990–1994)

Mandates
- Member of the supervisory board and chair of the Audit Committee, STMicroelectronics NV, Netherlands
- Board member, National Express Group PLC, UK
- Board member, Indra Sistemas SA, Spain (2020-2022)
- Board member, Merlin Properties Socimi SA, Spain (2015–2017)

Education
- General Management Program (PDG), IESE Business School, Spain
- Bachelor of Science in business studies, Complutense University of Madrid, Spain

Key skills
Leadership/management · Finance/accounting · Law/regulatory/risk management

Charles L. Sawyers, M.D.

Board member since 2013 | Nationality: American | Year of birth: 1959

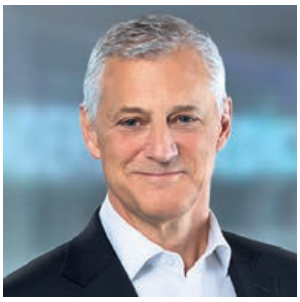
Charles L. Sawyers is a highly accomplished expert and leader in cancer research. As a physician and prominent scientist, he has a deep understanding of the benefits of drugs for patients and society at large, and the importance of access to medicines. Dr. Sawyers co-developed the Novartis cancer drug *Gleevec*/*Glivec* and has received numerous honors and awards, including the Lasker-DeBakey Clinical Medical Research Award.

Professional experience
- Chair of the Human Oncology and Pathogenesis Program, Memorial Sloan Kettering Cancer Center, US (2006–present)
- Professor of medicine (2008–present), and professor of cell and developmental biology (2011–present), Weill Cornell Graduate School of Medical Sciences, US
- Investigator, Howard Hughes Medical Institute, US (2002–2006 and 2008–present)
- Associate chief, Division of Hematology-Oncology, University of California, Los Angeles, US (1996–2006)

Mandates
- Member, National Academy of Medicine, US
- Member, National Academy of Sciences, US
- Investigator, Howard Hughes Medical Institute, US
- Science advisor for the following US companies: Arsenal Capital Partners; BeiGene Ltd.; Blueprint Medicines Corp.; Foghorn Therapeutics Inc.; Housey Pharmaceutical Research Laboratories; KSQ Therapeutics Inc.; Nextech Invest Ltd.; ORIC Pharmaceuticals Inc.; PMV Pharmaceuticals Inc.; The Column Group
- Member, National Cancer Advisory Board, US (2012–2020)
- President, American Association for Cancer Research, US (2013–2014)

Education
- Doctor of medicine, Johns Hopkins University School of Medicine, US
- Bachelor of Arts, Princeton University, US

Key skills
Medicine/healthcare/R&D · Leadership/management · Environmental, social and governance (ESG)



William T. Winters

Board member since 2013 | Nationality: British/American | Year of birth: 1961

William T. Winters has extensive leadership experience in the financial sector. He began his career at JPMorgan Chase & Co. in 1983 and has held management roles across several market areas and in corporate finance. Mr. Winters founded Renshaw Bay LLP, an alternative asset management firm, and now serves as CEO of Standard Chartered PLC, where he is leading a digital transformation of the global bank.

Professional experience
- CEO, Standard Chartered PLC, UK (2015–present)
- Chair and CEO, Renshaw Bay LLP, UK (2011–2015)
- Co-CEO of the Investment Bank, JPMorgan Chase & Co., UK (2004–2010)
- Various managerial positions at JPMorgan Chase & Co., UK and US (1983–2004)

Mandates
- Board member, Standard Chartered Bank PLC, UK
- Member of the board of overseers, International Rescue Committee, UK
- Chair of the board of trustees, The Coronet Theatre, UK
- Commissioner, Independent Commission on Banking, UK (2010–2011)

Education
- Master of Business Administration, Wharton School of the University of Pennsylvania, US
- Bachelor's degree in international relations, Colgate University, US

Key skills
Data/digital · Leadership/management · Law/regulatory/risk management · Finance/accounting

Corporate Secretary

Charlotte Pamer-Wieser, Ph.D.

Self-assessment

The Board and its committees conduct a self-assessment once a year, covering topics including Board composition, purpose, scope and responsibilities; succession planning; Board processes and governance; interaction between the Board and the Executive Committee; Board meetings and pre-reading material; team effectiveness; and Board Chair and peer evaluation. Every third year, this process is conducted by an independent external consultant. This last occurred in 2020 with the consulting firm Egon Zehnder.

Anonymous survey

- Each Board member fills out an anonymous survey.
- A report identifying key strengths and challenges is produced for the Board and its committees.

Qualitative review

- Based on the results, the Board Chair and the committee chairs each lead a qualitative review with their colleagues and then with the entire Board.
- In addition, the Vice-Chair leads a qualitative review of the Board Chair's performance, without the Chair being present, and then provides the Board Chair with the Board's feedback.

Outcome

- The last self-assessment of October 2022 determined that the Board and its committees are functioning effectively and efficiently.
- The feedback confirmed that the Board has an open culture, fostering a broad range of viewpoints.
- The results also identified key areas on which to focus, such as further development of Novartis strategy, oversight of a range of challenging technology and reorganizational projects, and the impact of the current geopolitical situation in Europe, the US and China, including pricing.

Trainings

Our Board receives regular briefings and trainings on ethics, risks and compliance, ESG and other relevant topics. In 2022, each Board member completed the following trainings:

- Health, Safety and Environment Policy
- 'Fit to Commit', which focused on anti-bribery, insider trading and procurement
- An ESG educational session conducted by an external expert on holistic value creation
- Third Party Risk Management

Our Chief Legal Officer also provides regular updates to our Board members on developments related to insider trading laws and regulations and briefs the members of the Board and the Executive Committee on an annual basis on their respective duties. In addition, the Company offers a broad range of external trainings to its Board members.

Role of the Board and its committees

The Board is responsible for the overall direction and oversight of management, and holds the ultimate decision-making authority, with the exception of decisions reserved for shareholders.

The Board has delegated certain of its duties and responsibilities to its five committees led by a Board-elected committee chair, as set out in the Board Regulations (www.novartis.com/investors/company-overview/corporate-governance). In some cases, these responsibilities are of an advisory or preparatory nature. In other cases, the committee has decision-making power that is subject to final Board approval, or the responsibilities have been fully delegated to the committee. All committees have the authority to retain external consultants.

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 for the discussions and to inform decision-making.

Attendance at Board and Board Committee Meetings in 2022

Name	Position	Board	Audit and Compliance Committee	Compensation Committee	Governance, Sustainability and Nomination Committee	Risk Committee	Science & Technology Committee
J. Reinhardt	Board Chair	10/10					4/4
S. Moroney	Vice-Chair	10/10		7/7			4/4
P. Bula	Lead Independent Director	10/10		7/7	3/3		
N. Andrews	Member	9/10				5/5	4/4
T. Buechner	Member	10/10	7/7			5/5	
E. Doherty	Member	10/10	7/7			5/5	
B. Heller	Member	10/10	7/7	7/7	3/3		
F. van Houten	Member	10/10	7/7				3/4
D. Hochstrasser [1]	Member	8/8					
A. von Planta	Member	10/10			3/3	5/5	
A. de Pro Gonzalo [1]	Member	8/8	5/5			5/5	
C. Sawyers	Member	10/10			3/3		4/4
W. Winters	Member	9/10		6/7	3/3		

[1] Ms. de Pro Gonzalo and Mr. Hochstrasser were elected at the 2022 AGM.

Further details can be found on pages 140 – 145.

Board of Directors

Primary responsibilities

- Strategy: decides on the ultimate direction of the Group's business (including portfolio, markets, acquisitions and divestments), considering also key ESG aspects
- Structure and organization: determines major changes in the Group's structure and organization
- Culture: oversees the strategy and implementation of the corporate culture
- Ethics and compliance: oversees the Group's ethics and compliance framework, including the approval of fundamental corporate policies such as the Novartis Code of Ethics
- Risk management: oversees the Group's risk management system, the most significant risks, and how these risks are managed
- Finance: determines the Group's accounting system, financial controls and financial planning; reviews and approves the Annual Report (including the Compensation Report)
- Non-financial reporting: reviews and approves the Group's annual reporting on non-financial matters
- People and organization: nominates or appoints, removes, and determines responsibilities of key executives, and succession planning

Key activities in 2022

- Oversaw the Company's strategy to become a fully focused medicines company with leading technology in key therapeutic and geographic areas
- Reviewed the set-up and functioning of the Executive Committee in the context of the Company's new organizational structure
- Reviewed the geopolitical situation in Europe, with a special focus on the impact on the Russian and Ukrainian markets
- Discussed and closely monitored the Transformation for Growth project to ensure a smooth transition and the successful implementation of its objectives
- Received an update on the US market and our priorities to accelerate growth in Innovative Medicines and become a top player in the market
- Received an update on the German market and the Company's strategic ambition to become the market leader in Germany
- Received updates from Global Drug Development and Operations
- Reviewed and discussed strategic considerations around mergers and acquisitions, and the Company's larger strategic moves to drive sustainable growth
- Conducted detailed discussions about the strategic review of Sandoz, deciding that a separation through a 100% spin-off would offer the best value proposition to investors (subject to shareholders approval)
- Discussed the Company's ESG strategy, plans and developments, and attended an ESG education session on holistic value creation
- Discussed the upcoming non-financial disclosure regulations and Novartis non-financial reporting governance
- Discussed longer-term Board succession planning and required profiles, proposing a new Board member candidate to be elected at the 2023 AGM
- Discussed the amendment of the Articles of Incorporation of Novartis AG as part of the reform of Swiss corporate law
- Discussed and reviewed the annual Board self-evaluation

Meetings

Number of meetings held	10
Number of members	13
Approximate average duration (hours)	6:30
Meeting attendance	98.5%

The Board met ten times in 2022. This includes regular meetings in January, April, June, August, October and December, and additional special meetings to deal with ad hoc matters. Board committees typically meet the day before the meetings of the full Board. The Board held virtual, hybrid and physical meetings, with participants joining in person when possible.

J. Reinhardt (Board Chair)	10
S. Moroney (Vice-Chair)	10
P. Bula (Lead Independent Director)	10
N. Andrews	9
T. Buechner	10
E. Doherty	10
B. Heller	10
D. Hochstrasser[1]	8
F. van Houten	10
A. von Planta	10
A. de Pro Gonzalo[1]	8
C. Sawyers	10
W. Winters	9

Documents

- Articles of Incorporation of Novartis AG
- Board Regulations

www.novartis.com/investors/company-overview/corporate-governance

[1] Ms. de Pro Gonzalo and Mr. Hochstrasser were elected at the 2022 AGM and have attended all Board meetings since their election.

Audit and Compliance Committee

Primary responsibilities

- Supervises the external auditor, and selects and nominates the external auditor for election by the shareholders (FD)**
- Oversees Internal Audit (FD)**
- Oversees accounting policies, financial controls, and compliance with accounting and internal control standards (FD)**
- Approves financial statements for the first three quarters of each calendar year and the corresponding financial results releases (FD)**, and reviews the annual financial statements and the corresponding financial results releases (FBA)***
- Reviews the non-financial data contained in the Group's annual reporting (FBA)***
- Oversees compliance with laws, regulations and internal policies related to its subject matter expertise (FD)**
- Reviews updates with regards to Quality Assurance and patient safety twice a year and Health Safety & Environment once a year (FD)**
- Reviews updates from the SpeakUp Office twice a year (FD)**
- Reviews the Group's tax policy every two years (FD)**
- Reviews updates in closed sessions with the Chief Financial Officer, Chief Audit Officer, and external auditor

Key activities in 2022

- Evaluated the performance of the external auditor KPMG during 2022
- Reviewed the accounting and financial reporting, focusing on those areas involving significant risk or judgment
- Monitored the geopolitical situation and reviewed the treasury aspects and cash collection in Russia
- Reviewed and discussed the Company's approach to non-financial reporting and assurance
- Reviewed the timelines and milestones of the intended Sandoz spin-off
- Received an update on data privacy and its mechanisms of classifications and control
- Received a presentation on foreign exchange risk management at Novartis
- Liaised with the Risk Committee to ensure adequate oversight of the Company's key transformation projects (Enterprise Data Governance and Management and Lean Digital Core (LDC) program)
- Received reports and updates from Internal Audit; Quality; Ethics, Risk & Compliance; the SpeakUp Office; Health, Safety & Environment; and Legal, and discussed progress on identifying and remedying the root causes of issues

Meetings

Number of meetings held	7
Number of members	5
Approximate average duration (hours)	2:35
Meeting attendance	100%

E. Doherty (Chair, Audit Committee Financial Expert)	7
T. Buechner	7
B. Heller	7
F. van Houten	7
A. de Pro Gonzalo[1] (Audit Committee Financial Expert)	5

Documents

- Board Committees Charter, Appendix I to the Board Regulations

www.novartis.com/investors/company-overview/corporate-governance

* A/P = advisory or preparatory task
** FD = fully delegated task
*** FBA = task subject to final Board approval
[1] Ms. de Pro Gonzalo became a member of the Audit and Compliance Committee after the 2022 AGM and has attended all Audit and Compliance Committee meetings since that time.

Compensation Committee

Primary responsibilities

- Designs, reviews and recommends to the Board the compensation policies and programs (FBA)***
- Advises the Board on the compensation of Board members and the CEO (A/P)*
- Decides on the compensation of Executive Committee members (FD)**
- Prepares the Compensation Report and the Say-on-Pay brochure, and submits them to the Board for approval (FBA)***

Key activities in 2022

- Made decisions relating to Executive Committee and wider employee compensation during the year
- Established compensation to be paid for the future Sandoz board and executive committee members
- Determined the critical performance measures (including financial, strategic, operational, innovation and ESG) to be considered in the 2022 and 2023 incentive plan targets
- Reviewed the achievement of incentive plan targets for the Executive Committee members
- Reviewed shareholder and proxy advisor feedback related to Novartis compensation practices and disclosures and to those of peer companies
- Reviewed disclosures in the Novartis Compensation Report
- Proposed appropriate peer companies for comparisons of board and executive committee compensation, and assessed the Company's level of compensation against the peer group
- Reviewed incentive plan rules to secure pay-for-performance alignment while preserving market competitiveness
- Appointed a new independent advisor to the Compensation Committee
- Reflected on effectiveness of the Company's compensation programs in view of its strategy to become a fully focused medicines company, following announcements of the introduction of a new organizational structure and the intention to separate the Sandoz business by way of a 100% spin-off
- Reviewed the Compensation Committee charter

Meetings

Number of meetings held	7
Number of members	4
Approximate average duration (hours)	1:40
Meeting attendance	96.5%

S. Moroney (Chair)	7
P. Bula	7
B. Heller	7
W. Winters	6

Documents

- Board Committees Charter, Appendix I to the Board Regulations

www.novartis.com/investors/company-overview/corporate-governance

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

Governance, Sustainability and Nomination Committee

Primary responsibilities

- Oversees the Company's strategy, governance and progress on sustainability, including access to medicine and healthcare, global health, environmental sustainability, human capital management and other material ESG aspects (FBA)***
- Recommends corporate governance best practices to the Board (FBA)***
- Reviews the Articles of Incorporation and Board Regulations on a periodic basis (FD)**
- Reviews the composition and size of the Board and its committees as well as the skills matrix on a regular basis (FBA)***
- Identifies new Board member candidates and recommends to the Board whether existing Board members should stand for re-election (FBA)***
- Prepares and reviews succession plans for the Board Chair, the Vice-Chair, the Lead Independent Director, Board members, committee members and chairs, and the CEO (FBA)***
- Reviews the independence of each Board member on an annual basis (FBA)***
- Reviews directorships and agreements of Board members for conflicts of interest, and deals with conflicts of interest (FBA)***

Key activities in 2022

- Evaluated progress on sustainability at Novartis, focusing on material ESG factors, together with targets and metrics
- Received updates on ESG and Global Health covering the Company's ESG priorities and 5-year roadmap
- Received an update on environmental sustainability covering governance, strategy and progress against near- and longer-term targets for carbon emissions, waste reduction and water consumption
- Received an update on human capital management covering the Company's People & Organization strategy, key people metrics and progress in its culture journey
- Evaluated the results of the 2022 AGM as well as investor and analyst feedback from ESG / Governance roadshows held in 2022
- Discussed and recommended to the Board amendments to the Articles of Incorporation of Novartis AG in connection with the reform of Swiss corporate law
- Discussed candidates for the Sandoz board chair elect and the nomination process for the entire Sandoz board
- Discussed the composition of, and the succession for, the (Novartis) Board and its committees on a regular basis

Meetings

Number of meetings held	3
Number of members	5
Approximate average duration (hours)	2:00
Meeting attendance	100%

P. Bula (Chair)	3
B. Heller	3
A. von Planta	3
C. Sawyers	3
W. Winters	3

Documents

- Board Committees Charter, Appendix I to the Board Regulations

www.novartis.com/investors/company-overview/corporate-governance

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

Risk Committee

Primary responsibilities

- Oversees the risk management system and processes (FBA)***
- Reviews, together with management, the prioritization and handling of risks, the risk portfolio, and actions implemented by management (FBA)***
- Performs deep dives into key risk areas and fosters a culture of smart risk-taking (FBA)***
- Reviews updates on cyber security on an annual basis (FD)**

Key activities in 2022

- Received updates on Enterprise Risk Management mitigation measures and results
- Evaluated the emerging risks associated with the current geopolitical crisis in Russia and Ukraine, and mitigation actions
- Received a presentation on launch excellence in Japan, evaluating opportunities and risks for Innovative Medicines
- Reviewed and discussed the current opportunities and risks at Global Drug Development
- Discussed the performance, risk management and transformation of Novartis Technical Operations associated supply chain
- Received updates and closely monitored the Enterprise Data Governance and Management and the risk assessment and mitigation of the Lean Digital Core (LDC) program
- Received a presentation on falsified medicines covering the various types of falsification and indirect import
- Evaluated the enterprise risks for Innovative Medicines in the US for 2022 related to the Transforming for Growth program, pipeline portfolio growth and diversity in clinical trials
- Reviewed the Third-Party Risk Management (TPRM) program
- Discussed the key risks associated with Intellectual Property (IP protection, IP enforcement, third-party assertion and trade secrets)
- Analyzed the opportunities and risks around talent management in key areas and geographies
- Received a deep-dive update on cyber security, including on data loss protection, from the Chief Security Officer

Meetings

Number of meetings held	5
Number of members	5
Approximate average duration (hours)	1:50
Meeting attendance	100%

T. Buechner (Chair)	5
N. Andrews	5
E. Doherty	5
A. von Planta	5
A. de Pro Gonzalo	5

Documents

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www.novartis.com/investors/company-overview/corporate-governance

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

Science & Technology Committee

Primary responsibilities

- Monitors emerging scientific, data-related, technological and research trends and issues, and brings recommendations to the Board (FBA)***
- Informs the Board on a periodic basis about critical developments for the success of the portfolio and for scientific, technological and research activities as well as benchmarking (A/P)*
- Assists the Board with setting the Company's strategy for science, data, technology and research (A/P)*
- Assists the Board with oversight and evaluation of the performance of the Company's scientific, technological and R&D activities (FBA)***
- Reviews performance and proposed targets in the area of science, technology and research (FD)**
- Reviews other matters in relation to science, data, technology and research that the committee may, in its own discretion, deem desirable in connection with its responsibilities (A/P)*

Key activities in 2022

- Reviewed and provided guidance on the technology strategy for the Novartis Institutes of BioMedical Research (NIBR)
- Reviewed the Company's early clinical pipeline
- Discussed the performance of Global Drug Development and its future strategy
- Provided guidance on the build-up of the Strategy & Growth function, and discussed the Company's innovation strategy with the Strategy & Growth leadership

Meetings

Number of meetings held	4
Number of members	5
Approximate average duration (hours)	6:00
Meeting attendance	95%

J. Reinhardt (Chair)	4
N. Andrews	4
F. van Houten	3
S. Moroney	4
C. Sawyers	4

Documents

- Board Committees Charter, Appendix I to the Board Regulations

www.novartis.com/investors/company-overview/corporate-governance

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

Board Chair

The Board Chair leads the Board to represent the interests of all stakeholders and ensures an appropriate balance of power between the Board and the Executive Committee. In this role, the Board Chair:

- Provides leadership to the Board
- Supports and mentors the CEO
- 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
- Ensures onboarding programs for new Board members, and continuing education for and specialization of all Board members
- Ensures the Board's annual performance evaluation
- Promotes effective relationships and communication between Board and Executive Committee members
- Ensures effective communication with the Company's shareholders, other stakeholders and the public

Vice-Chair and Lead Independent Director

Vice-Chair

The Vice-Chair has the following responsibilities:

- Leads the Board in case and as long as the Board Chair is incapacitated
- Leads the yearly session of the Board members to evaluate the performance of the Board Chair, during which the Board Chair is not present

The Vice-Chair also provides advice and support to the Board Chair.

Lead Independent Director

To support adequate control mechanisms, the Board Regulations outline the role of the Lead Independent Director. The Lead Independent Director has the following responsibilities:

- Chairs the sessions of the independent Board members
- Leads the independent Board members in the event of a crisis or matter requiring their separate consideration or decision

The roles of the Vice-Chair and the Lead Independent Director can be held by two Board members or by one Board member (combined role).

The Board appointed Simon Moroney as Vice-Chair and Patrice Bula as Lead Independent Director, both roles effective as of March 4, 2022.

Honorary Chairmen

Alex Krauer and Daniel Vasella were appointed Honorary Chairmen in recognition of their significant achievements on behalf of Novartis. In December 2021, Mr. Krauer passed away at the age of 90.

Mr. Vasella is not provided with Board documents and does not attend Board meetings.

Mandates outside the Novartis Group

According to article 34, paragraph 1 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), the following limitations on mandates apply:

	Maximum number of mandates
Mandates	10
Other listed companies[1]	4

[1] Holding a chair position of the board of directors in other listed companies counts as two mandates.

According to article 34, paragraph 3 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), the following mandates are not subject to the above-mentioned limitations:

	Maximum number of mandates
Mandates in companies that are controlled by Novartis AG	No limit
Mandates held at the request of Novartis AG or companies controlled by it	5
Mandates in associations, charitable organizations, foundations, trusts and employee welfare foundations	10

"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 to be one mandate.

Executive Committee

Composition (as per December 31, 2022)

Vasant (Vas) Narasimhan
Chief Executive Officer

Shreeram Aradhye
President, Global Drug Development & Chief Medical Officer

Victor Bulto
President, Innovative Medicines US

Aharon (Ronny) Gal
Chief Strategy & Growth Officer

Karen L. Hale
Chief Legal Officer

Harry Kirsch
Chief Financial Officer

Robert (Rob) Kowalski
Chief People & Organization Officer

Steffen Lang
President, Operations

Fiona H. Marshall
President, Novartis Institutes for BioMedical Research (NIBR)

Klaus Moosmayer
Chief Ethics, Risk & Compliance Officer

Marie-France Tschudin
President, Innovative Medicines International & Chief Commercial Officer

Changes to the Executive Committee

Susanne Schaffert, President of Novartis Oncology since 2019, stepped down from her role following the Company's decision to integrate the Pharmaceuticals and Oncology business units and create separate US and International commercial organizations under the Innovative Medicines (IM) Division, effective April 4, 2022. Marie-France Tschudin, President of Novartis Pharmaceuticals since 2019, was appointed President, Innovative Medicines International & Chief Commercial Officer, effective April 4, 2022. Victor Bulto, President, Novartis Pharmaceuticals Corporation, US, since 2019, was appointed President, Innovative Medicines US, effective April 4, 2022. He has been a member of the Executive Committee since May 1, 2022. Robert Weltevreden, Head of Customer & Technology Solutions (CTS) since February 1, 2021, stepped down from his role following the Company's decision to combine Novartis Technical Operations (NTO) and CTS into a new Operations unit, effective April 4, 2022. Steffen Lang, Global Head of Novartis Technical Operations since 2017, was appointed President, Operations, effective April 4, 2022. John Tsai, Head of Global Drug Development and Chief Medical Officer, stepped down from his role effective May 15, 2022. Shreeram Aradhye was appointed President, Global Drug Development & Chief Medical Officer, effective May 16, 2022. Aharon (Ronny) Gal was appointed Chief Strategy & Growth Officer, effective July 18, 2022. From April 4, 2022, until July 17, 2022, Lutz Hegemann, President Global Health & Sustainability, served as ad interim Chief Strategy & Growth Officer but was not a member of the Executive Committee. Richard Saynor, Chief Executive Officer, Sandoz, stepped down from the Executive Committee effective October 25, 2022, following his appointment as CEO designate of the Sandoz standalone company expected to be created in the second half of 2023. James (Jay) Bradner, President of the Novartis Institutes for BioMedical Research (NIBR), stepped down from his role effective October 31, 2022. Fiona H. Marshall was appointed President of the Novartis Institutes for BioMedical Research (NIBR), effective November 1, 2022. The biographies of the former members of the Executive Committee can be found in the 2021 Annual Report (pages 147 – 149), available at www.novartis.com/news/media-library/novartis-annual-report-2021.

Role of the Executive Committee

The Board has appointed the Executive Committee members and delegated the overall responsibility for and oversight of the operational management of Novartis to them, including:

- 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, and capital market and other important financing transactions, as well as all other matters of fundamental significance to 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

There are no contracts between Novartis and third parties whereby Novartis would delegate any business management tasks to such third parties.

CEO

With the support of the Executive Committee, the CEO is responsible for the operational management of Novartis. This includes effectively implementing the Company strategy, delivering financial results, and shaping a corporate culture of empowerment and responsibility to help drive innovation, performance and reputation.

In addition to other Board-assigned duties, the CEO leads the Executive Committee, and is responsible for building and maintaining an effective executive team. With the support of the Executive Committee, the CEO is responsible for:

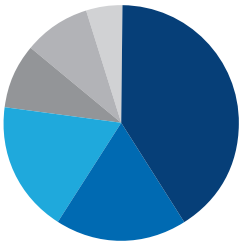
- Ensuring Novartis has the capabilities to achieve its long-term strategic objectives
- Developing robust management succession and development plans for presentation to the Board
- Promoting effective communication with shareholders and other stakeholders
- Ensuring Novartis conducts its business in a legal and ethical manner
- Developing an effective risk control framework for all business activities
- Ensuring the flow of information to the Board is accurate, timely and clear

Diversity

The composition as of December 31, 2022, in terms of nationality, gender, age and length of tenure, is shown in the following charts:

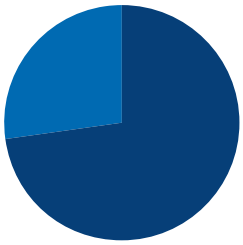
Diversity profile

Nationality[1]



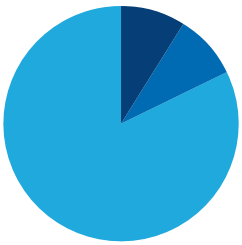
American	41%
German	18%
Swiss	18%
British	9%
Spanish	9%
Israeli	5%

Gender



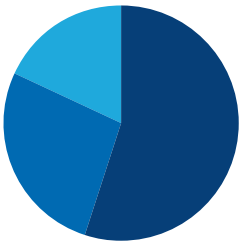
Male	73%
Female	27%

Age



<45	9%
45–50	9%
>50	82%

Tenure



<2 y	55%
2–4 y	27%
>4 y	18%

[1] Please note that three Executive Committee members have dual nationalities. Each of these nationalities is counted as a half in the above chart.

Mandates outside the Novartis Group

According to article 34, paragraph 2 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), the following limitations on mandates apply:

	Maximum number of mandates
Mandates	6
Other listed companies[1]	2

[1] Holding a chair position of the board of directors in other listed companies is not allowed.

According to article 34, paragraph 3 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), the following mandates are not subject to the above-mentioned limitations:

	Maximum number of mandates
Mandates in companies that are controlled by Novartis AG	No limit
Mandates held at the request of Novartis AG or companies controlled by it	5
Mandates in associations, charitable organizations, foundations, trusts and employee welfare foundations	10

"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 to be one mandate.

Members of the Executive Committee

Vasant (Vas) Narasimhan, M.D.

Chief Executive Officer of Novartis since 2018 | Nationality: American | Year of birth: 1976

Professional experience
- Global Head of Drug Development and Chief Medical Officer, Novartis AG, Switzerland (2016–2018)
- Global Head of Development, Novartis Pharmaceuticals, Switzerland (2014–2016)
- Global Head of Biopharmaceuticals and Oncology Injectables, Sandoz International, Germany (2014)
- Global Head of Development, Novartis Vaccines, US (2012–2014)
- North America Region Head, Novartis Vaccines, and US Country President, Novartis Vaccines and Diagnostics, US (2008–2012)
- Joined Novartis in 2005

Mandates
- Member, National Academy of Medicine, US
- Chair (since December 2022) and board member (2020–2022), African Parks Network, South Africa
- Committee member, Biopharmaceutical CEOs Roundtable (BCR), International Federation of Pharmaceutical Manufacturers & Associations (IFPMA), Switzerland
- Member of the board of fellows, Harvard Medical School, US
- Board member and treasurer, Pharmaceutical Research and Manufacturers of America (PhRMA), US

Education
- Doctor of medicine, Harvard Medical School, US
- Master's degree in public policy, John F. Kennedy School of Government, Harvard University, US
- Bachelor's degree in biological sciences, University of Chicago, US

Shreeram Aradhye, M.D.

President, Global Drug Development & Chief Medical Officer since May 16, 2022 | Nationality: American | Year of birth: 1962

Professional experience
- Executive Vice President & Chief Medical Officer, Dicerna Pharmaceuticals, US (2020–March 2022)
- Executive Vice President & Chief Development Officer, Axcella Health, US (2019–2020)
- Global Head, Medical Affairs and Chief Medical Officer, Pharmaceuticals, Novartis, US & Switzerland (2017–2019)
- Global Head, Development Franchise, Neuroscience, and US Head, Development, Novartis, US & Switzerland (2013–2017)
- Executive Global Program Head, Multiple Sclerosis, Novartis, Switzerland (2012–2013)
- Head, Global Development India, Novartis, India (2011–2012)
- Head, Global Clinical Development & Medical Affairs, Biosimilars, Sandoz, Germany (2009–2011)
- Joined Novartis in 1999 holding positions of increasing responsibility

Education
- Chief Resident and Teaching Fellow in Internal Medicine, Newton Wellesley Hospital, US
- Resident in Internal Medicine, Newton Wellesley Hospital, US
- Fellow in Nephrology, St Luke's Roosevelt Medical Center, US
- Resident in Internal Medicine (M.D.), All India Institute of Medical Sciences, India
- Bachelor of Medicine and Bachelor of Surgery, All India Institute of Medical Sciences, India

Victor Bulto

President, Innovative Medicines US since April 4, 2022 | Member of the Executive Committee as of May 1, 2022 | Nationality: Spanish | Year of birth: 1978

Professional experience
- President, Novartis Pharmaceuticals Corporation, US (2019–April 2022)
- Vice President & Head US Immunology & Dermatology Franchise, US (2017–2019)
- Vice President & Head US Alcon Pharmaceuticals, US (2016–2017)
- Head Neuroscience Franchise, Region Europe, Novartis, Switzerland (2013–2016)
- Business Franchise Head Neuroscience, Novartis, Spain (2012–2013)
- Business Franchise Head Neuroscience/MS, Respiratory, Osteoarticular, Spain, Novartis (2010–2012)
- Marketing Head Respiratory, Osteoarticular, Novartis, Spain (2009–2010)

Mandates
- Board member, Biotechnology Innovation Organization (BIO), US

Education
- Master of business administration, ESADE Business School, Spain
- Master's degree in health economics and pharmacoeconomics, Pompeu Fabra University Spain
- Master's degree in chemical engineering, Ramon Llull University, Spain
- Bachelor's of science degree in chemistry, Ramon Llull University, Spain

Aharon (Ronny) Gal, Ph.D.

Chief Strategy & Growth Officer since July 18, 2022 | Nationality: Israeli/American | Year of birth: 1966

Professional experience
- Senior analyst, US biopharmaceutical, Sanford Bernstein, US (2020–June 2022)
- Senior analyst, US specialty pharmaceuticals and Biotech, Sanford Bernstein, US (2016–2020)
- Senior analyst, US specialty pharmaceuticals and EU mid-cap pharmaceuticals, Sanford Bernstein, US, UK (2013–2016)
- Senior analyst, US specialty pharmaceuticals, Sanford Bernstein, US (2004–2013)
- Vice president, Canon US Life Sciences, US (2003–2004)
- Consultant, team leader, manager, The Boston Consulting Group, Inc., US, Singapore, China (1996–2002)

Mandates
- Scientific advisor, Pure Honey Technologies, US

Education
- Ph.D. in Biochemistry, Massachusetts Institute of Technology, US
- B.Sc. in Chemistry, Emory University, US

Karen L. Hale

Chief Legal Officer of Novartis since May 15, 2021 | Nationality: American | Year of birth: 1968

Professional experience
- Vice president, deputy general counsel, AbbVie Inc., US (2019–2021)
- Vice president, chief ethics and compliance officer, AbbVie Inc., US (2013–2019)
- Vice president, litigation and legal specialty operations, AbbVie Inc., US (2013)
- Divisional vice president, commercial litigation, Abbott Laboratories, US (2006–2012)
- Began practicing law in 1994 and joined Abbott in 1997

Education
- Bar memberships: Illinois and Virginia, US
- Juris doctor, William & Mary Law School, US
- Bachelor's degree in economics, Duke University, US

Harry Kirsch

Chief Financial Officer of Novartis since 2013 | Nationality: German/Swiss | Year of birth: 1965

Professional experience
- Chief Financial Officer of the Pharmaceuticals Division (now known as the Innovative Medicines Division), Novartis Pharmaceuticals, Switzerland (2010–2013)
- Chief Financial Officer of Pharma Europe, Novartis Pharmaceuticals, Switzerland (2008–2010)
- Head of Business Planning & Analysis for the Pharmaceuticals Division, Novartis Pharmaceuticals, Switzerland (2005–2008)
- Joined Novartis in 2003 as Head Finance Global Primary Care, and over the years held positions of increasing responsibility within Finance

Mandates
- Represented Novartis on the board of GlaxoSmithKline Consumer Healthcare Holdings Ltd. (2015–2018)

Education
- Diploma degree in industrial engineering and economics, University of Karlsruhe, Germany

Robert (Rob) Kowalski

Chief People & Organization Officer of Novartis since September 1, 2021 | Nationality: American | Year of birth: 1968

Professional experience
- Executive Vice President and Global Head of Regulatory Affairs (2018–2021), and US Head of Global Drug Development (2009–2015 and 2017–2021), Novartis Pharmaceuticals Corporation, US
- Ad interim President, Novartis Corporation, US (2021)
- Ad interim Head of Global Drug Development and Chief Medical Officer, Novartis AG, Switzerland (2018)
- Senior Vice President and Head of Regulatory Affairs, Novartis Pharmaceuticals Corporation, US (2009–2015 and 2017–2018)
- Senior Vice President and Head of Regulatory Affairs, Novartis Pharma AG, Switzerland (2015–2017)
- Global Head of Country Medical Development, Novartis Pharmaceuticals Corporation, US (2010–2011)
- Previously held regulatory leadership roles at Schering-Plough Corporation (now Merck) and Pharmacia Corporation (now Pfizer)

Mandates
- Member of the advisory board, Industry Pharmacists Organization, US

Education
- Doctor of pharmacy, University of Wisconsin-Madison, US
- Bachelor of Science in pharmaceutical sciences, University of Wisconsin-Madison, US

Steffen Lang, Ph.D.

President, Operations since April 4, 2022 | Nationality: German/Swiss | Year of birth: 1967

Professional experience
- Global Head of Novartis Technical Operations (NTO), Switzerland (2017–April 2022)
- Global Head of Biologics Technical Development and Manufacturing, Novartis Technical Operations, Switzerland (2015–2017)
- Global Head of Technical Research and Development, Novartis Pharmaceuticals, Switzerland (2009–2015)
- Joined Novartis in 1994 as Head of Laboratory in Research, and over the years held positions of increasing responsibility within Pharmaceuticals Development

Mandates
- Board member, Bachem Holding AG, Switzerland

Education
- Doctorate in pharmaceutical technology, Swiss Federal Institute of Technology, Switzerland
- Master's degree in pharmaceutical sciences, University of Heidelberg, Germany

Fiona H. Marshall, Ph.D.

President, Novartis Institutes for BioMedical Research (NIBR) since November 1, 2022 | Nationality: British | Year of birth: 1964

Professional experience
- Senior vice president, head of discovery, preclinical and translational medicine, Merck & Co., US, (2021–September 2022)
- Vice president, global head of neuroscience, Merck & Co., US (2019–2021)
- Vice president, head of UK discovery research, Merck & Co., UK (2018–2019)
- Executive vice president and chief scientific officer, Sosei Heptares, UK (2015–2018)
- Chief scientific officer and founder, Heptares Therapeutics, UK (2006–2018)

Mandates
- Member of the Scientific Advisory Board, SciLifeLab, Sweden
- Fellow, Royal Society, UK
- Honorary Fellow, Royal Society of Chemistry, UK
- Honorary Fellow, British Pharmacological Society, UK
- Fellow, UK Academy of Medical Sciences, UK
- Fellow, Royal Society of Biology, UK

Education
- PhD in Neuroscience, University of Cambridge, UK
- BSc in Biochemistry, University of Bath, UK

Klaus Moosmayer, Ph.D.

Chief Ethics, Risk & Compliance Officer of Novartis since 2018 | Nationality: German | Year of birth: 1968

Professional experience
- Chief compliance officer, Siemens AG, Germany (2014–2018)
- Chief counsel compliance, Siemens AG, Germany (2009–2013)
- Compliance operating officer, Siemens AG, Germany (2007–2009)

Mandates
- Board member, SwissHoldings, the Swiss federation representing Swiss-based multinational companies, Switzerland
- Member of the executive board, Business at OECD (BIAC), Paris
- Co-chair, B20 Integrity & Compliance Task Force under the G20 presidencies of Indonesia (2022), Italy (2021), Saudi Arabia (2020), Argentina (2018), and Chair of the Task Force under the G20 presidency of Germany (2017)
- Member of the advisory panel, Pharmaceutical Supply Chain Initiative, US
- Co-founder and board member, European Chief Compliance and Integrity Officers' Forum
- Chair of the Anti-Corruption Committee of the Business and Industry Advisory Committee (BIAC), Organization for Economic Co-operation and Development (OECD), Paris (2013–2020)

Education
- First and second state examination in law, Germany
- Doctor of jurisprudence, University of Freiburg, Germany

Marie-France Tschudin

President, Innovative Medicines International & Chief Commercial Officer since April 4, 2022 | Nationality: Swiss | Year of birth: 1971

Professional experience
- President, Novartis Pharmaceuticals, Switzerland (2019–April 2022)
- President, Advanced Accelerator Applications, France (2019)
- Europe Region Head, Novartis Pharmaceuticals, Switzerland (2017–2019)
- Corporate vice president of hematology and oncology for Europe, the Middle East and Africa, Celgene International, Switzerland (2014–2016)
- Regional vice president of northern Europe, Celgene International, Switzerland (2012–2014)
- General manager of Austria, Switzerland, the Czech Republic, Poland, Slovenia and Slovakia, Celgene International, Switzerland (2009–2011)
- Country manager of Switzerland, Celgene International, Switzerland (2008–2009)

Mandates
- Board member, IMD Foundation, Switzerland
- Board member, AXA, France
- Board member, European Federation of Pharmaceutical Industries and Associations (EFPIA), Belgium

Education
- Master of Business Administration, IMD business school, Switzerland
- Bachelor of Science, Georgetown University, US

Information and control systems

The Board's information and control systems vis-à-vis management include a steady flow of information from senior management; monthly financial reports; a comprehensive and integrated risk management framework; and the independent evaluation of our risk management and internal control framework by the Internal Audit function (see "Item 15. Controls and Procedures").

Information from senior management

The Board ensures that it receives sufficient information from the Executive Committee through:

- Monthly CEO reporting (including detailed written updates from each division and business unit head), frequent communications from the CEO on current developments, and a yearly presentation
- Executive Committee meeting minutes
- Regular meetings and teleconferences by the Board and/or Board committees with the CEO and/or other members of the Executive Committee (e.g., the CFO, the Chief Legal Officer, the Chief Ethics, Risk & Compliance Officer), and regular meetings and teleconferences with senior management (e.g., the Chief Audit Officer)
- Information from Executive Committee members or other Novartis employees, and visits to Novartis sites

To get an outside view, the Board and/or Board committees occasionally invite external advisors (e.g., the independent advisor of the Compensation Committee, the external auditor) to attend a meeting and/or share their observations about a specific topic.

Monthly financial reports

Novartis produces comprehensive, consolidated (unaudited) financial statements on a monthly basis for the Group and its operating divisions. These are typically available within 10 days after the end of the month, and include the following:

- Consolidated income statement of the month 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 "Item 5. Operating and Financial Review and Prospects—Item 5.A Operating results—Non-IFRS measures as defined by Novartis"). The IFRS and core figures are compared with the prior-year period and targets in both USD and on a constant currency basis.
- Supplementary data on a monthly and year-to-date basis, such as free cash flow and earnings per share on a USD basis

Management information related to the consolidated income statements and free cash flow is made available to Board members through the monthly CEO Report, which includes an analysis of key deviations from the prior year or target.

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.

Annually, in the middle of the year, the Board approves the Company's strategic plan for the next three years. In the fourth quarter of the year, the Board approves the operating targets for the following year as well as the financial targets for the following three-year period, including 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 Novartis financial and management reporting systems but can, at any time, request more detailed information.

Risk management

Overview

At Novartis, our continued success depends on our ability to manage risk. Our Board has ultimate oversight of the Enterprise Risk Management (ERM) system and regularly reviews the most significant risks and how these risks are managed. As explained further below, the Board is supported by its committees. Furthermore, our Internal Audit function provides an independent evaluation of risk management (see "—Item 6.C Board practices—Information and control systems—Internal Audit").

BOARD COMMITTEES

RISK COMMITTEE
- Oversees the risk management system and processes
- Reviews, together with management, the prioritization and handling of risks, the risk portfolio, and actions implemented by management
- Performs deep dives into key risk areas and fosters a culture of smart risk-taking
- Receives updates on cyber security on an annual basis
- Receives regular updates from designated risk owners as well as the Chief Ethics, Risk & Compliance Officer and/or the Head of Risk & Resilience

AUDIT AND COMPLIANCE COMMITTEE
- Ensures that Internal Audit plans are aligned with key risks, and that the function provides independent assurance and insights around these risks
- Works closely with the Risk Committee to minimize gaps in risk coverage
- Receives a semiannual presentation from the Chief Ethics, Risk & Compliance Officer
- Receives a quarterly presentation from the Chief Audit Officer on progress achieved in implementing the risk-based audit plan, and key insights about audit and advisory activities
- Pays particular attention to financial risk
- Has closed sessions with the Chief Audit Officer and, upon request, with the Chief Ethics, Risk & Compliance Officer

COMPENSATION COMMITTEE
- Works closely with the Risk Committee to ensure that the compensation system does not lead to excessive risk-taking (see "—Item 6.B Compensation—Compensation governance—Risk management principles")

EXECUTIVE COMMITTEE OF NOVARTIS

- Regularly assesses risks and fosters a culture of risk awareness, in line with the Novartis Values and Behaviors and the Novartis Code of Ethics

ETHICS, RISK & COMPLIANCE

- Governs the Novartis Code of Ethics
- Provides an integrated ERM framework (further described in the following section)
- Governs the global compliance program within Novartis
- Administers the Enterprise Policy Management and global Internal Controls framework

SENIOR LEADERS OF DIVISIONS, ORGANIZATIONAL UNITS AND GROUP FUNCTIONS, AT ALL LEVELS

- Provide appropriate risk management within their area of responsibility
- Establish adequate risk prevention and mitigation strategies when risk exposure is identified, including tracking progress and providing resources for possible actions
- Assess emerging risks, trends and overall exposure as part of the ERM process

Enterprise Risk Management framework

The Ethics, Risk & Compliance (ERC) function provides an integrated ERM framework to obtain a holistic view of Company risks and drive a culture of smart risk-taking. Under the leadership of the Chief Ethics, Risk & Compliance Officer, the Risk & Resilience team is responsible for the overall ERM process. This process covers, but is not limited to, risks associated with:
- The research, development, manufacturing, marketing and sales of products
- Finance, taxes, intellectual property, compliance with law and regulations, security, product safety, human resources, and health, safety and environmental protection
- Business objectives and strategies, including mergers and acquisitions
- External factors such as the social, political and economic environment

The ERM process continued to evolve in 2022. The Risk & Resilience team conducted risk workshops and collaborated with all risk assurance and monitoring functions to identify key risks across the Company. Each Novartis unit organized a focused risk workshop at the leadership team level. In parallel, risk workshops were held in the top 11 countries (by revenue) and in certain focus markets. Once key risks were identified, mitigation action plans were created to address them in an effective way. The findings from these workshops were consolidated into the Novartis Risk Compass, which enables senior management, the Executive Committee and the Board to focus discussions on key risks and more closely align our corporate strategy with our risk exposure and ways of working.

In 2022, we further matured our ERM framework within the Novartis Risk & Resilience organization, developed additional risk management trainings, and integrated other critical risk management functions (like Third-Party Risk Management and Health, Safety and Environment) into the Risk & Resilience department. Furthermore, the Enterprise Policy & Internal Control team is progressing as planned to create a holistic framework, and the Central Monitoring Coordination team is expanding its scope to ensure a harmonized and coordinated monitoring process across the Company.

SpeakUp Office

Our SpeakUp Office provides a safe place for employees to report potential misconduct, including the option to do so anonymously.

Global Security

Global Security proactively collects and shares threat intelligence to protect Novartis from situations that may compromise the safety of people, products and assets, and/or the reputation of our organization. Global Security protects patients from counterfeit products and, as part of the SpeakUp process, performs fair and timely investigations into high-risk cases of alleged internal misconduct. It also provides personal security advice and support for Novartis executives and other employees with the utmost discretion.

Internal Audit

The purpose of Internal Audit is to assist the Board and the Executive Committee in discharging their governance responsibilities by providing independent assurance and advice on the effectiveness, efficiency and adequacy of processes and controls that support Novartis in achieving its objectives, managing its major risks, and ensuring compliance with applicable policies, laws and regulations.

The Chief Audit Officer reports administratively to the CEO, and functionally to the chair of the Audit and Compliance Committee (ACC). The Chief Audit Officer meets with the ACC at least once a quarter and confirms the organizational independence of the Internal Audit function to the ACC on an annual basis.

In 2022, our Internal Audit function executed a risk-based audit plan and reported the results to the audited units, the Executive Committee and the ACC. Audit findings and action plans are stored and monitored in a single location to enable efficient and effective follow-up. The following outlines the number of audits, internal reviews and advisories performed in 2022, and key methodology steps when managing the Internal Audit cycle.

2022 INTERNAL AUDIT ACTIVITIES

AUDITS
41

INTERNAL REVIEWS
14

ADVISORIES
8

Internal Audit cycle methodology includes:

- Planning: Monitoring and information gathering via continuous risk assessment based on data analytics, business interviews and quarterly calibration of the audit plan
- Execution and Reporting: 63 engagements delivered in 2022, all linked to group risks, emerging topics and company-wide initiatives
- Follow Up: Management is responsible for resolving issues, supported by Internal Audit to ensure timely closure of observations

Internal Audit performed 85% of planned activities (equating to 63 of 74 engagements) in 2022, conducted under a hybrid model of engagement delivery, choosing between remote and in-person auditing based on the engagement scope and COVID-19 situation within the audited entity.

Auditors

Duration of the mandate and terms of office

On behalf of the Board, the ACC selects and nominates an independent auditor for election at the AGM. KPMG commenced its auditing mandate for Novartis in 2022. Richard Broadbelt, Auditor in charge, and Sara Burke, Global Audit Partner, began serving in their roles in 2022. The ACC together with KPMG will ensure that these partners are rotated at least every five years.

Auditing fees and additional fees

The ACC monitors and preapproves the fees paid to the external auditor for all audit and non-audit services. It has developed and approved a policy with clear guidelines on the engagement of the independent auditor firm. This policy is designed to help ensure that the independence of the external auditor is maintained. It limits the scope of services that the external auditor may provide to the Group, stipulating certain permissible types of audit-related and non-audit services, including tax services and other services that have been preapproved by the ACC. The ACC preapproves all other services on a case-by-case basis.

The external auditor is required to report periodically to the ACC about the scope of the services it has provided to the Group and the fees for the services it has performed to date. KPMG fees for professional services related to the 12-month period ended December 31, 2022, and PwC fees for professional services related to the 12-month period ended December 31, 2021, are as follows:

	2022 USD million	2021 USD million
Audit services	22.5	22.2
Audit-related services	0.7	1.5
Tax services	1.2	0.1
Other services	0.0	1.4
Total	**24.4**	**25.2**

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 the adoption of new accounting policies, audits of information systems and the related control environment, as well as reviews of quarterly financial results.

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; audits in connection with non-recurring transactions; contract audits of third-party arrangements; corporate responsibility assurance; and other audit-related services.

Tax services include tax compliance, assistance with historical tax matters, and other tax-related services.

Other services in 2021 included procedures related to corporate integrity agreements, benchmarking studies, and license fees for use of accounting and other reporting guidance databases.

Information to the Board and the ACC

The ACC, acting on behalf of the Board, is responsible for overseeing the activities of the external auditor. In 2022, this committee held seven meetings. KPMG was invited to all of these meetings to attend the discussions on auditing matters and any other matters relevant to its audit.

The ACC 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, 2022. The Board proposed the acceptance of these financial statements for approval by the shareholders at the next AGM.

The ACC regularly evaluates the performance of the external auditor and, based on this, once a year determines whether the external auditor should be proposed to the shareholders for re-election. To assess the performance of the external auditor, the ACC requests input from management and holds private meetings with the CFO and the Chief Audit Officer and, if necessary, obtains an independent external assessment. Criteria applied for the performance assessment of the external auditor 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 ACC, the Internal Audit function and management.

Once a year, the Auditor in charge and the Global Audit Partner report to the Board on the external auditor's activities during the current year, and on the audit plan for the coming year.

On an annual basis, the external auditor provides the ACC with written disclosures required by the US Public Company Accounting Oversight Board, and the committee and the external auditor discuss the external auditor's independence from Novartis.

Information policy

Novartis is committed to open and transparent communication with shareholders, investors, financial analysts, customers, suppliers and other stakeholders. Novartis disseminates information about 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. Novartis discloses financial results in accordance with IFRS on a quarterly basis, and issues press releases from time to time regarding business developments.

Novartis publishes press releases related to financial results and material events to the US Securities and Exchange Commission (SEC) via Form 6-K. An archive containing annual reports, US SEC Form 20-F, quarterly results releases and all related materials – including presentations and conference call webcasts – is available at www.novartis.com/investors.

Novartis also publishes a Novartis in Society Integrated Report, available at www.reporting.novartis.com, which highlights progress on the Company's strategic priorities and describes how Novartis creates value for diverse stakeholders. The Novartis in Society Integrated Report has been prepared in alignment with the Integrated Reporting Framework (part of the IFRS Foundation), the Task Force on Climate-related Financial Disclosures (TCFD), the Sustainability Accounting Standards Board (SASB) and the latest non-financial standards issued by the Global Reporting Initiative (GRI). It also contains our main disclosures against the Company's reporting requirement as a signatory of the United Nations Global Compact.

The information on Board and Executive Committee compensation is outlined in the Compensation Report (see "—Item 6.B Compensation" in general, and for certain compensation information with respect to our Board that is responsive to Item 6.C.2 of Form 20-F, see "—Item 6.B Compensation—2022 Board compensation—Philosophy and benchmarking"). Please also refer to articles 29-35 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance). There are no change-of-control or 'golden parachute' clauses benefiting Board members, Executive Committee members, or other members of senior management. Employment contracts with Executive Committee members are either for a fixed term not exceeding one year or for an indefinite period with a notice period not exceeding 12 months, and do not contain commissions for the acquisition or transfer of enterprises or severance payments. No loans or credits are granted to Board and Executive Committee members.

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

Investor Relations 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 at www.novartis.com/investors.

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/investors/share-data-analysis
Shareholder rights	Articles of Incorporation of Novartis AG www.novartis.com/investors/company-overview/corporate-governance
Annual General Meeting of Shareholders	Annual General Meeting of Shareholders www.novartis.com/investors/shareholder-information/annual-general-meeting
Board Regulations	Board Regulations www.novartis.com/investors/company-overview/corporate-governance
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
Novartis in Society Integrated Report	Novartis in Society Integrated Report www.reporting.novartis.com
Novartis financial data	Novartis financial data www.novartis.com/investors/financial-data
Press releases	Press releases www.novartis.com/news/news-archive?type=media_release Email service www.novartis.com/news/stay-up-to-date
Additional information (including Novartis investor event calendar, registered office, contact and email addresses, phone numbers, etc.)	Novartis Investor Relations www.novartis.com/investors

Quiet periods

According to our Global Insider Policy, employees who have access to material non-public information on a regular basis are designated as Continuing Insiders and are banned from trading in Novartis securities during quiet periods. Limited exemptions for the expiry of options or warrants within a quiet period apply. Until June 14, 2022, our quarterly quiet periods commenced at the beginning of the last trading day of each calendar quarter and ended at the beginning of the first trading day after the subsequent release of the quarterly and/or annual results. Effective June 15, 2022, our quarterly quiet periods commence on the first trading day of each calendar quarter and end at the beginning of the first trading day after the subsequent release of the quarterly and/or annual results.

In 2022, the following quiet periods applied:

- December 30, 2021, until (and including) February 2, 2022
- March 31, 2022, until (and including) April 26, 2022
- July 1, 2022, until (and including) July 19, 2022
- October 1, 2022, until (and including) October 25, 2022

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, 2022 (full-time equivalents)	Marketing and sales	Production and supply	Research and development	Operations[1]	General and administration	Total
USA	6 003	1 740	5 358	825	599	**14 525**
Canada and Latin America	2 678	809	514	1 071	270	**5 342**
Europe	14 078	18 781	10 483	5 028	2 483	**50 853**
Asia/Africa/Australasia	15 856	3 841	4 841	5 513	932	**30 983**
Total	**38 615**	**25 171**	**21 196**	**12 437**	**4 284**	**101 703**

For the year ended December 31, 2021 (full-time equivalents)	Marketing and sales	Production and supply	Research and development	Operations[1]	General and administration	Total
USA	6 074	1 938	5 324	879	654	**14 869**
Canada and Latin America	3 116	1 426	510	1 116	370	**6 538**
Europe	15 163	17 630	10 307	5 108	2 613	**50 821**
Asia/Africa/Australasia	16 927	3 570	4 812	5 696	1 090	**32 095**
Total	**41 280**	**24 564**	**20 953**	**12 799**	**4 727**	**104 323**

For the year ended December 31, 2020 (full-time equivalents)	Marketing and sales	Production and supply	Research and development	Operations[1]	General and administration	Total
USA	5 978	2 954	5 554	636	820	**15 942**
Canada and Latin America	3 405	1 286	504	928	401	**6 524**
Europe	16 066	18 628	10 043	4 506	2 852	**52 095**
Asia/Africa/Australasia	17 240	3 346	4 537	4 991	1 119	**31 233**
Total	**42 689**	**26 214**	**20 638**	**11 061**	**5 192**	**105 794**

[1] relates to full time equivalent employees (FTEs) from our Operations unit, excluding the Operations units' production and supply FTEs

As of December 31, 2022, the total number of our full-time equivalent employees decreased by 2 620 compared with December 31, 2021, mainly driven by the initiative announced in April 2022 to implement a new, streamlined organizational model. For more information about this new organizational structure, see "Item 4. Information on the Company—Item 4.B Overview."

A significant number of our employees 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 information set forth under "Item 6. Directors, Senior Management and Employees—Item 6.B Compensation—2021 Executive Committee compensation—Additional disclosures for the CEO and other Executive Committee members—Shares, ADRs and other equity rights owned by Executive Committee members at December 31, 2021" and under "Item 6. Directors, Senior Management and Employees—Item 6.B Compensation—2021 Board compensation—Additional disclosures—Shares, ADRs and share options owned by Board members" is incorporated by reference. For more information on our equity-based participation plans, see the information set forth under "Item 18. Financial Statements—Note 26. Equity-based participation plans for employees," 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, 2022, Novartis had approximately 186 000 shareholders listed in the Share Register of Novartis, representing approximately 67.0% of issued shares. Based on the Novartis Share Register and excluding treasury shares, approximately 48.4% of the shares registered by name were held in Switzerland, and approximately 21.3% were held in the US. Approximately 15.6% of the shares registered in the Share Register were held by individual investors, while approximately 37.7% were held by legal entities (excluding 7.7% of our share capital held as treasury shares by Novartis AG or its fully owned subsidiaries), and 46.7% were held by nominees, fiduciaries and the ADS depositary. Due to a change in Swiss corporate law, as of January 1, 2023, Novartis ordinary shares held by certain Swiss foundations controlled by Novartis (Foundation Shares) no longer carry the right to vote. As a result, in the future these Foundation Shares will be excluded from the calculation of the shares registered in the Share Register in the same way, as described above, that our treasury shares are excluded. This will impact some of the percentage holdings reported in this Item 7.A in future Form 20-F filings by Novartis.

Based on the 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.

The tables below set forth information with respect to our major shareholders according to the Share Register as of December 31, 2022, excluding 7.7% of our share capital held as treasury shares by Novartis AG or its fully owned 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:

		% of respective share capital beneficially owned as of:		
	Ordinary shares beneficially owned as of Dec 31, 2022	**Dec 31, 2022**	Dec 31, 2021	Dec 31, 2020
Shareholders registered for their own account:				
Emasan AG, Basel, Switzerland	89 135 960	3.7	3.7	3.6
UBS Fund Management (Switzerland) AG, Basel, Switzerland	55 906 821	2.3	2.3	2.3
Credit Suisse Funds AG, Zurich, Switzerland	49 335 879	2.1	2.1	2.0

		% of respective share capital held as of:		
	Ordinary shares held as of Dec 31, 2022	**Dec 31, 2022**	Dec 31, 2021	Dec 31, 2020
Shareholders registered as nominees:				
Chase Nominees Ltd., London, England	201 853 725	8.4	8.8	9.6
Nortrust Nominees Ltd., London, England	90 962 072	3.8	4.2	4.2
The Bank of New York Mellon, New York, NY	68 638 910	2.9	3.0	3.4
Through The Bank of New York Mellon, Everett, MA	*37 227 478*	*1.6*	*1.6*	*1.7*
Through The Bank of New York Mellon, New York, NY	*22 583 699*	*0.9*	*1.1*	*1.2*
Through The Bank of New York Mellon, SA/NV, Brussels, Belgium	*8 827 733*	*0.4*	*0.3*	*0.5*
Shareholder acting as American Depositary Share (ADS) depositary:				
JPMorgan Chase Bank, N.A., New York, NY	225 529 101	9.4	11.1	11.7

According to a disclosure notification filed with Novartis AG, Norges Bank (Central Bank of Norway), Oslo, Norway, held 2.3% of the share capital of Novartis AG, or 54 667 792 shares, as of December 31, 2022, but was not registered in the Share Register as of December 31, 2022. Provided that these shares are registered in the Share Register on the record date of the Annual General Meeting, Norges Bank will have full voting rights for all of these shares.

According to a disclosure notification filed with Novartis AG and the SIX Swiss Exchange, BlackRock, Inc., New York, NY, held between 5% and 10%, but was registered with less than 2% of the share capital of

Novartis AG in the Share Register as of December 31, 2022.

As of December 31, 2022, 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.

7.B Related party transactions

The information set forth under "Item 18. Financial Statements—Note 27. Transactions with related parties" 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 in Swiss francs per share. 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 3.20 per share to the shareholders for approval at the Annual General Meeting to be held on March 7, 2023. Because we pay dividends in Swiss francs, exchange rate fluctuations will affect the US dollar amounts received by holders of ADRs. For the amount of dividends we paid in the past three years, see “Item 18. Financial Statements—Note 18—Equity.”

Disclosure pursuant to Section 219 of the Iran Threat Reduction and Syria Human Rights Act (ITRA)

At Novartis, our purpose is to reimagine medicine 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 for many years maintained two 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.

From time to time, including in 2022, non-US affiliates in our Innovative Medicines and Sandoz Divisions made payments to government entities in Iran related to patents, trademarks, 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 2022, non-US affiliates in our Innovative Medicines and Sandoz Divisions enter into agreements with hospitals, research institutes, medical associations and universities in Iran to provide grants and 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 hospitals and research institutes are owned or controlled by the government of Iran, and some 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. In addition, from time to time, representatives of our non-US affiliates participate in meetings with Iranian officials to discuss issues relevant to our business and the pharmaceutical industry.

Non-US affiliates in our Innovative Medicines and Sandoz Divisions maintain local accounts at banks that are, as of November 5, 2018, on the Specially Designated Nationals and Blocked Persons List (SDN List). These non-US affiliates make local transactions for employee payroll and local vendor payment purposes. These transactions are conducted for the purpose of facilitating the provision of medicine to Iran, in line with the humanitarian exceptions contained in Section 11 of Executive Order 13902 and other applicable sanctions legal authorities. No transactions are made with an Iranian financial institution designated on the SDN List in connection with Iran's support for international terrorism or proliferation of weapons of mass destruction.

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).

ADSs, each representing one share, have been available in the US through an ADR program since December 1996. This program was established pursuant to a deposit agreement that 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 depositary has informed us that as of January 25, 2023, there were 220 million ADRs outstanding, each representing one Novartis share (approximately 9% of total Novartis shares issued). On January 25, 2023, the closing price was CHF 85.30 per share on the SIX, and USD 92.81 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 non-exhaustive summary of certain provisions of our Articles of Incorporation ("Articles"); our Regulations of the Board, the Board Committees and the Executive Committee ("Board Regulations"); and Swiss law, particularly the Swiss Code of Obligations ("Swiss CO"), and 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.

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 healthcare 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

According to our Articles, the Board of Directors ("Board") consists of a minimum of eight and a maximum of 16 members. The members of the Board (including the Board Chair) are elected individually by the General Meeting of Shareholders ("General Meeting") for a one-year term of office lasting until completion of the next Annual General Meeting of Shareholders ("AGM").

(a) A Board resolution requires the affirmative majority of the votes cast. According to our Board Regulations, a member of our Board ("Director") may not participate in decisions and resolutions on matters that affect, or reasonably might affect, the Director's interests or the interests of a person close to the Director.
(b) Compensation of the Directors is subject to the approval of the aggregate amounts of such compensation by a shareholders' resolution under the Ordinance against Excessive Compensation in Public Companies of the Swiss Federal Council.
(c) The Articles prohibit the granting of loans or credits to Directors.
(d) The Articles provide that a Director shall not serve on the Board for more than 12 years. The Board may, under certain circumstances and if deemed in the best interests of the Company, recommend exceptions to this rule to the General Meeting.
(e) Our Directors are not required to be shareholders at the time of the election by the General Meeting. However, according to our share ownership guidelines, the Board Chair is required to own a minimum of 30 000 Novartis AG shares, and other Directors are required to own at least 5 000 Novartis AG shares within five years after joining the Board, to ensure their interests are aligned with those of our shareholders.

10.B.3 Shareholder rights

Because Novartis AG has only one class of registered shares, the following information applies to all shareholders.

(a) Under the Swiss CO, we may only pay dividends out of balance sheet profits or out of distributable 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. Furthermore, the Swiss CO requires us to accrue general legal reserves under certain circumstances so long as these reserves amount to less than 20% of our registered share capital, and Swiss law and the Articles permit us to accrue additional reserves beyond the statutory reserves. Our auditors must confirm that the dividend proposal of our Board conforms with the Swiss CO and the Articles. Our Board expects to recommend the payment of a dividend in respect of each financial year. See "Item 6. Directors, Senior Management and Employees—Item 6.C Board Practices—Capital Structure—Limitation on transferability—Per-share information" 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 that 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. Voting rights may only be exercised for shares registered with the right to vote on the record date for the applicable General Meeting. 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 registered its shares, then the shareholder may not vote at, or participate in, a General Meeting.

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 0.5% or more of the registered share capital. The same restrictions indirectly apply to ADR holders. We have in the past granted exemptions from the 2% rule for shareholders and the 0.5% rule for nominees.

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.

Except as noted below, shareholders' resolutions require the approval of an absolute majority of the votes present at a General Meeting. 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:

- Adoption and amendment of the Articles
- Election and removal of the Board Chair, the Board and Compensation Committee members, the Independent Proxy and the external auditor
- Approval of the management report 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, if any
- Approval of the maximum aggregate compensation of the Board (from an AGM until the next AGM) and of the Executive Committee (for the financial year following the AGM)
- Discharge of Board and Executive Committee members from liability for matters disclosed to the General Meeting
- Decision on other matters that are reserved by law or by the Articles (e.g., advisory vote on the Compensation Report) to the General Meeting

According to the Articles and Swiss law, the following matters require the approval of a "supermajority" of at least two-thirds of the votes present at a General Meeting:

- 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 cancellation of subscription rights
- Change 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 demerger.

Our shareholders are required to annually elect all Directors (including the Board Chair), the Compensation Committee members, the external auditor and the Independent Proxy. The Articles do not provide for cumulative voting of shares.

At a General Meeting, shareholders can be represented by a proxy, which 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 resolves to have a ballot or where a ballot is ordered by the chair of the meeting. ADSs, each representing one Novartis AG share and evidenced by 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 AG 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 AG share and an ADR holder is not a Novartis AG 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 a General Meeting 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 AG share. JPMorgan Chase Bank, N.A., 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. Such designee has to be a shareholder of Novartis AG. The same voting restrictions apply to ADR holders as to those holding Novartis AG shares (i.e., the right to vote up to 2% of the Novartis AG 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 and to distribute dividends by vote taken at the General Meeting, 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 Novartis AG (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 sufficient freely disposable equity in the amount of the purchase price of the acquired shares. The aggregate nominal value of all Novartis AG shares held by us and our subsidiaries may not exceed 10% of our registered share capital. However, it is accepted that a Swiss 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 recognize a negative position, or if our subsidiaries acquire our shares, 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, 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, our shareholders are not obliged to make further contributions with respect to their shares.

(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 pre-emptive rights to obtain newly issued shares in an amount proportional to the nominal value of the shares they already hold. These pre-emptive rights could be excluded in certain limited circumstances with the approval of a resolution adopted at a General Meeting 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 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 AGM within six months after the end of our financial year. A General Meeting may be convened by the Board or, if necessary, by the external auditor. The Board is further required to convene an extraordinary General Meeting if so resolved by a General Meeting, or if so requested by shareholders representing at least 10% of the share capital, specifying the items for the agenda and their proposals. Shareholders representing shares with an aggregate nominal value of at least CHF 1 000 000 may request that an item be included in a General Meeting agenda. A General Meeting is convened by publishing a notice in the Swiss Official Gazette of Commerce (Schweizerisches Handelsamtsblatt) at least 20 days prior to such meeting. Shareholders may also be informed by mail. Neither the Swiss CO nor the Articles require a quorum for a General Meeting. In addition, see "—Item 10.B.3(b) Shareholder rights" regarding conditions for exercising a shareholder's right to vote at a General Meeting.

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 AG 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.

Under the Swiss Financial Market Infrastructure Act, shareholders and groups of shareholders acting in concert who acquire more than 33 1/3% of our shares would be under an obligation to make an offer to acquire all remaining Novartis AG shares. Novartis AG has neither opted out from the mandatory takeover offer obligation nor opted to increase the threshold for mandatory takeover offers in its Articles.

10.B.8 Disclosure of shareholdings

Under the Swiss Financial Market Infrastructure Act, persons who directly, indirectly or in concert with other parties acquire or dispose of our shares or purchase or sale rights relating to our shares are required to notify us and the SIX of the level of their holdings whenever such holdings reach, exceed or fall below certain thresholds – 3%, 5%, 10%, 15%, 20%, 25%, 33 1/3%, 50% and 66 2/3% – of the voting rights represented by our share capital (whether exercisable or not). This also applies to anyone who has discretionary power to exercise voting rights associated with our shares. 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.

An additional disclosure obligation exists under the Swiss CO that 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

Acquisition of The Medicines Company

On November 23, 2019, we entered into an Agreement and Plan of Merger (the "Merger Agreement") with US-based pharmaceutical company The Medicines Company. Pursuant to the Merger Agreement, on December 5, 2019, Novartis, through a subsidiary, commenced a tender offer to acquire all outstanding shares of The Medicines Company for USD 85 per share, or a total consideration of approximately USD 9.6 billion in cash on a fully diluted basis. The tender offer expired on January 3, 2020, and on January 6, 2020, the acquiring subsidiary merged with and into The Medicines Company, resulting in The Medicines Company becoming an indirect wholly owned subsidiary of Novartis. This merger broadens our cardiovascular portfolio by adding inclisiran, an investigational cholesterol-lowering therapy.

Divestment of Roche shares

On November 3, 2021, we entered into a Share Repurchase Agreement with Roche under which we agreed to sell 53.3 million (approximately 33%) of Roche bearer shares in a bilateral transaction to Roche for a total consideration of USD 20.7 billion. The transaction was approved by the shareholders of Roche on November 26, 2021, and closed on December 6, 2021.

10.D Exchange controls

There are no Swiss governmental laws, decrees or regulations that affect – in a manner material to Novartis AG – the export or import of capital, including the availability of cash and cash equivalents for use by Novartis or any foreign exchange controls that affect the remittance of dividends, interest or other payments to non-residents or non-citizens of Switzerland who hold Novartis AG securities.

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"); 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 that we pay and similar cash or in-kind distributions that 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 the Withholding Tax. We are required to withhold Withholding Tax due 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 tax 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 tax 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, 2023, 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
Algeria
Argentina
Armenia
Australia
Austria
Azerbaijan
Bahrain
Bangladesh
Belarus
Belgium
Brazil
Bulgaria
Canada
Chile
China
Colombia
Croatia
Cyprus
Czech Republic
Denmark
Ecuador
Egypt
Estonia
Finland
France
Georgia
Germany
Ghana
Greece
Hong Kong
Hungary
Iceland
India
Indonesia
Iran
Republic of Ireland
Israel
Italy
Ivory Coast
Jamaica
Japan
Kazakhstan
Republic of Korea
(South Korea)
Kosovo
Kuwait
Kyrgyzstan
Latvia
Liechtenstein
Lithuania
Luxembourg
Malaysia
Malta
Mexico
Moldova
Mongolia
Montenegro
Morocco
Netherlands
New Zealand
North Macedonia
Norway
Oman
Pakistan
Peru
Philippines
Poland
Portugal
Qatar
Romania
Russia
Saudi Arabia
Serbia
Singapore
Slovak Republic
Slovenia
South Africa
Spain
Sri Lanka
Sweden
Taiwan
Tajikistan
Thailand
Trinidad and Tobago
Tunisia
Turkey
Turkmenistan
Ukraine
United Arab Emirates
United Kingdom
United States of America
Uruguay
Uzbekistan
Venezuela
Vietnam
Zambia

Tax treaty negotiations are underway, or have been conducted, with Angola, Bosnia and Herzegovina, Cameroon, Costa Rica, Ethiopia, Jordan, Kenya, Libya, Nigeria, Rwanda, Senegal, Syria and Zimbabwe. Tax treaty negotiations between Switzerland and some of the countries listed in the immediately preceding sentence have been ongoing for an extended period of time, and we are not certain when or if such negotiations will be completed, and when or if the corresponding treaties will come into effect.

A Non-Resident Holder of shares or ADRs will not be liable for any Swiss taxes other than the Withholding Tax described above and, if the transfer occurs through or with a Swiss bank or other Swiss securities dealer, the Stamp Duty described below. If, however, the shares or ADRs of Non-Resident Holders can be attributed to a permanent establishment or a fixed place of business maintained by such person within Switzerland during the relevant tax year, the shares or ADRs may be subject to Swiss income taxes in respect of income and gains realized on the shares or ADRs, and such person may qualify for a full refund of the Withholding Tax based on Swiss tax law.

Residents of the US. A Non-Resident Holder who is a resident of the US for purposes of the Treaty is eligible for a reduced rate of tax on dividends equal to 15% of the dividend, provided that such holder (i) qualifies for benefits under the Treaty, (ii) is not a company (or, if it is a company, such company directly holds 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 Bern, 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 that (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 advisors 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 (without reduction for any Withholding Tax) of the 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 depositary, 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 that 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, provided that the US Holder meets certain holding period and other requirements. 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 that 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.

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 Exchange Act 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, which has established processes and procedures to identify, aggregate and manage our financial risk exposure. The Group 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 "Item 18. Financial Statements—Note 29. Financial instruments—additional disclosures" 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	USD 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	USD 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 that would have been charged as a result of the deposit of such shares	USD 5.00 for each 100 ADSs (or portion thereof)
Transferring, splitting or grouping receipts	Transfers, combining or grouping of depositary receipts	USD 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 USD 0.008 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 12-month period beginning on the effective date of the Agreement and on each subsequent anniversary of the effective date of the Agreement (each such 12-month period is a "Contract Year"). This annual contribution payment will equal: (a)(1) USD 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 USD 50 000 for such Contract Year. To the extent that the Custody Costs for a Contract Year exceed USD 1.7 million, these costs would be capped at USD 1.7 million.

JPMorgan has further agreed to waive the USD 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 Annual Report, 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 over financial reporting 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.

Internal controls over financial reporting, no matter how well designed, have inherent limitations. Therefore, even those internal controls over financial reporting 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, 2022. 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, 2022, the Group's internal control over financial reporting is effective based on those criteria.

KPMG 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 Annual Report under "Item 18. Financial Statements—Report of independent registered public accounting firm."

(c) See the report of KPMG AG, 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 Annual Report 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 Elizabeth Doherty and Ana de Pro Gonzalo possess specific accounting and financial management expertise, and that they are Audit Committee Financial Experts as defined by the SEC. The Board of Directors has also determined that Elizabeth Doherty and Ana de Pro Gonzalo are "independent" in accordance with the applicable requirements of Rule 10A-3 of the Exchange Act, 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 Ethics and Professional Practices Policy, which are applicable to all of our employees, 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

Item 16C. Principal Accountant Fees and Services

The information set forth under “Item 6. Directors, Senior Management and Employees—Item 6.C Board practices—Corporate governance—Auditors” 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

2022	Total number of shares purchased (a)[1]	Average price paid per share in USD (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 (CHF millions) (d)	Maximum approximate value of shares that may yet be purchased under the plans or programs (USD millions) (e)[3]
Jan. 1-31	10 746 816	87.76	9 773 500	7 831	8 405
Feb. 1-28	10 160 538	86.73	10 000 000	7 030	7 594
Mar. 1-31	11 494 338	85.43	11 470 000	16 119	17 451
Apr. 1-30	9 534 769	90.61	9 500 000	15 305	15 756
May 1-31	10 521 350	88.04	10 500 000	14 399	14 996
Jun. 1-30	10 524 101	84.79	10 500 000	13 535	14 164
Jul. 1-31	10 525 453	85.10	10 500 000	12 670	13 329
Aug. 1-31	11 045 776	84.91	11 000 000	11 775	12 098
Sep. 1-30	11 035 057	79.65	11 000 000	10 922	11 172
Oct. 1-31	10 524 526	77.45	10 500 000	10 113	10 118
Nov. 1-30	11 021 724	84.64	11 000 000	9 216	9 675
Dec. 1-31	10 520 012	91.17	10 500 000	8 324	8 999
Total	**127 654 460**	**85.45**	**126 243 500**		

[1] Column (a) shows shares repurchased on the SIX Swiss Exchange second trading line plus shares we purchased from employees who had obtained the shares through a Novartis Employee Ownership Plan. See "Item 18. Financial Statements – Note 26 Equity-based participation plans for employees."
[2] Column (c) shows shares repurchased on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback authority approved at the 2021 AGM and under the additional CHF 10 billion share buyback authority approved at the 2022 AGM for transactions in 2022. See "Item 6. Directors, Senior Management and Employees – Item 6C. Board Practices – Our capital structure – Changes in capital."
[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

Novartis AG is subject to and compliant with the laws and regulations of Switzerland (in particular, Swiss company and securities laws, SIX Swiss Exchange rules and the Swiss Code of Best Practice for Corporate Governance) and the securities laws of the United States, including New York Stock Exchange (NYSE) rules, as applicable to foreign private issuers of securities. The following summarizes some significant ways in which our corporate governance practices differ from those followed by domestic listed US companies under the listing standards of the NYSE:

- Novartis AG shareholders do not receive written reports directly from Board committees.

- External auditors are appointed by shareholders at the Annual General Meeting of Shareholders (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 votes on Board and Executive Committee compensation.

- The Board has set up a separate Risk Committee that oversees the risk management system and processes, 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.

Item 16H. Mine Safety Disclosure

Not applicable.

Item 16I. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

Not applicable.

PART III

Item 17. Financial Statements

See response to “Item 18. Financial Statements.”

Item 18. Financial Statements

The following financial statements are filed as part of this Annual Report.

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Item 19. Exhibits

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.

1.1 Articles of Incorporation of Novartis AG, as amended March 2, 2021 (English translation) (incorporated by reference to Exhibit 4.1 to Novartis AG's registration statement on Form S-8 (File No. 333-258081) as filed with the SEC on July 22, 2021).

1.2 Regulations of the Board of Directors, the Board Committees and the Executive Committee of Novartis AG, effective January 1, 2021 (incorporated by reference to Exhibit 1.2 to Novartis AG's Annual Report on Form 20-F (File No. 001-15024) as filed with the SEC on January 26, 2021).

2.1 Form of Second Amended and Restated Deposit Agreement among Novartis AG, JPMorgan Chase Bank, N.A., as depositary, and all Holders and Beneficial Owners from time to time of American Depositary Receipts issued thereunder (incorporated by reference to Exhibit 99.A to the Registration Statement on Form F-6 (File No. 333-198623) as filed with the SEC on December 16, 2022).

2.2 Form of American Depositary Receipt (incorporated by reference to Exhibit 99.A to the Registration Statement on Form F-6 (File No. 333-198623) as filed with the SEC on December 16, 2022).

2.3 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.

2.4 Description of Securities registered under Section 12 of the Exchange Act.*

8.1 For a list of all of our principal Group subsidiaries and associated companies, see "Item 18. Financial Statements—Note 31. Principal Group subsidiaries and associated companies."

12.1 Certification of Vasant Narasimhan, 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 Vasant Narasimhan, 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 KPMG AG.*

15.2 Consent of PricewaterhouseCoopers AG.*

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
104	Cover Page Interactive Data File (embedded within the Inline XBRL document and included in Exhibit 101).

* Previously filed with the Annual Report on Form 20-F for the year ended December 31, 2022 as filed with the SEC on February 1, 2023.

SIGNATURES

The registrant hereby certifies that it meets all of the requirements for filing on Form 20-F/A 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 of Novartis*

By: /s/ Karen Hale
Name: Karen Hale
Title: *Chief Legal Officer of Novartis*

Date: May 15, 2023

Novartis Group consolidated financial statements

Consolidated income statements

(For the years ended December 31, 2022, 2021 and 2020)

(USD millions unless indicated otherwise)	Note	2022	2021	2020
Net sales to third parties	3	**50 545**	**51 626**	**48 659**
Other revenues	3	1 283	1 251	1 239
Cost of goods sold		– 15 486	– 15 867	– 15 121
Gross profit		**36 342**	**37 010**	**34 777**
Selling, general and administration		– 14 253	– 14 886	– 14 197
Research and development		– 9 996	– 9 540	– 8 980
Other income		805	1 852	1 742
Other expense		– 3 701	– 2 747	– 3 190
Operating income		**9 197**	**11 689**	**10 152**
(Loss)/income from associated companies	4	– 9	15 339	673
Interest expense	5	– 837	– 811	– 869
Other financial income and expense	5	20	– 80	– 78
Income before taxes		**8 371**	**26 137**	**9 878**
Income taxes	6	– 1 416	– 2 119	– 1 807
Net income		**6 955**	**24 018**	**8 071**
Attributable to:				
Shareholders of Novartis AG		*6 955*	*24 021*	*8 072*
Non-controlling interests		*0*	*– 3*	*– 1*
Basic earnings per share (USD)	7	**3.19**	**10.71**	**3.55**
Diluted earnings per share (USD)	7	**3.17**	**10.63**	**3.52**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated statements of comprehensive income

(For the years ended December 31, 2022, 2021 and 2020)

(USD millions)	Note	2022	2021	2020
Net income		**6 955**	**24 018**	**8 071**
Other comprehensive income				
Items that are or may be recycled into the consolidated income statement				
Novartis share of other comprehensive income recognized by associated companies, net of taxes	4		46	– 56
Net investment hedge, net of taxes	8	91	216	– 201
Currency translation effects, net of taxes	8	– 450	– 4 762	3 194
Total of items that are or may be recycled		– 359	– 4 500	2 937
Items that will never be recycled into the consolidated income statement				
Actuarial (losses)/gains from defined benefit plans, net of taxes	8	– 103	1 809	143
Fair value adjustments on equity securities, net of taxes	8	– 382	194	250
Total of items that will never be recycled		– 485	2 003	393
Total comprehensive income		**6 111**	**21 521**	**11 401**
Attributable to:				
Shareholders of Novartis AG		*6 116*	*21 528*	*11 403*
Non-controlling interests		*– 5*	*– 7*	*– 2*

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated balance sheets

(At December 31, 2022 and 2021)

(USD millions)	Note	2022	2021
Assets			
Non-current assets			
Property, plant and equipment	9	10 764	11 545
Right-of-use assets	10	1 431	1 561
Goodwill	11	29 301	29 595
Intangible assets other than goodwill	11	31 644	34 182
Investments in associated companies	4	143	205
Deferred tax assets	12	3 739	3 743
Financial assets	13	2 411	3 036
Other non-current assets	13	1 110	2 210
Total non-current assets		**80 543**	**86 077**
Current assets			
Inventories	14	7 175	6 666
Trade receivables	15	8 066	8 005
Income tax receivables		268	278
Marketable securities, commodities, time deposits and derivative financial instruments	16	11 413	15 922
Cash and cash equivalents	16	7 517	12 407
Other current assets	17	2 471	2 440
Total current assets		**36 910**	**45 718**
Total assets		**117 453**	**131 795**
Equity and liabilities			
Equity			
Share capital	18	890	901
Treasury shares	18	– 92	– 48
Reserves		58 544	66 802
Equity attributable to Novartis AG shareholders		**59 342**	**67 655**
Non-controlling interests		81	167
Total equity		**59 423**	**67 822**
Liabilities			
Non-current liabilities			
Financial debts	19	20 244	22 902
Lease liabilities	10	1 538	1 621
Deferred tax liabilities	12	2 686	3 070
Provisions and other non-current liabilities	20	4 906	6 172
Total non-current liabilities		**29 374**	**33 765**
Current liabilities			
Trade payables		5 146	5 553
Financial debts and derivative financial instruments	21	5 931	6 295
Lease liabilities	10	251	275
Current income tax liabilities		2 533	2 415
Provisions and other current liabilities	22	14 795	15 670
Total current liabilities		**28 656**	**30 208**
Total liabilities		**58 030**	**63 973**
Total equity and liabilities		**117 453**	**131 795**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated statements of changes in equity

(For the years ended December 31, 2022, 2021 and 2020)

(USD millions)	Note	Share capital	Treasury shares	Reserves: Retained earnings	Reserves: Total value adjustments	Equity attributable to Novartis shareholders	Non-controlling interests	Total equity
Total equity at January 1, 2020		**936**	**– 80**	**59 275**	**– 4 657**	**55 474**	**77**	**55 551**
Net income				8 072		8 072	– 1	8 071
Other comprehensive income	8			– 56	3 387	3 331	– 1	3 330
Total comprehensive income				**8 016**	**3 387**	**11 403**	**– 2**	**11 401**
Dividends	18.1			– 6 987		– 6 987		– 6 987
Purchase of treasury shares	18.2		– 18	– 3 038		– 3 056		– 3 056
Reduction of share capital	18	– 23	31	– 8				
Exercise of options and employee transactions	18.2		8	798		806		806
Repurchase of options	18.4			– 89		– 89		– 89
Equity-based compensation	18.2		6	724		730		730
Shares delivered to Alcon employees as a result of the Alcon spin-off	18.2		0	30		30		30
Taxes on treasury share transactions				32		32		32
Increase of treasury share repurchase obligation under a share buyback trading plan	18.3			– 1 769		– 1 769		– 1 769
Fair value adjustments on financial assets sold	8			150	– 150			
Value adjustments related to divestments	8			– 2	2			
Impact of change in ownership of consolidated entities	18.5			7	– 1	6	– 7	– 1
Other movements	18.7			18		18		18
Total of other equity movements		**– 23**	**27**	**– 10 134**	**– 149**	**– 10 279**	**– 7**	**– 10 286**
Total equity at December 31, 2020		**913**	**– 53**	**57 157**	**– 1 419**	**56 598**	**68**	**56 666**
Net income				24 021		24 021	– 3	24 018
Other comprehensive income	8			46	– 2 539	– 2 493	– 4	– 2 497
Total comprehensive income				**24 067**	**– 2 539**	**21 528**	**– 7**	**21 521**
Dividends	18.1			– 7 368		– 7 368		– 7 368
Purchase of treasury shares	18.2		– 18	– 2 902		– 2 920		– 2 920
Reduction of share capital	18	– 12	18	– 6				
Exercise of options and employee transactions	18.2		0	39		39		39
Equity-based compensation	18.2		5	740		745		745
Shares delivered to Alcon employees as a result of the Alcon spin-off	18.2		0	17		17		17
Taxes on treasury share transactions				1		1		1
Increase of treasury share repurchase obligation under a share buyback trading plan	18.3			– 1 040		– 1 040		– 1 040
Transaction costs, net of taxes	18.8			12		12		12
Changes in non-controlling interests	18.6						– 1	– 1
Fair value adjustments on financial assets sold	8			164	– 164			
Value adjustments related to divestments	8			65	– 65			
Impact of change in ownership of consolidated entities	18.5			– 5	0	– 5	107	102
Other movements	18.7			48		48		48
Total of other equity movements		**– 12**	**5**	**– 10 235**	**– 229**	**– 10 471**	**106**	**– 10 365**
Total equity at December 31, 2021		**901**	**– 48**	**70 989**	**– 4 187**	**67 655**	**167**	**67 822**
Net income				6 955		6 955	0	6 955
Other comprehensive income	8				– 839	– 839	– 5	– 844
Total comprehensive income				**6 955**	**– 839**	**6 116**	**– 5**	**6 111**
Dividends	18.1			– 7 506		– 7 506		– 7 506
Purchase of treasury shares	18.2		– 66	– 10 844		– 10 910		– 10 910
Reduction of share capital	18	– 11	15	– 4				
Exercise of options and employee transactions	18.2		1	87		88		88
Equity-based compensation	18.2		6	848		854		854
Shares delivered to Alcon employees as a result of the Alcon spin-off	18.2		0	5		5		5
Taxes on treasury share transactions				14		14		14
Decrease of treasury share repurchase obligation under a share buyback trading plan	18.3			2 809		2 809		2 809
Changes in non-controlling interests	18.6						– 81	– 81
Fair value adjustments on financial assets sold	8			4	– 4			
Value adjustments related to divestments	8			– 34	34			
Other movements	18.7			217		217		217
Total of other equity movements		**– 11**	**– 44**	**– 14 404**	**30**	**– 14 429**	**– 81**	**– 14 510**
Total equity at December 31, 2022		**890**	**– 92**	**63 540**	**– 4 996**	**59 342**	**81**	**59 423**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated statements of cash flows

(For the years ended December 31, 2022, 2021 and 2020)

(USD millions)	Note	2022	2021	2020
Net income		**6 955**	**24 018**	**8 071**
Adjustments to reconcile net income to net cash flows from operating activities				
Reversal of non-cash items and other adjustments	23.1	11 546	– 5 299	9 881
Dividends received from associated companies and others		1	525	490
Interest received		254	13	47
Interest paid		– 696	– 664	– 703
Other financial receipts		71		464
Other financial payments		– 32	– 302	– 39
Income taxes paid	23.2	– 1 975	– 2 342	– 1 833
Net cash flows from operating activities before working capital and provision changes		**16 124**	**15 949**	**16 378**
Payments out of provisions and other net cash movements in non-current liabilities		– 885	– 1 119	– 2 437
Change in net current assets and other operating cash flow items	23.3	– 1 003	241	– 291
Net cash flows from operating activities		**14 236**	**15 071**	**13 650**
Purchases of property, plant and equipment		– 1 198	– 1 378	– 1 275
Proceeds from sale of property, plant and equipment		167	240	88
Purchases of intangible assets		– 1 473	– 1 593	– 1 310
Proceeds from sale of intangible assets		202	748	380
Purchases of financial assets		– 121	– 191	– 230
Proceeds from sale of financial assets		133	442	723
Purchases of other non-current assets		– 1	– 61	– 61
Proceeds from sale of other non-current assets			4	2
Acquisitions and divestments of interests in associated companies, net	23.4	– 24	20 669	– 7
Acquisitions and divestments of businesses, net	23.5	– 879	– 567	– 9 957
Purchases of marketable securities, commodities and time deposits		– 34 695	– 16 403	– 1 900
Proceeds from sale of marketable securities, commodities and time deposits		39 357	2 298	492
Net cash flows from/(used in) investing activities from continuing operations		**1 468**	**4 208**	**– 13 055**
Net cash flows used in investing activities from discontinued operations	23.7			– 127
Net cash flows from/(used in) investing activities		**1 468**	**4 208**	**– 13 182**
Dividends paid to shareholders of Novartis AG		– 7 506	– 7 368	– 6 987
Acquisitions of treasury shares		– 10 652	– 3 057	– 2 842
Proceeds from exercised options and other treasury share transactions, net		100	53	748
Increase in non-current financial debts	23.6	16	16	7 126
Repayments of the current portion of non-current financial debts	23.6	– 2 575	– 2 162	– 2 003
Change in current financial debts	23.6	295	– 3 524	2 261
Payments of lease liabilities	23.6	– 295	– 316	– 312
Impact of change in ownership of consolidated entities			– 3	– 2
Other financing cash flows, net		55	97	– 147
Net cash flows used in financing activities from continuing operations		**– 20 562**	**– 16 264**	**– 2 158**
Net cash flows used in financing activities from discontinued operations	23.7			– 50
Net cash flows used in financing activities		**– 20 562**	**– 16 264**	**– 2 208**
Net change in cash and cash equivalents before effect of exchange rate changes		**– 4 858**	**3 015**	**– 1 740**
Effect of exchange rate changes on cash and cash equivalents		– 32	– 266	286
Net change in cash and cash equivalents		**– 4 890**	**2 749**	**– 1 454**
Cash and cash equivalents at January 1		12 407	9 658	11 112
Cash and cash equivalents at December 31		**7 517**	**12 407**	**9 658**

The accompanying Notes form an integral part of the consolidated financial statements.

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 innovative pharmaceuticals and cost-saving generic medicines. The Group 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, which affect the reported amounts of revenues, expenses, assets, liabilities and contingent amounts.

Estimates are based on historical experience and other assumptions that are considered reasonable under the given circumstances and are regularly monitored. Actual outcomes and results could differ from those estimates and assumptions. Revisions to estimates are recognized in the period in which the estimate is revised.

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.

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 a subsidiary is generally the local currency of that 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 this currency.

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 for each month using the average exchange rate, with the US dollar values for each month being aggregated during the year
- Balance sheet using year-end exchange rates
- Resulting exchange rate differences are recognized in other comprehensive income

For subsidiaries operating in hyperinflationary economies, the impact of the restatement of the non-monetary assets and liabilities with the general price index at the beginning of the period is recorded in retained earnings in equity. The subsequent gains or losses resulting from the restatement of non-monetary assets are recorded in "Other financial income and expense" in the consolidated income statement.

Non-current assets held for sale or held for distribution to owners

Non-current assets are accounted for as assets held for sale or as related to discontinued operations when their carrying amount is to be recovered principally through a sale transaction or distribution to owners and a sale or distribution to owners is considered highly probable. They are stated at the lower of carrying amount and fair value less costs to sell and any resulting impairment is recognized. Assets related to discontinued operations and assets of a disposal group held for sale are not depreciated or amortized. The prior year consolidated balance sheet is not restated.

If in a subsequent period, the criteria for classification as held for sale are no longer met, the recoverable amount of assets and liabilities are reclassified out of assets held for sale into the respective balance sheet lines and the prior year consolidated balance sheet is not restated. The cumulative amount of depreciation and amortization not recorded since the date of their classification as assets held for sale, and any required

adjustments to the recoverable amounts of assets are recognized in the consolidated income statement.

Acquisition of assets and businesses

Assets separately acquired are recorded at cost, which 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 and restore the site when it is no longer used are included in their cost.

Acquired businesses are accounted for by applying the acquisition method, unless the optional concentration test is applied. The optional concentration test allows for an election on a transaction-by-transaction basis to account for the acquired business as an asset separately acquired when substantially all of the fair value of the gross assets acquired is concentrated in a single identifiable asset or group of similar identifiable assets.

The acquisition method requires that the assets acquired and liabilities assumed be recorded at their respective fair values on the date the Group obtains control. The excess of the fair value of the total purchase consideration transferred over the fair value of the acquired assets and assumed liabilities is recognized as goodwill. The valuations are based on information available at the acquisition date. Acquisition related costs are expensed as incurred.

The application of the acquisition method requires certain estimates and assumptions to be made, especially concerning the fair values of the acquired intangible assets, inventories, property, plant and equipment and the liabilities assumed at the acquisition date, and the useful lives of the intangible assets and property, plant and equipment. Estimates of fair value require the use of valuation techniques. These valuations require the use of management assumptions and estimates, including the value of comparable assets in the market, amount and timing of future cash flows, outcomes and costs of research and development activities, probability of obtaining regulatory approval, long-term sales forecasts, actions of competitors, discount rates and terminal growth rates. The section "—Impairment of goodwill and intangible assets" in this Note 1 provides additional information on key assumptions that are highly sensitive in the estimation of fair values using valuation techniques.

Property, plant and equipment

Property, plant and equipment is depreciated on a straight-line basis in the consolidated income statement over the estimated useful life of the individual asset. Freehold land is not depreciated. The related depreciation expense is included in the costs of the functions using the asset.

Property, plant and equipment is assessed for impairment whenever there is an indication that the balance sheet carrying amount may not be recoverable using cash flow projections over the useful life.

The following table shows the estimated useful life by major categories 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.

Leases and right-of-use assets

As lessee, at inception and upon the modification of a contract, the Group assesses whether the contract contains a lease. The Group elected to allocate the consideration in the contract to the lease and non-lease components on the basis of the relative standalone price of each component.

The Group recognizes a right-of-use asset and a corresponding lease liability for all arrangements in which it is a lessee, except for leases with a term of 12 months or less (short-term leases) and low-value leases. For these short-term and low-value leases, the Group recognizes the lease payments as an operating expense on a straight-line basis over the term of the lease.

The lease liability is initially measured at the present value of the future lease payments as from the commencement date of the lease to the end of the lease term. The lease term includes the period of any lease extension that management assess as reasonably certain to be exercised by the Group. The lease payments are discounted using the interest rate implicit in the lease or, if not readily determinable, the Novartis incremental borrowing rate for the asset subject to the lease in the relevant market.

The Group remeasures the lease liability (and makes a corresponding adjustment to the related right-of-use asset) whenever there is a change to the lease terms or expected payments under the lease, or a modification that is not accounted for as a separate lease.

The portion of the lease payments attributable to the repayment of lease liabilities is recognized in cash flows used in financing activities, and the portion attributable to the payment of interest is included in cash flows from operating activities.

Right-of-use assets are initially recognized on the balance sheet at cost, which comprises the amount of the initial measurement of the corresponding lease liability, adjusted for any lease payments made at or prior to the commencement date of the lease, any lease incentive received, and any initial direct costs incurred by Novartis, and expected costs for obligations to dismantle and remove right-of-use assets when they are no longer used.

Right-of-use assets are depreciated on a straight-line basis from the commencement date of the lease over

the shorter of the useful life of the right-of-use asset or the end of the lease term.

Right-of-use assets 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.

In arrangements where the Group is the lessor, it determines at lease inception whether the lease is a finance lease or an operating lease. Leases that transfer substantially all of the risk and rewards incidental to ownership of the underlying asset to the counterparty (the lessee) are accounted for as finance leases. Leases that do not transfer substantially all of the risks and rewards of ownership are accounted for as operating leases. Operating lease payments received are recognized on a straight-line basis over the lease term in the consolidated income statement in "Other income."

Goodwill and intangible assets

Goodwill

Goodwill arises on applying the acquisition method on the acquisition of a business and is the excess of the fair value of the consideration transferred to acquire the business over the underlying fair value of the net identified assets acquired. It is allocated to groups of cash-generating units (CGUs), that are expected to benefit from the synergies of the combination, and 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; technologies and other intangible assets (including software).

Currently marketed products represent the composite value of acquired intellectual property (IP), patents, distribution rights and product trade names.

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.

Intangible assets available for use with a definite useful life are amortized over their estimated useful lives on a straight-line basis and are evaluated for potential impairment whenever facts and circumstances indicate that their carrying value may not be recoverable.

The following table shows the estimated useful life by major categories for intangible assets available for use and the line in the consolidated income statement in which the amortization and any potential impairment charge is recognized:

	Useful life	Income statement line for amortization and impairment charges
Currently marketed products	5 to 20 years	"Cost of goods sold"
Technologies	10 to 20 years	"Cost of goods sold" or "Research and development"
Other (including software)	3 to 12 years	In the relevant functional expense

Intangible assets not yet available for use

Acquired research and development intangible assets that have not yet obtained marketing approval are recognized as in-process research and development (IPR&D).

IPR&D is not amortized, but is 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 and development." Once a project included in IPR&D has received marketing approval from a regulatory authority, it is transferred to the "Currently marketed products" category.

Impairment of goodwill and intangible assets

An asset, a CGU or a grouping of CGUs 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 CGU, and for this purpose, management considers the range of economic conditions that are expected to exist over the remaining useful life of the asset. These valuations are classified as "Level 3" in the fair value hierarchy.

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
- Sales forecasts
- 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 research and development activities (compound efficacy, results of clinical trials, etc.)
- Amount and timing of projected costs to develop IPR&D into commercially viable products
- Profit margins
- Probability of obtaining regulatory approval
- Future tax rate
- 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, Novartis generally utilizes cash flow projections for a three-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 asset, country and currency risks associated with cash flow projections, to approximate the discount rate that market participants would use to value the asset.

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.

Cash and cash equivalents

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 presented within current financial debts on the consolidated balance sheet.

Marketable securities, commodities and non-current financial assets

Commodities, which include gold bullion or coins, 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."

Marketable securities are financial assets held for short-term purposes which are principally traded in liquid markets and are classified within current assets on the consolidated balance sheet. The financial impacts related to these financial assets are recorded in "Other financial income and expense" in the consolidated income statement. Non-current financial assets held for long-term strategic purposes are classified within non-current assets on the consolidated balance sheet. The financial impacts related to these financial assets are recorded in "Other income" and "Other expense" in the consolidated income statement.

Marketable securities and non-current financial assets 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 remeasured 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 initially valued at fair value through the purchase price established between a willing buyer and seller. Non-quoted investments are subsequently adjusted based on values derived from discounted cash flow analysis or other pricing models. These investment values are classified as "Level 3" in the fair value hierarchy.

The Group classifies and accounts for its marketable securities and non-current financial assets in the following categories:

- Debt securities are valued at fair value through other comprehensive income with subsequent recycling into the consolidated income statement, as they meet both the "solely payment of principal and interest" and the business model criteria. Unrealized gains and losses, except exchange gains and losses, are recorded as a fair value adjustment in the consolidated statement of comprehensive income. They are recognized in the consolidated income statement when the debt instrument is sold, at which time the gain is transferred to "Other financial income and expense." Exchange gains and losses related to debt instruments are immediately recognized in the consolidated income statement in "Other financial income and expense."
- Fund investments and equity securities of the Novartis Venture Fund are valued at fair value through profit and loss (FVPL). Unrealized gains and losses, including exchange gains and losses, are recognized in the consolidated income statement in "Other income" for gains and "Other expense" for losses.
- Equity securities held as strategic investments, typically held outside of the Novartis Venture Fund, are generally designated at the date of acquisition as financial assets valued at fair value through other comprehensive income with no subsequent recycling through profit and loss. Unrealized gains and losses, including exchange gains and losses, are recorded as a fair value adjustment in the consolidated statement of comprehensive income. They are reclassified to retained earnings when the equity security is sold. If these equity securities are not designated at the date of acquisition as financial assets valued at fair value through other comprehensive income, they are valued at FVPL, as described above.
- Other non-current financial assets, such as loans and long-term receivables from customers, advances and other deposits, are valued at amortized cost, which reflects the time value of money less any allowances for expected credit losses.

The Group assesses on a forward-looking basis the expected credit losses associated with its debt securities valued at fair value through other comprehensive

income. Impairments on debt securities are recorded in "Other financial income and expense."

For other financial assets valued at amortized cost, impairments, which are based on their expected credit losses, and exchange rate losses are included in "Other expense" in the consolidated income statement. Exchange rate gains and interest income, using the effective interest rate method, are included in "Other income" or "Other financial income" in the consolidated income statement, depending on the nature of the item.

Derivative financial instruments

Derivative financial instruments are initially recognized in the balance sheet at fair value and are remeasured 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 rate curves and forward 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 enters into certain derivative financial instruments for the purpose of hedging to reduce the volatility in the Group's performance due to the exposure to various business-related risks. The risk mitigation 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 rate 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 or are not designated in a hedge relationship. Changes in the fair value of these 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 consolidated income statement as an adjustment to the gain or loss on disposal.

Inventories

Inventory is valued at the lower of acquisition or production cost determined on a first-in, first-out basis and net realizable value. This value is used for the "Cost of goods sold" in the consolidated income statement. Unsaleable 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 using a forward-looking expected credit loss model (ECL), which includes possible default events on the trade receivables over the entire holding period of the trade receivable. These provisions represent the difference between the trade receivable's carrying amount in the consolidated balance sheet and the estimated collectible amount. Charges for doubtful trade receivables are recorded as marketing and selling costs recognized in the consolidated income statement within "Selling, general and administration" 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 and commercial litigation, and governmental investigations and proceedings. A provision is recorded when there is a probable outflow of resources for which a reliable estimate can be made of the outcome of the legal or other disputes against the subsidiary.

Contingent consideration

In the acquisition or divestment of a business, it is necessary to recognize contingent future amounts due to previous owners, representing contractually defined potential amounts as a liability or an 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 fair value, which is then remeasured 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 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 and development" for IPR&D. Changes in contingent consideration assets are recognized in "Other income" or "Other expense," depending on their nature.

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

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 in which employees 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 employees as part of share-based compensation arrangements, are recorded in "Retained earnings" in the consolidated statement of changes in equity.

Revenue recognition

Revenue on the sale of Novartis Group products and services, which is recorded as "Net sales to third parties" in the consolidated income statement, is recognized when a contractual promise to a customer (performance obligation) has been fulfilled by transferring control over the promised goods and services to the customer, substantially all of which is at the point in time of shipment to or receipt of the products by the customer or when the services are performed. If contracts contain customer acceptance provisions, revenue is recognized upon the satisfaction of the acceptance criteria. If a contract contains more than one performance obligation, the consideration is allocated based on the standalone selling price of each performance obligation. The amount of revenue recognized is based on the consideration Novartis expects to receive in exchange for its goods and services, when it is highly probable that a significant reversal will not occur.

The consideration Novartis receives in exchange for its goods or services may be fixed or variable. Variable consideration is recognized when it is highly probable that a significant reversal will not occur. The most common elements of variable consideration are listed below.

- Rebates and discounts granted to wholesalers, retailers, government agencies (including US Medicaid and US Federal Medicare programs), government supported healthcare systems, private health systems, pharmacy benefit managers, managed healthcare organizations, purchasing organizations and other direct and indirect customers, as well as chargebacks are provisioned and recorded as revenue deductions at the time the related revenues are recorded, or when the incentives are offered. These rebates and discounts, applied using provision rates, are estimated based on the terms and conditions in the individual states, plans and customer agreements, historical experience, product sales and growth rate, population growth, product pricing including inflation impacts, the mix of contracts and products, the level of inventory in the distribution channel, regulations, contracts, channels and payers, as appropriate to the individual rebate and discount arrangements.
- Refunds granted to healthcare providers under innovative pay-for-performance agreements (i.e. outcome based arrangements) are provisioned and 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 specific terms of 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 the uncertainty is resolved, until such history is available or the period when the refund right has expired. The provisions for revenue deductions under the innovative pay-for-performance agreements are adjusted periodically based on established processes and actual experience, including the products actual outcomes achieved compared with the anticipated predefined targets.
- Cash discounts are offered to customers to encourage prompt payment and are provisioned and recorded as revenue deductions at the time the related sales are recorded.
- Shelf stock adjustments are generally granted to customers, primarily of the Sandoz Division, to cover the inventory held by them at the time a price decline becomes effective. Revenue deduction provisions for shelf stock adjustments are recorded when the price decline is anticipated, based on the impact of the price decline on the customer's estimated inventory levels.
- Sales returns provisions are recognized and recorded as revenue deductions when there is historical experience of Novartis agreeing to customer returns and Novartis can reasonably estimate expected future returns. In doing so, the estimated rate of return is applied, determined on the basis of 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 resale 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.

Net sales to third parties and provisions for revenue deductions are adjusted periodically to reflect experience and to reflect actual amounts as rebates, refunds,

discounts and returns are processed. There is often a time lag between recording of revenue deductions and the final accounting for them. The provision represents estimates of the related obligations, requiring the use of judgment when estimating the effect of these revenue deductions.

"Other revenue" includes income from profit-sharing arrangements with our collaboration partners, and royalty and milestone income from the out-licensing of intellectual property when Novartis retains an interest in the intellectual property through a license. Royalty income earned from a license is recognized when the underlying sales have occurred. Milestone income is recognized at the point in time when it is highly probable that the relevant milestone event criteria are met, and the risk of reversal of revenue recognition is remote. "Other revenue" also includes revenue from activities such as manufacturing or other services rendered, to the extent such revenue is not recorded under net sales to third parties, and is recognized when control transfers to the third party and our performance obligations are satisfied.

Research and development

Internal research and development (R&D) costs are fully charged to "Research and 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 are deemed not to transfer intellectual property to Novartis are expensed as internal R&D expenses in the period in which they are incurred. Such payments are only capitalized if they meet the criteria for recognition of an internally generated intangible asset, usually when marketing approval has been received 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 performing 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 in a major market 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 subsequently be 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 (RSs), restricted share units (RSUs) and performance share units (PSUs) in Novartis shares and ADRs granted to employees 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 in which the employees 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 at 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 forfeiture during the vesting period, is expensed on a straight-line basis over the respective vesting period.

PSUs are subject to the achievement of certain performance criteria during the vesting period and require plan participants to provide services during this period. The following paragraphs provide an overview of the accounting policies for the share-based compensation plan that grant PSUs.

For PSUs that are subject to performance criteria based on Novartis internal performance metrics and that are conditional on the provision of service by plan participants during the vesting period, the expense is recognized on a straight-line basis over the vesting period, and is determined based on assumptions concerning the expected performance against the internal performance metrics throughout the vesting period. The assumptions are based on the Group's targets for those performance metrics, and the expected forfeitures due to plan participants not meeting their service conditions. The

assumptions are periodically adjusted over the vesting period. Any change in estimates for past services is recorded immediately as an expense or income in the consolidated income statement, and amounts for the remaining vesting period are expensed on a straight-line basis. As a result, at the end of the vesting period, the charge during the entire vesting period represents the amount that will finally vest. The number of equity instruments that finally vest is determined at the vesting date.

For PSUs that are subject to performance criteria based on variables that can be observed in the market, which for Novartis plans is the Novartis total shareholder return (TSR) relative to a specific peer group of companies over the vesting period, and that are conditional on the provision of services by the plan participants during the vesting period, the expense is recognized on a straight-line basis over the vesting period, and is determined based on the total fair value of the grant over the vesting period. IFRS requires that these variables that can be observed in the market are taken into account in determining the fair value of the PSUs at the grant date. Novartis determined the fair value of these PSUs at the date of grant using a Monte Carlo simulation model. Adjustments to the number of equity instruments granted are only made if a plan participant does not fulfill the service conditions.

For PSUs granted under plans that are subject to both performance criteria based on Novartis internal performance metrics and Novartis TSR relative to a specific peer group of companies over the vesting period and that are conditional on the provision of service by plan participants during the vesting period, the expense is recognized on a straight-line basis over the vesting period, and is determined based on a bifurcation into the components based on the performance criteria related to Novartis internal performance metrics and TSR, as described in the paragraphs above.

Measuring the fair values of PSUs granted that include TSR performance criteria requires use of estimates. The Monte Carlo simulation used to determine the fair value of the PSUs TSR performance criteria requires 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 as input parameters.

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.

Government grants

Grants from governments or similar organizations are recognized at their fair value when there is reasonable assurance that the grant will be received and the Group will comply with all attached conditions.

Government grants received to compensate costs are deferred and recognized in the consolidated income statement over the period necessary to match them against 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 expenditure 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.

Healthcare contributions

Healthcare cost contribution levies and fees under governmental programs that require the Group to contribute to a country’s healthcare costs, other than programs described in “Revenue recognition” in this Note 1, are recognized in “Other expense” in the consolidated income statement. Provisions for healthcare cost contributions are adjusted to the actual amounts levied. The provision represents estimates of the related obligations, requiring the use of judgment when estimating the effect of these healthcare cost contributions.

Income taxes

Income taxes comprise current income taxes and deferred income taxes and are recognized in the same periods as the revenues and expenses to which they relate. Income taxes include interest and penalties incurred during the period, insofar as they are considered an income tax. Income taxes related to items recognized directly to other comprehensive income or to equity are recognized together with the corresponding item, to which the income tax is attributable, directly in other comprehensive income or in equity.

Deferred income 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 for financial reporting 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 recognized when a dividend is declared or has been planned. Furthermore, deferred income taxes are recognized for the net tax effects of net operating loss carryforwards and tax credits.

The carrying amount of deferred tax assets is reduced to the extent that it is not probable that sufficient taxable profits will be available to enable all or part of the asset to be recovered. In evaluating our ability to recover our deferred tax assets in the jurisdiction from

which they arise, we consider all available positive and negative evidence, including scheduled reversals of deferred tax liabilities, projected future taxable income, tax-planning strategies, and results of recent operations.

The estimated amounts for current and deferred tax assets or liabilities, including amounts related to any uncertain tax positions, are based on applicable tax law and regulations in the various tax jurisdictions, in which the Group operates, which are subject to interpretations 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.

The calculation of income tax assets and liabilities involves dealing with uncertainties in the application of complex tax laws and regulations in a multitude of jurisdictions across our global operations. As a result, inherent uncertainties exist in the estimates of the tax positions. Tax liabilities for uncertain tax provisions are recognized on the consolidated balance sheets within current income tax liabilities.

Impact of new IFRS standards, amendments and interpretations in 2022

There were no new IFRS standards adopted by the Group in 2022. In addition, new IFRS amendments or interpretations that became effective in 2022 did not have a material impact to the Group's consolidated financial statements.

Based on the Group's assessment, there are no IFRS standards, amendments or interpretations not yet effective in 2022 that would be expected to have a material impact on the Group's consolidated financial statements.

Impact of adopting significant new IFRS standard in 2021

The following new IFRS standard has been adopted by Novartis from January 1, 2021:

Interest Rate Benchmark Reform – Phase 2, Amendments to IFRS 9, IAS 39, IFRS 7, IFRS 4 and IFRS 16 (Interest Benchmark Reform Amendments)
Interest Benchmark Reform Amendments became effective from January 1, 2021. These amendments address issues that might affect financial reporting when an existing interest rate benchmark (i.e. Interbank offered rate – IBOR) is replaced with an alternative benchmark interest rate. The effects of interest rate benchmark reform on the Group's financial instruments and risk management strategies did not have a material impact on the Group's consolidated financial statements.

Impact of adopting significant new IFRS standard in 2020

The following new IFRS standard has been adopted by Novartis from January 1, 2020:

IFRS 3 Business Combinations amendments
The IASB issued amendments to IFRS 3 Business Combinations that revised the definition of a business, which assist entities with the evaluation of when an asset or group of assets acquired should be considered a business. This amended standard has been applied to transactions entered into on or after January 1, 2020. The amended standard allows an entity to apply an optional concentration test, on a transaction-by-transaction basis, to evaluate whether substantially all of the fair value of the gross assets acquired is concentrated in a single identifiable asset or group of similar identifiable assets. If this optional concentration test is met, the set of activities and assets is determined not to be a business. The adoption of this amended standard on January 1, 2020, did not have a significant impact on our consolidated financial statements and is not expected to have a significant impact in future periods. However, this will depend on the facts and circumstances of future transactions and if the Group decides to apply the optional concentration test in the assessment of whether an acquired set of activities and assets is or is not a business.

2. Significant transactions

The Group applied the acquisition method of accounting for businesses acquired, and did not elect to apply the optional concentration test to account for acquired business as an asset separately acquired.

Significant transactions in 2022

Innovative Medicines – acquisition of Gyroscope Therapeutics Holdings plc

On December 22, 2021, Novartis entered into an agreement to acquire all outstanding shares of Gyroscope Therapeutics Holdings plc (Gyroscope), a UK-based ocular gene therapy company. Gyroscope focuses on the discovery and development of gene therapy treatments for retinal indications. The purchase price consisted of a cash payment of USD 0.8 billion, subject to certain customary purchase price adjustments, and potential additional milestone payments of up to USD 0.7 billion, which Gyroscope shareholders are eligible to receive upon achievement of specified milestones. The acquisition closed on February 17, 2022.

The fair value of the total purchase consideration was USD 1.0 billion. The amount consisted of an upfront cash payment of USD 0.8 billion (including customary purchase price adjustments) and the fair value of contingent consideration of USD 0.2 billion, which Gyroscope shareholders are eligible to receive upon achievement of specified milestones. The purchase price allocation resulted in net identifiable assets of USD 0.9 billion, consisting primarily of intangible assets of USD 1.1 billion and net deferred tax liabilities of USD 0.2 billion. Goodwill amounted to USD 0.1 billion.

The results of operations since the date of acquisition are not material.

Significant transactions in 2021

Sandoz – acquisition of GSK's cephalosporin antibiotics business

On February 10, 2021, Sandoz entered into an agreement with certain subsidiaries of GlaxoSmithKline plc (GSK) for the acquisition of the GSK's cephalosporin antibiotics business.

Under the agreement, Sandoz acquired the global rights to three established brands (Zinnat®, Zinacef® and Fortum®) in more than 100 markets. It excluded the rights in the US, Australia and Germany to certain of those brands, which were previously divested by GSK, and the rights in India, Pakistan, Egypt, Japan (to certain of the brands) and China, which will be retained by GSK. The transaction closed on October 8, 2021.

The purchase price consisted of a USD 350 million upfront payment paid at closing and potential milestone payments up to USD 150 million, which GSK will be eligible to receive upon the achievement of certain annual sales milestones for the portfolio.

The fair value of the total purchase consideration was USD 415 million. The amount consisted of a payment of USD 351 million, including purchase price adjustments, and the fair value of contingent consideration of USD 64 million, which GSK is eligible to receive upon the achievement of specified milestones. The purchase price allocation resulted in net identifiable assets of USD 308 million, consisting of USD 292 million intangible assets and USD 16 million deferred tax assets. Goodwill amounted to USD 107 million.

The 2021 results of operations since the date of acquisition were not material.

Corporate – divestment of the investment in Roche Holding AG

On November 3, 2021, Novartis entered into a Share Repurchase Agreement with Roche Holding AG under which Novartis agreed to sell 53.3 million (approximately 33.3%) bearer shares of Roche Holding AG voting shares in a bilateral transaction to Roche Holding AG for a total consideration of USD 20.7 billion. As a result, Novartis discontinued the use of equity method accounting starting from November 3, 2021.

The transaction closed on December 6, 2021. Novartis realized a gain of USD 14.6 billion, recorded in income from associated companies.

Significant transactions in 2020

Innovative Medicines – acquisition of The Medicines Company

On November 23, 2019, Novartis entered into an agreement and plan of merger ("the Merger Agreement") with The Medicines Company, a US-based pharmaceutical company headquartered in Parsippany, New Jersey, USA. Pursuant to the Merger Agreement, on December 5, 2019, Novartis, through a subsidiary, commenced a tender offer to acquire all outstanding shares of The Medicines Company for USD 85 per share, or a total consideration of approximately USD 9.6 billion in cash on a fully diluted basis, including the equivalent share value related to The Medicines Company's convertible notes, in accordance with their terms. The tender offer expired on January 3, 2020, and on January 6, 2020, the acquiring subsidiary merged with and into The Medicines Company, resulting in The Medicines Company becoming an indirect wholly owned subsidiary of Novartis. Novartis financed the transaction through available cash, and short- and long-term borrowings.

The Medicines Company is focused on the development of inclisiran, a potentially first-in-class, twice yearly therapy that allows administration during patients' routine visits to their healthcare professionals and will potentially contribute to improved patient adherence and sustained lower LDL-C levels.

The fair value of the total purchase consideration was USD 9.6 billion. The purchase price allocation resulted in net identifiable assets of approximately USD 7.1 billion, consisting of USD 8.5 billion intangible assets, USD 1.4

billion net deferred tax liabilities and goodwill of approximately USD 2.5 billion.

The 2020 results of operations since the date of acquisition were not material.

Sandoz – acquisition of the Japanese business of Aspen Global Incorporated

On November 11, 2019, Sandoz entered into an agreement for the acquisition of the Japanese business of Aspen Global Incorporated (AGI), a wholly owned subsidiary of Aspen Pharmacare Holdings Limited. Under the agreement, Sandoz acquired the shares in Aspen Japan K.K. and associated assets held by AGI. The transaction closed on January 31, 2020.

Aspen's portfolio in Japan consisted of off-patent medicines with a focus on anesthetics and specialty brands. The acquisition will enable Sandoz to expand its presence in the third-largest worldwide generics marketplace.

The purchase price consisted of EUR 274 million (USD 303 million) upfront payment, less customary purchase price adjustment of EUR 27 million (USD 30 million), plus potential milestone payments of up to EUR 70 million (USD 77 million), which AGI is eligible to receive upon the achievement of specified milestones.

The fair value of the total purchase consideration was EUR 294 million (USD 324 million). The amount consisted of a cash payment of EUR 247 million (USD 273 million) and the fair value of contingent consideration of EUR 47 million (USD 51 million), which AGI is eligible to receive upon the achievement of specified milestones. The purchase price allocation resulted in net identifiable assets of USD 238 million, consisting of USD 196 million intangible assets, USD 26 million other net assets and USD 16 million net deferred tax assets. Goodwill amounted to USD 86 million.

The 2020 results of operations since the date of acquisition were not material.

Sandoz – retention of US dermatology business and generic US oral solids portfolio, previously planned to be divested

On September 6, 2018, Novartis announced that it entered into a stock and asset purchase agreement (SAPA) with Aurobindo Pharma USA Inc. (Aurobindo) for the sale of selected portions of its Sandoz US portfolio, specifically the Sandoz US dermatology business and generic US oral solids portfolio, for USD 0.8 billion in cash and potential earnouts. The closing was conditional on obtaining regulatory approval.

In March 2020, Novartis took the decision to retain the Sandoz US generic oral solids and dermatology businesses and on April 2, 2020 entered into a mutual agreement with Aurobindo to terminate the transaction. The decision was taken as approval from the US Federal Trade Commission for the transaction was not obtained within the agreed timelines.

The cumulative amount of the depreciation on property, plant and equipment (USD 38 million) and amortization on intangible assets (USD 102 million) not recorded in the consolidated income statement since the date of classification as held for sale was recognized in the consolidated income statement in the first quarter of 2020. In addition, an impairment of currently marketed products of USD 42 million was recognized in the first quarter of 2020 consolidated income statement.

As at March 31, 2020, the assets and liabilities of the Sandoz US generic oral solids and dermatology businesses were reclassified out of assets and liabilities of disposal group held for sale. The prior year balance sheet was not required to be restated.

There were no cumulative income or expenses included in the other comprehensive income relating to the disposal group.

3. Segmentation of key figures 2022, 2021 and 2020

The businesses of Novartis are divided operationally on a worldwide basis into two identified reporting segments: Innovative Medicines and Sandoz. 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.

The reporting segments are as follows:

Innovative Medicines researches, develops, manufactures, distributes and sells patented pharmaceuticals. Effective as of April 4, 2022, the Innovative Medicines Division is organized in two commercial organizational units: Innovative Medicines International and Innovative Medicines US, and is focused on the core therapeutic areas: cardiovascular; immunology; neuroscience; solid tumors and hematology; as well as other promoted brands (in the therapeutic areas of ophthalmology and respiratory) and established brands. Prior to the announcement on April 4, 2022, the Innovative Medicines Division was organized into two global business units: Novartis Oncology and Novartis Pharmaceuticals.

Sandoz develops, manufactures and markets finished dosage form medicines as well as intermediary products including active pharmaceutical ingredients. Sandoz is organized globally into three franchises: Retail Generics, Anti-Infectives and Biopharmaceuticals. In Retail Generics, Sandoz develops, manufactures and markets finished dosage forms of small molecule pharmaceuticals for sale to third parties across a broad range of therapeutic areas, including finished dosage form of 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.

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 debt (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.

Our divisions are supported by Novartis Institutes for BioMedical Research, Global Drug Development, and the Operations unit.

- The Novartis Institutes for BioMedical Research (NIBR) conducts research activities for the Innovative Medicines Division and also collaborates with Sandoz.
- The Global Drug Development organization oversees all drug development activities for our Innovative Medicines Division and collaborates with our Sandoz Division on the development of its biosimilars portfolio.
- The Operations unit, combines the Novartis Technical Operations (NTO) and Customer & Technology Solutions (CTS), following the internal reorganization announced on April 4, 2022. The Operations unit manages our manufacturing operations across our Innovative Medicines and Sandoz Divisions, and delivers business support services across the Group, such as information technology, real estate and facility services and procurement.

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 to third parties, operating income and net operating assets. Segment net operating assets consist primarily of property, plant and equipment; right-of-use assets; intangible assets; goodwill; inventories; and trade and other operating receivables less operating liabilities.

Segmentation – consolidated income statements

	Innovative Medicines		Sandoz		Corporate (including eliminations)[1]		Group	
(USD millions)	**2022**	2021	**2022**	2021	**2022**	2021	**2022**	2021
Net sales to third parties	**41 296**	**41 995**	**9 249**	**9 631**			**50 545**	**51 626**
Sales to other segments	825	795	205	180	– 1 030	– 975		
Net sales	**42 121**	**42 790**	**9 454**	**9 811**	**– 1 030**	**– 975**	**50 545**	**51 626**
Other revenues	1 249	1 179	28	61	6	11	1 283	1 251
Cost of goods sold	– 11 569	– 11 751	– 4 978	– 5 147	1 061	1 031	– 15 486	– 15 867
Gross profit	**31 801**	**32 218**	**4 504**	**4 725**	**37**	**67**	**36 342**	**37 010**
Selling, general and administration	– 11 679	– 12 306	– 2 062	– 2 062	– 512	– 518	– 14 253	– 14 886
Research and development	– 9 172	– 8 641	– 824	– 899			– 9 996	– 9 540
Other income	531	1 149	103	233	171	470	805	1 852
Other expense	– 2 695	– 1 732	– 273	– 397	– 733	– 618	– 3 701	– 2 747
Operating income	**8 786**	**10 688**	**1 448**	**1 600**	**– 1 037**	**– 599**	**9 197**	**11 689**
(Loss)/income from associated companies	– 2	5	2	2	– 9	15 332	– 9	15 339
Interest expense							– 837	– 811
Other financial income and expense							20	– 80
Income before taxes							**8 371**	**26 137**
Income taxes							– 1 416	– 2 119
Net income							**6 955**	**24 018**
Attributable to:								
Shareholders of Novartis AG							*6 955*	*24 021*
Non-controlling interests							*0*	*– 3*
Included in net income are:								
Interest income							379	71
Depreciation of property, plant and equipment	– 837	– 859	– 204	– 210	– 122	– 139	– 1 163	– 1 208
Depreciation of right-of-use assets	– 252	– 265	– 33	– 39	– 15	– 14	– 300	– 318
Amortization of intangible assets	– 3 728	– 3 638	– 222	– 238	– 32	– 27	– 3 982	– 3 903
Impairment charges on property, plant and equipment, net	– 407	– 271		– 9		– 1	– 407	– 281
Impairment of right-of-use assets	– 3						– 3	
Impairment charges on intangible assets, net	– 1 299	– 367	– 25	– 28	– 2	– 8	– 1 326	– 403
Impairment charges and fair value changes on financial assets, net	– 134	43			– 126	– 5	– 260	38
Additions to restructuring provisions	– 1 069	– 240	– 40	– 62	– 259	– 26	– 1 368	– 328
Equity-based compensation of Novartis equity plans	– 706	– 721	– 62	– 65	– 280	– 193	– 1 048	– 979

[1] Eliminations mainly relate to the elimination of sales to other segments and the corresponding cost of goods sold.

	Innovative Medicines		Sandoz		Corporate (including eliminations)[1]		Group	
(USD millions)	2021	2020	2021	2020	2021	2020	2021	2020
Net sales to third parties	**41 995**	**39 013**	**9 631**	**9 646**			**51 626**	**48 659**
Sales to other segments	795	792	180	189	– 975	– 981		
Net sales	**42 790**	**39 805**	**9 811**	**9 835**	**– 975**	**– 981**	**51 626**	**48 659**
Other revenues	1 179	1 018	61	53	11	168	1 251	1 239
Cost of goods sold	– 11 751	– 10 927	– 5 147	– 5 252	1 031	1 058	– 15 867	– 15 121
Gross profit	**32 218**	**29 896**	**4 725**	**4 636**	**67**	**245**	**37 010**	**34 777**
Selling, general and administration	– 12 306	– 11 657	– 2 062	– 2 076	– 518	– 464	– 14 886	– 14 197
Research and development	– 8 641	– 8 118	– 899	– 862			– 9 540	– 8 980
Other income	1 149	922	233	176	470	644	1 852	1 742
Other expense	– 1 732	– 1 871	– 397	– 831	– 618	– 488	– 2 747	– 3 190
Operating income	**10 688**	**9 172**	**1 600**	**1 043**	**– 599**	**– 63**	**11 689**	**10 152**
Income from associated companies	5	1	2	2	15 332	670	15 339	673
Interest expense							– 811	– 869
Other financial income and expense							– 80	– 78
Income before taxes							**26 137**	**9 878**
Income taxes							– 2 119	– 1 807
Net income							**24 018**	**8 071**
Attributable to:								
Shareholders of Novartis AG							*24 021*	*8 072*
Non-controlling interests							*– 3*	*– 1*
Included in net income are:								
Interest income							71	91
Depreciation of property, plant and equipment	– 859	– 912	– 210	– 282	– 139	– 124	– 1 208	– 1 318
Depreciation of right-of-use assets	– 265	– 273	– 39	– 41	– 14	– 16	– 318	– 330
Amortization of intangible assets	– 3 638	– 3 080	– 238	– 370	– 27	– 12	– 3 903	– 3 462
Impairment charges on property, plant and equipment, net	– 271	– 324	– 9	– 116	– 1		– 281	– 440
Impairment charges on intangible assets, net	– 367	– 768	– 28	– 141	– 8	– 5	– 403	– 914
Impairment charges and fair value changes on financial assets, net	43	153			– 5	182	38	335
Additions to restructuring provisions	– 240	– 217	– 62	– 98	– 26	– 39	– 328	– 354
Equity-based compensation of Novartis equity plans	– 721	– 714	– 65	– 64	– 193	– 180	– 979	– 958

[1] Eliminations mainly relate to the elimination of sales to other segments and the corresponding cost of goods sold.

Segmentation – consolidated balance sheets

	Innovative Medicines		Sandoz		Corporate (including eliminations)[1]		Group	
(USD millions)	**2022**	2021	**2022**	2021	**2022**	2021	**2022**	2021
Total assets	**75 510**	79 220	**16 078**	16 192	**25 865**	36 383	**117 453**	131 795
Total liabilities	**– 16 966**	– 15 929	**– 3 710**	– 3 632	**– 37 354**	– 44 412	**– 58 030**	– 63 973
Total equity							**59 423**	67 822
Net debt[2]					7 245	868	7 245	868
Net operating assets	**58 544**	63 291	**12 368**	12 560	**– 4 244**	– 7 161	**66 668**	68 690
Included in assets and liabilities are:								
Total property, plant and equipment	8 488	9 168	1 861	1 901	415	476	10 764	11 545
Additions to property, plant and equipment[3]	842	991	292	349	85	90	1 219	1 430
Total right-of-use assets	1 233	1 349	90	104	108	108	1 431	1 561
Additions to right-of-use assets[3]	196	222	31	26	20	73	247	321
Total goodwill and intangible assets	51 357	53 919	9 230	9 603	358	255	60 945	63 777
Additions to goodwill and intangible assets[3]	1 791	1 491	163	102	139	143	2 093	1 736
Total investment in associated companies	107	170	9	7	27	28	143	205
Additions to investment in associated companies	25	24			13	19	38	43
Cash and cash equivalents, marketable securities, commodities, time deposits and derivative financial instruments					18 930	28 329	18 930	28 329
Financial debts and derivative financial instruments					26 175	29 197	26 175	29 197
Current income tax liabilities and deferred tax liabilities					5 219	5 485	5 219	5 485

[1] Eliminations mainly relate to the elimination of intercompany receivables and payables to other segments and inventories
[2] Note 29 provides additional disclosures related to net debt
[3] Excluding the impact of business acquisitions

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 to third parties for the years ended December 31, 2022, 2021 and 2020, and for selected non-current assets for the years ended December 31, 2022 and 2021:

	Net sales to third parties[1]						Total of selected non-current assets[2]			
(USD millions)	**2022**	**%**	2021	%	2020	%	**2022**	**%**	2021	%
Country										
Switzerland	970	2	873	2	800	2	23 708	32	25 770	33
United States	17 653	35	16 818	33	16 484	34	35 353	48	37 054	48
France	2 257	4	2 522	5	2 442	5	3 188	4	3 615	5
Germany	4 278	8	4 870	9	4 518	9	2 229	3	2 378	3
China	3 128	6	3 052	6	2 573	5	599	1	703	1
Japan	2 205	4	2 683	5	2 804	6	165		217	
Other	20 054	41	20 808	40	19 038	39	8 241	12	7 351	10
Group	**50 545**	**100**	51 626	100	48 659	100	**73 483**	**100**	77 088	100
Region										
Europe	18 467	37	20 197	39	18 715	38	35 896	49	37 525	49
Americas	21 536	42	20 463	40	19 725	41	35 806	49	37 522	49
Asia/Africa/Australasia	10 542	21	10 966	21	10 219	21	1 781	2	2 041	2
Group	**50 545**	**100**	51 626	100	48 659	100	**73 483**	**100**	77 088	100

[1] Net sales to third parties by location of customer
[2] Total of property, plant and equipment; right-of-use assets; goodwill; intangible assets; investment in associated companies and other non-current assets excluding post-employment benefit assets

The Group's largest, second-largest and third-largest customers account for approximately 16%, 11% and 7% of net sales to third parties, respectively (2021: 17%, 11% and 6%, respectively; 2020: 17%, 11% and 6%, respectively). All segments had sales to these customers in 2022, 2021 and 2020.

The highest amounts of trade receivables outstanding were for these same three customers and amounted to approximately 16%, 14% and 7%, respectively, of the trade receivables at December 31, 2022 (2021: 16%, 12% and 7%, respectively).

Segmentation – net sales to third parties

Net sales to third parties by region[1]

	2022 USD m	2021 USD m	Change (2021 to 2022) USD %	2020 USD m	Change (2020 to 2021) USD %
Innovative Medicines					
Europe	13 554	14 919	– 9	13 484	11
US	15 899	14 999	6	14 342	5
Asia/Africa/Australasia	8 929	9 304	– 4	8 718	7
Canada and Latin America	2 914	2 773	5	2 469	12
Total	**41 296**	**41 995**	**– 2**	**39 013**	**8**
Of which in Established Markets	30 548	31 459	– 3	29 643	6
Of which in Emerging Growth Markets	10 748	10 536	2	9 370	12
Sandoz					
Europe	4 913	5 278	– 7	5 231	1
US	1 754	1 819	– 4	2 142	– 15
Asia/Africa/Australasia	1 613	1 662	– 3	1 501	11
Canada and Latin America	969	872	11	772	13
Total	**9 249**	**9 631**	**– 4**	**9 646**	**0**
Of which in Established Markets	6 460	6 855	– 6	7 089	– 3
Of which in Emerging Growth Markets	2 789	2 776	0	2 557	9
Group					
Europe	18 467	20 197	– 9	18 715	8
US	17 653	16 818	5	16 484	2
Asia/Africa/Australasia	10 542	10 966	– 4	10 219	7
Canada and Latin America	3 883	3 645	7	3 241	12
Total	**50 545**	**51 626**	**– 2**	**48 659**	**6**
Of which in Established Markets	37 008	38 314	– 3	36 732	4
Of which in Emerging Growth Markets	13 537	13 312	2	11 927	12

[1] Net sales to third parties by location of customer. Emerging Growth Markets comprise all markets other than the Established Markets of the US, Canada, Western Europe, Japan, Australia and New Zealand.

Innovative Medicines Division net sales to third parties by core therapeutic area; other promoted brands; and established brands

	2022 USD m	2021 USD m[1]	Change (2021 to 2022) USD %	2020 USD m[1]	Change (2020 to 2021) USD %
Cardiovascular					
Entresto	4 644	3 548	31	2 497	42
Leqvio	112	12	nm		nm
Total Cardiovascular	**4 756**	**3 560**	**34**	**2 497**	**43**
Immunology					
Cosentyx	4 788	4 718	1	3 995	18
Xolair[2]	1 365	1 428	– 4	1 251	14
Ilaris	1 133	1 059	7	873	21
Other	1		nm		nm
Total Immunology	**7 287**	**7 205**	**1**	**6 119**	**18**
Neuroscience					
Gilenya	2 013	2 787	– 28	3 003	– 7
Zolgensma	1 370	1 351	1	920	47
Kesimpta	1 092	372	194	15	nm
Mayzent	357	281	27	170	65
Aimovig	218	215	1	164	31
Other	1	1	0		nm
Total Neuroscience	**5 051**	**5 007**	**1**	**4 272**	**17**
Solid Tumors					
Tafinlar + Mekinist	1 770	1 693	5	1 542	10
Kisqali	1 231	937	31	687	36
Votrient	474	577	– 18	635	– 9
Lutathera	471	475	– 1	445	7
Piqray	373	329	13	320	3
Pluvicto	271		nm	2	nm
Tabrecta	133	90	48	35	157
Total Solid Tumors	**4 723**	**4 101**	**15**	**3 666**	**12**
Hematology					
Promacta/Revolade	2 088	2 016	4	1 738	16
Tasigna	1 923	2 060	– 7	1 958	5
Jakavi	1 561	1 595	– 2	1 339	19
Kymriah	536	587	– 9	474	24
Adakveo	194	164	18	105	56
Scemblix	149	7	nm		nm
Other	1	1	0	3	– 67
Total Hematology	**6 452**	**6 430**	**0**	**5 617**	**14**

	2022 USD m	2021 USD m[1]	Change (2021 to 2022) USD %	2020 USD m[1]	Change (2020 to 2021) USD %
Other Promoted Brands					
Lucentis	1 874	2 160	– 13	1 933	12
Xiidra	487	468	4	376	24
Ultibro Group	479	584	– 18	623	– 6
Beovu	203	186	9	190	– 2
Other respiratory	84	53	58	26	104
Total Other Promoted Brands	**3 127**	**3 451**	**– 9**	**3 148**	**10**
Total Promoted Brands	**31 396**	**29 754**	**6**	**25 319**	**18**
Established Brands					
Sandostatin	1 238	1 413	– 12	1 439	– 2
Galvus Group	859	1 092	– 21	1 199	– 9
Gleevec/Glivec	745	1 024	– 27	1 188	– 14
Exforge Group	743	901	– 18	980	– 8
Diovan Group	652	773	– 16	1 003	– 23
Afinitor/Votubia	512	938	– 45	1 083	– 13
Voltaren/Cataflam	334	373	– 10	360	4
Zortress/Certican	329	431	– 24	452	– 5
Exjade/Jadenu	323	563	– 43	653	– 14
Neoral/Sandimmun(e)	310	368	– 16	393	– 6
Contract manufacturing	214	108	98		nm
Other	3 641	4 257	– 14	4 944	– 14
Total Established Brands	**9 900**	**12 241**	**– 19**	**13 694**	**– 11**
Total division net sales to third parties	**41 296**	**41 995**	**– 2**	**39 013**	**8**

[1] Reclassified to reflect the new Innovative Medicines divisional structures announced on April 4, 2022

[2] Net sales to third parties reflect *Xolair* sales for all indications.

Net sales to third parties of the top 20 Innovative Medicines Division brands in 2022

Brands	Brand classification by therapeutic area, other promoted brands or established brands	Key indications	US USD m	Rest of world USD m	Total USD m
Cosentyx	Immunology	Psoriasis (PsO), ankylosing spondylitis (AS), psoriatic arthritis (PsA), non-radiographic axial spondyloarthritis (nr-axSPA)	2 770	2 018	4 788
Entresto	Cardiovascular	Chronic heart failure, hypertension	2 354	2 290	4 644
Promacta/Revolade	Hematology	Immune thrombocytopenia (ITP), severe aplastic anemia (SAA)	1 083	1 005	2 088
Gilenya	Neuroscience	Relapsing multiple sclerosis (RMS)	1 153	860	2 013
Tasigna	Hematology	Chronic myeloid leukemia (CML)	877	1 046	1 923
Lucentis	Other Promoted Brands	Age-related macular degeneration (AMD), diabetic macular edema (DME), retinal vein occlusion (RVO)		1 874	1 874
Tafinlar + Mekinist	Solid Tumors	BRAF V600+ metastatic adjuvant melanoma, advanced non-small cell lung cancer (NSCLC), tumor agnostic with BRAF mutation indication	678	1 092	1 770
Jakavi	Hematology	Myelofibrosis (MF), polycytomia vera (PV), graft-versus-host disease (GvHD)		1 561	1 561
Zolgensma	Neuroscience	Spinal muscular atrophy (SMA)	434	936	1 370
Xolair [1]	Immunology	Severe allergic asthma (SAA), chronic spontaneous urticaria (CSU), nasal polyps		1 365	1 365
Sandostatin	Established Brands	Carcinoid tumors, acromegaly	800	438	1 238
Kisqali	Solid Tumors	HR+/HER2- metastatic breast cancer	472	759	1 231
Ilaris	Immunology	Auto-inflammatory (CAPS, TRAPS, HIDS/MKD, FMF, SJIA, AOSD, gout)	570	563	1 133
Kesimpta	Neuroscience	Relapsing-remitting multiple sclerosis (RRMS)	921	171	1 092
Galvus Group	Established Brands	Type 2 diabetes		859	859
Gleevec/Glivec	Established Brands	Chronic myeloid leukemia (CML), gastrointestinal stromal tumors (GIST)	205	540	745
Exforge Group	Established Brands	Hypertension	14	729	743
Diovan Group	Established Brands	Hypertension	55	597	652
Kymriah	Hematology	r/r pediatric and young adults acute lymphoblastic leukemia (ALL), diffuse large B-cell lymphoma (DLBCL), follicular lymphoma (FL)	196	340	536
Afinitor/Votubia	Established Brands	Breast cancer/ tuberous sclerosis complex (TSC)	171	341	512
Top 20 brands total			**12 753**	**19 384**	**32 137**
Rest of portfolio			3 146	6 013	9 159
Total division net sales to third parties			**15 899**	**25 397**	**41 296**

[1] Net sales to third parties reflect *Xolair* sales for all indications.

Net sales to third parties of the top 20 Innovative Medicines Division brands in 2021

Brands	Brand classification by therapeutic area, other promoted brands or established brands [1]	Key indications	US USD m	Rest of world USD m	Total USD m
Cosentyx	Immunology	Psoriasis (PsO), ankylosing spondylitis (AS), psoriatic arthritis (PsA), non-radiographic axial spondyloarthritis (nr-axSPA)	2 883	1 835	**4 718**
Entresto	Cardiovascular	Chronic heart failure	1 712	1 836	**3 548**
Gilenya	Neuroscience	Relapsing multiple sclerosis (RMS)	1 427	1 360	**2 787**
Lucentis	Other Promoted Brands	Age-related macular degeneration (AMD)		2 160	**2 160**
Tasigna	Hematology	Chronic myeloid leukemia (CML)	882	1 178	**2 060**
Promacta/Revolade	Hematology	Immune thrombocytopenia (ITP), severe aplastic anemia (SAA)	947	1 069	**2 016**
Tafinlar + Mekinist	Solid Tumors	BRAF V600+ metastatic adjuvant melanoma, advanced non-small cell lung cancer (NSCLC)	606	1 087	**1 693**
Jakavi	Hematology	Myelofibrosis (MF), polycythemia vera (PV)		1 595	**1 595**
Xolair [2]	Immunology	Severe allergic asthma (SAA), chronic spontaneous urticaria (CSU), nasal polyps		1 428	**1 428**
Sandostatin	Established Brands	Carcinoid tumors, acromegaly	843	570	**1 413**
Zolgensma	Neuroscience	Spinal muscular atrophy (SMA)	469	882	**1 351**
Galvus Group	Established Brands	Type 2 diabetes		1 092	**1 092**
Ilaris	Immunology	Auto-inflammatory (CAPS, TRAPS, HIDS/MKD, FMF, SJIA, AOSD, gout)	501	558	**1 059**
Gleevec/Glivec	Established Brands	Chronic myeloid leukemia (CML), gastrointestinal stromal tumors (GIST)	263	761	**1 024**
Afinitor/Votubia	Established Brands	Breast cancer/ tuberous sclerosis complex (TSC)	521	417	**938**
Kisqali	Solid Tumors	HR+/HER2- metastatic breast cancer	339	598	**937**
Exforge Group	Established Brands	Hypertension	14	887	**901**
Diovan Group	Established Brands	Hypertension	51	722	**773**
Kymriah	Hematology	r/r pediatric and young adults acute lymphoblastic leukemia (ALL), diffuse large B-cell lymphoma (DLBCL)	230	357	**587**
Ultibro Group	Other Promoted Brands	Cronic obstructive pulmonary disease (COPD)		584	**584**
Top 20 products total			**11 688**	**20 976**	**32 664**
Rest of portfolio			3 311	6 020	**9 331**
Total division net sales to third parties			**14 999**	**26 996**	**41 995**

[1] Brand classifications have been changed to reflect the new Innovative Medicines divisional structures announced on April 4, 2022.
[2] Net sales to third parties reflect *Xolair* sales for all indications.

Net sales to third parties of the top 20 Innovative Medicines Division brands in 2020

Brands	Brand classification by therapeutic area, other promoted brands or established brands [1]	Key indications	US USD m	Rest of world USD m	Total USD m
Cosentyx	Immunology	Psoriasis (PsO), ankylosing spondylitis (AS), psoriatic arthritis (PsA)	2 516	1 479	**3 995**
Gilenya	Neuroscience	Relapsing multiple sclerosis (RMS)	1 562	1 441	**3 003**
Entresto	Cardiovascular	Chronic heart failure	1 277	1 220	**2 497**
Tasigna	Hematology	Chronic myeloid leukemia (CML)	859	1 099	**1 958**
Lucentis	Other Promoted Brands	Age-related macular degeneration (AMD)		1 933	**1 933**
Promacta/Revolade	Hematology	Immune thrombocytopenia (ITP), severe aplastic anemia (SAA)	833	905	**1 738**
Tafinlar + Mekinist	Solid Tumors	BRAF V600+ metastatic adjuvant melanoma, advanced non-small cell lung cancer (NSCLC)	569	973	**1 542**
Sandostatin	Established Brands	Carcinoid tumors, acromegaly	837	602	**1 439**
Jakavi	Hematology	Myelofibrosis (MF), polycythemia vera (PV)		1 339	**1 339**
Xolair [2]	Immunology	Severe allergic asthma (SAA), chronic spontaneous urticaria (CSU)		1 251	**1 251**
Galvus Group	Established Brands	Type 2 diabetes		1 199	**1 199**
Gleevec/Glivec	Established Brands	Chronic myeloid leukemia (CML), gastrointestinal stromal tumors (GIST)	315	873	**1 188**
Afinitor/Votubia	Established Brands	Breast cancer/ tuberous sclerosis complex (TSC)	644	439	**1 083**
Diovan Group	Established Brands	Hypertension	124	879	**1 003**
Exforge Group	Established Brands	Hypertension	16	964	**980**
Zolgensma	Neuroscience	Spinal muscular atrophy (SMA)	459	461	**920**
Ilaris	Immunology	Auto-inflammatory (CAPS, TRAPS, HIDS/MKD, FMF, SJIA, AOSD gout)	400	473	**873**
Kisqali	Solid Tumors	HR+/HER2- metastatic breast cancer	318	369	**687**
Exjade/Jadenu	Established Brands	Chronic iron overload	138	515	**653**
Votrient	Solid Tumors	Renal cell carcinoma (RCC)	259	376	**635**
Top 20 products total			**11 126**	**18 790**	**29 916**
Rest of portfolio			3 216	5 881	**9 097**
Total division net sales to third parties			**14 342**	**24 671**	**39 013**

[1] Brand classifications have been changed to reflect the new Innovative Medicines divisional structures announced on April 4, 2022.
[2] Net sales to third parties reflect *Xolair* sales for all indications.

Sandoz Division net sales to third parties by business franchise

	2022 USD m	2021 USD m	Change (2021 to 2022) USD %	2020 USD m	Change (2020 to 2021) USD %
Retail Generics [1]	6 776	7 092	– 4	7 244	– 2
Biopharmaceuticals	2 093	2 116	– 1	1 928	10
Anti-Infectives [1]	380	423	– 10	474	– 11
Total division net sales to third parties	**9 249**	**9 631**	**– 4**	**9 646**	**0**

[1] Sandoz total anti-infectives net sales to third parties amounted to USD 1.2 billion (2021: USD 1.1 billion; 2020: USD 1.2 billion), of which USD 777 million (2021: USD 707 million; 2020: USD 694 million) is sold through the Retail Generics business franchise and USD 380 million (2021: USD 423 million; 2020: USD 474 million) is sold to other third-party companies through the Anti-Infectives business franchise.

The product portfolio of Sandoz is widely spread in 2022, 2021 and 2020.

Segmentation – other revenue

	Innovative Medicines			Sandoz			Corporate (including eliminations)			Group		
(USD millions)	**2022**	2021	2020	**2022**	2021	2020	**2022**	2021	2020	**2022**	2021	2020
Profit-sharing income	921	873	835							921	873	835
Royalty income	28	74	107	18	24	25	6	11	168	52	109	300
Milestone income	145	127	39	3	28	11				148	155	50
Other [1]	155	105	37	7	9	17				162	114	54
Total other revenues	**1 249**	**1 179**	**1 018**	**28**	**61**	**53**	**6**	**11**	**168**	**1 283**	**1 251**	**1 239**

[1] Other includes revenue from activities such as manufacturing or other services rendered, to the extent such revenue is not recorded under net sales to third parties.

4. Associated companies

	Net income statement effect			Other comprehensive income effect [1]			Total comprehensive income effect		
(USD millions)	**2022**	2021	2020	**2022**	2021	2020	**2022**	2021	2020
Roche Holding AG, Switzerland		15 341	677		46	– 56		15 387	621
Others	– 9	– 2	– 4				– 9	– 2	– 4
Associated companies	**– 9**	**15 339**	**673**		**46**	**– 56**	**– 9**	**15 385**	**617**

[1] In 2021, Novartis share of other comprehensive income recognized by associated companies, net of taxes of USD 3 million was recycled into the consolidated income statement as a result of the divestment of the investment in Roche Holding AG. No Novartis share of other comprehensive income recognized by associated companies was recycled to the consolidated income statement in 2022 and 2020.

Novartis has certain non-significant investments and had a significant investment in Roche Holding AG, Basel (Roche), which was divested to Roche on December 6, 2021, that are accounted for as associated companies.

Roche Holding AG

On November 3, 2021, Novartis entered into an agreement with Roche Holding AG to divest its 33.3% of Roche Holding AG (Roche) voting shares, representing approximately 6.2% of Roche's total outstanding voting and non-voting equity instruments, to Roche for USD 20.7 billion in cash. As a result, Novartis discontinued the use of equity method accounting starting from November 3, 2021.

The divestment transaction closed on December 6, 2021, and Novartis realized a gain of USD 14.6 billion, recorded in income from associated companies. See Note 2.

The Group's holding in Roche voting shares was 33.3% at December 31, 2020. This investment represented approximately 6.2% of Roche's total outstanding voting and non-voting equity instruments at December 31, 2020.

Since full-year 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 were adjusted in the Group's consolidated financial statements when available. As Novartis discontinued the use of equity method accounting starting from November 3, 2021, and the divestment closed on December 6, 2021, no such adjustment has been made to the 2022 Group's consolidated financial statements.

In 2021, dividends received from Roche in relation to the distribution of its 2020 net income amounted to USD 522 million.

The consolidated income statement effects from applying Novartis accounting principles for this investment in 2021 and 2020 are as follows:

(USD millions)	2021	2020
Novartis share of Roche's estimated current-year consolidated net income	815	913
Prior-year adjustment	40	– 64
Amortization of fair value adjustments relating to intangible assets, net of taxes of 2021: USD 10 million; 2020: USD 26 million	– 70	– 172
Gain on divestment of the investment in Roche [1]	14 556	
Net income effect	**15 341**	**677**

[1] The gain on divestment of the investment in Roche includes the recycling of currency translation effects (see Note 8.1) and other comprehensive income effects totaling USD 3.2 billion.

5. Interest expense and other financial income and expense

Interest expense

(USD millions)	2022	2021	2020
Interest expense	– 669	– 651	– 708
Interest expense on lease liabilities	– 60	– 62	– 67
Expense arising from discounting long-term liabilities and capitalized borrowing costs	– 108	– 98	– 94
Total interest expense	**– 837**	**– 811**	**– 869**

Other financial income and expense

(USD millions)	2022	2021	2020
Interest income	379	71	91
Other financial income	19	12	18
Financial expense	– 194	– 94	– 52
Currency result, net	– 184	– 69	– 135
Total other financial income and expense	**20**	**– 80**	**– 78**

6. Income taxes

Income before taxes

(USD millions)	2022	2021	2020
Switzerland [1]	5 986	22 028	9 786
Foreign	2 385	4 109	92
Income before taxes	**8 371**	**26 137**	**9 878**

[1] The 2021 income before taxes in Switzerland includes a USD 14.6 billion non-taxable gain on the divestment of the Group's investment in Roche Holding AG (see Note 2 and Note 4).

Current and deferred income tax expense

The significant components of the provision for income taxes are as follows:

(USD millions)	2022	2021	2020
Switzerland	– 617	– 958	– 932
Foreign	– 1 454	– 1 470	– 1 168
Current income tax expense	**– 2 071**	**– 2 428**	**– 2 100**
Switzerland	– 142	23	– 137
Foreign	797	286	430
Deferred tax income	**655**	**309**	**293**
Income tax expense	**– 1 416**	**– 2 119**	**– 1 807**

Analysis of tax rate

Novartis has a substantial business presence in many countries and is therefore subject to income taxes in different tax jurisdictions. This leads to differences in income and expense items that are non-taxable or non-deductible (permanent differences) or are taxed at different statutory tax rates in those tax jurisdictions. As a result, there is a difference between our applicable tax rate and effective tax rate.

The applicable tax rate changes from year to year due to changes in the mix of the Group's pre-tax income and changes in statutory tax rates since it is calculated as the weighted average tax rate based on the pre-tax income of each subsidiary.

The main elements contributing to the difference between the Group's overall applicable tax rate and the effective tax rate are shown in the following table:

(As a percentage)	2022	2021	2020
Applicable tax rate	16.8	14.8	13.6
Effect of disallowed expenditures	2.6	1.0	4.6
Effect of utilization of previously unrecognized tax losses brought forward from prior periods	0.0	0.0	– 0.3
Effect of income taxed at reduced rates	– 0.3	– 0.1	– 0.3
Effect of income not subject to tax [1]	– 0.1	– 7.5	– 0.7
Effect of tax credits and allowances	– 3.8	– 1.4	– 2.3
Effect of release of contingent consideration liability	– 0.5	– 0.1	– 0.2
Effect of tax rate change on current and deferred tax assets and liabilities	– 0.1	0.0	0.3
Effect of derecognition and reversals of derecognition of deferred tax assets	1.2	0.0	0.2
Effect of write-down and reversal of write-down of investments in subsidiaries	0.0	0.0	– 0.8
Effect of prior-year items	– 0.4	0.1	2.3
Effect of changes in uncertain tax positions	1.4	1.3	2.0
Effect of other items	0.1	0.0	– 0.1
Effective tax rate	**16.9**	**8.1**	**18.3**

[1] 2021 includes the effect of income not subject to tax (– 7.3%) arising from the non-taxable gain on the divestment of our investment in Roche. See Notes 2 and 4 for further details.

Our effective tax rate fluctuates based primarily on, among other factors, changes in pre-tax income between countries with varying statutory tax rates, income taxed at reduced tax rates, effect of disallowed expenditures, effect of income not subject to tax, effect of tax credits and allowances, effect of prior-year items, changes in the measurement of deferred tax assets, changes in uncertain tax positions and changes in tax laws. The table above provides the details of the significant items

that impact the comparability of the effective tax rate between years.

The utilization of tax-loss carry-forwards lowered the tax charge by USD 1 million in 2022, by USD 5 million in 2021, and by USD 29 million in 2020.

7. Earnings per share

	2022	2021	2020
Net income attributable to shareholders of Novartis AG (USD millions)	**6 955**	**24 021**	**8 072**
Number of shares (in millions)			
Weighted average number of shares outstanding used in basic earnings per share	2 181	2 243	2 277
Adjustment for vesting of restricted shares, restricted share units and dilutive shares from options	16	17	19
Weighted average number of shares in diluted earnings per share	**2 197**	**2 260**	**2 296**
Basic earnings per share (USD)	**3.19**	**10.71**	**3.55**
Diluted earnings per share (USD)	**3.17**	**10.63**	**3.52**

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 2022, 2021 or 2020, 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, which under IFRS are not recorded in the consolidated income statement. These include fair value adjustments on financial instruments, actuarial gains or losses on defined benefit pension plans, and currency translation effects, net of taxes.

(USD millions)	Note	Fair value adjustments on financial instruments	Actuarial gains/(losses) from defined benefit plans	Cumulative currency translation effects	Total value adjustments attributable to Novartis AG shareholders	Non-controlling interest	Total value adjustments
Value adjustments at December 31, 2019		**120**	**– 5 919**	**1 142**	**– 4 657**	**– 29**	**– 4 686**
Fair value adjustments on equity securities, net of taxes of USD -36 million [1]		250			250		250
Net investment hedge				– 201	– 201		– 201
Defined benefit plans, net of taxes of USD -3 million			145		145	– 2	143
Currency translation effects, net of taxes of USD 10 million	8.1			3 193	3 193	1	3 194
Total value adjustments in 2020		**250**	**145**	**2 992**	**3 387**	**– 1**	**3 386**
Fair value adjustments on equity securities sold, reclassified to retained earnings		– 150			– 150		– 150
Value adjustments related to divestments			2		2		2
Impact of change in ownership of consolidated entities			– 1		– 1	1	
Value adjustments at December 31, 2020		**220**	**– 5 773**	**4 134**	**– 1 419**	**– 29**	**– 1 448**
Fair value adjustments on equity securities, net of taxes of USD -44 million [1]		194			194		194
Net investment hedge, net of taxes of USD 33 million				216	216		216
Defined benefit plans, net of taxes of USD -323 million			1 808		1 808	1	1 809
Currency translation effects, net of taxes of USD 17 million	8.1			– 4 757	– 4 757	– 5	– 4 762
Total value adjustments in 2021		**194**	**1 808**	**– 4 541**	**– 2 539**	**– 4**	**– 2 543**
Fair value adjustments on equity securities sold, reclassified to retained earnings net of taxes of USD 48 million		– 164			– 164		– 164
Value adjustments related to divestments		– 62	– 3		– 65		– 65
Value adjustments at December 31, 2021		**188**	**– 3 968**	**– 407**	**– 4 187**	**– 33**	**– 4 220**
Fair value adjustments on equity securities, net of taxes of USD 81 million [1]		– 382			– 382		– 382
Net investment hedge, net of taxes of USD -30 million				91	91		91
Defined benefit plans, net of taxes of USD -104 million			– 104		– 104	1	– 103
Currency translation effects, net of taxes of USD 18 million	8.1			– 444	– 444	– 6	– 450
Total value adjustments in 2022		**– 382**	**– 104**	**– 353**	**– 839**	**– 5**	**– 844**
Fair value adjustments on equity securities sold, reclassified to retained earnings net of taxes of nil		– 4			– 4		– 4
Value adjustments related to divestments, net of taxes of USD -4 million			34		34		34
Value adjustments at December 31, 2022		**– 198**	**– 4 038**	**– 760**	**– 4 996**	**– 38**	**– 5 034**

[1] Includes fair value adjustments on equity securities designated as financial assets valued at fair value through other comprehensive income with no subsequent recycling into the consolidated income statement

8.1) In 2022, net cumulative currency translation gains of USD 13 million were recycled through the income statement as a result of the divestments of subsidiaries. In 2021, net cumulative currency translation gains of USD 3.2 billion were recycled through the income statement as a result of the divestment of the investment in Roche. See Notes 2 and 4. In 2020, there were no currency translation losses or gains recycled through the income statement.

9. Property, plant and equipment

The following table summarizes the movements of property, plant and equipment during 2022:

(USD millions)	Land	Buildings	Construction in progress	Machinery and other equipment	Total
At January 1, 2022					
Cost	492	11 819	1 508	13 328	27 147
Accumulated depreciation and impairment	– 7	– 5 744	– 65	– 9 786	– 15 602
Net book value	**485**	**6 075**	**1 443**	**3 542**	**11 545**
At January 1, 2022	**485**	**6 075**	**1 443**	**3 542**	**11 545**
Impact of acquisitions of businesses				13	13
Reclassifications		297	– 964	667	
Additions	3	124	780	312	1 219
Disposals and derecognitions	– 28	– 49	– 33	– 45	– 155
Depreciation charge		– 437		– 726	– 1 163
Impairment charge	– 7	– 351	– 13	– 43	– 414
Reversal of impairment charge	1		1	5	7
Currency translation effects	– 12	– 166	– 57	– 53	– 288
At December 31, 2022	**442**	**5 493**	**1 157**	**3 672**	**10 764**
At December 31, 2022					
Cost	451	11 396	1 184	11 842	24 873
Accumulated depreciation and impairment	– 9	– 5 903	– 27	– 8 170	– 14 109
Net book value	**442**	**5 493**	**1 157**	**3 672**	**10 764**
Commitments for purchases of property, plant and equipment					**549**
Capitalized borrowing costs					**5**

The following table summarizes the movements of property, plant and equipment during 2021:

(USD millions)	Land	Buildings	Construction in progress	Machinery and other equipment	Total
At January 1, 2021					
Cost	555	12 377	1 248	14 038	28 218
Accumulated depreciation and impairment	– 19	– 5 807	– 66	– 10 063	– 15 955
Net book value	**536**	**6 570**	**1 182**	**3 975**	**12 263**
At January 1, 2021	**536**	**6 570**	**1 182**	**3 975**	**12 263**
Reclassifications		197	– 610	413	
Additions	1	109	1 027	293	1 430
Disposals and derecognitions	– 30	– 78	– 12	– 30	– 150
Depreciation charge		– 453		– 755	– 1 208
Impairment charge	– 4	– 137	– 76	– 167	– 384
Reversal of impairment charge	5	70	16	12	103
Currency translation effects	– 23	– 203	– 84	– 199	– 509
At December 31, 2021	**485**	**6 075**	**1 443**	**3 542**	**11 545**
At December 31, 2021					
Cost	492	11 819	1 508	13 328	27 147
Accumulated depreciation and impairment	– 7	– 5 744	– 65	– 9 786	– 15 602
Net book value	**485**	**6 075**	**1 443**	**3 542**	**11 545**
Commitments for purchases of property, plant and equipment					**204**
Capitalized borrowing costs					**4**

The following table shows the property, plant and equipment impairment charges and reversals by reporting segment:

	Impairment charges			Impairment reversals		
(USD millions)	**2022**	2021	2020	**2022**	2021	2020
Innovative Medicines	– 411	– 315	– 326	4	44	2
Sandoz	– 3	– 68	– 121	3	59	5
Corporate		– 1				
Total	**– 414**	**– 384**	**– 447**	**7**	**103**	**7**

10. Right-of-use assets and lease liabilities

The following table summarizes the movements of the right-of-use assets:

(USD millions)	2022	2021
Right-of-use assets at January 1	**1 561**	**1 676**
Impact of acquisitions of businesses	12	
Additions	247	321
Depreciation charge	– 300	– 318
Impairment charge [1]	– 3	
Lease contract terminations [2]	– 34	– 66
Currency translation effects	– 52	– 52
Total right-of-use assets at December 31	**1 431**	**1 561**

[1] Impairment charges in 2022 were recorded in the Innovative Medicines segment.
[2] Lease contract terminations also includes modifications to existing leases that result in reductions to the right-of-use assets, and reductions due to sub-leasing.

The following table shows the right-of-use assets carrying value and depreciation charge at December 31, 2022 and 2021, by underlying class of asset:

(USD millions)	December 31, 2022 carrying value	Depreciation charge 2022	December 31, 2021 carrying value	Depreciation charge 2021
Land	505	16	522	11
Buildings	745	177	866	192
Vehicles	117	96	136	105
Machinery and equipment, and other assets	64	11	37	10
Total right-of-use assets	**1 431**	**300**	**1 561**	**318**

The following table shows the lease liabilities by maturity at December 31, 2022 and 2021:

(USD millions)	Lease liabilities 2022	Lease liabilities undiscounted 2022	Lease liabilities 2021	Lease liabilities undiscounted 2021
Less than one year	251	297	275	324
Between one and two years	190	232	216	258
Between two and three years	167	201	162	198
Between three and four years	137	172	139	172
Between four and five years	122	154	122	154
After five years	922	2 149	982	2 243
Total lease liabilities	**1 789**	**3 205**	**1 896**	**3 349**
Less current portion of lease liabilities	– 251	– 297	– 275	– 324
Non-current portion of lease liabilities	**1 538**	**2 908**	**1 621**	**3 025**
Commitments for leases not yet commenced		**83**		**134**

At December 31, 2022, and December 31, 2021, there were no material future cash outflows, including extension options, excluded from the measurement of lease liabilities. The Group's most material lease with a lease term extension, representing a lease liability value of USD 0.7 billion (2021: USD 0.6 billion), has a determined lease term end date of 2071 (2021: 2071). Non-enforceable extension options of up to 10 years have not been included within the measurement of this lease liability, and do not have a material impact to the carrying value of the lease for both 2022 and 2021. Should the landlord agree to a lease extension, rent will be referenced to the market rates as at the commencement of the extension period.

In 2022, the Group completed three sale and leaseback transactions for certain property, plant and equipment as part of the Groups plans to focus on key operating locations. The transactions resulted in net cash inflows of USD 49 million and the recognition of USD 23 million of lease liabilities, and USD 13 million of right-of-use assets. The right-of-use assets value reflects the proportion of the property, plant and equipment retained. Extension options have been included where management believe that such options will be exercised. The liabilities reflect the net present value of future lease payments. The net gain on the sale and leaseback transactions amounted to USD 17 million. There were no significant sale and leaseback transactions in 2021 or 2020.

The following table provides additional disclosures related to right-of-use assets and lease liabilities for 2022, 2021 and 2020:

(USD millions)	2022	2021	2020
Interest expense on lease liabilities [1]	60	62	67
Expense on short-term leases	3	6	4
Expense on low-value leases	6	7	7
Total cash outflows for leases	355	381	379
Thereof:			
Cash outflows for short-term leases and low-value leases [2]	*9*	*13*	*11*
Payments of interest [3]	*51*	*52*	*56*
Payments of lease liabilities [4]	*295*	*316*	*312*

[1] The weighted average interest rate is 3.3% (2021: 3.2%, 2020: 3.4%).
[2] Cash flows from short-term and low-value leases are included within total net cash flows from operating activities. The portfolio of short-term leases to which the Group is committed to at December 31, 2022, 2021 and 2020, is similar to the portfolio of short-term leases the Group entered into during 2022, 2021 and 2020.
[3] Included within total net cash flows from operating activities
[4] Reported as cash outflows in financing activities net of lease incentives received, if any.

The net investment held and income from subleasing right-of-use assets were not significant for 2022, 2021, and 2020. Income from leasing Novartis property, plant and equipment to third parties for 2022, 2021 and 2020 was not significant.

11. Goodwill and intangible assets

The following table summarizes the movements of goodwill and intangible assets in 2022:

	Goodwill	Intangible assets other than goodwill				
(USD millions)	Total	In-process research and development	Technologies	Currently marketed products	Other intangible assets	Total
At January 1, 2022						
Cost	29 900	8 013	1 080	56 213	2 905	68 211
Accumulated amortization and impairment	– 305	– 2 514	– 903	– 29 107	– 1 505	– 34 029
Net book value	**29 595**	**5 499**	**177**	**27 106**	**1 400**	**34 182**
At January 1, 2022	**29 595**	**5 499**	**177**	**27 106**	**1 400**	**34 182**
Impact of acquisitions of businesses	161	1 209				1 209
Reclassifications [1]		– 1 429	2	1 403	24	
Additions		330		1 175	588	2 093
Disposals and derecognitions [2]	– 28	– 95		– 3	– 2	– 100
Amortization charge			– 37	– 3 603	– 342	– 3 982
Impairment charge		– 917	– 15	– 322	– 72	– 1 326
Currency translation effects	– 427	– 176	– 6	– 243	– 7	– 432
At December 31, 2022	**29 301**	**4 421**	**121**	**25 513**	**1 589**	**31 644**
At December 31, 2022						
Cost	29 596	7 092	1 038	58 249	3 305	69 684
Accumulated amortization and impairment	– 295	– 2 671	– 917	– 32 736	– 1 716	– 38 040
Net book value	**29 301**	**4 421**	**121**	**25 513**	**1 589**	**31 644**

[1] Reclassifications between various asset categories as a result of product launches of acquired in-process research and development and completion of software development
[2] Derecognition of assets that are no longer being used or 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 2021:

	Goodwill	Intangible assets other than goodwill				
(USD millions)	Total	In-process research and development	Technologies	Currently marketed products	Other intangible assets	Total
At January 1, 2021						
Cost	30 321	6 893	1 115	57 333	2 384	67 725
Accumulated amortization and impairment	– 322	– 2 193	– 885	– 26 566	– 1 272	– 30 916
Net book value	**29 999**	**4 700**	**230**	**30 767**	**1 112**	**36 809**
At January 1, 2021	**29 999**	**4 700**	**230**	**30 767**	**1 112**	**36 809**
Impact of acquisitions of businesses	238	262		292	98	652
Reclassifications [1]		– 20	15	5		
Additions		958		270	508	1 736
Disposals and derecognitions [2]				– 36	– 1	– 37
Amortization charge			– 41	– 3 607	– 255	– 3 903
Impairment charge		– 350	– 17	– 1	– 35	– 403
Currency translation effects	– 642	– 51	– 10	– 584	– 27	– 672
At December 31, 2021	**29 595**	**5 499**	**177**	**27 106**	**1 400**	**34 182**
At December 31, 2021						
Cost	29 900	8 013	1 080	56 213	2 905	68 211
Accumulated amortization and impairment	– 305	– 2 514	– 903	– 29 107	– 1 505	– 34 029
Net book value	**29 595**	**5 499**	**177**	**27 106**	**1 400**	**34 182**

[1] Reclassifications between various asset categories as a result of product launches of acquired in-process research and development and completion of software development
[2] Derecognition of assets that are no longer being used or 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, 2022:

	Goodwill[1]	Intangible assets other than goodwill				
(USD millions)	Total	In-process research and development	Technologies	Currently marketed products	Other intangible assets	Total
Innovative Medicines	21 531	4 186	14	24 487	1 139	29 826
Sandoz	7 770	235	107	1 026	92	1 460
Corporate					358	358
Net book value at December 31, 2022	**29 301**	**4 421**	**121**	**25 513**	**1 589**	**31 644**

[1] The Innovative Medicines and Sandoz Divisions' represent the grouping of cash-generating units, to which goodwill is allocated.

The following table summarizes the allocation of the net book values of goodwill and intangible assets by reporting segment at December 31, 2021:

	Goodwill[1]	Intangible assets other than goodwill				
(USD millions)	Total	In-process research and development	Technologies	Currently marketed products	Other intangible assets	Total
Innovative Medicines	21 562	5 313	15	25 938	1 091	32 357
Sandoz	8 026	186	162	1 168	61	1 577
Corporate	7				248	248
Net book value at December 31, 2021	**29 595**	**5 499**	**177**	**27 106**	**1 400**	**34 182**

[1] The Innovative Medicines and Sandoz Divisions' and Corporate represent the grouping of cash-generating units, to which goodwill is allocated.

As at December 31, 2022, the most significant intangible assets within currently marketed products category are *Leqvio* (Innovative Medicines: acquisition of The Medicines Company) and *Zolgensma* (Innovative Medicines: acquisition of Avexis Inc.). As at December 31, 2022, the carrying value and remaining amortization period for *Leqvio* is USD 7.4 billion and 13 years, respectively (2021: USD 7.9 billion and 14 years, respectively), and for *Zolgensma* USD 5.9 billion and 8 years, respectively (2021: USD 6.6 billion and 9 years, respectively).

The Innovative Medicines and Sandoz Divisions' cash-generating units, to which goodwill is allocated,

each comprise a group of smaller cash-generating units. The valuation method of the recoverable amount of the group of cash-generating units, to which goodwill is allocated, is based on the fair value less costs of disposal.

The following assumptions are used in the calculations:

(As a percentage)	Innovative Medicines	Sandoz
Terminal growth rate	1.5	1.0
Discount rate (post-tax)	8.0	8.0

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 cash-generating units containing goodwill, 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 and reversals by reporting segment:

	Impairment charges			Impairment reversals		
(USD millions)	**2022**	2021	2020	**2022**	2021	2020
Innovative Medicines [1]	– 1 299	– 367	– 768			
Sandoz	– 25	– 28	– 141			
Corporate	– 2	– 8	– 5			
Total	**– 1 326**	**– 403**	**– 914**			

[1] 2022 includes an impairment of USD 0.6 billion related to the write-down of IPR&D related to cessation of clinical development program UNR844.
2021 includes an impairment of USD 0.2 billion related to the write-down of IPR&D related to cessation of clinical development program GTX312.
2020 includes an impairment of USD 0.5 billion related to the write-down of IPR&D related to cessation of clinical development program ZPL389 for atopic dermatitis and USD 0.2 billion related to a partial write-down of the *Votrient* currently marketed product (*Votrient* carrying value was USD 0.9 billion in 2022 and USD 1.3 billion in 2021).

12. Deferred tax assets and liabilities

(USD millions)	Property, plant and equipment	Intangible assets	Pensions and other benefit obligations of employees	Inventories	Tax loss carry-forwards	Other assets, provisions and accruals	Total
Gross deferred tax assets at January 1, 2022	**125**	**1 307**	**1 026**	**2 273**	**374**	**2 727**	**7 832**
Gross deferred tax liabilities at January 1, 2022	**– 381**	**– 4 704**	**– 591**	**– 148**		**– 1 335**	**– 7 159**
Net deferred tax balance at January 1, 2022	**– 256**	**– 3 397**	**435**	**2 125**	**374**	**1 392**	**673**
At January 1, 2022	**– 256**	**– 3 397**	**435**	**2 125**	**374**	**1 392**	**673**
Credited/(charged) to income	69	628	– 5	– 43	5	1	655
Charged to equity						1	1
Credited/(charged) to other comprehensive income	– 2		– 104			63	– 43
Impact of acquisitions of businesses		– 300			55	1	– 244
Other movements	4	10	– 7	– 6	– 9	19	11
Net deferred tax balance at December 31, 2022	**– 185**	**– 3 059**	**319**	**2 076**	**425**	**1 477**	**1 053**
Gross deferred tax assets at December 31, 2022	158	1 726	739	2 214	425	2 789	8 051
Gross deferred tax liabilities at December 31, 2022	– 343	– 4 785	– 420	– 138		– 1 312	– 6 998
Net deferred tax balance at December 31, 2022	**– 185**	**– 3 059**	**319**	**2 076**	**425**	**1 477**	**1 053**
After offsetting the following amount of deferred tax assets and liabilities within the same tax jurisdiction, the balance amounts to:							4 312
Deferred tax assets at December 31, 2022							3 739
Deferred tax liabilities at December 31, 2022							– 2 686
Net deferred tax balance at December 31, 2022							**1 053**
Gross deferred tax assets at January 1, 2021	**189**	**1 351**	**1 137**	**2 502**	**507**	**2 658**	**8 344**
Gross deferred tax liabilities at January 1, 2021	**– 430**	**– 5 269**	**– 340**	**– 159**	**– 10**	**– 1 344**	**– 7 552**
Net deferred tax balance at January 1, 2021	**– 241**	**– 3 918**	**797**	**2 343**	**497**	**1 314**	**792**
At January 1, 2021	**– 241**	**– 3 918**	**797**	**2 343**	**497**	**1 314**	**792**
Credited/(charged) to income	– 27	567	– 22	– 215	– 121	127	309
Charged to equity						– 35	– 35
Credited/(charged) to other comprehensive income			– 323			6	– 317
Impact of acquisitions of businesses		– 58			12		– 46
Other movements	12	12	– 17	– 3	– 14	– 20	– 30
Net deferred tax balance at December 31, 2021	**– 256**	**– 3 397**	**435**	**2 125**	**374**	**1 392**	**673**
Gross deferred tax assets at December 31, 2021	125	1 307	1 026	2 273	374	2 727	7 832
Gross deferred tax liabilities at December 31, 2021	– 381	– 4 704	– 591	– 148		– 1 335	– 7 159
Net deferred tax balance at December 31, 2021	**– 256**	**– 3 397**	**435**	**2 125**	**374**	**1 392**	**673**
After offsetting the following amount of deferred tax assets and liabilities within the same tax jurisdiction, the balance amounts to:							4 089
Deferred tax assets at December 31, 2021							3 743
Deferred tax liabilities at December 31, 2021							– 3 070
Net deferred tax balance at December 31, 2021							**673**

Deferred tax liabilities have not been recognized for the withholding tax and other taxes that would be payable on the remittance of earnings of foreign subsidiaries, insofar as the Group has the ability to control any future reversal and the unremitted earnings are retained in the foreign subsidiaries for reinvestment. The total unremitted earnings retained for reinvestment in the Group's foreign subsidiaries that would be subject to withholding tax or other taxes if remitted to the Group are estimated at approximately USD 32 billion in 2022, (2021: USD 29 billion).

The gross value of tax-loss carry-forwards that have or have not been recognized as deferred tax assets, with their expiry dates, is as follows:

(USD millions)	Unrecognized	Recognized	**2022 total**
One year	18	0	18
Two years	37	5	42
Three years	25	5	30
Four years	138	0	138
Five years	79	688	767
More than five years	3 880	2 380	6 260
Not subject to expiry	433	452	885
Total	**4 610**	**3 530**	**8 140**

(USD millions)	Unrecognized	Rcognized	2021 total
One year	15	4	19
Two years	14	6	20
Three years	37	10	47
Four years	26	11	37
Five years	146	20	166
More than five years	3 536	1 872	5 408
Not subject to expiry	418	684	1 102
Total	**4 192**	**2 607**	**6 799**

(USD millions)	**2022**	2021	2020
Tax losses carried forward that expired	6	18	14

Deferred tax assets related to carry-forwards of taxable losses and tax credits of relevant Group entities are recognized to the extent it is considered probable that future taxable profits will be available in the respective tax jurisdictions against which such losses and credits can be utilized.

13. Financial and other non-current assets

Financial assets

(USD millions)	**2022**	2021
Equity securities	1 145	1 663
Debt securities	37	34
Fund investments	281	366
Total financial investments	**1 463**	**2 063**
Long-term receivables from finance subleases	59	70
Other long-term receivables	197	184
Contingent consideration receivables [1]	607	641
Long-term loans, advances and security deposits	85	78
Total financial assets	**2 411**	**3 036**

[1] Note 29 provides additional disclosures related to contingent consideration.

Other non-current assets

(USD millions)	**2022**	2021
Deferred compensation plans	419	520
Prepaid post-employment benefit plans [1]	491	1 415
Other non-current assets	200	275
Total other non-current assets	**1 110**	**2 210**

[1] Note 25 provides additional disclosures related to post-emplyment benefits.

14. Inventories

(USD millions)	2022	2021
Raw material, consumables	934	870
Work in progress	3 673	3 160
Finished products	2 568	2 636
Total inventories	**7 175**	**6 666**

The following table shows the amount of inventory recognized as an expense in "Cost of goods sold" in the consolidated income statements:

(USD billions)	2022	2021	2020
Cost of goods sold	– 8.6	– 8.8	– 8.5

The following table shows the recognized amount of inventory provision and reversals of inventory provision recorded in the consolidated income statements:

(USD millions)	2022	2021	2020
Inventory provisions	– 633	– 573	– 702
Reversals of inventory provisions	161	158	255

The reversals mainly result from the release of products initially requiring additional quality control inspections and from the reassessment of inventory values manufactured prior to regulatory approval but for which approval was subsequently received.

15. Trade receivables

(USD millions)	2022	2021
Total gross trade receivables	8 128	8 088
Provisions for doubtful trade receivables	– 62	– 83
Total trade receivables, net	**8 066**	**8 005**

The following table summarizes the movement in the provision for doubtful trade receivables:

(USD millions)	2022	2021	2020
January 1	**– 83**	**– 93**	**– 95**
Provisions for doubtful trade receivables charged to the consolidated income statement	– 47	– 39	– 59
Utilization of provisions for doubtful trade receivables	9	9	13
Reversal of provisions for doubtful trade receivables credited to the consolidated income statement	56	34	53
Currency translation effects	3	6	– 5
December 31	**– 62**	**– 83**	**– 93**

The following table shows 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)	2022	2021
Not overdue	7 664	7 639
Past due for not more than one month	190	162
Past due for more than one month but less than three months	110	99
Past due for more than three months but less than six months	62	63
Past due for more than six months but less than one year	23	28
Past due for more than one year	79	97
Provisions for doubtful trade receivables	– 62	– 83
Total trade receivables, net	**8 066**	**8 005**

Trade receivable balances represent amounts due from our customers, which are mainly drug wholesalers, retailers, private health systems, government agencies, managed care providers, pharmacy benefit managers and government-supported healthcare systems. We particularly monitor the level of trade receivables in countries deemed to have an elevated credit risk. We consider macroeconomic environment, historical experience, country and political risk, in addition to other relevant information when assessing risk. These risk factors are monitored regularly to determine any adjustments in risk classification. The majority of the past due trade receivables from elevated credit risk countries are due from local governments or from government-funded entities. Deteriorating credit and economic conditions as well as other factors in these elevated credit risk 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 the Group to re-evaluate the expected credit loss amount of these trade receivables in future periods. At December 31, 2022, amounts past due for more than one year are not significant in elevated credit risk countries.

Total trade receivables include amounts denominated in the following major currencies:

(USD millions)	**2022**	2021
US dollar (USD)	3 709	3 344
Euro (EUR)	1 426	1 408
Russian ruble (RUB)	430	473
Japanese yen (JPY)	177	383
British pound (GBP)	176	200
Chinese yuan (CNY)	155	197
Canadian dollar (CAD)	151	139
Brazilian real (BRL)	145	129
Australian dollar (AUD)	137	139
Swiss franc (CHF)	108	106
Other currencies	1 452	1 487
Total trade receivables, net	**8 066**	**8 005**

16. Marketable securities, commodities, time deposits, derivative financial instruments, and cash and cash equivalents

Marketable securities, commodities, time deposits and derivative financial instruments

(USD millions)	**2022**	2021
Commodities	111	111
Debt securities	9	2 741
Time deposits and short-term investments with original maturity more than 90 days	11 089	12 965
Derivative financial instruments	204	105
Total marketable securities, commodities, time deposits and derivative financial instruments	**11 413**	**15 922**

The vast majority of debt securities, time deposits and short-term investments with an original maturity of more than 90 days was denominated in USD as of December 31, 2022, and 2021.

Cash and cash equivalents

(USD millions)	**2022**	2021
Current accounts	2 877	3 396
Time deposits and short-term investments with original maturity less than 90 days	4 640	9 011
Total cash and cash equivalents	**7 517**	**12 407**

17. Other current assets

(USD millions)	2022	2021
VAT receivable	509	487
Withholding tax recoverable	50	58
Prepaid expenses	911	1 102
Contingent consideration receivable [1]	43	
Other receivables and current assets	958	793
Total other current assets	**2 471**	**2 440**

[1] Note 29 provides additional disclosures related to contingent consideration.

18. Equity

The following table shows the movement in the share capital:

(USD millions)	Jan 1, 2020	Movement in year	Dec 31, 2020	Movement in year	Dec 31, 2021	Movement in year	Dec 31, 2022
Share capital [1]	936	– 23	913	– 12	901	– 11	890
Treasury shares	– 80	27	– 53	5	– 48	– 44	– 92
Outstanding share capital	**856**	**4**	**860**	**– 7**	**853**	**– 55**	**798**

[1] The Novartis AG share capital consists of registered shares with a nominal value of CHF 0.50 each. No authorized and conditional capital exists.

The following table shows the movement in the shares:

		2022			2021			2020		
Number of outstanding shares (in millions)	Note	Total Novartis shares	Total treasury shares [1]	Total outstanding shares	Total Novartis shares	Total treasury shares [1]	Total outstanding shares	Total Novartis shares	Total treasury shares [1]	Total outstanding shares
Balance at beginning of year		**2 434.4**	**– 199.5**	**2 234.9**	**2 467.0**	**– 210.2**	**2 256.8**	**2 527.3**	**– 262.3**	**2 265.0**
Shares canceled for capital reduction [2]		– 30.7	30.7		– 32.6	32.6		– 60.3	60.3	
Shares acquired to be canceled [3]			– 126.2	– 126.2		– 30.7	– 30.7		– 32.6	– 32.6
Other share purchases [4]			– 1.4	– 1.4		– 1.5	– 1.5		– 1.7	– 1.7
Exercise of options and employee transactions [5]	18.9		1.9	1.9		0.6	0.6		14.7	14.7
Equity-based compensation [5]			10.4	10.4		9.6	9.6		11.0	11.0
Shares delivered to Alcon employees			0.0	0.0		0.1	0.1		0.4	0.4
Total movements		**– 30.7**	**– 84.6**	**– 115.3**	**– 32.6**	**10.7**	**– 21.9**	**– 60.3**	**52.1**	**– 8.2**
Balance at end of year		**2 403.7**	**– 284.1**	**2 119.6**	**2 434.4**	**– 199.5**	**2 234.9**	**2 467.0**	**– 210.2**	**2 256.8**

[1] Approximately 99.0 million treasury shares (2021: 102.5 million; 2020: 103.0 million) are held in Novartis entities that restrict their availability for use.
[2] Novartis reduced its share capital by canceling shares that were repurchased on the SIX Swiss Exchange second trading line during previous years.
[3] Shares repurchased on the SIX Swiss Exchange second trading line under a CHF 10 billion share buyback authority approved at the 2019 Annual General Meeting (AGM) for transactions after February 28, 2019, until March 2, 2021. Transactions after March 2, 2021, were executed under the CHF 10 billion share buyback authority approved at the 2021 AGM and the additional CHF 10 billion authority approved at the 2022 AGM.
[4] Shares acquired from employees, which were previously granted to them under the respective equity-based participation plans
[5] Shares delivered as a result of options being exercised and physical share deliveries related to equity-based participation plans

18.1) 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.

	2022	2021	2020
Dividend per share (in CHF)	3.10	3.00	2.95
Total dividend payment (in USD billion)	7.5	7.4	7.0

18.2) The following table summarizes the treasury shares movements:

	Note	2022 Number of outstanding shares (in millions)	2022 Equity impact USD m	2021 Number of outstanding shares (in millions)	2021 Equity impact USD m	2020 Number of outstanding shares (in millions)	2020 Equity impact USD m
Shares acquired to be canceled [1]		– 126.2	– 10 787	– 30.7	– 2 775	– 32.6	– 2 897
Other share purchases [2]		– 1.4	– 123	– 1.5	– 145	– 1.7	– 159
Purchase of treasury shares		– 127.6	– 10 910	– 32.2	– 2 920	– 34.3	– 3 056
Exercise of options and employee transactions [3]	18.9	1.9	88	0.6	39	14.7	806
Equity-based compensation [4]		10.4	854	9.6	745	11.0	730
Shares delivered to Alcon employees		0.0	5	0.1	17	0.4	30
Total		**– 115.3**	**– 9 963**	**– 21.9**	**– 2 119**	**– 8.2**	**– 1 490**

[1] Shares repurchased on the SIX Swiss Exchange second trading line under a CHF 10 billion share buyback authority approved at the 2019 Annual General Meeting (AGM) for transactions after February 28, 2019, until March 2, 2021. Transactions after March 2, 2021, were executed under the CHF 10 billion share buyback authority approved at the 2021 AGM and the additional CHF 10 billion authority approved at the 2022 AGM.

[2] Shares acquired from employees, which were previously granted to them under the respective equity-based participation plans

[3] 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.

[4] 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.

18.3) In December 2021, 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 15.0 billion share buyback. The arrangement was updated in July 2022. Novartis is able to cancel this arrangement at any time but could be subject to a 90-day waiting period.

As of December 31, 2022, these waiting period conditions were not applicable and as a result, there was no requirement to record a liability under this arrangement as of December 31, 2022. The liability under this arrangement amounted to USD 2.8 billion as of December 31, 2021.

In June 2021, Novartis entered into an irrevocable, non-discretionary arrangement with a bank to repurchase Novartis shares to mitigate dilution related to participation plans of employees. Novartis would have been able to cancel this arrangement at any time but would have been subject to a 90-day waiting period.

This trading plan commitment was fully executed and expired in June 2021, and as a consequence, there is no liability related to this plan recognized as of December 31, 2021.

In November 2020, 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 2.5 billion share buyback. Novartis would have been able to cancel this arrangement at any time, but would have been subject to a 90-day waiting period. The commitment under this arrangement therefore reflected the obligated purchases by the bank under such trading plan over a rolling 90-day period, or if shorter, until the maturity date of such trading plan.

The commitment under this arrangement amounted to USD 1.8 billion as of December 31, 2020. This trading plan commitment was fully executed and expired in March 2021, and as a consequence, there is no liability related to this plan recognized as of December 31, 2021.

In August 2020, Novartis entered into an irrevocable, non-discretionary arrangement with a bank to repurchase Novartis shares to mitigate dilution related to participation plans of associates. Novartis would have been able to cancel this arrangement at any time but would have been subjected to a 90-day waiting period.

This trading plan commitment was fully executed and expired, and as a consequence, there is no liability related to this plan recognized as of December 31, 2020.

18.4) In October 2020, Novartis entered into an agreement with the market maker for its employee options to repurchase a portion of the outstanding written call options. A total of 3.7 million options were repurchased under this agreement. This agreement was terminated in November 2020.

18.5) 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.

18.6) 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.

18.7) Other movements include, for subsidiaries in hyperinflationary economies, the impact of the restatement of the equity balances of the current year as well as restatement of the non-monetary assets and liabilities with the general price index at the beginning of the period. See Note 29 for additional disclosures.

18.8) In 2021, transaction costs that were directly attributable to the distribution (spin-off) of Alcon Inc. to Novartis AG shareholders and that would otherwise have been avoided, were recorded to equity.

18.9) At December 31, 2022, the market maker held 3 million (2021: 3 million; 2020: 1 million) written call options, originally issued as part of the share-based compensation for employees, that have not yet been exercised. The weighted average exercise price of these options is USD 66.07 (2021: USD 61.45; 2020: USD 60.09), and they have contractual lives of 10 years, with remaining lives less than one year (2021: two years; 2020: three years).

19. Non-current financial debt

(USD millions)	2022	2021
Straight bonds	22 341	25 296
Liabilities to banks and other financial institutions [1]	144	227
Total, including current portion of non-current financial debt	**22 485**	**25 523**
Less current portion of non-current financial debt	– 2 241	– 2 621
Total non-current financial debt	**20 244**	**22 902**

[1] Average interest rate 2.3% (2021: 0.9%)

All bonds are initially recorded at the amount of proceeds received, net of transaction costs. They are subsequently carried at amortized cost, with the difference between the proceeds, net of transaction costs, and the amount due on redemption being recognized as a charge to the consolidated income statement over the period of the relevant bond. 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 86% at December 31, 2022, and 87% at December 31, 2021.

The average interest rate on total financial debt in 2022 was 2.4% (2021: 1.9%).

Note 29 contains a maturity table of the Group's future contractual interest payments commitments.

The following table provides a breakdown of straight bonds:

Coupon	Currency	Notional amount (millions)	Issuance year	Maturity year	Issuer	Issue price	**2022 (USD millions)**	2021 (USD millions)
2.400%	USD	1 500	2012	2022	Novartis Capital Corporation, New York, United States	99.225%		1 498
3.700%	USD	500	2012	2042	Novartis Capital Corporation, New York, United States	98.325%	490	490
3.400%	USD	2 150	2014	2024	Novartis Capital Corporation, New York, United States	99.287%	2 147	2 144
4.400%	USD	1 850	2014	2044	Novartis Capital Corporation, New York, United States	99.196%	1 827	1 826
1.625%	EUR	600	2014	2026	Novartis Finance S.A., Luxembourg, Luxembourg	99.697%	638	676
0.250%	CHF	500	2015	2025	Novartis AG, Basel, Switzerland	100.640%	541	547
0.625%	CHF	550	2015	2029	Novartis AG, Basel, Switzerland	100.502%	595	602
1.050%	CHF	325	2015	2035	Novartis AG, Basel, Switzerland	100.479%	352	356
3.000%	USD	1 750	2015	2025	Novartis Capital Corporation, New York, United States	99.010%	1 742	1 740
4.000%	USD	1 250	2015	2045	Novartis Capital Corporation, New York, United States	98.029%	1 221	1 220
0.125%	EUR	1 250	2016	2023	Novartis Finance S.A., Luxembourg, Luxembourg	99.127%	1 330	1 409
0.625%	EUR	500	2016	2028	Novartis Finance S.A., Luxembourg, Luxembourg	98.480%	528	559
2.400%	USD	1 000	2017	2022	Novartis Capital Corporation, New York, United States	99.449%		1 000
3.100%	USD	1 000	2017	2027	Novartis Capital Corporation, New York, United States	99.109%	994	993
1.125%	EUR	600	2017	2027	Novartis Finance S.A., Luxembourg, Luxembourg	99.874%	638	677
0.500%	EUR	750	2018	2023	Novartis Finance S.A., Luxembourg, Luxembourg	99.655%	798	846
1.375%	EUR	750	2018	2030	Novartis Finance S.A., Luxembourg, Luxembourg	99.957%	797	846
1.700%	EUR	750	2018	2038	Novartis Finance S.A., Luxembourg, Luxembourg	99.217%	792	840
1.750%	USD	1 000	2020	2025	Novartis Capital Corporation, New York, United States	99.852%	998	998
2.000%	USD	1 250	2020	2027	Novartis Capital Corporation, New York, United States	99.909%	1 246	1 246
2.200%	USD	1 500	2020	2030	Novartis Capital Corporation, New York, United States	99.869%	1 494	1 493
2.750%	USD	1 250	2020	2050	Novartis Capital Corporation, New York, United States	97.712%	1 215	1 214
0.000%[1]	EUR	1 850	2020	2028	Novartis Finance S.A., Luxembourg, Luxembourg	99.354%	1 958	2 076
Total straight bonds							**22 341**	**25 296**

[1] The EUR 1 850 million bond issued in 2020 features a coupon step-up of 0.25% commencing with the first interest payment date after December 31, 2025, if one or both of the 2025 Patient Access Targets are not met. These 2025 Patient Access Targets are the 2025 Flagship Programs Patient Reach Target and the 2025 Strategic Innovative Therapies Patient Reach Target, as defined in the bond prospectus. As of December 31, 2022, there is no indication that these 2025 Patient Access Targets will not be met.

The following tables provide a breakdown of total non-current financial debt, including current portion by maturity and currency:

Breakdown by maturity:

(USD millions)	**2022**	2021
2022		2 621
2023	2 241	2 342
2024	2 147	2 144
2025	3 281	3 284
2026	638	693
2027	2 909	2 916
After 2027	11 269	11 523
Total	**22 485**	**25 523**

Breakdown by currency:

(USD millions)	**2022**	2021
US dollar (USD)	13 376	15 862
Euro (EUR)	7 478	7 930
Japanese yen (JPY)	76	174
Swiss franc (CHF)	1 488	1 505
Others	67	52
Total	**22 485**	**25 523**

The following table shows the comparison of balance sheet carrying value and fair value of total non-current financial debt, including current portion:

(USD millions)	**2022 Balance sheet**	**2022 Fair values**	2021 Balance sheet	2021 Fair values
Straight bonds	22 341	20 277	25 296	27 079
Others	144	144	227	227
Total	**22 485**	**20 421**	**25 523**	**27 306**

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.

20. Provisions and other non-current liabilities

(USD millions)	2022	2021
Accrued liability for employee benefits:		
Defined benefit pension plans [1]	1 723	2 640
Other long-term employee benefits and deferred compensation	554	662
Other post-employment benefits [1]	362	487
Environmental remediation provisions	535	567
Provisions for product liabilities, governmental investigations and other legal matters	154	341
Contingent consideration [2]	704	956
Other non-current liabilities	874	519
Total provisions and other non-current liabilities	**4 906**	**6 172**

[1] Note 25 provides additional disclosures related to post-employment benefits.
[2] Note 29 provides additional disclosures related to contingent consideration.

Novartis believes that its total provisions are adequate based upon currently available information. However, given the inherent difficulties in estimating liabilities in this area, Novartis may incur additional costs beyond the amounts provided. Management believes that such additional amounts, if any, would not be material to the Group's financial condition but could be material to the results of operations or cash flows in a given period.

Environmental remediation provisions

The following table shows the movements in the environmental liability provisions:

(USD millions)	2022	2021	2020
January 1	**616**	**809**	**714**
Cash payments	– 6	– 169	– 10
Releases	– 18	– 105	– 27
Additions	6	105	82
Currency translation effects	– 10	– 24	50
December 31	**588**	**616**	**809**
Less current provision	– 53	– 49	– 167
Non-current environmental remediation provisions at December 31	**535**	**567**	**642**

The significant components of the environmental remediation provisions consist of costs to sufficiently clean and refurbish contaminated sites to the extent necessary, and to 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 reassessed on an annual basis and 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 cleanup 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, 2022, is currently projected as follows:

(USD millions)	Expected cash outflows
Due within two years	128
Due later than two years, but within five years	163
Due later than five years, but within 10 years	251
Due after 10 years	46
Total environmental remediation provisions	**588**

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 offset 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. These not-provisioned-for matters include individual product liability cases and certain other legal matters. Plaintiffs' have alleged claims in these matters and the Group does not believe that information about the amount sought by plaintiffs, if that is known, would be meaningful with respect to those legal proceedings. This is due to a number of factors, including, but not limited to, the stage of proceedings, the entitlement of parties to appeal a decision and clarity as to theories of liability, damages and governing law. Therefore, it is not practicable to provide information about the potential financial impact of these matters. In addition, in some of

these matters there are claims for punitive or multiple (treble) damages, civil penalties and disgorgement of profits that in the view of Novartis are either wholly or partially unspecified, or wholly or partially unquantifiable at present; the Group believes that information about these amounts claimed by plaintiffs generally is not meaningful for purposes of determining a reliable estimate of a loss that is probable or more than remote.

A number of other legal matters are in such early stages or the issues presented are such that the Group has not made any provisions since it cannot currently estimate either a potential outcome or the amount of any potential losses. For these reasons, among others, the Group generally is unable to make a reliable estimate of possible loss with respect to such cases. It is therefore not practicable to provide information about the potential financial impact of those cases.

There might also be cases for which the Group was able to make a reliable estimate of the possible loss or the range of possible loss, but the Group believes that publication of such information on a case-by-case basis would seriously prejudice the Group's position in ongoing legal proceedings or in any related settlement discussions. Accordingly, in such cases, information has been disclosed with respect to the nature of the contingency, but no disclosure is provided as to an estimate of the possible loss or range of possible loss.

Note 28 contains additional information on contingent liabilities.

Summary of significant legal proceedings

The following is a summary of significant legal proceedings to which Novartis or its subsidiaries are currently a party, or were a party and that concluded in 2022.

Investigations and related litigations

Southern District of New York (S.D.N.Y.) Gilenya marketing practices investigation and litigation

In 2013, Novartis Pharmaceuticals Corporation (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, the S.D.N.Y. and New York State declined to intervene in claims raised by an individual relator in a qui tam complaint. In 2022, NPC's motion to dismiss this complaint was granted, which was appealed. The claims are being vigorously contested.

Government generic pricing antitrust investigations, antitrust class actions

Since 2016, Sandoz Inc. has received a grand jury subpoena and a civil investigative demand and interrogatories from the Antitrust and Civil Divisions of the US Department of Justice (DOJ) into alleged price fixing and market allocation of generic drugs in the United States as well as alleged federal False Claims Act (FCA) violations. Sandoz Inc. also received a subpoena and interrogatories from the Attorney General of the State of Connecticut in connection with a similar States' investigation. In 2020, Sandoz Inc. reached a resolution with the DOJ Antitrust Division, pursuant to which Sandoz Inc. paid USD 195 million and entered into a deferred prosecution agreement. The Sandoz Inc. resolution related to instances of misconduct at the Company between 2013 and 2015 with regard to certain generic drugs sold in the United States. Under the terms of that agreement, Sandoz Inc. will continue to take steps to enhance its compliance program, employee training and monitoring, and will continue to cooperate with the US government's ongoing investigation into the generic pharmaceutical industry. Sandoz Inc. also finalized a resolution with the DOJ Civil Division and in 2021 paid USD 185 million, which includes interest from the date of the agreement in principle, to settle related claims arising under the FCA, and entered into a corporate integrity agreement with the Office of Inspector General (OIG) of the US Department of Health and Human Services (HHS). This resolution with the DOJ resolves all federal government matters related to price fixing allegations.

Since the third quarter of 2016, Sandoz Inc. and Fougera Pharmaceuticals Inc. have been sued alongside other generic pharmaceutical companies in numerous individual and putative class action complaints by direct and indirect private purchasers and by over 50 US states and territories, represented by their respective Attorneys General. Plaintiffs claim that defendants, including Sandoz Inc., engaged in price fixing and market allocation of generic drugs in the United States, and seek damages and injunctive relief. The litigation includes complaints alleging product-specific conspiracies, as well as complaints alleging the existence of an overarching industry conspiracy, and assert claims for damages and penalties under federal and state antitrust and consumer protection acts. The cases have been consolidated for pretrial purposes in the United States District Court (USDC) for the Eastern District of Pennsylvania, and the claims are being vigorously contested.

Lucentis/Avastin® matters

In connection with an investigation into whether Novartis entities, 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 (ICA) imposed a fine equivalent to USD 125 million on the Novartis entities. Novartis paid the fine, subject to the right to later claim recoupment, and appealed before the Consiglio di Stato (CdS). 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 1.3 billion in damages from Novartis and Roche entities based on these allegations. In 2019, the CdS upheld the ICA decision and fine. Following that CdS decision, several additional Italian regions and hospitals sent letters claiming damages for an aggregate amount of approximately USD 330 million. None of these claims have been asserted in legal proceedings and no further letters have been sent since. Novartis continues to appeal the CdS decision. In 2019, the French Competition Authority (FCA) issued a Statement of Objections against Novartis entities, alleging anti-competitive practices on the French market for anti-vascular endothelial growth factor treatments for wet age-related macular degeneration from 2008 to

2013. In 2020, the FCA issued a decision finding that the Novartis entities had infringed competition law by abusing a dominant position and imposing a fine equivalent to approximately USD 452 million. Novartis paid the fine, again subject to recoupment, and is appealing the FCA's decision. Novartis is the subject of similar investigations and proceedings involving competition authorities in Belgium and Greece and is currently in the appeal process in Turkey. Novartis continues to vigorously contest all claims in all those countries. Novartis is also challenging policies and regulations allowing off-label/unlicensed use and reimbursement for economic reasons in Turkey.

Greece investigation

The Greek authorities are investigating legacy allegations of potentially inappropriate economic benefits to HCPs, government officials and others in Greece. These authorities include the Greek Coordinating Body for Inspection and Control, and the Greek Body of Prosecution of Financial Crime (SDOE), from which the Company received a summons in 2018 and 2020. Novartis has cooperated in these investigations. In 2021, SDOE imposed on Novartis Hellas a fine equivalent to approximately USD 1.2 million, which Novartis Hellas has appealed. In 2022, the Greek State served a civil lawsuit on Novartis Hellas, seeking approximately USD 225 million for moral damages allegedly arising from the conduct that was the subject of the Company's 2020 settlement with the DOJ regarding allegations of inappropriate economic benefits in Greece that was disclosed in the 2020 Annual Report and the 2020 Form 20-F. The claims are being vigorously contested.

340B Drug Pricing Program investigations

In 2021, NPC received a notification from the US Health Resources and Services Administration (HRSA) which stated that HRSA believes NPC's contract pharmacy policy violates the 340B statute, and threatened potential enforcement action. NPC subsequently sued HRSA in the USDC for the District of Columbia to challenge HRSA's determination and to enjoin HRSA from taking action with respect to NPC's contract pharmacy policy. HRSA then referred the matter regarding NPC's contract pharmacy policy to OIG, which could result in the imposition of civil monetary penalties on NPC. The USDC issued a decision rejecting HRSA's interpretation of the 340B statute, vacating the violation notification and remanding the matter to HRSA. HRSA appealed, and the United States Court of Appeals for the DC Circuit heard argument on the case in 2022. In addition, in 2021, Emory University Hospital Midtown filed an Administrative Dispute Resolution (ADR) proceeding against NPC, seeking the return of alleged overcharges resulting from NPC's contract pharmacy policy. NPC has moved to dismiss the proceeding pending resolution of the HRSA litigation. Finally, also in 2021, NPC received a civil investigative subpoena from the Office of the Attorney General of the State of Vermont requesting the production of documents and information concerning NPC's participation in the 340B Drug Pricing Program in Vermont; NPC provided documents and information to the Office of the Attorney General.

Swiss and EU investigation

In September 2022, the Swiss Competition Commission (COMCO) initiated an investigation of Novartis acquisition of certain patents from Genentech in April 2020 and their subsequent enforcement against Eli Lilly and other parties, allegedly in an attempt to protect *Cosentyx* from competing products. COMCO is investigating whether enforcement of the patents violates the Swiss Cartel Act. The European Commission also requested information from Novartis regarding this matter. Novartis is cooperating with the authorities and will vigorously contest any allegations.

Antitrust class actions

Exforge

Since 2018, Novartis Group companies as well as other pharmaceutical companies have been sued by various direct and indirect purchasers of *Exforge* in multiple US individual and putative class action complaints. They claim that Novartis made a reverse payment in the form of an agreement not to launch an authorized generic, alleging violations of federal antitrust law and state antitrust, consumer protection and common laws, and seeking damages as well as injunctive relief. The cases have been consolidated in the S.D.N.Y. In 2022, Novartis agreed to a settlement in principle to pay USD 245 million to resolve these cases. These settlements are subject to mutually agreeable terms, finalization of documentation and, in some cases, court approval.

Product liability litigation

Reclast

NPC is a defendant in more than 20 US product liability actions involving *Reclast* and alleging atypical femur fracture injuries, all of which are in New Jersey state or federal court and in California state court, coordinated with claims against other bisphosphonate manufacturers. The claims are being vigorously contested.

Taxotere® (docetaxel)

Sandoz is a defendant in more than 3 100 US product liability actions involving Taxotere® (docetaxel), an oncology product, many of which have been transferred to a multidistrict litigation in the Eastern District of Louisiana. The complaints allege misleading marketing and that Sanofi, as innovator, and several 505(b)(2) NDA holders (including Sandoz) failed to warn of the risk of permanent alopecia/hair loss. In 2022, actions involving claims related to alleged eye injuries caused by the use of Taxotere® were coordinated in a separate multidistrict litigation in the Eastern District of Louisiana. The claims are being vigorously contested.

Amiodarone

Sandoz entities are named in two 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. The claims are being vigorously contested.

Sartans and ranitidine
Since 2018, claims have been brought against Sandoz and other pharmaceutical companies alleging injury from carcinogenic impurities found in valsartan and valsartan/HCT film-coated tablets and/or losartan marketed or manufactured by Sandoz. These claims include several putative class actions in Canada. Claims have also been brought alleging injury from carcinogenic impurities in ranitidine-containing medicines. These claims also include several putative class actions in Canada and a multidistrict litigation in Florida. All of these claims are being vigorously contested.

Tasigna
NPC is a defendant in more than 400 US product liability actions involving *Tasigna*, alleging that the product caused various cardiovascular effects and that NPC failed to provide adequate warnings about those alleged side effects. State court actions are pending in a multicounty litigation in Bergen County, New Jersey, and federal cases are pending in a multidistrict litigation in the Middle District of Florida. The claims are being vigorously contested.

Other matters
Shareholder derivative lawsuit
In 2021, NPC, Sandoz Inc., Novartis Capital Corporation and certain present and former directors and officers of Novartis were named as defendants, and Novartis was named as a nominal defendant, in a purported shareholder derivative lawsuit filed in New York state court. The plaintiffs, derivatively as purported Novartis shareholders on behalf of Novartis, seek damages and other remedies based on alleged conduct by the corporate and individual defendants. In 2022, the court granted Novartis motion to dismiss the lawsuit, which the plaintiffs have appealed.

Concluded legal matters
Average Wholesale Price (AWP) litigation – Concluded matter
Lawsuits were brought, the latest in February 2016, by various US state governmental entities and private parties against various pharmaceutical companies, including NPC, alleging that they fraudulently overstated the AWP that is or has been used by payers, including state Medicaid agencies, to calculate reimbursements to healthcare providers. In 2022, NPC settled a putative class action brought by private payers in New Jersey, which resolved the last AWP lawsuit. This matter is now concluded.

Entresto matter– Concluded matter
In 2021, NPC received a civil investigative demand from the DOJ seeking information from 2016 to the present regarding the marketing and pricing of Entresto, including remuneration provided to HCPs. In December 2022, the DOJ advised that it has no additional requests and that the matter is considered closed. This matter is now concluded.

South Korea investigation – Concluded matter
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 healthcare professionals (HCPs). This resulted in a non-material fine, which the prosecutor appealed. In 2021, the appellate court upheld the fine, and the prosecutor appealed that decision. In January 2023, the Supreme Court dismissed the appeal. This matter is now concluded.

Summary of product liability, governmental investigations and other legal matters provision movements

(USD millions)	**2022**	2021	2020
January 1	**397**	**487**	**1 369**
Impact of acquisitions of businesses	4		11
Cash payments	– 105	– 292	– 1 863
Releases of provisions	– 52	– 44	– 31
Additions to provisions	466	251	1 018
Currency translation effects	– 8	– 5	– 17
December 31	**702**	**397**	**487**
Less current portion	– 548	– 56	– 306
Non-current product liabilities, governmental investigations and other legal matters provisions at December 31	**154**	**341**	**181**

Novartis believes that its total provisions for investigations, product liability, arbitration and other legal matters are adequate based upon currently available information. However, given the inherent difficulties in estimating liabilities, there can be no assurance that additional liabilities and costs will not be incurred beyond the amounts provided.

21. Current financial debt and derivative financial instruments

(USD millions)	2022	2021
Interest-bearing accounts of employees payable on demand [1]		1 814
Bank and other financial debt [2]	863	899
Commercial paper	2 772	893
Current portion of non-current financial debt	2 241	2 621
Derivative financial instruments	55	68
Total current financial debt and derivative financial instruments	**5 931**	**6 295**

[1] Weighted average interest rate 0.25% through September 30, 2022 (2021: 0.25%)
[2] Weighted average interest rate 9.7% (2021: 6.1%)

During the third quarter of 2022, Novartis closed the interest-bearing accounts of employees payable on demand, and paid out USD 0.9 billion to the respective beneficiaries on October 3, 2022. The net cash outflows from interest-bearing accounts of employees payable on demand were reported within the line change in current financial debts in the consolidated statements of cash flows. See Note 23.6.

The carrying 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 and short-term borrowings are provided under “Liquidity risk” in Note 29.

22. Provisions and other current liabilities

(USD millions)	2022	2021
Taxes other than income taxes	836	619
Restructuring provisions	1 131	345
Accrued expenses for goods and services received but not invoiced	1 059	1 089
Accruals for royalties	767	752
Accrued interests on financial debt	116	127
Provisions for deductions from revenue	6 732	6 481
Accruals for compensation and benefits, including social security	2 321	2 260
Environmental remediation provisions	53	49
Deferred income	123	123
Provisions for product liabilities, governmental investigations and other legal matters [1]	548	56
Accrued share-based payments	235	253
Contingent consideration [2]	131	119
Commitment for repurchase of own shares [3]		2 809
Other payables	743	588
Total provisions and other current liabilities	**14 795**	**15 670**

[1] Note 20 provides additional disclosures related to legal provisions.
[2] Note 29 provides additional disclosures related to contingent consideration.
[3] Note 18.3 provides additional disclosures related to commitment for repurchase of own shares.

Provisions are based upon management’s best estimate and adjusted for actual experience. Such adjustments to 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)	2022	2021	2020
January 1	**6 481**	**6 256**	**5 595**
Effect of currency translation, business combinations	– 210	– 218	234
Payments/utilizations	– 22 261	– 19 838	– 19 294
Adjustments of prior years charged to income statement	– 322	– 245	– 151
Current year income statement charge	23 072	20 413	19 773
Change in provisions offset against gross trade receivables	– 28	113	99
December 31	**6 732**	**6 481**	**6 256**

The provisions for deductions from revenue include specific healthcare plans and program rebates as well as non-healthcare plans and program-related rebates, returns and other deductions. The provisions for deductions from revenue are adjusted to reflect experience and to reflect actual amounts as rebates, refunds, discounts and returns are processed. The provision represents estimates of the related obligations, requiring the use of judgment when estimating the effect of these deductions from revenue.

Restructuring provisions movements

(USD millions)	2022	2021	2020
January 1	**345**	**459**	**438**
Additions	1 368	328	354
Cash payments	– 468	– 344	– 268
Releases	– 42	– 54	– 87
Transfers	– 53	– 27	
Currency translation effects	– 19	– 17	22
December 31	**1 131**	**345**	**459**

In 2022, additions to provisions of USD 1.4 billion were mainly related to the following reorganizations:
- Initiative announced in April 2022 to implement a new streamlined organizational model designed to support innovation, growth and productivity.
- The continuation of the Innovative Medicines Division and the Operation unit (formerly Novartis Technical Operations and the Customer & Technology Solutions) 2021 restructuring initiatives.

In 2021, additions to provisions of USD 328 million were mainly related to the following reorganizations:
- The Innovative Medicines Division commenced a plan to restructure its field force and supporting functions in response to changes in its go-to-market structure with increased utilization of digital technology.
- Group-wide initiatives to streamline manufacturing platforms and manufacturing functions and implement new technologies continued. In addition, the Operations unit (formerly Customer & Technology Solutions) continued the phased implementation of the new operating model to transition activities to service centers.

In 2020, additions to provisions of USD 354 million were mainly related to the following reorganizations:
- The Innovative Medicines Division restructured its field force and supporting functions in Region Europe.
- The Sandoz Division initiatives to realign its organizational structures to improve competitiveness that commenced in 2019 continued.
- Group-wide initiatives to streamline manufacturing platforms and manufacturing functions through the setup of operations centers and implementation of new technologies, in the Innovative Medicines Division and the Sandoz Division, continued. In addition, the Operations unit (formerly Customer & Technology Solutions) continued the phased implementation of the new operating model to change outsourcing structures and transition activities to service centers.

23. Details to the consolidated statements of cash flows

23.1) Non-cash items and other adjustments

The following table shows the reversal of non-cash items and other adjustments in the consolidated statements of cash flows.

(USD millions)	**2022**	2021	2020
Depreciation, amortization and impairments on:			
Property, plant and equipment	1 570	1 489	1 758
Right-of-use assets	303	318	330
Intangible assets	5 308	4 306	4 376
Financial assets [1]	260	– 38	– 335
Change in provisions and other non-current liabilities	1 403	896	1 411
Gains on disposal and other adjustments on property, plant and equipment; intangible assets; financial assets; and other non-current assets, net	– 333	– 677	– 478
Equity-settled compensation expense	823	736	738
Loss/(income) from associated companies [2]	9	– 15 339	– 673
Income taxes	1 416	2 119	1 807
Net financial expense	817	891	947
Other	– 30		
Total	**11 546**	**– 5 299**	**9 881**

[1] Includes fair value changes
[2] 2021 included the gain of USD 14.6 billion recognized from the divestment of the Group's investment in Roche (see Notes 2 and 4).

In 2022, other than through business combinations, there were USD 635 million additions to intangible assets with deferred payments. In 2022, there were USD 247 million (2021: USD 321 million, 2020: USD 346 million) additions to right-of-use assets recognized.

23.2) Total amount of income taxes paid

In 2022, the total amount of income taxes paid was USD 2.0 billion (2021: USD 2.3 billion), which was included within "Net cash flows from operating activities."

In 2020, the total amount of income taxes paid was USD 1.9 billion, of which USD 1.8 billion was included within "Net cash flows from operating activities," and USD 88 million was included within "Net cash flows used in investing activities from discontinued operations."

23.3) Cash flows from changes in working capital and other operating items included in the net cash flows from operating activities

(USD millions)	**2022**	2021	2020
(Increase)/decrease in inventories	– 830	81	– 543
(Increase)/decrease in trade receivables	– 589	– 389	137
Decrease in trade payables	– 48	– 21	– 324
Change in other current and non-current assets	– 194	– 202	229
Change in other current liabilities	658	772	211
Other adjustments, net		0	– 1
Total	**– 1 003**	**241**	**– 291**

23.4) Cash flows arising from acquisitions and divestments of interests in associated companies, net

In 2021, acquisitions and divestments of interests in associated companies, net included USD 20.7 billion proceeds from the divestment of the Group's investment in Roche (see Notes 2 and 4).

23.5) Cash flows arising from acquisitions and divestments of businesses, net

The following table is a summary of the cash flow impact of acquisitions and divestments of businesses. The most significant transactions are described in Note 2.

(USD millions)	Note	2022	2021	2020
Net assets recognized as a result of acquisitions of businesses	24	**– 1 077**	**– 735**	**– 10 173**
Fair value of previously held equity interests		21	42	7
Contingent consideration payables, net		205	59	98
Payments, deferred consideration and other adjustments, net		– 13	1	62
Cash flows used for acquisitions of businesses		**– 864**	**– 633**	**– 10 006**
Cash flows (used for)/from divestments of businesses, net [1]		**– 15**	**66**	**49**
Cash flows used for acquisitions and divestments of businesses, net		**– 879**	**– 567**	**– 9 957**

[1] In 2022, USD 15 million net cash outflows from divestments of businesses included USD 20 million reduction to cash and cash equivalents due to the derecognized cash and cash equivalents following a loss of control of a company upon expiry of an option to purchase the company, partly offset by USD 5 million net cash inflows from business divestments in 2022 and in prior years.
In 2022, the net identifiable assets of divested businesses amounted to USD 173 million, comprised of non-current assets of USD 132 million, current assets of USD 113 million, including USD 71 million cash and cash equivalents and of non-current and current liabilities of USD 72 million. Deferred sales price receivables and other adjustments amounted to USD 41 million.
In 2021, USD 66 million included USD 52 million net cash inflows from divestments in previous years, and a USD 14 million net cash inflow from a business divestment in 2021, comprised of intangible assets.
In 2020, USD 49 million represented the net cash inflows from divestments in previous years.

Notes 2 and 24 provide further information regarding acquisitions and divestments of businesses. All acquisitions were for cash.

23.6) Reconciliation of liabilities arising from financing activities

(USD millions)	Non-current financial debts	Current financial debts and derivative financial instruments	Non-current lease liabilities	Current lease liabilities
January 1, 2022	**22 902**	**6 295**	**1 621**	**275**
Increase in non-current financial debts	16			
Repayments of the current portion of non-current financial debts		– 2 575		
Change in current financial debts [1]		295		
Payments of lease liabilities				– 295
Interest payments for amounts included in lease liabilities classified as cash flows from operating activities				– 51
New, modified and terminated leases, net			173	49
Impact of acquisitions and divestments of businesses, net			9	3
Changes in fair values, lease interest and other changes, net		– 13		60
Amortization of bonds discount	17	5		
Currency translation effects	– 366	– 401	– 41	– 14
Reclassification from non-current to current, net	– 2 325	2 325	– 224	224
December 31, 2022	**20 244**	**5 931**	**1 538**	**251**

[1] Change in current financial debts included net cash outflows from interest-bearing accounts of employees payable on demand amounting to USD 1.7 billion. See Note 21.

(USD millions)	Non-current financial debts	Current financial debts and derivative financial instruments	Non-current lease liabilities	Current lease liabilities
January 1, 2021	**26 259**	**9 785**	**1 719**	**286**
Increase in non-current financial debts	16			
Repayments of the current portion of non-current financial debts		– 2 162		
Change in current financial debts		– 3 524		
Payments of lease liabilities, net				– 316
Interest payments for amounts included in lease liabilities classified as cash flows from operating activities				– 52
New, modified and terminated leases, net			192	61
Impact of acquisitions of businesses		1		
Changes in fair values, lease interest and other changes, net		– 124		62
Amortization of bonds discount	25	4		
Currency translation effects	– 774	– 309	– 43	– 13
Reclassification from non-current to current, net	– 2 624	2 624	– 247	247
December 31, 2021	**22 902**	**6 295**	**1 621**	**275**

(USD millions)	Non-current financial debts	Current financial debts and derivative financial instruments	Non-current lease liabilities	Current lease liabilities
January 1, 2020	**20 353**	**7 031**	**1 703**	**246**
Increase in non-current financial debts	7 126			
Repayments of the current portion of non-current financial debts		– 2 003		
Change in current financial debts		2 261		
Payments of lease liabilities, net				– 312
Interest payments for amounts included in lease liabilities classified as cash flows from operating activities				– 56
New, modified and terminated leases, net			221	73
Impact of acquisitions of businesses		32	36	8
Changes in fair values, lease interest and other changes, net	– 1		– 30	65
Amortization of bonds discount	16	5		
Currency translation effects	832	392	39	12
Reclassification from non-current to current, net	– 2 067	2 067	– 250	250
December 31, 2020	**26 259**	**9 785**	**1 719**	**286**

23.7) Supplemental disclosures related to the Alcon business distributed to Novartis AG shareholders

In 2020, net cash flows used in investing activities from discontinued operations of USD 127 million included the investing activities of the Alcon business, which was spun-off to Novartis AG shareholders on April 8, 2019, and cash outflows for transaction-related expenditures attributable to the series of portfolio transformation transactions completed in 2015.

In 2020, net cash flows used in financing activities from discontinued operations of USD 50 million were for transaction cost payments directly attributable to the distribution (spin-off) of the Alcon business to Novartis AG shareholders on April 8, 2019.

24. Acquisitions of businesses

Fair value of assets and liabilities arising from acquisitions of businesses:

(USD millions)	**2022**	2021	2020
Property, plant and equipment	13		26
Right-of-use assets	12		32
Currently marketed products		292	196
Acquired research and development	1 209	262	8 600
Other intangible assets		98	218
Deferred tax assets	56	28	476
Non-current financial and other assets			49
Inventories			84
Trade receivables and financial and other current assets	5	1	109
Cash and cash equivalents	89	10	76
Deferred tax liabilities	– 300	– 74	– 1 977
Current and non-current financial debts		– 1	– 32
Current and non-current lease liabilities	– 12		– 44
Trade payables and other liabilities	– 67	– 4	– 144
Net identifiable assets acquired	**1 005**	**612**	**7 669**
Acquired cash and cash equivalents	– 89	– 10	– 76
Non-controlling interests		– 105	
Goodwill	161	238	2 580
Net assets recognized as a result of acquisitions of businesses	**1 077**	**735**	**10 173**

Note 2 details significant acquisitions of businesses, specifically of Gyroscope in 2022, the cephalosporin antibiotics business from GSK in 2021; and of the The Medicines Company and the Japanese business of AGI in 2020. The goodwill arising out of these acquisitions is attributable to the buyer-specific synergies, the assembled workforce, and the accounting for deferred tax liabilities on the acquired assets. In 2022, no goodwill (2021: USD 107 million; 2020: USD 74 million) is tax deductible.

25. Post-employment benefits for employees

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 employees. In these cases, the related unfunded liability is included in the balance sheet. The defined benefit obligations (DBOs) of all major pension and other post-employment benefit plans are reappraised annually by independent actuaries. Plan assets are recognized at fair value. The major plans are based in Switzerland, the United States, the United Kingdom, Germany and Japan, which represent 95% of the Group's total DBO for pension plans. Details of the plans in the two most significant countries, Switzerland and the United States, which represent 83% of the Group's total DBO for post-employment benefit plans, 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 the benefits are linked to contributions paid into the plan, interest credits granted and conversion rates applied.

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 employee'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 employee 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 employees. The boards of trustees are responsible for the plan design and asset investment strategy.

In December 2020, the Board of Trustees of the Novartis Swiss Pension Fund agreed to adjust the annuity conversion rate at retirement with effect from January 1, 2022. This amendment did not affect existing pensioners, and its impact on existing plan participants will be mitigated by way of defined compensatory measures. This amendment resulted in a net pre-tax curtailment gain of USD 101 million (CHF 90 million) recognized in 2020.

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, in certain countries, employees are covered under other post-employment benefit plans and post-retirement medical plans.

In the US, other post-employment benefit plans consist primarily of post-employment healthcare benefits, which have been closed to new members since 2015. Part of the costs of these plans is reimbursable under the Medicare Prescription Drug, Improvement, and Modernization Act of 2003. There is no statutory funding requirement for these plans. The Group is funding these plans to the extent that it is tax efficient.

The following tables are a summary of the funded and unfunded defined benefit obligation for pension and other post-employment benefit plans of employees at December 31, 2022 and 2021:

	Pension plans		Other post-employment benefit plans	
(USD millions)	**2022**	2021	**2022**	2021
Benefit obligation at January 1	**23 583**	**25 602**	**560**	**632**
Current service cost	348	415	12	11
Interest cost	249	151	17	16
Past service costs and settlements	– 40	63	1	– 3
Administrative expenses	23	24		
Remeasurement gains arising from changes in financial assumptions [1]	– 5 046	– 713	– 94	– 20
Remeasurement (gains)/losses arising from changes in demographic assumptions	– 53	– 377		4
Experience-related remeasurement losses/(gains)	199	531	– 28	– 47
Currency translation effects	– 650	– 865	– 2	– 1
Benefit payments	– 1 253	– 1 450	– 44	– 32
Contributions of employees	174	179		
Effect of acquisitions, divestments or transfers	– 1	23		
Benefit obligation at December 31	**17 533**	**23 583**	**422**	**560**
Fair value of plan assets at January 1	**22 420**	**22 317**	**73**	**89**
Interest income	220	105	2	2
Return on plan assets excluding interest income	– 2 500	1 512	– 12	7
Currency translation effects	– 539	– 726		
Novartis Group contributions	424	490	41	7
Contributions of employees	174	179		
Settlements	– 1	– 7		
Benefit payments	– 1 253	– 1 450	– 44	– 32
Effect of acquisitions, divestments or transfers				
Fair value of plan assets at December 31	**18 945**	**22 420**	**60**	**73**
Funded status	**1 412**	**– 1 163**	**– 362**	**– 487**
Limitation on recognition of fund surplus at January 1	**– 62**	**– 51**		
Change in limitation on recognition of fund surplus	– 2 504	– 16		
Currency translation effects	– 76	6		
Interest income on limitation of fund surplus	– 2	– 1		
Limitation on recognition of fund surplus at December 31 [2]	**– 2 644**	**– 62**		
Net liability in the balance sheet at December 31	**– 1 232**	**– 1 225**	**– 362**	**– 487**

[1] The remeasurement gains arising from changes in financial assumptions is driven mainly by changes in the actuarial discount rates used to determine the benefit obligation.
[2] As of December 31, 2022, the most significant pension plans where the asset ceiling was required to be applied were in Switzerland and amounted to USD 2 587 million.

The reconciliation of the net liability from January 1 to December 31 is as follows:

	Pension plans		Other post-employment benefit plans	
(USD millions)	**2022**	2021	**2022**	2021
Net liability at January 1	**– 1 225**	**– 3 336**	**– 487**	**– 543**
Current service cost	– 348	– 415	– 12	– 11
Net interest expense	– 31	– 47	– 15	– 14
Administrative expenses	– 23	– 24		
Past service costs and settlements	39	– 70	– 1	3
Remeasurements	2 400	2 071	110	70
Currency translation effects	35	145	2	1
Novartis Group contributions	424	490	41	7
Effect of acquisitions, divestments or transfers	1	– 23		
Change in limitation on recognition of fund surplus	– 2 504	– 16		
Net liability at December 31	**– 1 232**	**– 1 225**	**– 362**	**– 487**
Amounts recognized in the consolidated balance sheet				
Prepaid benefit cost	491	1 415		
Accrued benefit liability	– 1 723	– 2 640	– 362	– 487

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:

	2022				2021			
(USD millions)	Switzerland	United States	Rest of the world	Total	Switzerland	United States	Rest of the world	Total
Benefit obligation at December 31	**11 824**	**2 746**	**2 963**	**17 533**	**15 268**	**3 645**	**4 670**	**23 583**
Thereof unfunded		*556*	*363*	*919*		*688*	*439*	*1 127*
By type of member								
Active	4 799	431	931	6 161	6 478	620	1 412	8 510
Deferred pensioners		830	861	1 691		1 208	1 730	2 938
Pensioners	7 025	1 485	1 171	9 681	8 790	1 817	1 528	12 135
Fair value of plan assets at December 31	**14 701**	**1 978**	**2 266**	**18 945**	**16 436**	**2 551**	**3 433**	**22 420**
Funded status	**2 877**	**– 768**	**– 697**	**1 412**	**1 168**	**– 1 094**	**– 1 237**	**– 1 163**

The following table shows a breakdown of the DBO for other post-employment benefit plans by geography and type of member, and the breakdown of plan assets into the geographical locations in which they are held:

	2022			2021		
(USD millions)	United States	Rest of the world	Total	United States	Rest of the world	Total
Benefit obligation at December 31	**346**	**76**	**422**	**473**	**87**	**560**
Thereof unfunded	*286*	*76*	*362*	*400*	*87*	*487*
By type of member						
Active	30	18	48	60	23	83
Deferred pensioners	8	0	8	13	0	13
Pensioners	308	58	366	400	64	464
Fair value of plan assets at December 31	**60**	**0**	**60**	**73**	**0**	**73**
Funded status	**– 286**	**– 76**	**– 362**	**– 400**	**– 87**	**– 487**

The following table shows the principal weighted average actuarial assumptions used for calculating defined benefit plans and other post-employment benefits of employees:

	Pension plans			Other post-employment benefit plans		
	2022	2021	2020	**2022**	2021	2020
Weighted average assumptions used to determine benefit obligations at December 31						
Discount rate	3.0%	0.9%	0.6%	6.3%	3.3%	2.9%
Expected rate of pension increase	0.4%	0.5%	0.3%			
Expected rate of salary increase	2.9%	2.7%	2.7%			
Interest on savings account	2.2%	0.5%	0.1%			
Current average life expectancy for a 65-year-old male in years	22	22	22	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 employee's savings account where the assumption on interest accrued often changes broadly 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 usually 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. The Group's actuaries use mortality tables which take into account historic patterns and expected changes, such as further increases in longevity.

In 2022 the mortality assumptions used for the pension plans in Switzerland were based on BVG 2020 tables with future improvements based on the BVG generational model. In US for the Pension and Postretirement Medical Benefit Plans, the Society of Actuaries Pri-2012 mortality tables with generational improvements based on Scale MP-2021 are used.

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 2022 year-end defined benefit pension obligation	Change in 2021 year-end defined benefit pension obligation
25 basis point increase in discount rate	– 466	– 790
25 basis point decrease in discount rate	491	839
One-year increase in life expectancy	535	869
25 basis point increase in rate of pension increase	316	512
25 basis point decrease in rate of pension increase	– 63	– 136
25 basis point increase of interest on savings account	38	58
25 basis point decrease of interest on savings account	– 37	– 58
25 basis point increase in rate of salary increase	37	54
25 basis point decrease in rate of salary increase	– 37	– 54

The healthcare cost trend rate assumptions used for other post-employment benefits are as follows:

	2022	2021	2020
Healthcare cost trend rate assumed for next year	6.5%	6.0%	6.3%
Rate to which the cost trend rate is assumed to decline	4.5%	4.5%	4.5%
Year that the rate reaches the ultimate trend rate	2031	2028	2028

The following table shows the weighted average plan asset allocation of funded defined benefit pension plans at December 31, 2022 and 2021:

	Pension plans			
(as a percentage)	Long-term target minimum	Long-term target maximum	**2022**	2021
Equity securities	15	40	24	27
Debt securities	20	60	31	33
Real estate	5	30	21	19
Alternative investments	0	20	18	15
Cash and other investments	0	15	6	6
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, private equity, infrastructure and commodity investments, usually have a quoted market price or a regularly updated net asset value.

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 employees, 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, 2022	December 31, 2021
Investment in shares of Novartis AG		
Number of shares (in millions)	2.3	2.3
Market value (in USD billions)	0.2	0.2

The weighted average duration of the defined benefit pension obligation is 11.8 years (2021: 14.9 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 predetermined thresholds). The only significant plans that require additional funding are those in the United Kingdom and Germany.

The expected future cash flows in respect of pension and other post-employment benefit plans at December 31, 2022, were as follows:

(USD millions)	Pension plans	Other post-employment benefit plans
Novartis Group contributions		
2023 (estimated)	397	38
Expected future benefit payments		
2023	1 268	38
2024	1 441	38
2025	1 128	38
2026	1 114	38
2027	1 099	38
2028–2032	5 310	171

Defined contribution plans

In many subsidiaries, employees are covered by defined contribution plans. Contributions charged to the consolidated income statement for the defined contribution plans were:

(USD millions)	**2022**	2021	2020
Contributions for defined contribution plans	520	523	501

The Group's total personnel costs amounted to USD 14.9 billion in 2022.

26. Equity-based participation plans for employees

The expense related to all equity-based participation plans and the liabilities arising from equity-based payment transactions were as follows:

(USD millions)	2022	2021	2020
Expense related to equity-based participation plans	1 048	979	958
Liabilities arising from equity-based payment transactions	235	253	269

Equity-based participation plans can be separated into the following plans:

Annual Incentive

The Annual Incentive for the Novartis Group CEO and other Executive Committee members (ECN) is paid 50% in cash and 50% in Novartis restricted shares (RSs) or restricted share units (RSUs). For the Novartis Top Leaders (NTLs), the Annual Incentive is paid 70% in cash and 30% in RSs or RSUs. Both the ECN and NTLs can opt to invest up to the maximum cash portion of their Annual Incentive to receive further RSs or RSUs. Any cash is paid out during March in the year following the end of the performance period, and the shares are granted during January in the year following the end of the performance period.

Employee share savings plan

Novartis operates employee share savings and purchase plans in certain countries. The most significant is described below.

The Employee Share Ownership Plan (ESOP) in Switzerland offers participants to 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. Employees eligible for the equity plan "Select" are not eligible to receive ESOP matching shares. The Novartis Group CEO, the other Executive Committee members and the NTLs are not eligible to participate in this plan.

Novartis Employee share purchase plan

In 2022 Novartis started to grant shares under the Employee Share Purchase Plan. The plan enables employees to voluntarily purchase Novartis shares through payroll deductions at a discounted price. While the plan is global in scope, the first phase covers: North America (the US, Puerto Rico and Canada). The shares are not subject to a vesting period.

Novartis equity plan "Select"

The equity plan "Select" is a global equity incentive plan under which eligible employees may annually be awarded a grant subject to a three-year, and for selected units a four-year, staggered vesting period. No awards are granted for performance ratings below a certain threshold. Executive Committee members and NTLs are not eligible to participate in the equity plan "Select."

The equity plan "Select" currently allows participants employed and living in Switzerland to choose the form of their equity compensation in RSs or RSUs. In all other jurisdictions, RSs or RSUs are granted unilaterally. Until 2013, participants could also choose to receive part or the entire grant in the form of tradable share options.

Tradable share options expire on their 10th anniversary from the grant date, meaning all outstanding options exercisable at December 31, 2022, will expire in January 2023. Each tradable share option entitles the holder to purchase after vesting (and before the 10th anniversary from the grant date) one Novartis share at a stated exercise price that equals the closing market price of the underlying share at the grant date. As the exercise price does not reflect the decrease in the Novartis share due to the Alcon spin, one-fifth of an Alcon share will also be awarded to the option holder upon exercise.

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.

	2022		2021	
	Options (millions)	Weighted average exercise price (USD)	Options (millions)	Weighted average exercise price (USD)
Options outstanding at January 1	**1.7**	**63.6**	**2.6**	**62.0**
Sold or exercised	– 1.2	62.6	– 0.9	58.9
Outstanding at December 31	**0.5**	**66.0**	**1.7**	**63.6**
Exercisable at December 31	**0.5**	**66.0**	**1.7**	**63.6**

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 86.1.

Options under Novartis equity plan "Select" for North America

The following table shows the activity associated with the ADR options during the period:

	2022		2021	
	ADR options (millions)	Weighted average exercise price (USD)	ADR options (millions)	Weighted average exercise price (USD)
Options outstanding at January 1	**4.0**	**64.4**	**6.7**	**62.9**
Sold or exercised	– 2.9	63.7	– 2.7	60.7
Outstanding at December 31	**1.1**	**66.1**	**4.0**	**64.4**
Exercisable at December 31	**1.1**	**66.1**	**4.0**	**64.4**

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 89.1.

Long-Term Performance Plan

The Long-Term Performance Plan (LTPP) is an equity plan for the ECN, the NTLs and employees of Group units with specific targets.

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. The actual payout depends on the achievement of the performance measures and ranges between 0% and 200% of the granted amount. PSUs granted under the LTPP do not carry voting rights, but do carry dividend equivalents that are paid in unrestricted Novartis shares at the end of the performance period.

The LTPP awards are subject to a three-year performance and vesting period. Until 2018, the performance criteria were based on Novartis internal performance metrics. For LTPP awards starting in 2019, following the combination of the two LTPP and Long-Term Relative Performance Plan (LTRPP), the performance criteria are based on both Novartis internal performance metrics and variables that can be observed in the market, which is the ranking of the Novartis total shareholder return (TSR) relative to a global healthcare peer group of 14 other companies, over rolling three-year performance periods.

TSR for Novartis and the peer companies is calculated as the change in the company share price, which is translated to USD at the relevant exchange rate, including the reinvestment return of dividends, over the three-year performance period. The calculation is based on Bloomberg standard published TSR data, which is publicly available. The position of Novartis in the peer group determines the payout range based on a payout matrix.

Long-Term Relative Performance Plan

The LTRPP was an equity plan for the Novartis ECN and NTLs and the awards were subject to a three-year performance and vesting period. The last grant under this plan was made in 2018. The LTRPP performance criteria were based on variables that could be observed in the market, which was the ranking of the Novartis TSR relative to a global healthcare peer group of 14 other companies, over rolling three-year performance periods. The TSR for Novartis and the peer companies was calculated as described in the LTPP section above.

Other share awards

Selected employees 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 had a minimum three-year vesting period before 2021 and mainly three years thereafter. In exceptional circumstances, Special Share Awards may be awarded to attract special expertise and new talents to the organization. Externally recruited ECN members are eligible only for special awards that are “buyouts” in the case that it is to replace equity forfeited with their former employer. The equity is provided on a like-for-like basis as the forfeited equity, at the same value with the same vesting period, and with or without a performance condition.

Worldwide, employees at different levels in the organization were awarded RSs and RSUs in 2022, 2021 and 2020.

In addition, in 2022, 2021 and 2020, Board members received unrestricted shares as part of their regular compensation.

Summary of share grants

The table below provides a summary of share grants (shares, RSs, RSUs and PSUs) for all plans:

	2022		2021	
	Number of shares in millions	Weighted average fair value at grant date in USD	Number of shares in millions	Weighted average fair value at grant date in USD
Annual Incentive				
– RSU	0.2	74.7	0.2	87.5
– Restricted shares	0.1	85.0	0.1	97.0
Share savings plans				
– RSU	0.4	75.0	0.4	86.9
– Shares	1.2	85.0	1.1	97.0
Novartis Employee Share Purchase Plan	0.8	82.8		
Select North America (RSU)	4.9	74.5	4.3	86.9
Select outside North America				
– RSU	2.0	75.1	1.8	86.9
– Restricted shares	0.7	85.0	0.6	97.0
Long-Term Performance Plan (PSU)	1.7	82.0	1.8	89.5
Other share awards				
– RSU	0.5	76.3	0.6	78.4
– Restricted shares	0.1	86.9		
– Shares	0.1	86.1	0.1	91.9

27. Transactions with related parties

Roche Holding AG

Novartis has two agreements with Genentech, Inc., United States (Genentech), and one agreement with Spark Therapeutics, Inc., United States (Spark). Both companies are subsidiaries of Roche Holding AG (Roche), which were indirectly included in the consolidated financial statements using equity accounting until November 3, 2021, when Novartis entered into an agreement with Roche to divest its 33.3% of Roche voting shares. On December 6, 2021, Novartis divested its investment in Roche, on which date Roche ceased to be a related party (see Notes 2 and 4).

Lucentis
Novartis has licensed from Genentech/Roche the exclusive rights to develop and market *Lucentis* outside the United States for indications related to diseases of the eye. Novartis pays royalties on the net sales to third parties of *Lucentis* products outside the United States. From January 1, 2021 until December 6, 2021, *Lucentis* sales of USD 2.0 billion (2020: USD 1.9 billion) were recognized by Novartis.

Xolair
Novartis and Genentech/Roche are co-promoting *Xolair* in the United States, where Genentech/Roche records all sales. Novartis records sales outside 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. From January 1, 2021 until December 6, 2021, Novartis recognized total sales of *Xolair* of USD 1.3 billion (2020: USD 1.3 billion), including sales to Genentech/Roche for the United States market.

Luxturna
In 2018, Novartis entered into an exclusive licensing and commercialization agreement and a supply agreement with Spark for *Luxturna* outside the United States. The agreements include regulatory and sales milestones as well as royalties payable to Spark on ex-US sales. On December 17, 2019, Roche acquired Spark.

The net income for royalties, cost sharing and profit sharing arising out of the *Lucentis*, *Xolair* and *Luxturna* agreements with Roche totaled USD 188 million from January 1, 2021 until December 6, 2021 (net income in 2020: USD 217 million).

Furthermore, Novartis has several patent license, supply and distribution agreements with Roche.

Novartis Pension Fund

In 2018, a Group subsidiary provided an uncommitted overnight credit facility to the Novartis Pension Fund, Switzerland, for up to USD 500 million with interest at the US Federal Funds Rate. This credit facility was not utilized during the current and past years.

Executive Officers and Non-Executive Directors compensation

At December 31, 2022, there were 11 Executive Committee members ("Executive Officers"). During 2022, 5 Executive Officers stepped down. At December 31, 2021, there were 12 Executive Officers. During 2021, 3 Executive Officers stepped down. At December 31, 2020, there were 13 Executive Officers.

The total compensation for Executive Committee members and the 15 Non-Executive Directors (14 in 2021 and 14 in 2020) using the Group's accounting policies for equity-based compensation and pension benefits was as follows:

	Executive Officers			Non-Executive Directors			Total		
(USD millions)	**2022**	2021	2020	**2022**	2021	2020	**2022**	2021	2020
Cash and other compensation	25.0	20.3	25.6	4.6	4.7	4.6	29.6	25.0	30.2
Post-employment benefits	2.8	2.5	2.7				2.8	2.5	2.7
Equity-based compensation	42.6	37.3	41.1	4.8	5.2	5.2	47.4	42.5	46.3
Total	**70.4**	**60.1**	**69.4**	**9.4**	**9.9**	**9.8**	**79.8**	**70.0**	**79.2**

During 2022, there was an increase in the IFRS compensation expense for executive officers compared to 2021, driven by accelerated expenses (cash and other compensation and equity-based compensation) required under IFRS for the executive members who stepped down in 2022, in accordance with their employment contracts and the relevant incentive plan terms, compared to the accelerated expenses due to executive officers who stepped down in 2021.

During 2021, the IFRS compensation expense decreased due to one role less at the ECN, and lower cash and equity compensation attributable to former ECN members, partially offset by the net increase of the IFRS compensation expense of current ECN members.

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 of the Group.

Transactions with former members of the Board of Directors

During 2022, 2021 and 2020, the following payments (or waivers of claims) were made to former Board members or to "persons closely" linked to them:

	Currency	**2022**	2021	2020
Dr. Krauer	CHF		60 000	60 000

Dr. Alex Krauer, was an Honorary Chairman of Novartis and was 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. The last payment under this arrangement was in 2021.

28. Commitments and contingent liabilities

Research and development commitments

The Group has entered into long-term research and development agreements with various institutions related to intangible assets. These agreements provide for potential milestone payments by Novartis, which are dependent on successful clinical development, or meeting specified sales targets, or other conditions which are specified in the agreements.

As of December 31, 2022, the amount and estimated timing of the Group's commitments to make payments under those agreements, which are shown without risk adjustment and on an undiscounted basis, were as follows:

(USD millions)	**2022**
2023	420
2024	808
2025	448
2026	282
2027	687
Thereafter	3 169
Total	**5 814**

Commitments for capital calls

The Group holds investments in funds in which it has committed to invest further upon future capital calls. As of December 31, 2022, the total uncalled capital commitments for the Group's investments in funds amounts to USD 83 million. Note 29 contains further information on the Group's investments in funds.

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. For disclosure of property, plant and equipment purchase commitments, see Note 9.

Guarantees issued

The Group has issued guarantees to third parties in the ordinary course of business, mostly for tax, customs or other governmental agencies.

Contingent liabilities

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; and 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 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. These government settlements have involved and may in the future involve 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 and antitrust cases often require companies to enter into corporate integrity agreements, which are intended to regulate company behavior for a period of years. Our affiliates Novartis Corporation and Sandoz Inc. are parties to such agreements, which will expire in 2025 and 2026, respectively. Also, matters underlying governmental investigations and settlements may be the subject of separate private litigation.

While provisions have been made for probable outflows of economic resources, which management deems to be reasonable or appropriate, there are uncertainties connected with these estimates.

Note 20 contains additional information on these matters.

A number of Group companies are involved in legal proceedings concerning intellectual property rights. The inherent unpredictability of such proceedings means that there can be no assurances as to their ultimate outcome. A negative result in any such proceeding could potentially adversely affect the ability of certain Novartis companies to sell their products, or require the payment of substantial damages or royalties. The timing and the outcome of legal proceedings and their potential financial effect are not predictable.

In the opinion of management, however, the outcome of these actions will not materially affect the Group's financial position but could be material to the results of operations or cash flow in a given period.

The Group's potential environmental remediation liability is assessed based on a risk assessment and investigation of the various sites identified by the Group as at risk for environmental remediation exposure. The Group's future remediation expenses are affected by a number of uncertainties. These uncertainties include, but are not limited to, the method and extent of remediation, the percentage of material attributable to the Group at the remediation sites relative to that attributable to other parties, and the financial capabilities of the other potentially responsible parties.

Note 20 contains additional information on environmental liabilities.

29. Financial instruments – additional disclosures

The following tables show the carrying values of financial instruments by measurement category as of December 31, 2022 and 2021. Except for straight bonds (see Note 19), the carrying values are equal to, or a reasonable approximation of, the fair values.

		2022			
(USD millions)	Note	Financial instruments at amortized costs	Financial instruments at fair value through other comprehensive income	Financial instruments at fair value through the consolidated income statement	Other financial liabilities at amortized costs
Cash and cash equivalents	16	7 517			
Time deposits and short-term investments with original maturity more than 90 days	16	11 089			
Trade receivables	15	8 066			
Other receivables and current assets	17	958			
Marketable securities – debt securities	16		9		
Long-term financial investments – equity securities	13		828	317	
Long-term financial investments – debt securities	13		37		
Long-term financial investments – fund investments	13			281	
Long-term loans, advances, security deposits and other long-term receivables	13	341			
Associated companies at fair value through profit and loss				129	
Derivative financial instruments	16			204	
Contingent consideration receivables	13/17			650	
Total financial assets		**27 971**	**874**	**1 581**	
Bank and other short-term financial debt	21	863			
Commercial paper	21	2 772			
Straight bonds	19	22 341			
Long-term liabilities to banks and other financial institutions	19	144			
Trade payables		5 146			
Contingent consideration liabilities (see Note 20/22) and other financial liabilities				1 067	
Derivative financial instruments	21			55	
Lease liabilities	10				1 789
Total financial liabilities		**31 266**		**1 122**	**1 789**

		2021			
(USD millions)	Note	Financial instruments at amortized costs	Financial instruments at fair value through other comprehensive income	Financial instruments at fair value through the consolidated income statement	Other financial liabilities at amortized costs
Cash and cash equivalents [1]	16	10 397	2 010		
Time deposits and short-term investments with original maturity more than 90 days	16	12 965			
Trade receivables	15	8 005			
Other receivables and current assets	17	793			
Marketable securities – debt securities	16		2 741		
Long-term financial investments – equity securities	13		1 195	468	
Long-term financial investments – debt securities	13		34		
Long-term financial investments – fund investments	13			366	
Long-term loans, advances, security deposits and other long-term receivables	13	332			
Associated companies at fair value through profit and loss				192	
Derivative financial instruments	16			105	
Contingent consideration receivables	13			641	
Total financial assets		**32 492**	**5 980**	**1 772**	
Interest-bearing accounts of employees payable on demand	21	1 814			
Bank and other short-term financial debt	21	899			
Commercial paper	21	893			
Straight bonds	19	25 296			
Long-term liabilities to banks and other financial institutions	19	227			
Trade payables		5 553			
Commitment for repurchase of own shares	18/22	2 809			
Contingent consideration liabilities (see Note 20/22) and other financial liabilities				1 094	
Derivative financial instruments	21			68	
Lease liabilities	10				1 896
Total financial liabilities		**37 491**		**1 162**	**1 896**

[1] Includes short-term highly rated government-backed debt securities, with an original maturity of three months or less

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, 2022 and 2021. 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, 2022 and 2021.

	Contract or underlying principal amount		Positive fair values		Negative fair values	
(USD millions)	**2022**	2021	**2022**	2021	**2022**	2021
Forward foreign exchange rate contracts	7 907	13 248	189	92	– 41	– 35
Commodity purchase contract	97	17	15	13		
Options on equity securities	39	82			– 14	– 33
Total derivative financial instruments included in marketable securities and in current financial debts	**8 043**	**13 347**	**204**	**105**	**– 55**	**– 68**

The following table shows a breakdown by currency of the contract or underlying principal amount of derivative financial instruments at December 31, 2022 and 2021:

	2022			
(USD millions)	EUR	USD	Other	Total
Forward foreign exchange rate contracts	687	5 659	1 561	7 907
Commodity purchase contract	80	17		97
Options on equity securities		39		39
Total derivative financial instruments	**767**	**5 715**	**1 561**	**8 043**

	2021			
(USD millions)	EUR	USD	Other	Total
Forward foreign exchange rate contracts	1 485	5 158	6 605	13 248
Commodity purchase contract		17		17
Options on equity securities		82		82
Total derivative financial instruments	**1 485**	**5 257**	**6 605**	**13 347**

Derivative financial instruments effective for hedge accounting purposes

At the end of 2022 and 2021, 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 increasing 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 as well as fund investments listed in active markets.

The assets generally included in Level 2 fair value hierarchy are derivatives, and certain debt securities. The liabilities generally included in this fair value hierarchy consist of derivatives. These are valued using corroborated market data.

Level 3 inputs are unobservable for the asset or liability. The assets generally included in Level 3 fair value hierarchy are various investments in funds and unquoted equity security investments. Contingent consideration and other financial liabilities carried at fair value are included in this category.

	2022			
(USD millions)	Level 1	Level 2	Level 3	Total
Financial assets				
Marketable securities				
Debt securities		9		9
Derivative financial instruments		204		204
Total marketable securities and derivative financial instruments at fair value		**213**		**213**
Current contingent consideration receivables			**43**	**43**
Long-term financial investments				
Debt and equity securities	473	10	699	1 182
Fund investments	20		261	281
Non-current contingent consideration receivables			607	607
Total long-term financial investments at fair value	**493**	**10**	**1 567**	**2 070**
Associated companies at fair value through profit and loss			**129**	**129**
Financial liabilities				
Current contingent consideration liabilities			– 131	– 131
Derivative financial instruments		– 55		– 55
Total current financial liabilities at fair values		**– 55**	**– 131**	**– 186**
Non-current contingent consideration liabilities			– 704	– 704
Other financial liabilities			– 232	– 232
Total non-current financial liabilities at fair value			**– 936**	**– 936**

	2021			
(USD millions)	Level 1	Level 2	Level 3	Total
Financial assets				
Cash and cash equivalents				
Debt securities [1]	2 010			2 010
Total cash and cash equivalents at fair value	**2 010**			**2 010**
Marketable securities and derivative financial instruments				
Debt securities	2 719	22		2 741
Derivative financial instruments		105		105
Total marketable securities and derivative financial instruments at fair value	**2 719**	**127**		**2 846**
Long-term financial investments				
Debt and equity securities	1 080		617	1 697
Fund investments	28		338	366
Contingent consideration receivables			641	641
Total long-term financial investments at fair value	**1 108**		**1 596**	**2 704**
Associated companies at fair value through profit and loss			**192**	**192**
Financial liabilities				
Contingent consideration payables			– 1 075	– 1 075
Derivative financial instruments		– 68		– 68
Other financial liabilities			– 19	– 19
Total financial liabilities at fair value		**– 68**	**– 1 094**	**– 1 162**

[1] Includes short-term highly rated government-backed debt securities, with an original maturity of three months or less

The change in carrying values associated with Level 3 financial instruments, using significant unobservable inputs during the year ended December 31, is set forth below:

	2022					
(USD millions)	Associated companies at fair value through profit and loss	Fund investments	Long-term financial investments	Contingent consideration receivables	Contingent consideration liabilities	Other financial liabiltiies
January 1	**192**	**338**	**617**	**641**	**– 1 075**	**– 19**
Fair value gains and other adjustments, including from divestments recognized in the consolidated income statement		4	35	53	530	15
Fair value losses (including impairments and amortizations) and other adjustments recognized in the consolidated income statement	– 63	– 78	– 84		– 114	– 18
Fair value adjustments recognized in the consolidated statement of comprehensive income, including currency translation effects			24		11	
Purchases	4	11	160		– 231	– 238
Cash receipts and payments				– 44	44	28
Disposals		– 12	– 13			
Reclassification	– 4	– 2	– 40			
December 31	**129**	**261**	**699**	**650**	**– 835**	**– 232**
Total of fair value gains and losses recognized in the consolidated income statement for assets and liabilities held at December 31, 2022	– 63	– 74	– 49	53	416	– 3

	2021				
(USD millions)	Associated companies at fair value through profit and loss	Fund investments	Long-term financial investments	Contingent consideration receivables	Contingent consideration payables
January 1	**211**	**366**	**460**	**625**	**– 1 046**
Fair value gains and other adjustments, including from divestments recognized in the consolidated income statement	2	70	69	124	182
Fair value losses (including impairments and amortizations) and other adjustments recognized in the consolidated income statement	– 26	– 8	– 13	– 44	– 189
Fair value adjustments recognized in the consolidated statement of comprehensive income, including currency translation effects	– 2	– 1	51	– 22	22
Purchases	34	12	137		– 88
Cash receipts and payments				– 42	44
Disposals	– 27	– 71	– 43		
Reclassification		– 30	– 44		
December 31	**192**	**338**	**617**	**641**	**– 1 075**
Total of fair value gains and losses recognized in the consolidated income statement for assets and liabilities held at December 31, 2021	– 24	62	56	80	– 7

During 2022, there was one transfer of equity securities from Level 3 to Level 1 for USD 44 million (2021: USD 73 million), due to Initial Public Offering of the invested company. During 2022, there were no transfers of equity securities from Level 1 to Level 3 due to de-listing (2021: USD 29 million).

Realized gains and losses associated with Level 3 long-term financial investments measured at fair value through the consolidated income statement are recorded in the consolidated income statement under "Other income" or "Other expense," respectively. Realized gains and losses associated with Level 3 long-term financial investments measured at fair value through other comprehensive income are not recycled through the consolidated income statement but are instead reclassified to retained earnings.

During the year, the net loss and net gain recorded on associated companies, fund investments and long-term financial investments at fair value through profit and loss were USD 316 million and USD 55 million, respectively.

To determine 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 and 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 and contingent consideration receivables, this would change the amounts recorded in the 2022 consolidated income statement by USD 154 million and USD 140 million, respectively.

Equity securities measured at fair value through other comprehensive income

Equity securities held as strategic investments, typically held outside the Novartis Venture Fund, are generally designated at date of acquisition as financial assets valued at fair value through other comprehensive income with no subsequent recycling through profit and loss. These are made up of individually non-significant investments. At December 31, 2022, the Group holds 65 non-listed equity securities (December 31, 2021: 60) and 46 listed equity securities (December 31, 2021: 40) in this category with the following fair values:

(USD millions)	**2022**	2021
Listed equity securities	438	888
Non-listed equity securities	390	307
Total equity securities	**828**	**1 195**

During 2022 and 2021, dividends received from these equity securities were insignificant. In 2022, in accordance with the consolidated foundations Alcon Inc. shares divestment plans, Alcon Inc. shares with a fair value of USD 22 million were sold (2021: USD 9 million), and the USD 7 million gain on disposal (2021: USD 1 million gain) was transferred from other comprehensive income to retained earnings during 2022. In addition, in 2022, equity securities that were no longer considered strategic, with a fair value of USD 3 million (2021: USD 254 million), were sold, and the USD 3 million loss on disposal (2021: USD 211 million gain) was transferred from other comprehensive income to retained earnings (see Note 8).

Nature and extent of risks arising from financial instruments

Market risk

Market risk in general comprises currency risk, interest rate risk and price risk, such as commodity and equity prices. Novartis is exposed to market risk, primarily related to foreign currency exchange rates, interest rates and the market value of the investments. 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. 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.

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.

There is also a risk that certain countries could experience a devaluation of 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.

Subsidiaries whose functional currencies have experienced a cumulative inflation rate of more than 100% over the past three years apply the principles of IAS 29 "Financial reporting in Hyperinflationary Economies." The hyperinflationary economies in which Novartis operates are Argentina, Venezuela and Turkey. Venezuela and Argentina were hyperinflationary for all periods presented, and Turkey became hyperinflationary effective May 1, 2022, requiring retroactive implementation of hyperinflation accounting as of January 1, 2022. The impacts of applying IAS 29 were not significant in all years presented.

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 may enter into 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, maturing in 2028, as hedges of the translation risk arising on certain of these net investments in foreign operations with euro functional currency. As of December 31, 2022, long-term financial debt with a carrying amount of EUR 1.8 billion (USD 2.0 billion; December 31, 2021: USD 2.1 billion), has been designated as a hedge instrument. During 2022, USD 91 million of net of taxes unrealized income (2021: USD 216 million) 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 2022, 2021 and 2020.

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 or 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 (for example payment guarantees, credit insurance and factoring).

The provisions for expected credit losses for customers are based on a forward-looking expected credit loss, which includes possible default events on the trade

receivables over the entire holding period of the trade receivables.

In measuring the expected credit losses, trade receivables are grouped based on shared credit risk characteristics (such as private versus public receivables) and days past due. In determining the expected credit loss rates, the Group considers current and forward-looking macroeconomic factors that may affect the ability of the customers to settle the receivables, and historical loss rates for each category of customers.

The Group's largest customer accounted for approximately 16% of net sales to third parties, and the second largest and third largest customers accounted for 11% and 7% of net sales to third parties, respectively (2021: 17%, 11% and 6%, respectively; 2020: 17%, 11% and 6%, respectively).

The highest amounts of trade receivables outstanding were for these same three customers and amounted to 16%, 14% and 7%, respectively, of the Group's trade receivables at December 31, 2022 (2021: 16%, 12% and 7%, 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. To further reduce the settlement risk, the Group has implemented a multi-currency payment system, Continuous Linked Settlement (CLS), providing multilateral netting (payment-versus-payment settlement) of cash flows from foreign exchange transactions.

The Group's cash and cash equivalents are held with major regulated financial institutions; the three largest ones hold approximately 13.2%, 9.2% and 6.8%, respectively (2021: 9.7%, 9.7% and 7.6%, respectively). As of December 31, 2021, the Group's cash and cash equivalents also included short-term highly rated government-backed debt securities, with an original maturity of three months or less, for approximately 16% (2022: nil).

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 associated with financial liabilities that are settled by delivering cash or another financial asset. 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 and tax, capital or regulatory considerations, if applicable, through numerous sources of financing in order to maintain flexibility.

Certain countries have legal or economic restrictions on the ability of subsidiaries to transfer funds to the Group in the form of cash dividends, loans or advances, but these restrictions do not have an impact on the ability of the Group to meet its cash obligations.

Management monitors the Group's net debt or liquidity position through rolling forecasts on the basis of expected cash flows.

Novartis has two US commercial paper programs under which it can issue up to USD 9.0 billion in the aggregate of unsecured commercial paper notes. Novartis also has one Japanese commercial paper program under which it can issue up to JPY 150 billion (approximately USD 1.1 billion) of unsecured commercial paper notes. Commercial paper notes totaling USD 2.8 billion under these three programs were outstanding as per December 31, 2022 (2021: USD 0.9 billion). Novartis further has a committed credit facility of USD 6.0 billion, which was extended in September 2022. 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. The facility matures in September 2025 and was undrawn as per December 31, 2022, and December 31, 2021.

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 liabilities for contingent consideration at December 31, 2022, and December 31, 2021:

	2022					
(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, time deposits and short-term investments with original maturity more than 90 days and accrued interest	4 142	6 911	36		9	11 098
Commodities					111	111
Derivative financial instruments	23	147	19		15	204
Cash and cash equivalents	4 011	3 506				7 517
Total current financial assets	**8 176**	**10 564**	**55**		**135**	**18 930**
Non-current liabilities						
Financial debt				– 8 975	– 11 269	– 20 244
Financial debt – undiscounted				*– 9 002*	*– 11 394*	*– 20 396*
Total non-current financial debt				**– 8 975**	**– 11 269**	**– 20 244**
Current liabilities						
Financial debt	– 3 215	– 146	– 2 515			– 5 876
Financial debt – undiscounted	*– 3 215*	*– 146*	*– 2 517*			*– 5 878*
Derivative financial instruments	– 38	– 13	– 4			– 55
Total current financial debt	**– 3 253**	**– 159**	**– 2 519**			**– 5 931**
Net debt	**4 923**	**10 405**	**– 2 464**	**– 8 975**	**– 11 134**	**– 7 245**

	2021					
(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, time deposits and short-term investments with original maturity more than 90 days and accrued interest	11	14 585	1 088	4	18	15 706
Commodities					111	111
Derivative financial instruments	21	64	7		13	105
Cash and cash equivalents	7 406	5 001				12 407
Total current financial assets	**7 438**	**19 650**	**1 095**	**4**	**142**	**28 329**
Non-current liabilities						
Financial debt				– 8 464	– 14 438	– 22 902
Financial debt – undiscounted				*– 8 490*	*– 14 587*	*– 23 077*
Total non-current financial debt				**– 8 464**	**– 14 438**	**– 22 902**
Current liabilities						
Financial debt	– 2 780	– 521	– 2 926			– 6 227
Financial debt – undiscounted	*– 2 780*	*– 521*	*– 2 928*			*– 6 229*
Derivative financial instruments	– 50	– 16	– 2			– 68
Total current financial debt	**– 2 830**	**– 537**	**– 2 928**			**– 6 295**
Net debt	**4 608**	**19 113**	**– 1 833**	**– 8 460**	**– 14 296**	**– 868**

The carrying 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:

	2022			
(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	– 2 029	– 4 598	– 316	– 6 943
Potential inflows in various currencies – from financial derivative assets	2 029	4 712	321	7 062

	2021			
(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	– 843	– 5 482	– 461	– 6 786
Potential inflows in various currencies – from financial derivative assets	847	5 516	457	6 820

Other contractual liabilities that are not part of management's monitoring of the net debt or liquidity consist of the following items:

	2022				
(USD millions)	Due within 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	– 64	– 412	– 1 432	– 3 624	– 5 532
Lease liabilities [1]	– 71	– 180	– 616	– 922	– 1 789
Trade payables	– 5 020	– 126			– 5 146
Contingent consideration liabilities	– 16	– 115	– 437	– 267	– 835

[1] Note 10 provides additional disclosures related to lease liabilities.

	2021				
(USD millions)	Due within 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	– 82	– 445	– 1 628	– 3 908	– 6 063
Lease liabilities [1]	– 78	– 197	– 639	– 982	– 1 896
Trade payables	– 5 373	– 180			– 5 553
Commitment for repurchase of own shares	– 2 809				– 2 809
Contingent consideration liabilities	– 54	– 65	– 517	– 439	– 1 075

[1] Note 10 provides additional disclosures related to lease liabilities.

Capital risk management

Novartis strives to maintain a strong credit rating. In managing its capital, Novartis focuses on maintaining a strong balance sheet. As of December 31, 2022, Moody's Investors Service rated the Company A1 for long-term maturities and P-1 for short-term maturities, and S&P Global Ratings rated the Company AA- for long-term maturities and A-1+ for short-term maturities.

Sensitivity analysis

The Group uses sensitivity analysis disclosures to provide quantitative information about market risks to which it is exposed.

The sensitivity analysis disclosures are in line with the Group's financial risk management policy, and are based on a one-parameter risk model that considers a one-factor linear relationship between risk factors and

exposures. They consider aggregated risk exposures arising from the most significant risk factors (currency risk, interest rate risk and equity price risk) and include all financial assets and financial liabilities as set forth in the table on page F-64.

The disclosures below illustrate the potential impact on the Group's consolidated financial statements as a result of hypothetical market movements in foreign currency exchange rates, interest rates and equity prices. The range of variables chosen reflects management's view of changes that are reasonably possible over a one-year period.

Foreign currency exchange rate sensitivity

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, as well as in the Swiss franc. A strengthening (weakening) of the US dollar against these currencies as of December 31, 2022 and 2021 would have affected the measurement of financial instruments denominated in these foreign currencies. This analysis assumes that all other variables, in particular interest rates, remain constant. A hypothetical 5% increase or decrease in the foreign currency exchange rates against the US dollar would have impacted the Group's consolidated income statement as presented below:

(USD millions)	**2022**	2021
5% increase in foreign currency exchange rates against USD	– 6	3
5% decrease in foreign currency exchange rates against USD	7	– 3

As of December 31, 2022, the Group designated EUR 1.8 billion (December 31, 2021: EUR 1.8 billion) of its long-term euro-denominated straight bonds as hedges of the translation risk arising on certain net investments in foreign operations with euro functional currency. This analysis assumes that all other variables, in particular interest rates, remain constant. A hypothetical 5% increase, or decrease, in the foreign currency exchange rates against the US dollar, without considering the translation effect of these net investments, would have impacted the Group's consolidated equity as presented below:

(USD millions)	**2022**	2021
5% increase in foreign currency exchange rates against USD	93	99
5% decrease in foreign currency exchange rates against USD	– 98	– 104

Interest rate sensitivity

Our portfolio of fixed-income instruments as of December 31, 2022, was mainly composed of time deposits and debt securities.

Novartis uses duration models to approximate the possible change in the value of fixed-income instruments. Based on these models, management believes that a 100-basis point change in interest is deemed a reasonable possible change over a one-year period.

Based on exposures in 2022 and 2021, a hypothetical 100-basis point increase (decrease) in interest rates would not have resulted in a significant increase (decrease) in the fair values of the fixed-income instruments. In addition, a hypothetical 100-basis point increase (decrease) in interest rates would not have resulted in a material increase (decrease) of cash flows attributable to such fixed-income instruments.

The vast majority of our outstanding financial debts are straight bonds with fixed interest rates and are therefore not affected by movements in interest rates.

Equity price sensitivity

Fund investments and equity securities held by the Novartis Venture Fund are valued at fair value through profit and loss. Equity securities held as strategic investments, typically held outside the Novartis Venture Fund, are generally designated at date of acquisition as financial assets valued at fair value through other comprehensive income with no subsequent recycling through profit and loss.

The fair value of these fund investments and equity securities was USD 1.6 billion as of December 31, 2022 (December 31, 2021: USD 2.2 billion). The fair values of these investments are impacted by the volatility of the stock market, valuation parameters applied (for non-listed equities) and changes in general economic factors. This analysis assumes that all other variables, in particular interest rates, remain constant. A hypothetical increase or decrease of 15% in the risk factors would have impacted the Group's consolidated income statement as presented below:

(USD millions)	**2022**	2021
15% increase in equity prices	109	154
15% decrease in equity prices	– 109	– 154

A hypothetical increase or decrease of 15% in the risk factors would have impacted the Group's consolidated equity as presented below:

(USD millions)	**2022**	2021
15% increase in equity prices	124	179
15% decrease in equity prices	– 124	– 179

30. Events subsequent to the December 31, 2022, consolidated balance sheet date

South Korea investigation – Concluded matter
In January 2023, the Supreme Court dismissed the appeal by the Seoul Western District Prosecutor on the criminal investigation on, among other things, allegations that Novartis Korea utilized medical journals to provide inappropriate economic benefits to healthcare professionals (HCPs). This matter is now concluded. For additional information see Note 20.

Dividend proposal for 2022 and approval of the Group's 2022 consolidated financial statements
On January 31, 2023, the Novartis AG Board of Directors proposed the acceptance of the 2022 consolidated financial statements of the Novartis Group for approval by the Annual General Meeting on March 7, 2023. Furthermore, also on January 31, 2023, the Board proposed a dividend of CHF 3.20 per share to be approved at the Annual General Meeting on March 7, 2023. If approved, total dividend payments would amount to approximately USD 7.3 billion (2021: USD 7.5 billion), using the CHF/USD December 31, 2022, exchange rate.

31. Principal Group subsidiaries and associated companies

The following table lists the principal subsidiaries controlled by Novartis, associated companies in which Novartis is deemed to have significant influence, and foundations required to be consolidated under IFRS. It includes all subsidiaries, associated companies and consolidated foundations 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.

As at December 31, 2022		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%
Australia			
Novartis Australia Pty Ltd, Macquarie Park, NSW	AUD	2	100%
Novartis Pharmaceuticals Australia Pty Ltd, Macquarie Park, NSW	AUD	3.8 m	100%
Sandoz Pty Ltd, Macquarie Park, NSW	AUD	11.6 m	100%
Austria			
Novartis Austria GmbH, Vienna	EUR	1.0 m	100%
Novartis Pharma GmbH, Vienna	EUR	1.1 m	100%
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			
Novartis Pharma NV, Vilvoorde	EUR	72.1 m	100%
Sandoz NV, Vilvoorde	EUR	19.2 m	100%
Alcon – Couvreur NV, Puurs	EUR	110.6 m	100%
Bermuda			
Novartis Investment Ltd., Hamilton[2]	USD	12 000	100%
Novartis Securities Investment Ltd., Hamilton	CHF	30 000	100%
Novartis Finance Services Ltd., Hamilton	CHF	20 000	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	507.1 m	100%
Sandoz do Brasil Indústria Farmacêutica Ltda., Cambé, PR	BRL	190.0 m	100%
Canada			
Novartis Pharmaceuticals Canada Inc., Dorval, Quebec	CAD	1.2 m	100%
Sandoz Canada Inc., Boucherville, Quebec	CAD	80.8 m	100%
Chile			
Novartis Chile S.A., 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 Technical Development Co., Ltd., Changshu	USD	12.0 m	100%
Shanghai Novartis Trading Ltd., Shanghai	USD	3.2 m	100%
Sandoz (China) Pharmaceutical Co., Ltd., Zhongshan	USD	57.6 m	100%
Colombia			
Novartis de Colombia S.A., Santafé de Bogotá	COP	7.9 bn	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%
Denmark			
Novartis Healthcare A/S, Copenhagen	DKK	14.0 m	100%
Sandoz A/S, Copenhagen	DKK	12.0 m	100%
Ecuador			
Novartis Ecuador S.A., Quito	USD	4.0 m	100%
Egypt			
Novartis Pharma S.A.E., Cairo	EGP	1.3 bn	99.96%
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, 2022		Share capital[1]	Equity interest
France			
Novartis Groupe France S.A., Rueil-Malmaison	EUR	903.0 m	100%
Novartis Pharma S.A.S., Rueil-Malmaison	EUR	43.4 m	100%
Novartis Gene Therapies France SAS, Rueil-Malmaison	EUR	10 000	100%
Advanced Accelerator Applications S.A., Rueil-Malmaison	EUR	9.6 m	99.23%
Advanced Accelerator Applications Molecular Imaging France, Saint-Genis-Pouilly	EUR	7.5 m	99.23%
CELLforCURE, Les Ulis	EUR	4.2 m	100%
Sandoz S.A.S., Levallois-Perret	EUR	5.4 m	100%
Germany			
Novartis Deutschland GmbH, Nuremberg	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, Holzkirchen	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%
Greece			
Novartis (Hellas) S.A.C.I., Metamorphosis / Athens	EUR	233.9 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	123.5 m	70.68%
Novartis Healthcare Private Limited, Mumbai	INR	60.0 m	100%
Sandoz Private Limited, Mumbai	INR	32.0 m	100%
Indonesia			
PT. Novartis Indonesia, Jakarta	IDR	7.7 bn	100%
Ireland			
Novartis Ireland Limited, Dublin	EUR	25 000	100%
Novartis Integrated Services Limited, Cork City	EUR	100	100%
Novartis Gene Therapies EU Limited, Dublin	EUR	100	100%
Israel			
Novartis Israel Ltd., Tel Aviv	ILS	1 000	100%
Italy			
Novartis Farma S.p.A., Milan	EUR	18.2 m	100%
Advanced Accelerator Applications (Italy) S.r.l., Pozzilli	EUR	119 000	99.23%
Sandoz S.p.A., Origgio	EUR	1.7 m	100%
Japan			
Novartis Pharma K.K., Tokyo	JPY	100.0 m	100%
Ciba-Geigy Japan Limited, Tokyo	JPY	100.0 m	100%
Sandoz K.K., Tokyo	JPY	100.0 m	100%
Latvia			
Novartis Baltics SIA, Riga	EUR	3.0 m	100%
Luxembourg			
Novartis Investments S.à r.l., Luxembourg City[2]	USD	100.0 m	100%
Novartis Finance S.A., Luxembourg City	USD	100 000	100%
Malaysia			
Novartis Corporation (Malaysia) Sdn. Bhd., Petaling Jaya	MYR	3.3 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%
Morocco			
Novartis Pharma Maroc SA, Casablanca	MAD	80.0 m	100%
Netherlands			
Novartis Netherlands B.V., Amsterdam	EUR	1.4 m	100%
Novartis Pharma B.V., Amsterdam	EUR	4.5 m	100%
IDB Holland BV, Baarle-Nassau	EUR	18 000	99.23%
Sandoz B.V., Almere	EUR	907 560	100%
New Zealand			
Novartis New Zealand Ltd, Auckland	NZD	820 000	100%

As at December 31, 2022		Share capital[1]	Equity interest
Norway			
Novartis Norge AS, Oslo	NOK	1.5 m	100%
Pakistan			
Novartis Pharma (Pakistan) Limited, Karachi	PKR	6.7 bn	99.99%
Panama			
Novartis Pharma (Logistics), Inc., Panama City	USD	10 000	100%
Philippines			
Novartis Healthcare Philippines, Inc., Makati City	PHP	298.8 m	100%
Sandoz Philippines Corporation, Makati City	PHP	30.0 m	100%
Poland			
Novartis Poland Sp. z o.o., Warsaw	PLN	44.2 m	100%
Sandoz Polska Sp. z o.o., Warsaw	PLN	25.6 m	100%
Lek S.A., Strykow	PLN	11.4 m	100%
Portugal			
Novartis Portugal, S.G.P.S., 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%
Romania			
Novartis Pharma Services Romania S.R.L., Bucharest	RON	3.0 m	100%
Sandoz S.R.L., Targu-Mures	RON	119.5 m	100%
Russian Federation			
Novartis Pharma LLC, Moscow	RUB	20.0 m	100%
Novartis Neva LLC, St. Petersburg	RUB	500.0 m	100%
JSC Sandoz, Moscow	RUB	57.4 m	100%
Saudi Arabia			
Novartis Saudi Ltd., Riyadh	SAR	30.0 m	100%
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%
Slovakia			
Novartis Slovakia s.r.o., Bratislava	EUR	2.0 m	100%
Slovenia			
Lek Pharmaceuticals d.d., Ljubljana	EUR	48.4 m	100%
Sandoz Pharmaceuticals d.d., Ljubljana	EUR	1.5 m	100%
South Africa			
Novartis South Africa (Pty) Ltd, Midrand	ZAR	86.3 m	100%
Sandoz South Africa (Pty) Ltd, Midrand	ZAR	3.0 m	100%
South Korea			
Novartis Korea Ltd., Seoul	KRW	24.5 bn	100%
Spain			
Novartis Farmacéutica, S.A., Barcelona	EUR	63.0 m	100%
Advanced Accelerator Applications Iberica, S.L.U., Esplugues de Llobregat	EUR	22.6 m	99.23%
Sandoz Farmacéutica S.A., Madrid	EUR	270 450	100%
Sandoz Industrial Products S.A., Les Franqueses del Vallés / Barcelona	EUR	9.3 m	100%
Abadia Retuerta S.A., Sardón de Duero / Valladolid	EUR	6.0 m	100%
Sweden			
Novartis Sverige AB, Stockholm	SEK	5.0 m	100%
Switzerland			
Novartis International AG, Basel	CHF	10.0 m	100%
Novartis Holding AG, Basel[2]	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[3]	--	--	--
Novartis Stiftung für Kaderausbildung, Basel[3]	--	--	--
Novartis-Mitarbeiterbeteiligungsstiftung, Basel[3]	--	--	--
Novartis Stiftung für Mensch und Umwelt, Basel[3]	--	--	--
Stiftung der Novartis AG für Erziehung, Ausbildung und Bildung, Basel[3]	--	--	--
Novartis Overseas Investments AG, Basel	CHF	1.0 m	100%
Japat AG, Basel	CHF	50 000	100%
Novartis Pharma AG, Basel[2]	CHF	350.0 m	100%
Novartis Pharma Services AG, Basel	CHF	20.0 m	100%
Novartis Pharma Schweizerhalle AG, Muttenz	CHF	18.9 m	100%
Novartis Pharma Stein AG, Stein	CHF	251 000	100%
Novartis Pharma Schweiz AG, Risch	CHF	5.0 m	100%
Cellerys AG, Schlieren	CHF	129 630	20%
Arctos Medical AG, Bern	CHF	360 020	100%
Novartis Innovative Therapies AG, Risch	CHF	100 000	100%
Advanced Accelerator Applications International SA, Geneva	CHF	9.3 m	99.23%
Sandoz AG, Basel[2]	CHF	5.0 m	100%
Sandoz Pharmaceuticals AG, Risch	CHF	100 000	100%

As at December 31, 2022		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%
Turkey			
Novartis Saglik, Gida ve Tarim Ürünleri Sanayi ve Ticaret A.S., Istanbul	TRY	448.0 m	100%
Farmanova Saglik Hizmetleri Ltd. Sti., Istanbul	TRY	6.7 m	100%
Sandoz Ilaç Sanayi ve Ticaret A.S., Istanbul	TRY	880.0 m	99.99%
Sandoz Grup Saglik Ürünleri Ilaçlari Sanayi ve Ticaret A.S., Gebze – Kocaeli	TRY	96.0 m	100%
Ukraine			
Sandoz Ukraine LLC, Kyiv	UAH	8.0 m	100%
United Arab Emirates			
Novartis Middle East FZE, Dubai	AED	7.0 m	100%
United Kingdom			
Novartis UK Limited, London	GBP	25.5 m	100%
Novartis Pharmaceuticals UK Limited, London	GBP	5.4 m	100%
Novartis Grimsby Limited, London	GBP	250.0 m	100%
Advanced Accelerator Applications (UK & Ireland), London	GBP	100	99.23%
Neutec Pharma Limited, London	GBP	7.7 m	100%
Gyroscope Therapeutics Limited, London	GBP	1 492	100%
Sandoz Limited, Frimley / Camberley	GBP	2.0 m	100%
United States of America			
Novartis Corporation, East Hanover, NJ	USD	72.2 m	100%
Novartis Finance Corporation, East Hanover, NJ[2]	USD	1 000	100%
Novartis Capital Corporation, East Hanover, NJ	USD	1	100%
Novartis Services, Inc., East Hanover, NJ	USD	1	100%
Novartis US Foundation, East Hanover, NJ[3]	--	--	--
Novartis Pharmaceuticals Corporation, East Hanover, NJ[2]	USD	650	100%
Advanced Accelerator Applications USA, Inc., Millburn, NJ	USD	1	99.23%
Novartis Gene Therapies, Inc., Bannockburn, IL	USD	1	100%
Novartis Technology LLC, East Hanover, NJ	--	--	--
Novartis Institutes for BioMedical Research, Inc., Cambridge, MA	USD	1	100%
Cadent Therapeutics, Cambridge, MA	USD	0.1	100%
Endocyte, Inc., East Hanover, NJ	USD	1	100%
Navigate BioPharma Services, Inc., Carlsbad, CA	USD	1	100%
The Medicines Company, East Hanover, NJ	USD	1 000	100%
Sandoz Inc., Princeton, NJ	USD	25 000	100%
Oriel Therapeutics, Inc., Durham, NC	USD	50.0 m	100%
Fougera Pharmaceuticals Inc., Melville, NY	USD	1	100%
Eon Labs, Inc., Princeton, NJ	USD	1	100%
Venezuela			
Novartis de Venezuela, S.A., Caracas	VES	0	100%
Vietnam			
Novartis Vietnam Company Limited, Ho Chi Minh City	VND	70 bn	100%

In addition, the Group is represented by subsidiaries and associated companies with total assets or net sales to third parties below USD 25 million in the following countries: Bosnia and Herzegovina, Bulgaria, Cameroon, Dominican Republic, Ghana, Guatemala, Ivory Coast, Kazakhstan, Kenya, Kuwait, North Macedonia, Nigeria, Peru, Senegal and Uruguay.

[1] Share capital may not reflect the taxable share capital and does not include any paid-in surplus.

[2] Significant subsidiary under SEC Regulation S-X Rule 1-02(w)

[3] Fully consolidated Foundation

m = million; bn = billion

Report of Independent Registered Public Accounting Firm

To the shareholders and the Board of Directors of Novartis AG

Opinions on the Consolidated Financial Statements and Internal Control Over Financial Reporting
We have audited the accompanying consolidated balance sheet of Novartis AG, and its consolidated subsidiaries (the Group) as of December 31, 2022, the related consolidated statements of income, comprehensive income, changes in equity, and cash flows for the year ended December 31, 2022, and the related notes (collectively, the consolidated financial statements). We also have audited the Group's internal control over financial reporting as of December 31, 2022, 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 Group as of December 31, 2022, and the results of its operations and its cash flows for the year ended December 31, 2022, in conformity with International Financial Reporting Standards ("IFRS") as issued by the International Accounting Standards Board. Also in our opinion, the Group maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022 based on criteria established in Internal Control – Integrated Framework (2013) issued by the COSO.

Basis for Opinions
The Group's management is 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 accompanying Report of Novartis Management on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Group's consolidated financial statements and an opinion on the Group'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 Group 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 audit 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 audit 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 generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) 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.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Assessment of the recoverable amount for the Leqvio and Xiidra intangible assets

As discussed in Note 1 to the consolidated financial statements, the Group determined the recoverable amount of the intangible assets other than goodwill based on the fair value less costs of disposal method for which no directly observable market inputs were available. As discussed in Note 11, the Group has intangible assets in its Innovative Medicines Division other than goodwill totaling USD 29 826 million as at December 31, 2022, a portion of which related to the currently marketed products *Leqvio* and *Xiidra*.

We identified the assessment of the recoverable amount, specifically the sales forecasts of the *Leqvio* and *Xiidra* intangible assets, as a critical audit matter. Significant auditor judgment and subjectivity was required to assess the sales forecasts assumptions which were a significant input in the determination of the recoverable amount of these intangible assets.

The following are the primary procedures we performed to address this critical audit matter:

- We evaluated the design and tested the operating effectiveness of a certain internal control related to the Group's intangible asset impairment process for Leqvio and Xiidra, including the development of the sales forecasts;
- We evaluated the reasonableness of management's sales forecasts for Leqvio and Xiidra by (1) comparing certain underlying assumptions to company-specific operational information and management's communications to the board of directors, (2) comparing the most recent sales performance to previous drug launches, and (3) comparing certain underlying assumptions to available external market and industry data; and
- We assessed management's ability to accurately forecast sales by comparing historical sales forecasts for Leqvio and Xiidra to actual results.

Provisions for deductions from revenue related to Innovative Medicines US Managed Care, Medicare Part D and Medicaid rebate programs

As discussed in Note 1 to the consolidated financial statements, the Group records provisions for estimated rebates as a deduction from revenue when the related revenue is recognized. Rebates involve the use of assumptions and judgements in the determination of the provision rates at the time revenues are recorded. Provision rates are influenced by the terms and conditions in the individual agreements, historical experience, product sales and growth rate, population growth, product pricing, the mix of contracts and products, the level of inventory in the distribution channel, regulations, contracts, and channels and payers. As discussed in Note 22, provisions for deductions from revenue totaled USD 6 732 million as at December 31, 2022, a portion of which related to Innovative Medicines US Managed Care, Medicare Part D and Medicaid rebate programs (hereafter "IM US rebates").

We identified the estimation of the IM US rebates provisions, specifically the provision rebate rates, as a critical audit matter. The evaluation of the provision rebate rates required a high degree of subjective auditor judgment as it involved estimating the portion of the Group's revenue which will ultimately be subject to a related rebate.

The following are the primary audit procedures we performed to address this critical audit matter:

- We evaluated the design and tested the operating effectiveness of certain internal controls over the Group's IM US rebates process related to the development of the provision rebate rates;
- We developed our own independent expectation of the IM US rebates provisions, by using internal information, including historical experience and trend analysis of actual rebate claims paid, and comparing it to management's actual recorded balances;
- For a sample of actual rebate claims processed by the Group, we evaluated the claims against the contractual and mandated terms of the rebate arrangements; and
- We assessed management's ability to accurately estimate the IM US rebates provisions by comparing historically recorded provisions to the actual amount that was ultimately paid by the Group.

/s/ KPMG AG

We have served as the Company's auditor since 2022.

Basel, Switzerland
January 31, 2023

Report of Independent Registered Public Accounting Firm

To the shareholders and Board of Directors of Novartis AG

Opinion on the Financial Statements
We have audited the consolidated balance sheet of Novartis AG and its subsidiaries (the "Group") as of December 31, 2021, and the related consolidated income statements, consolidated statements of comprehensive income, consolidated statements of changes in equity, and consolidated statements of cash flows, for each of the two years in the period ended December 31, 2021, including the related notes appearing in item 18 (collectively referred to as the "consolidated financial statements").

In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Group as of December 31, 2021, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2021 in conformity with International Financial Reporting Standards ("IFRS") as issued by the International Accounting Standards Board.

Basis for Opinion
These consolidated financial statements are the responsibility of the Group's management. Our responsibility is to express an opinion on the Group's consolidated financial statements 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 of these consolidated financial statements in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud.

Our audits 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. We believe that our audits provide a reasonable basis for our opinion.

/s/ PricewaterhouseCoopers AG

Basel, Switzerland
February 1, 2022

We served as the Company's auditor from at least 1940 to 2022. We have not been able to determine the specific year we began serving as auditor of the Group's predecessors.

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