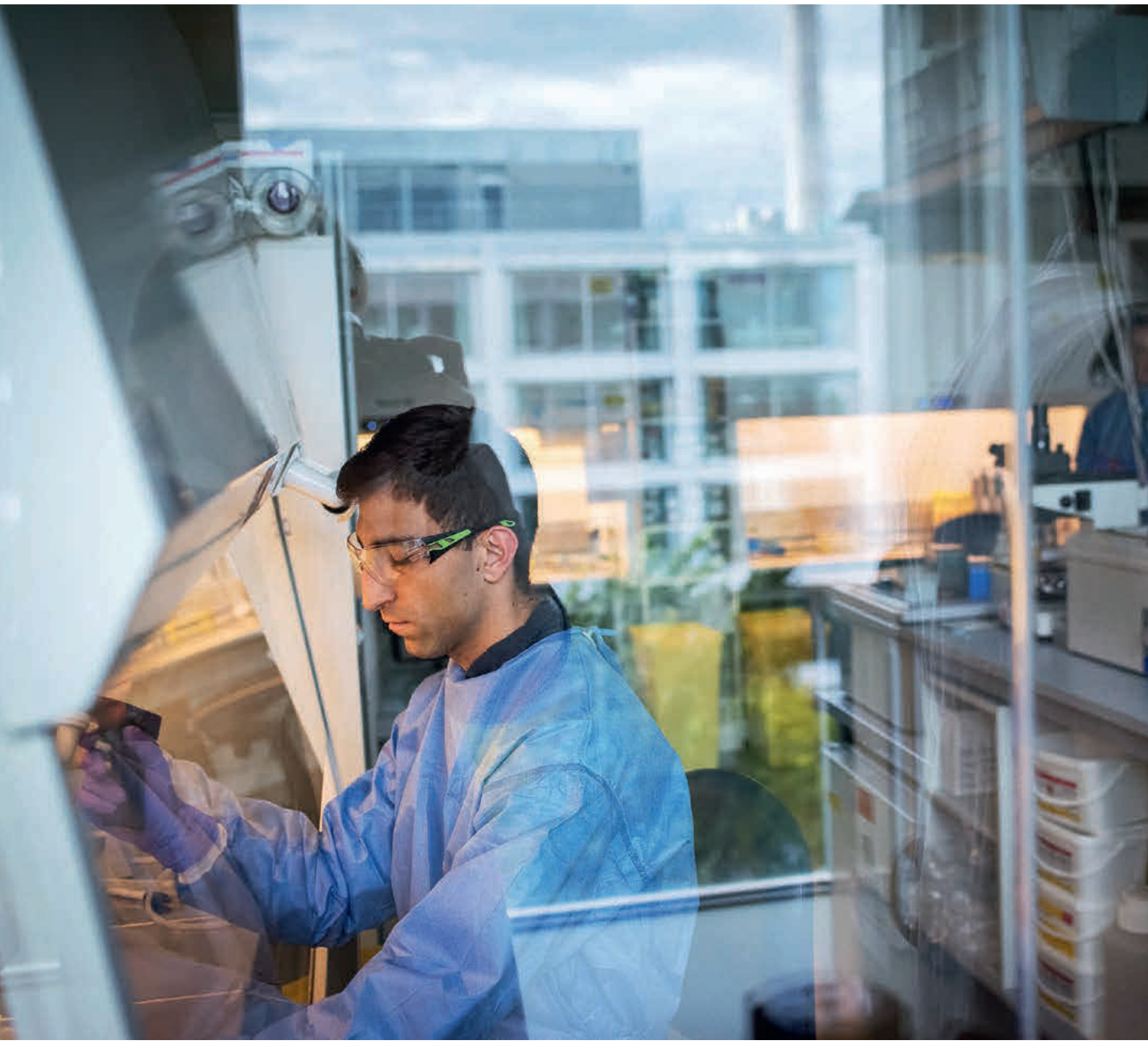
Annual Report

2017

NOVARTIS

Our mission

Our mission is to discover new ways to improve and extend people's lives. We use science-based innovation 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 provide a shareholder return that rewards those who invest their money, time and ideas in our company.



Contents

Cover photo Ratan Singh and his wife, Ram Kali, attend a health clinic in Triveni Vihar in Uttar Pradesh, India, supported by a Novartis initiative that has improved access to healthcare for India's rural poor over the past decade.

Photo below Graduate intern Felix Peix uses CRISPR genome editing technology at Novartis in Basel, Switzerland. CRISPR edits the genes of targeted cells, assisting in drug discovery and offering the potential to treat disease by deleting, repairing or replacing specific genes.

Chairman's letter

Dear shareholder,

Novartis made substantial progress in 2017. We returned Alcon to growth, launched important new products, and benefited from efficiency gains delivered by Novartis Business Services and the recently established global drug development and production organizations. These accomplishments have helped us to deliver solid performance. We increased sales by 2% in constant currencies, improved net income by 12% in constant currencies, and were able to strengthen our cash flow and core earnings per share with the objective of continuing to create value for our shareholders.

Joerg Reinhardt

With the appointment of Vasant Narasimhan as Chief Executive Officer starting February 1, the Board of Directors is confident Novartis is well placed to begin a new phase of growth and strengthen its global market position

We believe innovation will become increasingly important in view of the persistent challenges in the healthcare environment. To remain at the forefront of innovation, we have continued to strengthen our leadership. We have also enhanced our ability to develop breakthrough therapies by accelerating internal and external collaboration, pursuing bolt-on acquisitions and digitizing our operations. The creation of the Chief Digital Officer position is set to add further impetus to the transformation of Novartis.

With the appointment of Vasant Narasimhan as Chief Executive Officer starting February 1, the Board of Directors is confident Novartis is well placed to begin a new phase of growth and strengthen its global market position. As we move forward, our leadership team is focused on driving innovation and is cultivating a company culture aimed at helping us become one of the most trusted partners in the healthcare industry. On behalf of the Board of Directors, I would also like to express my gratitude to our outgoing CEO, Joseph Jimenez, who has successfully led Novartis for eight years through a challenging period of major patent expirations and laid the foundation for a strong future.

We will continue to make substantial investments in research and development and to concentrate on exploring new therapeutic pathways that help improve and extend people's lives. We are currently investigating more than 70 new molecules in areas of high unmet medical need such as cancer, respiratory disease and heart disease.

The future of healthcare

The healthcare industry is going through a transformative period marked by diverging trends.

On the one hand, digital technologies and new biotechnological discoveries allow for the development of breakthrough therapies that can help substantially improve the individual treatment of patients. At the same time, aging populations are set to lead to an increase in the cost of care due to the rise in noncommunicable diseases.

Novartis is committed to enhancing healthcare innovation to address high unmet medical needs and is prepared to leverage breakthrough technologies in the interest of patients. We are also collaborating with healthcare providers on new pricing solutions such as outcomes-based payment models that can help ease the burden on healthcare systems while at the same time supporting patients' access to quality care.

For further detail, see
→ **Our strategy** page 17

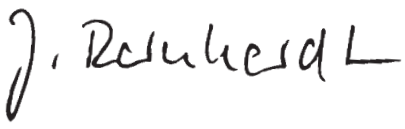
We are prepared to take calculated risks across the research portfolio and work toward translating scientific advances in fields such as genetics and immunology into pharmaceutical products. As part of these efforts, we launched three cancer therapies in 2017: *Kisqali*, *Rydapt* and *Kymriah*. *Kymriah*, developed with the University of Pennsylvania in the US, is the first approved chimeric antigen receptor T-cell (CAR-T) therapy, an innovative cell therapy that is available in the US on an industrial scale and takes personalized medicine to a new level.

Reflecting our ambition to deliver our treatments to as many patients as possible, we are also accelerating our activities to improve access to healthcare in developing countries. As part of these efforts, we expanded the reach of our Novartis Access program, which aims to help address the rise in chronic diseases in lower-income countries in Africa, Asia and South America.

We constantly seek ways to improve our corporate governance, strengthen our commitment to integrity and ethical behavior, and continue cultivating an open and transparent dialogue with our many stakeholders. We pursue engagement with patient groups, customers, shareholders and society as a whole. We are convinced that this exchange benefits our company in the long term and can also contribute to strengthening healthcare systems.

I thank you for the confidence you have placed in our company and am pleased to be able to propose a dividend increase of 2% to CHF 2.80 at the next Annual General Meeting.

Sincerely,



Joerg Reinhardt
Chairman of the Board of Directors

Chief Executive Officer's letter

Dear shareholder,

Emily Whitehead was once a little girl close to death. At just 5 years old, she developed an aggressive form of acute lymphoblastic leukemia (ALL) that chemotherapy was unable to tame. Several years later, as a last hope, she was enrolled in a clinical trial and became the first pediatric patient in the world to receive the CAR-T cell therapy now known as Kymriah. The therapy worked, and today Emily is a happy, healthy 12-year-old in complete remission.

Our ability to deliver new breakthrough treatments like *Kymriah* is one of the many reasons I am proud of our company and our performance in 2017

Our ability to deliver new breakthrough treatments like *Kymriah* is one of the many reasons I am proud of our company and our performance in 2017. Despite navigating the final year of the *Gleevec/Glivec* patent expiration, we grew Group net sales by 2% in constant currencies (cc). This performance is being driven by recently launched products such as *Cosentyx*, which reached multi-blockbuster status, and *Entresto*, which achieved USD 507 million in full-year sales, as well as oncology products such as *Promacta/Revolade* and *Tafinlar* + *Mekinist*. Sandoz is expanding access to biosimilars, and we have a leading portfolio with five biosimilars now on the market. However, Sandoz net sales were down 2% cc due to fierce price competition in the US. Alcon made significant progress on its turnaround, returning to growth and building momentum toward the end of the year, supported by the launch of innovative new products and continued double-digit growth in sales of *Dailies Total1* contact lenses. We've updated Alcon's strategic plan, indicating its potential to grow sales at or above market while delivering profitability at least in line with the industry.

Joseph Jimenez

Since 2015, we have transformed our portfolio and focused the company on leading businesses with innovation power and global scale, which contributed to our solid 2017 performance. In addition, we now have the right organizational structure in place to enable future growth. Notably, we've centralized Global Drug Development, enabling the organization to more effectively leverage new technologies such as advanced analytics to speed clinical trials and bring medicines to market faster. We're building one of the most powerful pipelines in the industry with multiple potential blockbusters, and we're pursuing strategic collaborations to further strengthen our innovation.

At the same time, we're leading the industry's shift toward outcomes-based pricing and we're piloting new commercial models using real-world evidence to help illustrate the value our products bring to patients and payers. We have implemented a novel collaboration with the US Centers for Medicare & Medicaid Services for *Kymriah* that will allow for payment only when pediatric and young adult ALL patients respond to this therapy by the end of the first month. The agreement also includes

Our unwavering commitment to R&D

Research and development (R&D) is a core part of our strategy at Novartis. We have a strong track record of innovation, delivering 16 major approvals as well as six FDA breakthrough therapy designations and 16 major submissions in 2017 alone.

Innovation is going to be more important than ever to our future success. And we can expect the environment for innovation to get tougher, with healthcare systems sharpening their focus on treatments that produce the most value for patients and society.

That is why we are working to think differently about how we innovate. Over the last year, we have made progress advancing open innovation at the Novartis Institutes for BioMedical Research, making our drug development efforts more efficient and effective, and harnessing new digital technologies that can help us measure the value our medicines deliver to society.

For further detail, see
→ **Innovation** page 42

an indication-based pricing approach, supporting payments for a medicine based on the clinical outcomes achieved. This potentially lowers prices for future indications, bringing savings to the healthcare system.

I'm also proud of the cultural shift we have made, focusing on our mission of improving and extending people's lives. We're having a significant impact on millions of patients every day and we reached nearly 1 billion patients in 2017 alone. As a purpose-driven organization, we ranked fourth on Fortune magazine's "Change the World" list in 2017, and we moved to fourth in the 2017 Dow Jones Sustainability Index World, up from seventh in 2016. We continued to expand our efforts to eliminate malaria, for example by working with Medicines for Malaria Venture to initiate a clinical trial for KAF156, our next-generation antimalarial compound with the potential to treat drug-resistant strains of the malaria parasite. We also made progress in our efforts to expand access to healthcare. For instance, our Novartis Access program, which offers a portfolio of medicines for chronic diseases at a price of USD 1 per treatment, per month, delivered more than 800 000 treatments to lower-income patients since its launch in 2015.

As many of you know, I have decided to step down as CEO of Novartis after eight years in this position and 10 years with the company. I am confident that Vasant Narasimhan is the right person to lead this company into our next growth phase, and that the changes we have made position the company for future success. I am most thankful to our associates for their creativity, energy and engagement. Our associates all over the world are committed to our mission, and they are the best in the industry. I will miss all of them. I also want to thank our Board of Directors for their support and collaboration over the years, and you – our shareholders – for your continued confidence in Novartis.

Sincerely,

Joseph Jimenez
Chief Executive Officer

Key performance indicators consolidated highlights

Financial

Key figures[1]

(in USD millions, unless indicated otherwise)

			% Change	
	2017	2016	USD	Constant currencies
Net sales to third parties	49 109	48 518	1	2
Operating income	8 629	8 268	4	7
Return on net sales (%)	17.6	17.0		
Net income	7 703	6 698	15	12
Basic earnings per share[2] (USD)	3.28	2.82	16	14
Core operating income	12 850	12 987	– 1	0
Core return on net sales (%)	26.2	26.8		
Core net income	11 391	11 314	1	2
Core earnings per share[2] (USD)	4.86	4.75	2	3
Free cash flow	10 428	9 455	10	

Share information

	2017	2016	% Change
Share price at year-end (CHF)	82.40	74.10	11
ADR price at year-end (USD)	83.96	72.84	15
Dividend[3] (CHF)	2.80	2.75	2
Payout ratio[4] (%)	87	97	
Total shareholder return[5] (% in USD)	20.4	– 13.8	

For further detail, see
→ **Our performance** page 22
→ **Our Financial Report** page 156

[1] This Annual Report includes non-IFRS financial measures such as core results, constant currencies and free cash flow. Novartis believes that investor understanding of the Group's performance is enhanced by disclosing these non-IFRS measures. A definition of non-IFRS measures used by Novartis, and further details, including reconciliation tables, can be found starting on page 179.
[2] 2017 weighted average number of shares outstanding: 2 346 million (2016: 2 378 million)
[3] Dividend 2017: proposal to shareholders for approval at the Annual General Meeting on March 2, 2018
[4] Payout ratio 2017 is calculated by converting into USD the proposed total gross dividend amount in CHF at the CHF-USD exchange rate of December 31, 2017, based on an estimated number of shares outstanding on dividend payment date, and dividing it by the USD consolidated net income attributable to shareholders of Novartis AG in the Group's 2017 consolidated financial statements.
[5] Further details related to share development and total shareholder return can be found starting on page 85.

Innovation

Key figures [1]

	2017	2016
Projects entering development pipeline [2]	**9**	5
Ongoing Phase III programs [3]	**37**	29
US FDA breakthrough therapy designations [4]	**6**	5
Major submissions (US, EU, JP) [5]	**16**	24
Major approvals (US, EU, JP) [5]	**16**	16
New molecular entity (NME) approvals [6]	**3**	3

Social

Access

	2017	2016
Total patients reached (millions)	**927**	965
Patients reached through access programs (millions)	**46**	52
People reached through training, health education and service delivery (millions) [7]	**15**	17

People

Full-time equivalent positions / headcount [8]	**121 597 / 126 457**	118 393 / 122 985
Turnover: % voluntary / % overall	**7.0 / 11.3**	7.4 / 12.2
Women in management: % of management[9] / % of Novartis Top Leaders[10] / % of Board of Directors	**41 / 27 / 23**	40 / 25 / 25
Misconduct cases reported / allegations substantiated [11]	**2 031 / 1 147**	1 804 / 1 313

Health, safety and environment [12]

Lost-time injury and illness rate (per 200 000 hours worked) [13]	**0.12**	0.08
Greenhouse gas emissions, total Scope 1 and Scope 2 (1 000 t) [14]	**1 259.9**	1 320.4

For further detail, see
→ **Innovation** page 42
→ **Social** page 66 (corporate responsibility)

[1] Includes Innovative Medicines and Sandoz biosimilars only
[2] Includes programs entering confirmatory development, based on internal R&D activities. First patient, first visit (FPFV) has occurred in post-proof-of-concept stage. Includes small molecules, biologics; new fixed-dose combinations of existing active pharmaceutical ingredients (APIs); and new target indications, defined as new disease or new line of treatment (e.g., first line vs. second line). Counted by indication and not compound
[3] Includes projects with FPFV in a Phase III study but not yet filed in the US, EU or Japan
[4] Number of breakthrough therapy designations by the US Food and Drug Administration for therapies under development by Novartis
[5] Includes small molecules, biologics; new fixed-dose combinations of existing APIs; and new target indications, defined as new disease or new line of treatment (e.g., first line vs. second line)
[6] Includes NMEs such as small molecules, biologics; in the EU, new fixed-dose combinations of existing APIs
[7] Includes reporting of the catchment of a population in the area where a program has been implemented.
[8] Headcount reflects the total number of associates in our payroll systems. Full-time equivalent adjusts headcount for associates working less than 100%. All data as of December 31
[9] Management defined by Global Job Level Architecture and Novartis Top Leaders
[10] Novartis Top Leaders comprise the approximately 350 most senior managers at Novartis, including the Executive Committee of Novartis.
[11] The number of misconduct cases reported may change, as matters may be reassessed in the course of the case lifecycle. The number of substantiated allegations may change due to the fact that investigation reports with assessments are received on an ongoing basis, which potentially leads to a difference in numbers at a later stage.
[12] 2017 environmental sustainability data published in the Annual Report are actual data for the period from January through September, and best estimates for the period from October through December. They will be updated with actual data in the first quarter of 2018. Significant deviations will be reported on our website and restated in next year's Annual Report. For more detail on health, safety and environmental sustainability, see www.novartis.com/our-company/corporate-responsibility/doing-business-responsibly/health-safety-environment
[13] Data include Novartis associates and third-party personnel managed by Novartis associates.
[14] Scope 1: combustion and process, and vehicles; Scope 2: purchased energy

2017 at a glance

Who we are

126 000
Employees worldwide (headcount)

155
Countries where Novartis products are sold

49.1 bn
Net sales (USD)

195.5 bn
Market capitalization (USD) on Dec. 31, 2017

Novartis is a global healthcare company based in Basel, Switzerland, with a history going back more than 150 years. We provide healthcare solutions that address the evolving needs of patients and societies worldwide. Novartis products are sold in about 155 countries and they reached nearly 1 billion people globally in 2017. About 126 000 people of 145 nationalities work at Novartis around the world.

For further detail, visit
→ **www.novartis.com/our-company**

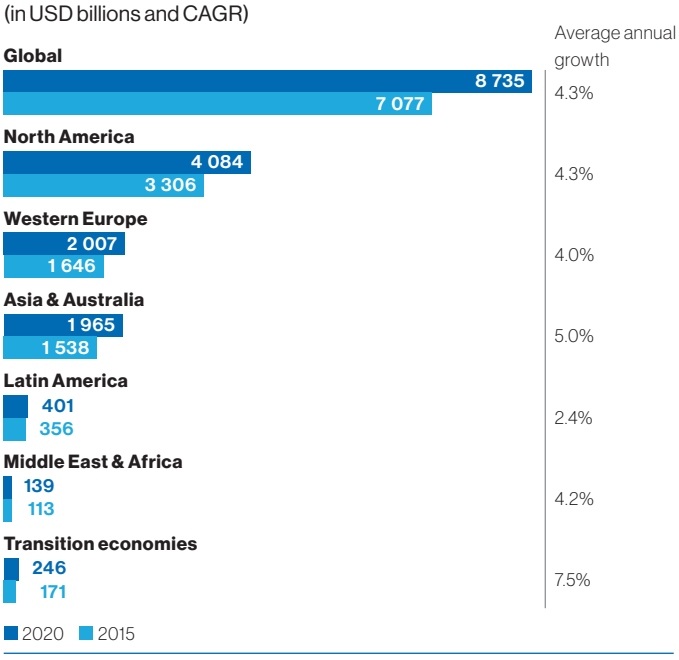
Our environment

We believe biomedical innovation will continue to accelerate in coming years, yielding new treatments that will have an unparalleled impact on humanity. Better understanding of the molecular mechanisms of disease and new types of therapies promise to yield powerful new medicines. The trend toward patient-specific precision treatments will likely accelerate.

The adoption of more digital technology in science and healthcare is likely to transform everything from drug research to how doctors care for patients. Proliferating sensor technology is helping researchers and doctors gather more information about their patients' responses to treatment. But other trends in society raise significant challenges. Rapidly aging populations and the growth in chronic illnesses such as heart disease and cancer continue to increase demand for care and put pressure on health systems around the world. These trends raise the importance of delivering true innovation that produces better health outcomes for patients and society – and doing this more efficiently.

Expected healthcare spending 2015–2020

(in USD billions and CAGR)



Source: World Industry Outlook, Healthcare and Pharmaceuticals
The Economist Intelligence Unit, June 2017

For further detail, see
→ **Our environment** page 15

Our strategy

Our mission is to discover new ways to improve and extend people's lives. Our vision is to be a trusted leader in changing the practice of medicine. Our strategy is to use science-based innovation to deliver better patient outcomes in growing areas of healthcare.

We believe innovation leadership will be increasingly important to respond to future opportunities and challenges, as we strive to continue creating value for our company, our shareholders and society. We are implementing our strategy with a focus on further strengthening innovation, driving a digital transformation, and reinforcing our position in growing areas of healthcare.

We believe innovation leadership will be increasingly important to respond to future opportunities and challenges

Our values

A strong culture anchored in a talented and committed workforce enables us to implement our strategy. We work to reinforce a company culture that supports our people as they grapple with a rapidly evolving healthcare industry and the shifting expectations of society. Our six values – innovation, quality, collaboration, performance, courage and integrity – help guide us as we select new recruits, shape employee development programs, and assess individual performance and rewards.

Our structure

In 2017, we focused on fully implementing the integrated drug development and manufacturing structures we established a year earlier. With these latest steps in our transformation, we believe our organization is well positioned to drive forward our strategy.

Research and development is at the core of our company. The **Novartis Institutes for BioMedical Research** (NIBR) is the innovation engine of Novartis. NIBR focuses on discovering new drugs that can change the practice of medicine. The **Global Drug Development** (GDD) organization oversees the development of new medicines discovered by our researchers and partners. GDD allocates resources to the most promising development projects.

Our three divisions focus on growing areas of healthcare.

- The **Innovative Medicines Division** has two business units: Novartis Pharmaceuticals, with patented treatments in the areas of ophthalmology, immunology and dermatology, neuroscience, respiratory and cardiometabolic; and Novartis Oncology, with treatments for cancers and rare diseases.
- **Sandoz** focuses on high-quality, affordable generics and biosimilars.
- **Alcon** offers one of the world's widest selections of ophthalmic surgical devices and vision care products.

Novartis Operations includes our global service and manufacturing organizations. They focus on operational excellence and improving efficiency. **Novartis Technical Operations** handles manufacturing of innovative medicines and Sandoz products. **Novartis Business Services** consolidates support services across our organization.

For further detail, see
→ **Our strategy** page 17
→ **Our culture and values** page 18
→ **Our structure** page 19

2017 at a glance (continued)

Performance highlights

Financial

49.1 bn
Net sales (USD)

12.9 bn
Core operating income (USD)

8.6 bn
Operating income (USD)

7.7 bn
Net income (USD)

10.4 bn
Total free cash flow (USD)

Novartis delivered solid performance in 2017 as strong sales of our growth drivers, including *Cosentyx*, *Entresto*, *Promacta/Revolade*, and *Tafinlar + Mekinist*, continued to offset the impact of generic competition for our cancer drug *Gleevec/Glivec*. Our results underscore the breadth and strength of our product portfolio and highlight our success at steering through patent expirations.

Sales increased in the Innovative Medicines Division and the Alcon eye care division returned to growth. Sandoz Division sales declined due to increased price competition in the US.

Novartis net sales were USD 49.1 billion, up 1% in reported terms and up 2% in constant currencies (cc). Sales volumes increased 7%, more than offsetting the impact of patent expirations. Operating income in 2017 was USD 8.6 billion (+4%, +7% cc), mainly driven by higher sales, productivity improvements and lower amortization, which were partly offset by generic competition and higher marketing investments. Net income was USD 7.7 billion (+15%, +12% cc), benefiting from growth in operating income and income from associated companies. Earnings per share were USD 3.28 (+16%, +14% cc), benefiting from higher net income and our share buyback program. Free cash flow rose 10% to USD 10.4 billion, driven mainly by improved cash flow from operating activities.

We also present our core results, which exclude the impact of amortization, impairments, disposals, acquisitions, restructurings and other significant items, to help investors understand our underlying performance. Core operating income was USD 12.9 billion (–1%, 0% cc). Core operating income margin in constant currencies decreased 0.3 percentage points, mainly due to generic competition for *Gleevec/Glivec*, and higher launch investments, which were partially offset by expanded gross margins and productivity improvements. Exchange rate movements had an additional negative impact of 0.3 percentage points, yielding a net decrease of 0.6 percentage points to 26.2% of net sales. Core net income was USD 11.4 billion (+1%, +2% cc). Core earnings per share were USD 4.86 (+2%, +3% cc).

Innovation

200+
Projects in clinical development

9.0 bn
Research and development spend (USD)

Our research and development team made strong progress in 2017. We received 16 major approvals, made 16 major submissions, and received six breakthrough therapy designations from the US Food and Drug Administration (FDA).

The FDA approved *Kymriah* (tisagenlecleucel, formerly CTL019) to treat children and young adults with a deadly cancer called acute lymphoblastic leukemia. Novartis was the first company to receive approval for this type of novel immunocellular therapy, which reprograms a patient's own T-cells to fight cancer. Novartis also filed for FDA approval for *Kymriah* to treat adults with the most common form of non-Hodgkin's lymphoma.

Several targeted cancer therapies were also approved. They include *Kisqali* (ribociclib, formerly LEE011), approved in 45 countries – including the US and in Europe – to treat advanced or metastatic breast cancer, and *Rydapt* (midostaurin), approved in the US and EU for acute myeloid leukemia and advanced systemic mastocytosis.

Sandoz built on its leadership in biosimilars, with European approvals for *Rixathon* (rituximab) and *Erelzi* (etanercept). Alcon received European approval for the *Clareon* IOL with *AutonoMe*, an automated, disposable, pre-loaded IOL delivery system for cataract surgery.

Social

46 m

Patients reached through access programs

15 m

People reached through health education programs

Novartis Access, our portfolio of medicines to help fight chronic diseases in lower-income countries, signed agreements with three countries, bringing the total to six. The program delivered more than 685 000 treatments – each providing a one-month supply of medicine – in 2017, and it has delivered a total of more than 800 000 treatments since its 2015 launch. Starting in 2018, we will broaden Novartis Access into the private sector in select countries.

Along with Novartis Oncology, Novartis Access also partnered with the American Society for Clinical Pathology and the American Cancer Society to improve the management of cancer in sub-Saharan Africa.

The Novartis Foundation and partners launched Better Hearts Better Cities to address hypertension in low-income urban communities with interventions that go beyond healthcare. The approach is being tested in Mongolia, Senegal and Brazil.

Our Healthy Family programs reached more than 7.7 million people through health education sessions in India, Kenya and Vietnam. Nearly 580 000 people attended specific health camps. In India, the program celebrated its 10th anniversary; it covers 11 states and approximately 14 000 villages and small towns that are home to more than 32 million people. At the same time, the Kenya program broke even, joining India and Vietnam in this regard.

We took steps to further strengthen integrity and compliance, including approving a new Professional Practices Policy, updating our Anti-Bribery Third-Party Guideline, and strengthening our anti-bribery due diligence process. We published a US Transparency and Patient Access Report, which addresses important questions about our business practices in the US.

Novartis was recognized in sustainability rankings, including Fortune magazine's "Change the World" list (No. 4) and "World's Most Admired Companies" list for the pharmaceutical industry (No. 2). We were also fourth in the 2017 Dow Jones Sustainability Index (DJSI) World, and we re-entered the DJSI Europe Index for the first time in four years. We were again recognized as one of the world's most sustainable companies by Corporate Knights, and we were one of 73 companies worldwide to make CDP's Water A List.

For further detail, see
→ **Performance** page 22

Governance and compensation

We continued to pursue excellence in corporate governance in 2017. We further refreshed the Board of Directors with the addition of Frans van Houten, reinforcing our expertise in the area of digital health solutions. We benefited from the experience and knowledge of new Board members, appointed new heads of three Board committees, and intensified our shareholder engagement.

Key focus areas for our Board in 2017 included CEO succession; strategic options for Alcon; the overall Novartis strategy, including the digital strategy; the culture of our company; compliance; and our compensation system.

During 2017, we also reviewed and adapted the compensation systems for the Board and Executive Committee, and enhanced our disclosures in the 2017 Compensation Report.

For further detail, see
→ **Governance** page 82
→ **Compensation** page 118


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Photo Mingzhu Tao, 68, gives a helping hand to an elderly resident at a nursing home in Shanghai, China. The changing patterns of life in Chinese cities mean old people are increasingly being cared for at institutions, and by each other, rather than by their families as was traditionally the norm.

Strategic overview

Surging innovation in medical science and technology is spawning dramatic advances in healthcare. At the same time, growing and graying populations continue to raise challenges for healthcare systems worldwide. This dynamic environment puts a premium on finding new treatment approaches that deliver clear value to patients and society.

1 800

The number of human proteins that are possible drug targets, of which only about 600 are actually targeted by currently approved therapies

1.4 bn

The projected number of people in the world aged 60 or over by 2030, up from less than 1 billion today

4.3 %

The expected annual average growth in healthcare spending worldwide between 2015 and 2020

Our strategic approach

Our mission

Discover new ways to improve and extend people's lives

Our vision

Be a trusted leader in changing the practice of medicine

Our strategy

Science-based innovation

Better patient outcomes

Growing areas of healthcare

Our values

Innovation
Quality
Collaboration
Performance
Courage
Integrity

Long-term value creation

→ page 17

Our culture and values

Our company culture is underpinned by clear values that guide how we select and develop employees as well as assess their performance.

→ page 18

Our structure

Our integrated organization is helping us remain an innovation leader and supports ongoing efforts to make operations more efficient and effective.

→ page 19

Our environment

The healthcare industry is entering a phase of exhilarating progress and change. Over the next two decades, we believe biomedical innovation will continue to accelerate – spawning new treatments that will have unparalleled impact on humanity, with the potential to tame scourges like cancer and heart disease. The digital revolution that is now gaining momentum in healthcare is likely to transform everything from drug research and development to how doctors diagnose and treat diseases. These trends promise to help society address the changing healthcare needs of aging populations and produce better health outcomes for patients.

Accelerating biomedical innovation

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

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

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

Transforming how doctors diagnose and treat diseases

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

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

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

Better understanding of the molecular mechanisms of disease, coupled with new types of therapies, promises to yield powerful new medicines for patients

Transforming drug research and development

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

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

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

Our environment (continued)

Aging populations

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

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

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

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

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

Better health outcomes for patients

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

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

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

For more detailed discussion about the risks facing Novartis and what we're doing to mitigate them, see pages 175-179.

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

Our strategy

Science and innovation remain at the heart of our strategy, while our mission and vision are anchored in the important role we play in society. Together, our mission, vision and strategy help guide us through a world that is experiencing rapid advances in technology to deliver better health outcomes for patients and society.

Our mission is to discover new ways to improve and extend people's lives

Our vision is to be a trusted leader in changing the practice of medicine

Our strategy is to use science-based innovation to deliver better patient outcomes in growing areas of healthcare

Our mission sums up our company's reason for being. Our vision is an aspiration to strive for, even as society's expectations about healthcare are changing. Our strategy describes where we will channel our energy and how we expect to continue creating value for our company, shareholders and society.

We have been consistent in our commitment to science-based innovation. We believe future trends in our industry and society will only increase the importance of innovation leadership.

As we implement our strategy, we have identified key priorities in the areas of innovation, digital technology and scale.

Further strengthen innovation
Novartis has long been an innovation leader, and we are taking steps designed to ensure we remain one. We continue to maintain our investment in research and development (R&D) at a level that is among the highest in the industry. And we are ruthlessly prioritizing our R&D spending to focus resources on the projects most likely to deliver true innovations with the potential to change the practice of medicine.

In an increasingly fragmented research landscape, we are working to break down barriers to collaboration both inside and outside our company to improve our access to the best early-stage science.

Drive a digital transformation
We are finding new ways to harness the power of digital technology in all aspects of our business – including R&D, sales and operations – to improve effectiveness and efficiency. A particular focus is advanced analytics. Artificial intelligence and other technologies can help us extract insights from vast pools of data from clinical trials, from our daily interactions with physicians, and from other sources.

Growing areas of healthcare
We will prioritize further steps to reinforce our presence in growing areas of healthcare with unmet needs. We aim to strengthen our position in specific therapeutic areas in innovative medicines (including oncology, cardiology, ophthalmology, and immunology and dermatology), as well as in biosimilars and some specialty generics. Geographically, we see scope to reinforce our presence in some key markets, such as the US and Japan, and in emerging markets that are long-term growth opportunities, such as China.

We believe future trends in our industry and society will only increase the importance of innovation leadership

Looking ahead, we think success will be driven by our scientific expertise, how well we leverage new technologies to improve productivity, and our ongoing ability to deliver value to our customers and patients.

Photo Ioanna Meli, 86, finds plenty to laugh about at her home on Ikaria, a Greek island identified as one of the places in the world where people live the longest. Mrs. Meli has been married to her husband, Yannis, for 70 years. Experts believe family and social activity are two keys to longevity in places like Ikaria, along with low levels of meat eating and smoking, and frequent moderate physical activity.

Our culture and values

We are building a company culture that supports the success of Novartis through clear values to guide our people in their work. A strong culture rooted in a talented and committed workforce is essential for implementing our strategy.

Our culture

We work to reinforce a company culture that supports our people as they navigate a rapidly evolving healthcare environment and shifting expectations from society.

Our values define our culture as we pursue the Novartis strategy in line with our mission and vision. They describe how we get things done, including the professional behavior we expect from our employees. We use six values to guide us as we pursue new talent, shape employee development programs, and assess individual performance and rewards. Training programs ensure people know our values as well as how to apply them at work.

Our values

INNOVATION

Innovation is at the heart of Novartis and key for our strategy and success. We nurture a culture of innovation by encouraging people to experiment and take intelligent risks. We encourage unconventional thinking that leads to new solutions to challenges in all of our activities, including in science, healthcare and business.

QUALITY

Delivering high quality is critical to ensuring a reliable supply of important medicines and earning the trust of our customers and society. Our focus on quality excellence includes continuously enhancing our standards, technology and training for our people.

COLLABORATION

We foster teamwork among our employees and with external partners to efficiently deliver innovative new products to patients and healthcare providers. This capitalizes on the diversity and creativity of our global staff.

PERFORMANCE

People at Novartis focus on delivering results, and they often make extraordinary efforts to achieve their goals. We aim to reinforce that focus on personal and collective achievement while maintaining high ethical standards.

COURAGE

We want a culture where our associates speak out, challenge conventional thinking, and stand up for their ideas. We also want them to have the courage to do the right thing in the face of resistance or moral dilemmas. They need the fortitude to take smart risks.

Photo Dr. Manuel Cobos carries out a transplant operation on a patient with liver failure in Argentina. An epidemic of chronic liver disease linked to obesity may increase the need for such drastic surgery. But new therapies could ultimately become available, including compounds under development by Novartis.

INTEGRITY

High performance with integrity is fundamental to the way we operate and is critical to maintaining the trust of society and governments. Our Code of Conduct sets high ethical standards, and mandatory training for employees underscores the importance of adhering to these standards at work. We also enforce our code, investigating allegations of misconduct and taking decisive corrective action when necessary.

For further detail, see
→ **People** page 28

Our structure

In 2017, we focused on fully implementing the integrated drug development and manufacturing structures we established a year earlier. With these latest steps in our transformation, we believe our organization is now well positioned to drive forward our strategy – leading in innovation, harnessing new technology, and making the most of our global scale.

Research and development is at the core of our company, with 23 000 scientists, physicians and business professionals worldwide focused on discovering new treatments and developing them for patients.

The Novartis Institutes for BioMedical Research

The Novartis Institutes for BioMedical Research (NIBR) is the innovation engine of Novartis. NIBR focuses on discovering new drugs that can change the practice of medicine.

Global Drug Development

The Global Drug Development (GDD) organization oversees the development of new medicines discovered by our researchers and partners. GDD regularly evaluates the potential new products in our pipeline and ensures we allocate resources to the most promising development projects. It also drives the adoption of common standards and procedures, best practices and new technologies, with the aim of greater efficiency and effectiveness.

Our divisions

INNOVATIVE MEDICINES

The Innovative Medicines Division has two business units. Novartis Pharmaceuticals focuses on patented treatments in the areas of ophthalmology, immunology and dermatology, neuroscience, respiratory and cardio-metabolic. Novartis Oncology is focused on treatments for a variety of cancers and rare diseases.

SANDOZ

Sandoz offers patients and healthcare professionals high-quality, affordable generics and biosimilars.

ALCON

With its Surgical and Vision Care businesses, Alcon offers one of the world's widest selections of eye care devices – from sophisticated equipment for delicate eye surgery to a wide portfolio of advanced contact lenses.

Novartis Operations

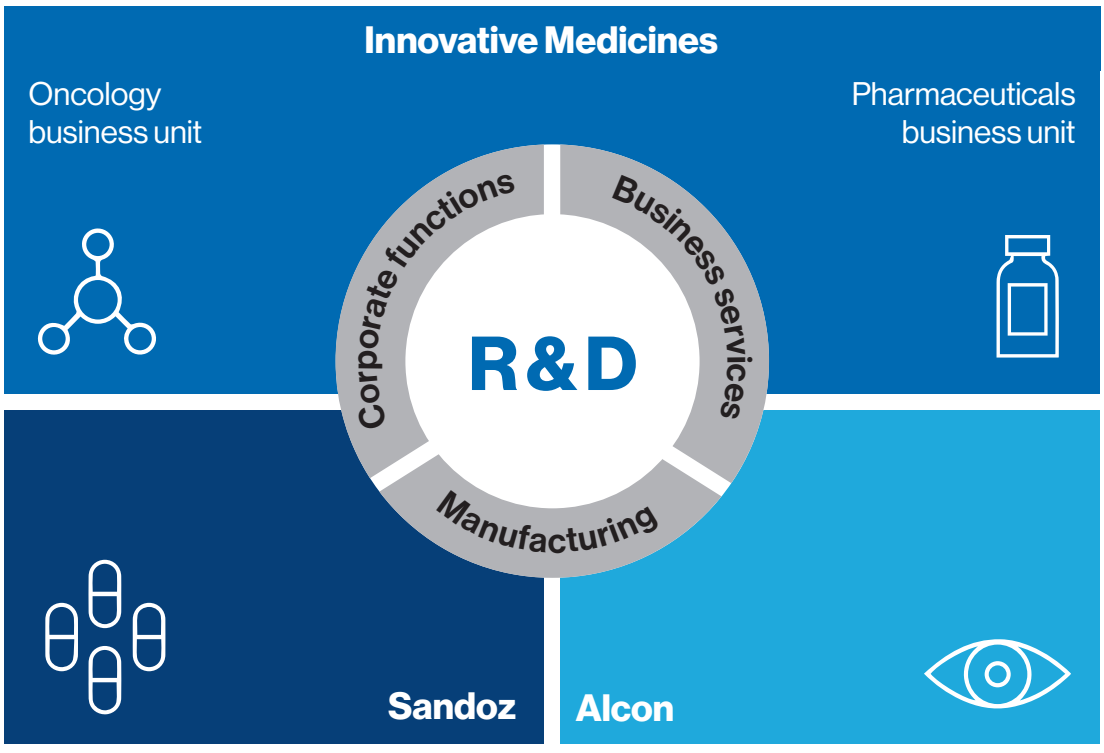
Our global service and manufacturing organizations help us benefit from our global scale and support our efforts to improve efficiency.

NOVARTIS TECHNICAL OPERATIONS

Novartis Technical Operations (NTO) handles manufacturing of innovative medicines and Sandoz products. NTO helps us optimize resource allocation and capacity planning across our production sites while further improving quality.

NOVARTIS BUSINESS SERVICES

Novartis Business Services (NBS) consolidates support services across our organization, helping drive efficiency, simplification, standardization and quality. NBS includes six service domains: financial reporting and accounting operations, human resources services, information technology, procurement, product lifecycle services, and real estate and facility management. It helps generate productivity gains.




大华店
FIRST FOODMALL

Photo In an effort to stay fit as they grow older, a group of elderly friends gather to perform tai chi-style exercises each morning at a shopping center in Shanghai, China. Such activities help people cope with the effects of aging as China's large cities come to terms with their growing population of seniors.

Performance

Novartis delivered solid performance in 2017. Strong growth of recently launched products helped counter the effects of generic competition for products that have lost patent protection, including our pioneering cancer drug *Gleevec/Glivec*. Our research and development teams delivered good results, with 16 major approvals and important progress for projects in our pipeline. Our efforts to improve access to medicines and healthcare worldwide continued to advance.

49.1 bn
Net sales (USD)

7.7 bn
Net income (USD)

10.4 bn
Free cash flow (USD)

Key figures[1]

(in USD millions, unless indicated otherwise)

			% Change	
	2017	2016	USD	Constant currencies
Net sales to third parties	49 109	48 518	1	2
Operating income	8 629	8 268	4	7
Return on net sales (%)	17.6	17.0		
Net income	7 703	6 698	15	12
Basic earnings per share[2] (USD)	3.28	2.82	16	14
Core operating income	12 850	12 987	– 1	0
Core return on net sales (%)	26.2	26.8		
Core net income	11 391	11 314	1	2
Core earnings per share[2] (USD)	4.86	4.75	2	3
Free cash flow	10 428	9 455	10	

[1] This Annual Report includes non-IFRS financial measures such as core results, constant currencies and free cash flow. Novartis believes that investor understanding of the Group's performance is enhanced by disclosing these non-IFRS measures. A definition of non-IFRS measures used by Novartis, and further details, including reconciliation tables, can be found starting on page 179.
[2] 2017 weighted average number of shares outstanding: 2 346 million (2016: 2 378 million)

Performance summary

Financial performance

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

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

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

The impact of currency exchange headwinds eased in 2017 compared to what we have seen for several years, particularly in 2015 when currency fluctuations had a negative 10% impact on sales. To help investors assess the impact of exchange rates on our performance, we continue to also indicate growth rates in constant currencies.

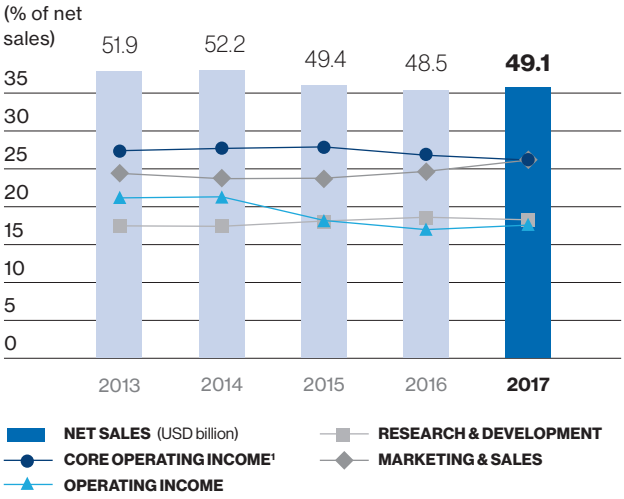
Operating income in 2017 was USD 8.6 billion (+4%, +7% cc), mainly driven by higher sales, productivity improvements and lower amortization, which were partly offset by generic competition and higher marketing investments to support product launches. Net income was USD 7.7 billion (+15%, +12% cc), benefiting from growth in operating income and higher income from our stake in GSK Consumer Healthcare Holdings Ltd. Earnings per share were USD 3.28 (+16%, +14% cc), benefiting from higher net income and our share buyback program.

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

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

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

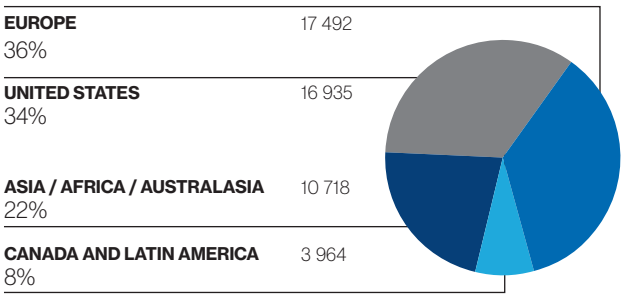
Net sales, operating income, core operating income,[1] research & development, marketing & sales as % of net sales[2]



[1] Core operating income is a non-IFRS measure. A definition of non-IFRS measures used by Novartis, and further details, including reconciliation tables, can be found starting on page 179.
[2] 2013 – 2015 reflects continuing operations as defined on page 202

2017 net sales by geographical region

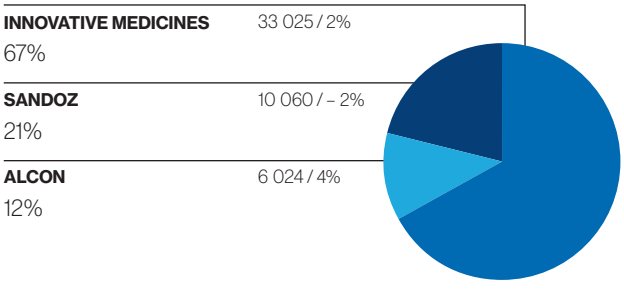
(% of net sales and in USD millions)



TOTAL	**49 109**

2017 net sales by division

(in USD millions, % growth in constant currencies and divisional share of net sales)



TOTAL	**49 109 / 2%**

Performance summary (continued)

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

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

In 2017, NTO completed its first full year as an integrated global manufacturing organization, delivering synergies across 68 pharmaceutical production facilities worldwide and improving capabilities through the sharing of skills and excellence across the manufacturing network.

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

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

Top five products – Innovative Medicines
(in USD millions, % growth in USD, % growth in constant currencies)

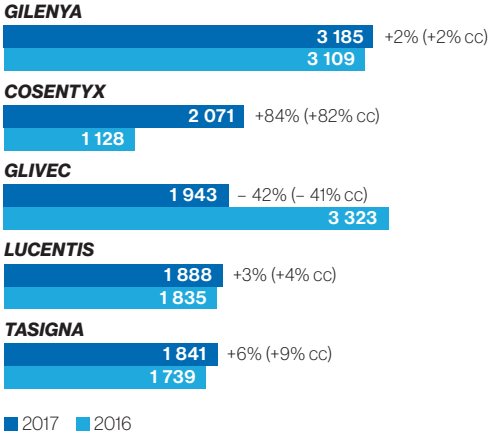


Photo Yoga practitioners strike a warrior's pose at an event outside the Philadelphia Museum of Art organized by the group Living Beyond Breast Cancer (LBBC). Since it was founded 27 years ago, LBBC has become one of the leading US patient advocacy organizations.

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

NBS continues to take steps to improve efficiency through such measures as simplifying and standardizing processes across the company, making the most of our global scale. Working with colleagues in our Global Drug Development (GDD) organization, for instance, NBS has upgraded our information technology platforms, streamlined hundreds of processes, and launched six new systems in 2017 with the aim of better equipping colleagues to focus on drug development activities. These include the planning, data management, statistical analysis, reporting, funding and management of clinical trials. These changes are expected to simplify work for more than 10 000 Novartis employees and facilitate more effective interactions with 145 000 external clinicians supporting our studies.

Innovation performance

Our research and development team made strong progress in 2017, using new tools and approaches to address the world's health challenges. We received 16 major approvals, made 16 major submissions, and received six breakthrough therapy designations from the FDA. We also reported positive clinical data for key molecules in diverse therapeutic areas.

We received 16 major approvals, made 16 major submissions, and received six breakthrough therapy designations from the FDA

Oncology

2017 was a significant year in oncology with important clinical trial results and three major regulatory approvals, including two new molecules and a pioneering personalized therapy for leukemia with the potential to open a new frontier in cancer care.

The FDA cleared *Kymriah* (tisagenlecleucel, formerly CTL019) to treat a deadly childhood cancer, marking the first FDA approval for a chimeric antigen receptor T-cell (CAR-T) therapy. The novel immunocellular therapy is a one-time intravenous treatment that uses a patient's own T-cells to fight cancer. It is indicated for patients up to 25 years of age with B-cell precursor acute lymphoblastic leukemia (ALL) that is refractory or in second or later relapse. In studies sponsored by Novartis and led by the University of Pennsylvania (Penn) and Children's Hospital of Philadelphia in the US, the therapy showed an 83% overall remission rate in this young patient population that has limited treatment options and historically poor outcomes.

In addition, Kymriah has shown promising results for the investigational treatment of adult patients with relapsed/refractory diffuse large B-cell lymphoma (DLBCL), the most common form of non-Hodgkin's lymphoma. In a study sponsored by Novartis and led by Penn researchers, *Kymriah* showed an overall response rate of 53.1%, with 39.5% achieving a complete response among patients with three or more months of follow-up, or earlier discontinuation. Six months after infusion, *Kymriah* showed an overall response rate of 37%, with a complete response rate of 30%.

The FDA granted breakthrough therapy designation to *Kymriah* for the treatment of adult patients with relapsed/refractory DLBCL who have failed two or more prior therapies. The breakthrough designation is intended to expedite development and review of potential new treatments for serious or life-threatening conditions. Novartis has submitted an application to the FDA for *Kymriah* for the treatment of adult patients with relapsed/refractory DLBCL who are ineligible for autologous stem cell transplant.

Together with our collaborators at Penn, we also announced positive findings from a pilot study of CTL119, a next-generation CAR-T therapy, in combination with ibrutinib in patients with relapsed/refractory chronic lymphocytic leukemia (CLL). Three months after treatment, eight of the first nine patients had no signs of CLL in their bone marrow, supporting the potential of this combination therapy for high-risk CLL patients unlikely to achieve complete remission on ibrutinib alone. Novartis is at the forefront of investigational immunocellular therapy, with a growing portfolio of personalized cell therapies as part of our global collaboration with Penn. For more on CAR-T therapy development, see page 48.

We also had several approvals for key targeted cancer therapies. *Kisqali* was approved in 45 countries around the world in 2017, including the US and in Europe. The approval of *Kisqali* is for use in combination with any aromatase inhibitor for treatment of postmenopausal women with hormone receptor-positive (HR+)/human epidermal growth factor receptor 2-negative (HER2-) locally advanced or metastatic breast cancer as initial endocrine-based therapy. *Kisqali* was developed under a research collaboration with Astex Pharmaceuticals.

Rydapt received FDA and European Medicines Agency (EMA) approvals for two rare, life-threatening indications. In the US, *Rydapt* is approved in combination with standard chemotherapy for the treatment of adult patients with newly diagnosed acute myeloid leukemia (AML) who are FLT3 mutation-positive. *Rydapt* is also approved for adults with aggressive systemic mastocytosis (ASM), systemic mastocytosis with associated hematological neoplasm (SM-AHN), and mast cell leukemia – three subtypes of systemic mastocytosis (SM) that are collectively known as advanced SM. In the EU, *Rydapt* is approved for adults with FLT3-mutated AML

Performance summary (continued)

in combination with standard chemotherapy, and alone as a maintenance therapy in patients who have attained complete response. It is also approved for use as monotherapy for the treatment of adults with ASM, SM-AHN and mast cell leukemia.

The EMA and FDA approved *Tafinlar* (dabrafenib) combined with *Mekinist* (trametinib) to treat patients with advanced or metastatic non-small cell lung cancer (NSCLC) whose tumors have the BRAF V600 mutation, another cancer with extremely limited treatment options. Also with *Tafinlar* + *Mekinist*, we reported results from a pivotal Phase III adjuvant melanoma study that showed a 53% reduction in the risk of death or recurrence in patients with stage III BRAF V600 mutation-positive melanoma after complete surgical resection. The FDA granted breakthrough therapy designation for adjuvant use of *Tafinlar* + *Mekinist* in these patients.

The use of *Zykadia* (ceritinib) was expanded to include first-line treatment of patients with advanced (EU approval) or metastatic (US approval) NSCLC whose tumors are anaplastic lymphoma kinase-positive. In addition, *Votubia* (everolimus) was approved as an adjunctive treatment for refractory partial-onset seizures, with or without secondary generalization, for patients aged 2 years and older with tuberous sclerosis complex, a rare genetic disorder.

We announced a clinical collaboration with Bristol-Myers Squibb Co. (BMS) to evaluate potential treatments in metastatic colorectal cancer. A joint early-stage trial will study *Mekinist* in combination with BMS' Opdivo® and Opdivo® + Yervoy®.

Drug shows cross-disease potential

Significant immuno-oncology data emerged during a key Phase III cardiovascular study that confirmed inflammation as a risk factor for heart disease. The study, called Canakinumab Anti-inflammatory Thrombosis Outcomes Study (CANTOS), evaluated quarterly injections of ACZ885 (canakinumab) in combination with standard care, such as cholesterol-lowering statins, in people with a prior heart attack and inflammatory atherosclerosis. Canakinumab lowers C-reactive protein (CRP), a signal of inflammation. CANTOS included more than 10 000 heart attack survivors with elevated CRP but no elevated cholesterol. Findings showed that targeting inflammation with ACZ885 significantly reduces the risk of major adverse cardiovascular events, such as a heart attack, stroke and cardiovascular death.

Intriguingly, patients who received ACZ885 in the study also had low cancer death rates, especially from lung cancer, compared to patients who received placebo. Analyses revealed a 77% reduction in lung cancer mortality and a 67% reduction in lung cancer cases in patients treated with 300 mg of ACZ885 compared to the placebo arm. Along with submitting the drug for cardiovascular indication, we plan to initiate further Phase III lung cancer studies with ACZ885.

Additionally, we received orphan drug designation from the FDA in our study of canakinumab for the treatment of adult-onset Still's disease, a rare type of inflammatory arthritis.

Psoriasis clearance

We reported results of a Phase III psoriasis study demonstrating that *Cosentyx* delivers high and long-lasting skin clearance in patients with moderate-to-severe plaque psoriasis. High response rates were essentially maintained from year one to year five. Additionally, a label update for *Cosentyx* was approved in the EU based on data showing its long-term superiority over Stelara® (ustekinumab) in moderate-to-severe plaque psoriasis and its efficacy in the treatment of moderate-to-severe scalp psoriasis, one of the most difficult to treat forms of the disease.

Neuroscience

Another first-of-its-kind Phase III study, PARADIGMS, showed *Gilenya* (fingolimod) significantly reduces relapses in children and adolescents with multiple sclerosis (MS) versus treatment with interferon beta-1a. There are no specifically approved disease-modifying therapies for pediatric MS. When the disease strikes before age 18, patients often experience more frequent relapses than adults and face disability that severely limits daily life.

In migraine prevention, both the EMA and FDA accepted submissions for AMG 334 (erenumab), the first and only fully human monoclonal antibody of its kind. It is designed to block the calcitonin gene-related peptide receptor, which plays a critical role in the activation of migraine headaches. The filings include data from four Phase II and Phase III clinical studies showing patients who received AMG 334 experienced fewer monthly migraine days than patients who received placebos. We are developing AMG 334 with Amgen, and in 2017, we also expanded our partnership to bring it to market.

Eye care

We announced that RTH258 (brolucizumab) met the primary endpoint of non-inferiority in vision against aflibercept in two pivotal Phase III trials studying neovascular age-related macular degeneration (nAMD), with a majority of patients dosed on a less frequent quarterly schedule. Additionally, significantly fewer patients treated with RTH258 showed signs of disease activity and had fluid accumulation in the eye. In nAMD, abnormal blood vessels leak fluid into the eye, ultimately causing damage and blindness. Frequent injections into the eye, a standard requirement for nAMD therapies, can be a major inconvenience for patients and a burden on caregivers. RTH258 could therefore address important needs for patients with nAMD.

In our Alcon Division, we received EU approval for the *CyPass* Micro-Stent, a surgical device for patients with mild-to-moderate primary open-angle glaucoma in conjunction with cataract surgery, or as a standalone procedure in patients with primary open-angle glaucoma who have failed previous medical treatments. The device was approved by the FDA in 2016.

Alcon also received FDA approval for the *AcrySof IQ ReSTOR* +2.5 D Multifocal Toric intraocular lens (IOL) with *ACTIVEFOCUS* optical design for cataract surgery patients who choose to address their astigmatism and presbyopia at the same time.

In addition, Alcon introduced its newly optimized *UltraSert* delivery system pre-loaded with the *AcrySof IQ* aspheric monofocal IOL for cataract surgery. The system is designed to deliver a pristine, untouched IOL directly into the eye of cataract surgery patients in less time.

In December, Novartis announced plans to create a new institute dedicated to basic research and clinical science for eye diseases in Basel, Switzerland. Novartis joined with the University of Basel and the University Hospital Basel to found the Institute of Molecular and Clinical Ophthalmology Basel. The institute is expected to start operations in 2018, with the goal to advance the understanding of eye diseases and develop new therapies for vision loss.

Biosimilars

We received approvals and regulatory acceptances for several important Sandoz biosimilars. The EMA approved *Rixathon*, which was also accepted for review by the FDA. The EU approval is for all indications of the reference medicine MabThera®, used to treat blood cancers and immunological diseases such as rheumatoid arthritis. We also received EU approval for *Erelzi* to treat multiple inflammatory diseases. Data confirms its equivalency to the reference product Enbrel®.

The approval brings to five the number of Sandoz biosimilars approved in the EU. The EMA accepted regulatory submissions for two additional biosimilars, adalimumab and infliximab, for use in all indications of their respective reference medicines, Humira® and Remicade®, both used to treat many immunological diseases such as rheumatoid arthritis and inflammatory bowel disease.

Liver disease

In 2017, we announced a clinical collaboration with Allergan to explore a combination therapy for non-alcoholic steatohepatitis (NASH), a major cause of liver disease worldwide and the leading cause of liver transplants for people under 50 in the US. The joint study will evaluate a Novartis FXR agonist in combination with Allergan's cenicriviroc for treating NASH, which does not have any approved treatments. In addition, we announced an agreement with Conatus Pharmaceuticals Inc. for potential future trials involving VAY785 (emricasan), under study for the treatment of chronic liver diseases, including NASH. For more on liver disease development projects, see page 52.

Malaria

In partnership with Medicines for Malaria Venture (in collaboration with the Bill & Melinda Gates Foundation), we launched a patient trial for KAF156, one of our next-generation antimalarial compounds with the potential to treat drug-resistant strains of the malaria parasite. The study, being done in nine countries in Africa and Asia, is testing KAF156 in combination with a new, improved formulation of the existing antimalarial lumefantrine. With growing resistance to current treatments and nearly half of the world's population at risk from the disease, malaria remains a major public health challenge. For more on antimalarial development projects, see page 56.

Photo Dr. Martin Rausch from Novartis in Basel, Switzerland, uses the Olympus 3-D microscope, developed to investigate complex cell physiology. With him are oncology scientist Rita Andraos-Rey and Martin Stoeckli from Olympus Schweiz.

Performance summary
(continued)

People

Scientific and technological advances are at the core of our company, and the critical factor that determines our ability to implement the Novartis strategy is the power of our people to innovate. As Novartis adapts to reflect trends in society and healthcare, our human resources strategy has evolved to anticipate these changes. Our strategic priorities in human resources include attracting, developing and retaining people with strong, diverse skills; ensuring our people are aligned with the evolving structure of the organization; and shaping a culture based on our core values that will enable the company to fulfill its purpose.

Talent: promoting excellence and diversity in leadership

We continue to make progress in strengthening our leadership pipeline. Our progress was highlighted by the appointment of an internal candidate as our new CEO. In September, Novartis announced the selection of Vasant Narasimhan, who joined Novartis in 2005 and is currently Global Head of Drug Development and Chief Medical Officer. He becomes CEO on February 1, 2018.

We filled 67% of Novartis Top Leader (NTL) roles internally in 2017, compared to 77% the year before. NTL roles are the top 350 positions in the company. We also made strategic external hires to build our pipeline of senior leaders, facilitate longer job tenures, increase diversity and build new capabilities in areas such as digital technologies. This approach helped us to rapidly implement our new operating model in 2016, including the formation of the GDD organization and NTO. The priority now is to sustain and build on the changes that we have implemented.

We continue to make progress in strengthening our leadership pipeline

The company's succession strength declined slightly to 82% from 84% in 2016. This represents the percentage of senior leadership roles for which at least one suitable internal successor is ready to take over immediately if required. We will continue to invest in our leadership pipeline through internal development and promotion as well as external talent mapping and scouting.

We have also reduced voluntary turnover for all staff from 7.4% to 7%, and for high performers from 5.8% to 5.2%. This has been achieved through a range of initiatives, one key example being the program of engagement workshops at Alcon to connect employees with the organization's purpose, principles and history.

We continue to focus on learning and development to build capabilities and energize employees throughout the company. In 2017, we launched a fresh approach to developing leaders that moves away from purely classroom-based training toward immersive programs called leadership journeys that last nine to 12 months. These feature a combination of webinars, simulations, social learning and personalized coaching support. The journeys are geared toward specific groups with strategic importance to the company, such as enterprise leaders, female leaders, talent in emerging markets, and people early in their careers who show potential for leadership roles. During the first year, nearly 2 000 people participated in these programs.

In addition to these leadership journeys, the Novartis Learning Council is providing a range of new training opportunities across the organization. These include the use of interactive simulations to help the sales force expand its product knowledge, and the launch of a Global Drug Development University in 2017 to meet the organization's specific training requirements. The council's work was recognized when it was named Team of the Year in the 2017 Learning Technologies Awards. Novartis universities are also in place to address the learning needs of regions and markets, including Africa, Asia, Latin America and Russia.

In 2017, more than 46 000 employees accessed online training courses and supporting materials known as Instant Learning Solutions to develop their knowledge and skills in areas such as leadership and business. More than 7 000 employees took part in Personal Effectiveness Portfolio programs, which use a combination of self-paced learning and classroom training to improve communication, decision-making and other functional skills.

Photo A game of backgammon at a café on the Greek island of Ikaria, where social interaction is one factor contributing to the impressive longevity of its residents.

Overall, annual training hours per employee declined to 24.5 hours in 2017 from 26.9 hours in 2016, as a result of simplified mandatory trainings using new technologies.

Our efforts to help our people learn and grow gained recognition when our score related to human capital development in the 2017 Dow Jones Sustainability Index rose to 92 out of a possible 100, up from 76 the prior year.

In 2017, we continued to focus on diversity and inclusion (D&I) in support of our approach to science-based innovation. One of the major priorities of our D&I strategy is to increase female representation in management, and the number of female leaders at senior management levels grew for the second year running – reaching 27% at NTL level compared to 25% in 2016. Women now make up 41% of Novartis management globally. Our talent pipeline maintained its focus on female candidates, with women now making up 35% of the global NTL succession pipeline. The number of African, Asian and Latin American managers at NTL level also increased to 7%. We believe this figure will improve, with 17% of candidates in the global NTL succession pipeline now coming from emerging markets. The Thomson Reuters global Diversity and Inclusion Index recognized our efforts by placing Novartis No. 6 out of all companies worldwide based on an assessment of publicly available data.

In 2017, we focused on simplifying and modernizing many of our people-related processes. For instance, in terms of variable compensation, starting in 2018, awards for all employees will be calculated based partly on the performance of the entire enterprise to foster cross-business collaboration and shared ownership of results. Performance management has been streamlined to ensure the focus is on high-quality discussion and more continuous feedback. These conversations are now structured to build on employees' strengths and to accelerate their career development. In addition, beginning in 2018, all managers will receive upward feedback from direct reports to assist them in enhancing their own performance.

Organization: embedding the company's new operating model

The new integrated operating model announced in 2016 is now fully in place. The revised model and new ways of working were embedded through a series of 235 leadership forums involving 2000 managers. These interactive sessions were designed to inspire the teams, actively engage them in the changes, and build capabilities to ensure the future success of the new organizational structure.

The Global Employee Survey in March 2017 showed that 80% of respondents were aligned with the company's priorities and values, which is 5% higher than the average for top-performing companies. This indicates that staff understood how the new operating model will enable Novartis to achieve its strategy and objectives.

Moving forward, we plan to focus on building digital capabilities through the establishment of a new function led by our first Chief Digital Officer Bertrand Bodson, whose appointment was announced in August. In this

People performance indicators

	2017	2016
Full-time equivalent positions / headcount [1]	**121 597 / 126 457**	118 393 / 122 985
Turnover: % voluntary / % overall	**7.0 / 11.3**	7.4 / 12.2
Voluntary turnover of high performers (%)	**5.2**	5.8
Internal hires / external hires (%)	**55 / 45**	47 / 53
Women in management: % of management [2] / % of Novartis Top Leaders [3] / % of Board of Directors	**41 / 27 / 23**	40 / 25 / 25
Associate nationalities / associate nationalities in management [2]	**145 / 112**	142 / 109
Annual training hours per employee [4]	**24.5**	26.9

[1] Headcount reflects the total number of associates in our payroll systems. Full-time equivalent adjusts headcount for associates working less than 100%. All data as of December 31
[2] Management defined by Global Job Level Architecture and Novartis Top Leaders
[3] Novartis Top Leaders comprise the approximately 350 most senior managers at Novartis, including the Executive Committee of Novartis.
[4] In 2017, we refined the training hours per employee methodology and invested in a new platform that consistently extract defined training hours per employee across the company.

Performance summary (continued)

newly created position reporting directly to the CEO, he will be responsible for developing the company's digital innovation strategy, building relevant capabilities, and establishing new ways of working across all areas of the business.

Culture: connecting with our purpose and values

The Global Employee Survey showed that we continue to make good progress in reinforcing our culture. A key finding was that 83% of employees identified with the company's purpose, compared to an average of 72% among top-performing organizations. Respondents felt confident that products and services introduced by Novartis help improve patients' health, and most saw a clear link between their work and the company's goals and objectives. Four out of five respondents felt they played a part in programs and activities that help Novartis be a responsible company.

The survey also showed that three-fourths of respondents felt engaged and experienced a sense of pride and energy in working for Novartis, which is slightly higher than at other top-performing companies.

Another important finding was that employees identify strongly with the foundations of our culture, as embodied in the company's Values and Behaviors. The results for quality, integrity and courage were all higher compared to other best-in-class companies.

However, the survey also highlighted that further efforts are needed to simplify processes, speed up decision-making, and anticipate and plan for future changes. Respondents rated the organization's ability to sense and respond to change lower than the average for other leading companies. Managers are using these results to inform and shape ongoing business activities and action plans. Initiatives include reducing the number of approvals required and developing a new employee-driven approach to change management that will be initiated in 2018.

Social performance

Expanding access to healthcare

We have made progress in further expanding access to our medicines, and we have taken steps to embed our access efforts more deeply in our day-to-day business. As of 2018, we plan to systematically integrate patient access strategies into all our new medicine launches.

Novartis Access, our portfolio of medicines to help fight chronic diseases, delivered more than 685 000 treatments to patients in lower-income countries in 2017

In 2017, we expanded our access-to-healthcare programs. Novartis Access, our portfolio of medicines to help fight chronic diseases in lower-income countries, signed agreements with three countries to launch the program, bringing the total to six. Launched in 2015, the portfolio is available to governments, nongovernmental organizations and other public sector healthcare providers at a price of USD 1 per treatment, per month. In 2017, we were able to deliver more than 685 000 treatments – each providing a one-month supply of medicine – to patients, reaching a total of more than 800 000 treatments delivered since launch. Starting in 2018, we will broaden the program into the private sector in select countries.

The Novartis Malaria Initiative continued its long-standing efforts to provide our high-quality antimalarial, achieving yet another milestone with more than 850 million treatments, including 350 million pediatric treatments, delivered without profit to malaria-endemic countries since 2001.

Our generics division, Sandoz, a global leader in biosimilars, gained approval for two new biosimilar products in the EU and launched them in several European markets. The introduction of affordable, high-quality generics and biosimilars improves access to medicines for patients worldwide.

Even the most effective treatments have limited impact without skilled healthcare personnel who can prevent, diagnose and treat diseases. Healthcare systems also need strong regulatory systems, which are vital to helping lower-income countries improve healthcare capabilities and patient outcomes.

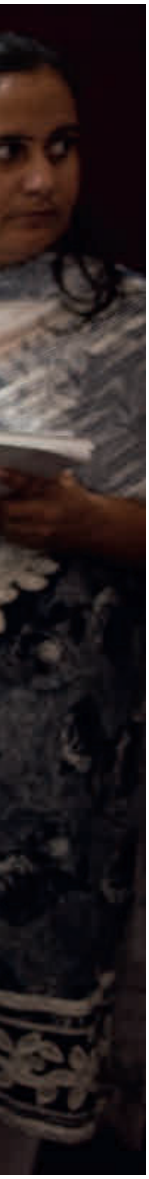


Photo A patient receives a checkup at a health camp run by Dr. Jitendra Singh in the northern Indian village of Triveni Vihar. Free medical advice is given here under a Novartis social business program called Arogya Parivar, or "healthy family" in the Hindi language. The initiative is intended to address the complex health challenges of India's rural poor by providing them with education and advice, supported by access to doctors and a range of low-cost medicines.

We work on a variety of programs aimed at reinforcing healthcare systems. The Novartis Foundation and partners launched Better Hearts Better Cities, an initiative to address the high rates of hypertension in low-income urban communities. Better Hearts Better Cities brings together multisector partners to co-design and implement interventions beyond healthcare. The approach is being tested in Mongolia, Senegal and Brazil.

Partnerships are key to expanding access. Novartis joined 22 pharmaceutical companies to launch Access Accelerated, a global initiative to advance access to treatment and care for chronic diseases in lower-income countries in collaboration with the World Bank Group and the Union for International Cancer Control. Novartis is also partnering with Last Mile Health to support the launch of the Community Health Academy. Last Mile Health partnered with the government of Liberia to successfully establish its integrated community health worker program in Liberia, and Novartis will provide a USD 1 million donation, spread over three years, to help scale up community health worker training programs in sub-Saharan Africa through the academy.

The Novartis CEO is co-leading the Health Delivery Systems initiative of the Bill & Melinda Gates Foundation CEO Roundtable. This group aims to map company programs to build health capabilities, identify opportunities for synergies and collaboration, and propose potential joint initiatives that could amplify these individual efforts.

Novartis Access, in collaboration with Novartis Oncology, launched a new partnership with the American Society for Clinical Pathology and the American Cancer Society to improve the management of cancer in sub-Saharan Africa. And Sandoz expanded its partnership with World Child Cancer to help children access treatment in developing countries. The agreement now covers three additional countries: Ghana, Mexico and Myanmar.

Patient health and safety

Working more closely with patients is an important part of improving health outcomes. We reviewed and revised our Commitment to Patients and Caregivers, to help better explain what they can expect from Novartis. It will be published in early 2018.

Counterfeit medicines pose a significant threat to public health. To protect patients from fakes, we take a diverse and multipronged approach. During 2017, Novartis Global Security, with the support of local law enforcement and health authorities, initiated seizures of counterfeit and falsified products in more than 30 countries globally. As a result, nine illegal pharmaceutical manufacturing facilities and assembly lines were dismantled and more than 7 300 illegal online pharmacies were shut down.

Patient education and awareness is an important step in improving health and well-being, and in increasing disease prevention and health-seeking behavior. The Novartis Foundation and the University of Basel, together with other partners, launched Healthy Schools for Healthy Communities, which aims to address poor health in disadvantaged schools in South Africa.

Our Healthy Family programs, which are innovative business models to reach more patients in rural areas in

Performance summary (continued)

the developing world, continued their expansion. In 2017, they reached more than 7.7 million people through health education sessions in India, Kenya and Vietnam. Nearly 580 000 people attended specific health camps. The program in India celebrated its 10th anniversary; it covers some 14 000 villages and small towns that are home to more than 32 million people. The program in Kenya broke even, joining India and Vietnam in this regard.

Ethical business practices

We took a series of steps in 2017 to further strengthen integrity and compliance. The Novartis Executive Committee and Board of Directors approved a new harmonized Professional Practices Policy. This single policy will replace the three divisional policies that currently govern how we interact with patients and healthcare professionals, beginning on March 1, 2018 (except at Alcon, where it will take effect at a later date).

We have also taken a series of steps to strengthen our anti-bribery compliance program, including updating our Anti-Bribery Third-Party Guideline and further strengthening our anti-bribery due diligence process.

All Novartis Group company associates are required to complete integrity and compliance training. In 2017, almost 115 000 employees completed the Code of Conduct course. All allegations of any inappropriate behavior are taken very seriously and are actively investigated, and – where substantiated – appropriate disciplinary action is taken. In 2017, the Business Practices Office investigated 2 031 cases related to misconduct covering 2 574 allegations; 1 147 allegations were substantiated and resulted in 521 dismissals or resignations.

We continued upgrading our compliance monitoring efforts by conducting 230 country and monitoring visits in 2017, an approximate increase of 40% from 2016.

Innovation

Innovation in its many forms supports our efforts to grow in emerging markets and around the world, and can help us respond to patients' unmet medical needs in both the developed and developing worlds. Infectious diseases still take a large toll on lower-income countries. Novartis and Medicines for Malaria Venture launched a patient trial in Africa for KAF156, a novel compound against multidrug-resistant malaria. KAF156 is the first compound from the imidazolopiperazines, a novel class of antimalarials, to enter Phase IIb combination studies.

Scientists from Novartis, the University of Georgia and Washington State University in the US reported the discovery and early validation of a drug candidate for treating cryptosporidiosis, a diarrheal disease that is a major cause of child mortality in lower-income countries. Currently there are no vaccines or effective treatments. The discovery and preclinical findings were published in the journal Nature.

We invested in the discovery of new antibiotics and in the fight against antimicrobial resistance (AMR). In 2017, we reported progress in researching a novel antibiotic candidate, LYS228, for multidrug-resistant infections caused by the Enterobacteriaceae family of Gram-negative pathogens. We also joined the AMR Industry Alliance to ensure that we collectively deliver on the specific commitments made in the Industry Declaration on AMR and the subsequent AMR Roadmap.

Evaluating our financial, environmental and social impact

We have developed, tested and applied a methodology for valuing the financial, environmental and social impact our business activities have on society. In 2016, this methodology showed that our activities contributed USD 65 billion to the global economy, as well as an estimated 260 000 jobs beyond those held by our own employees. In addition, our social impact – including employee development and occupational safety – was valued at USD 398 million. At the same time, we are taking steps to minimize our negative environmental impact, as measured by the carbon, water and waste impacts of our own operations and supply chain, which was valued at USD 1.2 billion for 2016.

Impact valuation is still evolving, with gaps in methodologies and data. For a full explanation of the evolving methodology, see page 15 of the 2017 Novartis Corporate Responsibility Report.

Awards and recognition

In 2017, we were proud to be ranked No. 4 on Fortune magazine's "Change the World" list, which recognizes companies that have a positive social impact through activities that are part of their core business strategy. We were also ranked fourth in the 2017 Dow Jones Sustainability Index (DJSI) World, and we re-entered the DJSI Europe Index for the first time in four years. We were again recognized as one of the world's most sustainable companies by Corporate Knights, jumping 30 places to No. 68, and we were one of 73 companies worldwide to make CDP's Water A List in 2017. Novartis was also ranked No. 2 on Fortune's 2017 "World's Most Admired Companies" list for the pharmaceutical industry, and we were included in the FTSE4Good Index for 2017.

Photo The village chief of Bougoula surrounded by his council in the West African country of Mali. Their local clinic is taking part in a pioneering clinical study to investigate a new antimalarial compound called KAF156. There are hopes that the drug could prove effective even against malaria parasites that show resistance to available therapies.

Innovative Medicines

In the Innovative Medicines Division in 2017, our growth drivers – such as *Cosentyx*, *Entresto* and other recently launched products – more than offset the effects of generic competition on products such as *Gleevec/Glivec* that have lost patent protection. This highlights the strength of our portfolio and our ability to manage through patent expirations.

The Innovative Medicines Division includes the Novartis Oncology and Novartis Pharmaceuticals business units. Novartis Pharmaceuticals focuses on the franchises of Ophthalmology, Immunology and Dermatology, Neuroscience, Respiratory, Cardio-Metabolic and Established Medicines. Novartis Oncology's broad portfolio of products addresses primarily cancers of the blood, breast, kidney, lung and skin.

Photo After surviving breast cancer, Dana Donofree put her fashion design skills to work on a range of lingerie for women who have had breast surgery. Here she demonstrates her products to fellow survivors.

Performance

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

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

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

Core operating income, which excludes certain items,[1] was USD 10.3 billion (0%, +2% cc). Core operating income margin decreased 0.1 percentage points in constant currencies, and fluctuations in exchange rates had a further negative impact of 0.4 percentage points, resulting in a net decrease of 0.5 percentage points to 31.3% of net sales.

Products contributing to sales growth included *Cosentyx, Entresto, Promacta/Revolade, Tafinlar + Mekinist,* and *Jakavi*

Key figures

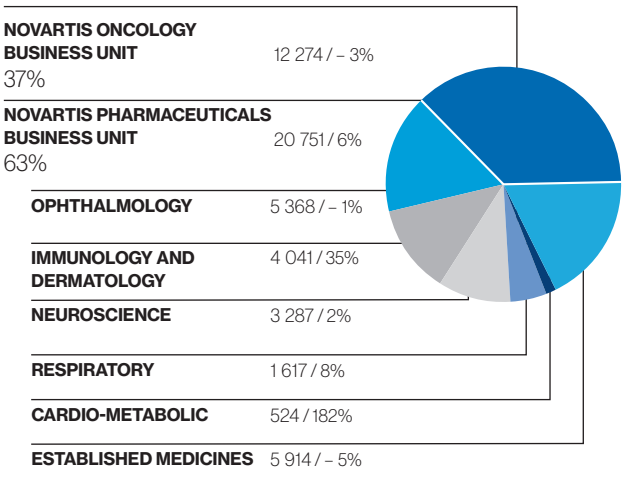
(in USD millions, unless indicated otherwise)

			% Change	
	2017	2016	USD	cc[1]
Net sales	33 025	32 562	1	2
Operating income	7 782	7 426	5	7
Return on net sales (%)	23.6	22.8		
Core operating income[1]	10 330	10 354	0	2
Core return on net sales (%)	31.3	31.8		
Core Research & Development[1]	7 049	7 112	1	1
As a % of net sales	21.3	21.8		
Net operating assets	42 618	41 904	2	

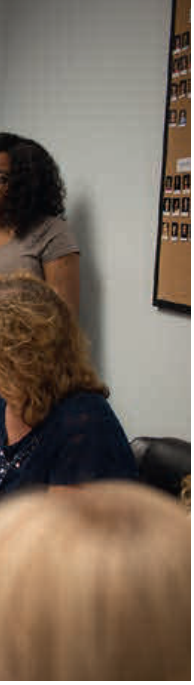
[1] Constant currencies (cc) and core results are non-IFRS measures. A definition of non-IFRS measures used by Novartis, and further details, including reconciliation tables, can be found starting on page 179.

Innovative Medicines 2017 net sales by business unit and franchise

(in USD millions and % growth in constant currencies)



TOTAL	**33 025 / 2%**



Novartis Oncology business unit

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

Novartis Pharmaceuticals business unit

Ophthalmology

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

Immunology and Dermatology

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

Neuroscience

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

Respiratory

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

Cardio-Metabolic

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

Established Medicines

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

For further detail, see
→ **Condensed Financial Report** at **www.novartis.com/investors**

2017 news highlights

In March, the FDA approved *Kisqali* (ribociclib, formerly LEE011) in combination with an aromatase inhibitor as initial endocrine-based therapy for treatment of postmenopausal women with hormone receptor-positive (HR+)/human epidermal growth factor receptor 2-negative (HER2-) advanced or metastatic breast cancer.

In August, Novartis received FDA approval for CAR-T therapy *Kymriah* (tisagenlecleucel, formerly CTL019), to treat patients up to 25 years of age with B-cell precursor acute lymphoblastic leukemia that is refractory or in second or later relapse.

In October, Novartis announced the planned acquisition of Advanced Accelerator Applications, a developer of radiation therapies to diagnose and treat certain types of cancer. The deal closed in January 2018.

In November, Novartis announced positive results from two Phase III studies of RTH258 (brolucizumab) in neovascular age-related macular degeneration (nAMD). RTH258 met its primary endpoint of non-inferiority versus aflibercept in mean change in best-corrected visual acuity. Additionally, RTH258 demonstrated superiority in three secondary endpoints that are considered key markers of nAMD, central subfield retinal thickness, retinal fluid and disease activity. Further, a majority of patients were maintained on a 12 week treatment schedule immediately following the loading phase (secondary endpoint).

Sandoz

Sandoz performance in 2017 was negatively impacted by greater industry-wide price competition in US generics, which was partially offset by continued growth outside the US. Strong sales of biosimilars reinforced global leadership in the field, with five biosimilars now approved in Europe and two in the US. Overall, Sandoz further progressed its long-term strategy, with increased focus on key markets and future growth drivers, including biosimilars, branded generics, value-added medicines and over-the-counter products.

Sandoz offers approximately 1000 high-quality, affordable medicines to patients and healthcare professionals worldwide, helping support broad access to healthcare. The division has three global businesses: Retail Generics, Biopharmaceuticals and Anti-Infectives.

Performance

Sandoz net sales in 2017 were USD 10.1 billion, down 1% in reported terms. In constant currencies, or cc, sales declined 2%. A 6 percentage-point increase in volume was more than offset by the negative 8 percentage-point effect of price erosion. Sales rose 4% (cc) in Europe to USD 4.6 billion. In the US, where we continue to see customer consolidation and greater competition, sales were USD 3.3 billion (–12% cc), mainly due to increased industry-wide pressure on prices in generics. Sales in Asia, Africa and Australasia were USD 1.4 billion, up 1% in constant currencies.

Operating income was USD 1.4 billion (–5%, –7% cc), down mainly due to pressure on prices in the US, investments in marketing and sales in key markets outside the US, and higher manufacturing restructuring charges. These negative impacts were partly offset by favorable changes in product mix. Core operating income, which excludes certain items,[1] was USD 2.1 billion (0%, –1% cc). Core operating income margin in constant currencies increased 0.1 percentage points, and an additional 0.2 percentage-point increase from exchange rates yielded a result of 20.7% of net sales.

Key figures

(in USD millions, unless indicated otherwise)

			% Change	
	2017	2016	USD	cc[1]
Net sales	10 060	10 144	– 1	– 2
Operating income	1 368	1 445	– 5	– 7
Return on net sales (%)	13.6	14.2		
Core operating income[1]	2 080	2 071	0	– 1
Core return on net sales (%)	20.7	20.4		
Core Research & Development[1]	774	804	4	5
As a % of net sales	7.7	7.9		
Net operating assets	14 772	14 443	2	

[1] Constant currencies (cc) and core results are non-IFRS measures. A definition of non-IFRS measures used by Novartis, and further details, including reconciliation tables, can be found starting on page 179.

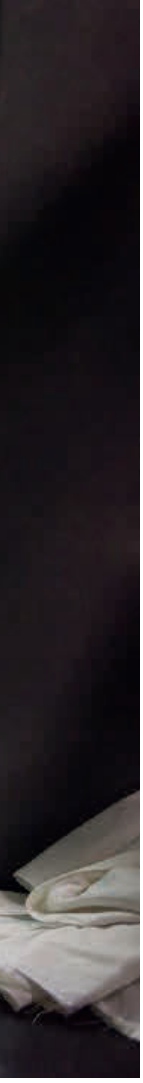
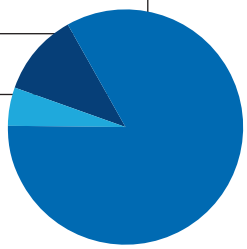


Photo Clinical investigator Dakota Hamadoun completes paperwork at a health clinic in the Sikasso region of Mali, West Africa. The clinic is one of 18 centers across nine countries that are studying a potential new therapy for malaria.

1.1 bn (USD) Biopharmaceuticals net sales, up 12% (cc)

Sandoz 2017 net sales by franchise
(in USD millions and % growth in constant currencies)

RETAIL GENERICS 84%	8 409 / – 3%	
BIOPHARMACEUTICALS 11%	1 135 / 12%	
ANTI-INFECTIVES (partner label/API) 5%	516 / – 2%	
TOTAL	**10 060 / – 2%**	



Retail Generics

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

Biopharmaceuticals

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

Anti-Infectives

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

For further detail, see
→ **Condensed Financial Report** at **www.novartis.com/investors**

2017 news highlights

In May, the EMA accepted Sandoz biosimilars filings for infliximab and adalimumab, the first of four regulatory filings accepted in 2017. The others were rituximab by the FDA in **September** and pegfilgrastim by the EMA in **October.**

In June, Sandoz biosimilars of rituximab and etanercept were approved in the EU and launched in several European markets.

In June, the US Supreme Court ruled unanimously in favor of Sandoz in a landmark case involving timing of the Notice of Commercial Marketing for biosimilars, enabling earlier patient access to critical biosimilar medicines. The Court also provided additional clarity on the functioning of the process by which biosimilar manufacturers may provide confidential and proprietary information to the manufacturer of the reference medicine in the patent exchange process.

In June, the FDA accepted for regulatory review a Sandoz application for a substitutable generic version of key respiratory therapy Advair Diskus®.

Photo Seventy-year-old Baozhen Mao has lived alone in Shanghai, China, since her husband's death last year. She is typical of many elderly people in Chinese cities who are becoming more self-reliant as their children take advantage of greater social mobility to seek new jobs and opportunities elsewhere in China or abroad.

Alcon

Alcon returned to growth in 2017, driven by operating improvements, marketing investments and the launch of new products. Both the Surgical and Vision Care businesses contributed to the division's sales growth.

Alcon develops and markets innovative products to meet the world's growing needs for eye care and to improve people's quality of life by helping them see better. Alcon's Surgical and Vision Care businesses together offer one of the world's widest selections of eye care devices – from sophisticated equipment for precision eye surgery, to a broad offering of advanced contact lenses and lens care solutions.

Performance

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

Alcon net sales in 2017 grew 4% to USD 6.0 billion. In constant currencies (cc), net sales also grew 4%. Operating loss was USD 190 million, compared to an operating loss of USD 132 million the year before, as higher sales were offset by continued investment in the division's growth plan and charges related to business development activities.

Core operating income, which excludes certain items,[1] was USD 857 million (+1%, +5% cc). Core operating income margin in constant currencies increased by 0.2 percentage points, offset by negative currency impact of 0.6 percentage points, yielding a net decrease of 0.4 percentage points to 14.2% of net sales.

During 2017, we made significant progress on a strategic review of Alcon to explore all options to maximize value for shareholders, ranging from retaining the business to an initial public offering or a spinoff. A final decision depends on continued sales growth and margin improvement over multiple quarters, and any potential action is not likely before the first half of 2019.

Also as part of the strategic review, we decided to move over-the-counter and diagnostic ophthalmic products from the Innovative Medicines Division to Alcon effective January 1, 2018, where we believe they will create the most value, given their strong synergies with the Vision Care and Surgical businesses.

Key figures

(in USD millions, unless indicated otherwise)

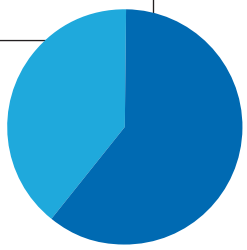
			% Change	
	2017	2016	USD	cc[1]
Net sales	6 024	5 812	4	4
Operating loss	– 190	– 132	– 44	– 14
Return on net sales (%)	– 3.2	– 2.3		
Core operating income[1]	857	850	1	5
Core return on net sales (%)	14.2	14.6		
Core Research & Development[1]	490	486	– 1	– 1
As a % of net sales	8.1	8.4		
Net operating assets	20 121	20 450	– 2	

[1] Constant currencies (cc) and core results are non-IFRS measures. A definition of non-IFRS measures used by Novartis, and further details, including reconciliation tables, can be found starting on page 179.

Alcon 2017 net sales by franchise

(in USD millions and % growth in constant currencies)

SURGICAL 61%	3 660 / 5%
VISION CARE 39%	2 364 / 3%
TOTAL	**6 024 / 4%**



6.0 bn (USD) Alcon net sales

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

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

For further detail, see
→ **Condensed Financial Report** at **www.novartis.com/investors**

2017 news highlights

In March, the FDA approved the *AcrySof IQ ReSTOR* +2.5 D Multifocal Toric IOL with *ACTIVEFOCUS* optical design for uncompromised distance vision and presbyopia correction in patients with astigmatism.

In July, US reimbursement of the *CyPass* Micro-Stent became effective for the treatment of open-angle glaucoma at the time of cataract surgery.

In October, Alcon received European approval for the *Clareon* IOL with *AutonoMe* pre-loaded delivery system, an automated, disposable, pre-loaded IOL delivery system for cataract surgery.

Photo Argentinian surgeon Manuel Cobos and his team board a plane to Buenos Aires with a donor liver, which was successfully transplanted into a patient a few hours later. The demand for such emergency treatment is expected to increase with the current epidemic of nonalcoholic fatty liver disease (NAFLD), a condition linked to obesity that can progress to more severe diseases causing liver failure. The global prevalence of NAFLD is estimated at 24%, with the highest rates reported in Latin America.

Innovation

The Novartis Institutes for BioMedical Research works in concert with our Global Drug Development group to bring innovative treatments to patients around the world. In 2017, we advanced our drug discovery and development efforts by encouraging greater collaboration and out-of-the-box thinking, exploring new approaches that could improve how we work, and investing in promising tools and technologies. We made progress in priority disease areas with high unmet medical needs. We also marked several key milestones, including US FDA approval – the first of its kind – for a type of personalized cell therapy that could change the course of cancer care.

9.0 bn
Research and development spending in 2017, amounting to 18.3% of net sales (USD)

23 000
Scientists, physicians and business professionals working in research and development worldwide

200 +
Projects in clinical development

Collaborative science

We are increasing collaboration in research as we try to leverage innovation from a variety of sources. We are also exploring ways to harness digital technology in drug discovery, as well as new therapeutic approaches such as cell therapies.

→ page 43

Efficient, effective drug development

We are using digital technology and data analysis to make drug development swifter and more effective. And we are taking steps to strengthen our pipeline.

→ page 46

Progress in important disease areas

We highlight areas of our work where we are driving significant innovation, or where we can potentially have an important impact on patients and public health.

→ **Immuno-oncology** page 48
→ **Multiple sclerosis** page 50
→ **Liver disease** page 52
→ **Ophthalmology** page 53
→ **Asthma** page 55
→ **Malaria** page 56

For new treatments, the journey from laboratory to patient starts in the discovery phase where researchers try to identify potentially groundbreaking therapies. When new molecules show promise and have been qualified for testing in humans, we organize small-scale proof-of-concept studies to get an early read on a drug's safety and effectiveness. If those studies are successful, we decide whether to move experimental therapies into clinical development for testing in larger patient trials.

In this report, we describe our approach to discovery and development, and then provide detail on our R&D efforts in the areas of immuno-oncology, multiple sclerosis, liver disease, ophthalmology, asthma and malaria. Our pipeline table starting on page 58 gives a broad overview of major development projects.

Discovery

The Novartis Institutes for BioMedical Research (NIBR) is the innovation engine of Novartis. With a global team of approximately 6 000 scientists, physicians and business professionals, NIBR works to discover potential new therapies that could improve health outcomes for patients.

Collaboration is critical to our success. The standard tools of biology and chemistry leave many drug targets – key proteins and nucleic acids known to play a role in disease – out of reach. We are working to expand our toolbox to hit these targets and discover treatments for patients with limited options. This requires breaking down barriers between disciplines and sometimes organizations.

Indeed, exciting new ideas and technologies emerge from unexpected places, and our programs are designed to foster connections with external innovators. NIBR is a conduit for innovation wherever it arises, leveraging discoveries from a variety of sources – internal and external. We are even applying methods pioneered by the technology giants of Silicon Valley to accelerate drug discovery.

In 2017, NIBR established and expanded programs to spark unconventional thinking by our associates as well as collaboration across the organization and beyond. We encourage researchers to make connections between different disciplines, build diverse professional networks, and hunt for promising inventions outside the company. Formal agreements and deals with external investigators, academic institutions and companies support these efforts.

Exciting new ideas and technologies emerge from unexpected places, and our programs are designed to foster connections with external innovators

Promoting open innovation

Our efforts to increase the flow of ideas between researchers gained momentum in 2017. We provided new opportunities for our associates to pursue multidisciplinary projects and collaborate with investigators inside and outside the company, advancing drug discovery research at Novartis while contributing tools and knowledge to the broader scientific community.

We launched a new research concept called the Genesis Labs, where employees together with external collaborators can explore transformative ideas that fall outside the scope of existing departments at NIBR. Multidisciplinary teams pitch ideas to a panel of scientists, who decide which projects are most promising. In the first year of the program, teams submitted 90 proposals, and five projects ultimately received funding.

We launched a new research concept called the Genesis Labs, where employees together with external collaborators can explore transformative ideas that fall outside the scope of existing departments at NIBR

Members of the selected teams step away from their day jobs to focus on their new project for six to 18 months. They're partnered with NIBR or academic mentors with relevant experience. One of the winning projects, for example, involves a device developed by an engineer based at the Massachusetts Institute of Technology in the US, who is a member of the team. NIBR scientists will work with members of her lab to investigate ways to use the device – which monitors breathing, heart rate, gait and body elevation remotely – in clinical trials.

In 2017, we also announced a collaboration with the University of California, Berkeley, to tackle difficult drug targets. Research at the new Novartis-Berkeley Center for Proteomics and Chemistry Technologies in the US focuses on proteins that dodge conventional small molecules, the standard ammunition of drug hunters. These elusive proteins seem to be missing the indentations – or pockets – that such small molecules need to bind to proteins and interrupt their work. Researchers from the two organizations use emerging technologies to identify previously hidden binding pockets on proteins as well as starting points for new therapeutics.

In addition to entering agreements with academic institutions, NIBR encourages collaborations with individual investigators and labs. In 2017, we streamlined the process by which we provide chemical probes discovered at Novartis to scientists around the world.

Innovation (continued)

We also expanded our Faculty of Scholars program, inviting additional academic investigators to participate. Each scholar is a prominent researcher with expertise in a field that the company is interested in exploring, or in a topic that's relevant to an active drug discovery project. A hematologist from Boston Children's Hospital and Harvard Medical School in the US, for example, recently joined the program to advise NIBR teams working on treatments for a blood disorder called sickle cell anemia.

Information flows freely between scholars and NIBR researchers without the need for additional nondisclosure agreements or contracts that have impeded discussions in the past, while still protecting Novartis intellectual property. The academic researchers are exposed to drug discovery research and platforms, while Novartis scientists tap the scholars' knowledge, learning directly from thought leaders.

We seeded the biotechnology community with new inventions by out-licensing drug candidates that, while promising, fall outside our current research strategy. For instance, we signed an agreement that gives PureTech/resTORbio the right to develop two potential treatments for diseases linked to age-related deterioration of the immune system. And we penned a deal that gives Magenta Therapeutics the right to develop a compound that boosts the growth of blood stem cells for specific applications.

The digital technology sector is increasingly a source of innovation for pharmaceutical research

The promise of digital drug discovery

The digital technology sector is increasingly a source of innovation for pharmaceutical research. We are harnessing advances made by software and hardware engineers to make drug discovery more efficient and effective as well as to improve clinical research.

We are exploring, for example, how to use machine learning – a field that has exploded in recent years – to replace certain lab experiments with computer simulations, with 20 projects underway. The goal is to reduce the time and resources required to make a medicine while improving drug design. Machine learning involves feeding computers enormous amounts of data (what we know) and asking them to predict what we don't know.

One of our machine learning projects builds on the types of algorithms that Facebook uses to recognize individuals in photos and suggest who should be tagged. The social media service trains its image analysis software on millions of photos that have already been tagged. The software is then able to recognize faces that it has encountered before, even if the angle or lighting is different in subsequent photos. It is much better than humans at making these connections.

Similarly, we are asking computers to predict how new compounds are working, based solely on images of cells that have been treated with them. We train the software on images of cells that have been treated with compounds that we already understand. Our team recently published a proof-of-concept study detailing its methodology in the journal Bioinformatics. The approach has the potential to cut the time required to determine the properties and characteristics of new compounds.

Another machine learning project focuses on the interaction between potential drugs and their protein targets. We are training software to predict the degree to which a compound at a particular concentration will interact with its target, reducing the need for lab experiments.

We are also investigating how to use devices – including wearable technologies – and apps to improve the quality of the data that we are collecting in our clinical trials and to shift data collection away from clinical trial sites. NIBR researchers are conducting this work in collaboration with colleagues in Global Drug Development as well as external partners. For example, we announced a partnership with Pear Therapeutics Inc. – a digital medicine developer – to test several apps, including one designed to monitor symptoms in patients with multiple sclerosis.

Investing in new tools and technologies

Our investment in tools and technologies extends beyond the digital realm. We are exploring a number of platforms and approaches to augment our arsenal of agents with disease-fighting potential.

For example, we have adopted a platform for generating DNA-encoded libraries to rapidly expand our collection of small molecules that serves as a starting point for potential new medicines. Our conventional compound library contains approximately 1.5 million small molecules. Using the new platform, we have already produced hundreds of millions of additional compounds, which can be tested against evasive protein targets.

To build a DNA-encoded library, our researchers start with a set of chemical building blocks, selected based on computer simulations and desired chemical properties. They put the blocks through several rounds of synthesis, iteratively building a collection of molecules. Each building block includes a short DNA tag. Every compound in the library thus carries a unique DNA barcode recording its synthetic history: which blocks were used to make it, and the order in which they were added.

An entire DNA-encoded library can fit into a single test tube, making it easy to run a simple experiment. Researchers add a target protein to the test tube, fish out compounds that bind to the protein, and then sequence their DNA barcodes, identifying starting points for drug discovery programs.

Photo Senior investigator Paul Erbel uses three-dimensional visualization at NIBR in Basel, Switzerland. This technique helps researchers study the complex interactions between therapeutic compounds and their molecular targets to improve drug design.

We are also rethinking the definition of a medicine. Our work with small molecules and biological molecules – therapeutic staples – continues, but we are also investigating novel approaches to treating diseases. A new Cell and Gene Therapy Initiative at NIBR illustrates the breadth and depth of this effort.

The initiative brings together associates engaged in a variety of projects that involve genetically reprogramming cells. Researchers share tips and lessons learned with their colleagues, driving the science forward. For some projects, the strategy is to deliver genes to particular cells where they reside in the body. For others, it's to remove cells from the body and alter them in the lab, generating "living" drugs that can be given to patients.

Novartis recently received the first ever approval from the US Food and Drug Administration (FDA) for such a living drug: *Kymriah* (tisagenlecleucel). *Kymriah* is a chimeric antigen receptor T-cell (CAR-T) therapy that uses a patient's own T-cells to fight cancer.

Our researchers and our collaborators in academic medicine are building on this achievement, pursuing additional applications of CAR-T technology, including for a number of blood cancers and solid tumors.

We are also working on projects outside the oncology field. For example, we are delivering a gene to particular cells in the ear in an attempt to reverse hearing loss. An early-phase clinical trial of this experimental treatment is underway. Another project involves editing blood cells outside the body in an effort to create a living drug for sickle cell anemia.

This work illustrates our multifaceted approach to drug discovery. We are mining the best ideas from a variety of sources and translating exciting research into potential therapies for patients.

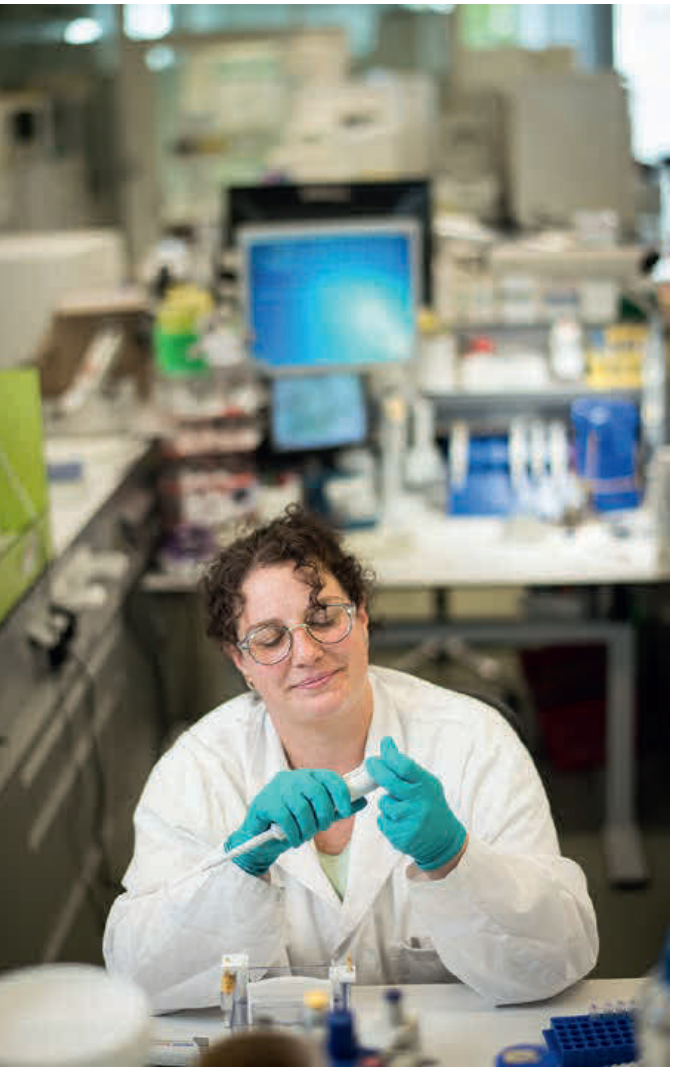
Innovation (continued)

Development

Once we determine that a potential new treatment has promise, we decide whether to begin larger clinical trials to test effectiveness and safety in more patients. Since its creation in 2016, the Global Drug Development (GDD) group has begun moving us toward our goal of more rapid, cost-effective and innovative drug development powered by digital technology and data science. In 2017, we advanced a strong portfolio that aims to address many of the world's significant unmet medical needs. We doubled the number of drug candidates transitioned from NIBR in the last year, bringing our total development projects in clinical testing to more than 200, with 40 potential filings in the US and EU between 2017 and 2020.

Achievements last year included FDA approval for our CAR-T therapy *Kymriah,* previously called CTL019, to treat patients up to 25 years of age with B-cell precursor acute lymphoblastic leukemia that is refractory or in second or later relapse.

For full details on our innovation achievements in 2017, see pages 25-27 of the performance summary.



Our development strategy includes taking measures to strengthen our pipeline, as well as adopting digital technology to improve the efficiency and effectiveness of clinical trials.

As part of our long-term development strategy, we are working to anticipate future health needs, particularly for aging populations

Strengthening our pipeline

We are taking several steps to help ensure our potential new treatments can deliver significant health improvements for patients. We assess all of our projects on multiple criteria, such as feasibility, the potential to change medical practice, and alignment with current capabilities. Our late-stage pipeline covers a broad range of disease areas, including cardio-metabolic, oncology, ophthalmology, respiratory, neuroscience, and immunology and dermatology.

As part of our long-term development strategy, we are working to anticipate future health needs, particularly for aging populations. This means focusing on treatments that could potentially improve quality of life and stop or slow the progression of diseases. Examples include treatments to fight hearing and vision impairment, and to counter deteriorating mobility. At the same time, we are increasingly focusing on disease areas with high unmet medical needs, such as liver and kidney diseases.

We supplement potential new treatments coming from our own researchers with promising innovation from outside our organization. For instance, in 2017 we exercised an option with biotechnology company Conatus Pharmaceuticals Inc. to develop and commercialize an experimental drug called VAY785 (emricasan) to treat patients with fatty liver disease – an area where we are building our pipeline.

Adopting digital technology

To strengthen our innovation capabilities and prepare us for the future, we are investing in a variety of emerging technologies that could help make the drug development process smarter, faster and cheaper. These include advanced analytical tools aimed at improving the efficiency and effectiveness of our trials. In collaboration with QuantumBlack, for example, we created a program

Photo Scientist Gabi Schutzius works in a laboratory at NIBR devoted to regenerative medicine, or the use of stem cells to replace or repair damaged human cells, tissues or organs.

Major clinical trial results in 2017

This table summarizes the results of major clinical trials conducted during the year and includes successful and unsuccessful outcomes.

Project/product	Indication	Trial (phase)	Outcome
Oncology			
CTL019 (tisagenlecleucel, approved in the US as *Kymriah*)	Pediatric relapsed/ refractory acute lymphoblastic leukemia	ELIANA (Phase II)	In this trial, 83% of patients achieved complete remission or complete remission with incomplete blood count recovery within three months of infusion. No minimal residual disease – a blood marker that indicates potential relapse – was detected among responding patients. At six months, 75% of patients remained relapse-free, and overall survival was 89%. The median duration of remission was not reached. No new safety findings were identified.
CTL019 (tisagenlecleucel)	Diffuse large B-cell lymphoma	JULIET (Phase II)	The study showed an overall response rate of 53.1%, with 39.5% achieving a complete response, and 13.6% achieving a partial response among 81 infused patients with three or more months of follow-up, or earlier discontinuation. At six months from infusion, the overall response rate was 37%, with a complete response rate of 30%. The median duration of response was not reached.
CTL119 (CAR-T cell therapy)	Chronic lymphocytic leukemia (CLL)	NCT02640209 (pilot study)	In the pilot trial, eight of nine evaluable patients with relapsed/refractory CLL had no signs of CLL in their bone marrow at three months after treatment with CTL119 in combination with ibrutinib. The patients had been taking ibrutinib for at least six months, had not been in complete remission, and had failed at least one prior regimen before ibrutinib or carried high-risk cytogenetics or mutations.
Promacta/ Revolade (eltrombopag)	Severe aplastic anemia (SAA)	NHLBI: 12-H-0150 (Phase I-II)	The study found 52% of patients with treatment-naïve SAA achieved a complete response at six months when *Promacta/Revolade* was given at the initiation of and concurrently with standard immunosuppressive therapy. No new safety findings were identified.
Tafinlar + *Mekinist* (dabrafenib + trametinib)	Melanoma	COMBI-AD (Phase III)	The combination BRAF- and MEK-inhibition adjuvant therapy reduced the risk of death or recurrence by 53% vs. placebo in patients with high-risk, resected BRAF V600 mutation-positive melanoma. The three-year relapse-free survival rate for patients treated with the combination was 58%, compared to 39% with placebo. No new safety signals were reported.
Votrient (pazopanib)	Adjuvant renal cell carcinoma (RCC)	PROTECT (Phase III)	The study did not meet its primary endpoint in showing a significant improvement in disease-free survival between *Votrient* (600 mg daily) vs. placebo for the adjuvant treatment of patients with locally advanced RCC at high risk for relapse following nephrectomy. The drug did demonstrate significant benefit at a higher daily dose (800 mg daily), but that dose had to be lowered due to adverse events.
Cardiovascular and metabolism			
ACZ885 (canakinumab)	Cardiovascular risk reduction	CANTOS (Phase III)	The 10 065-patient study showed that anti-inflammatory interleukin-1 beta blockade reduced cardiovascular risk (MACE) by a statistically significant 15% in patients with a prior heart attack and inflammatory atherosclerosis who received quarterly injections of ACZ885 (150 mg). Additional analysis revealed a 77% reduction in lung cancer mortality and a 67% reduction in lung cancer cases in patients dosed with 300 mg. The canakinumab safety profile was consistent with the known canakinumab safety profile in approved indications. Canakinumab safety was acceptable in this high-risk population, with no new safety concerns.
RLX030 (serelaxin)	Acute heart failure	RELAX-AHF-2 (Phase III)	The trial did not confirm a benefit in adding RLX030 to standard therapy for the treatment of patients with acute heart failure. The study did not meet either of its two primary endpoints: reduction in cardiovascular death or reduction in worsening heart failure.
Immunology and dermatology			
Erelzi (biosimilar etanercept)	Rheumatoid arthritis (RA)	EQUIRA: GP15-301 (Phase III)	The primary endpoint was met, demonstrating equivalent efficacy and safety of *Erelzi* and EU-authorized Enbrel® in patients with moderate-to-severe active RA who had inadequate response to disease-modifying antirheumatic drugs, including methotrexate.
Neuroscience			
AMG 334 (erenumab)	Chronic migraine	STRIVE (Phase III)	STRIVE evaluated AMG 334, 70 mg and 140 mg, compared with placebo as a migraine prophylactic agent in 955 patients. The primary endpoint of reduction in monthly migraine days was met, with reductions of 3.2 (70 mg) and 3.7 (140 mg) from baseline compared with 1.8 from placebo. All secondary endpoints were met. Among these, it was shown that AMG 334 reduced migraine days by at least 50% in 50% of the patients. The safety and tolerability profile was comparable to placebo.
BAF312 (siponimod)	Secondary progressive multiple sclerosis (SPMS)	EXPAND (Phase III)	The study met its primary endpoint, demonstrating that BAF312 significantly reduced the risk of three-month confirmed disability progression vs. placebo in patients with SPMS, as measured by the Expanded Disability Status Scale. The safety profile of BAF312 is comparable to other drugs of the same class of S1P receptor modulators.
Gilenya (fingolimod)	Multiple sclerosis (MS) in pediatric population	PARADIGMS (Phase III)	PARADIGMS is the first randomized controlled trial in pediatric MS patients (aged 10 to <18 years). Patients were treated for up to 24 months with either *Gilenya* or interferon beta-1a. The trial met its primary endpoint and decreased annualized relapse rates relative to the active comparator by 82%. The overall safety profile of patients treated with *Gilenya* in this pediatric population is consistent with the safety profile observed in the adult studies.
Ophthalmology			
Fovista® (pegpleranib)	Neovascular age-related macular degeneration (nAMD)	OPH1002 and OPH1003 (Phase III)	The two studies did not show additional improvement in best-corrected visual acuity in patients with nAMD treated with a combination of Fovista® and *Lucentis* (ranibizumab) vs. standard-of-care *Lucentis* monotherapy.
RTH258 (brolucizumab)	nAMD	HAWK and HARRIER (Phase III)	RTH258 (3 mg and 6 mg) met the primary efficacy endpoint of non-inferiority to aflibercept in mean change in best-corrected visual acuity from baseline to week 48 in two Phase III trials (HAWK and HARRIER) for both doses in patients with nAMD. Significantly fewer RTH258 patients showed signs of disease activity (at week 16) as well as retinal fluid (IRF and/or SRF), and RTH258-treated patients demonstrated superior reductions in retinal thickness (CST) – key markers used by physicians to determine injection frequency, and each a secondary endpoint. Furthermore, these results were achieved while a majority of patients on RTH258 6 mg – 57% in HAWK and 52% in HARRIER – were maintained on a q12w dosing interval immediately following the loading phase through week 48 (a secondary endpoint). RTH258 safety was comparable to aflibercept, with the overall incidence of adverse events balanced across all treatment groups in both studies.

Innovation (continued)

called Nerve Live that has collected data from 350 clinical trials over the last five years. Predictive analytics can help us use that data to make key decisions, such as choosing the best trial sites for a specific development program.

We are also using app-based technologies to assist in research. In a trial of our heart failure medicine *Entresto*, for instance, we used a smart watch to track patients' physical activity, symptoms and sleep, among other measures. The precision of the results from this approach allowed us to enroll slightly more than 100 patients for the trial, rather than the thousands who are typically needed for a traditional trial where data is recorded manually.

Although in its early stages, data-centered innovation has great promise for helping us produce better treatments more efficiently. Biomedical sensors used by patients and physicians can provide valuable insights into treatment effectiveness and disease progression. Natural language processing – or computer understanding of human language – could help automate the management of millions of regulatory and safety documents each year. We believe advancements in artificial intelligence will steer us toward more optimal, personalized treatments for cancers, neurological and immunological disorders, and other challenging diseases.

Development projects

The pipeline chart on pages 58-63 gives an overview of projects in advanced stages of development. In addition, several areas of our work warrant more detailed discussion because they are areas of significant innovation, or areas of potentially important impact on patients and public health.

Immuno-oncology

Despite recent therapeutic advances, cancer is the second most common cause of death in the world. Moreover, the number of new cancer cases is expected to rise by about 70% in the next 20 years, according to the World Health Organization. This is due in part to the aging global population as well as environmental and lifestyle risk factors.

While Novartis is a leader in targeted cancer therapies, we are equally focused on immunotherapy, which harnesses the body's immune system to help fight cancer. Our immuno-oncology portfolio explores a range of strategies to boost patients' immune responses, and includes our personalized CAR-T therapies.

CAR-T therapies

Called "a new frontier in medical innovation" by the FDA, CAR-T therapies represent one of the most ambitious treatment strategies in immuno-oncology and could even help usher in a new era of personalized medicine. They involve taking a patient's T-cells (white blood cells that help fight infections) and genetically reprogramming them to track down and fight cells – including cancer cells – that express a particular protein. These modified T-cells are then reinfused into the patient.

In August, our most advanced CAR-T therapy, *Kymriah* (tisagenlecleucel), received FDA approval to treat patients up to 25 years of age with B-cell precursor acute lymphoblastic leukemia (ALL) that is refractory or in second or later relapse. Formerly known as CTL019, *Kymriah* is the first CAR-T therapy approved by the FDA.

This one-time treatment – developed in collaboration with the University of Pennsylvania (Penn) in the US – addresses an urgent need for pediatric and young adult patients with relapsed/refractory ALL, who have limited treatment options. FDA approval followed a promising study, sponsored by Novartis and led by researchers from Children's Hospital of Philadelphia and Penn, in which 83% of patients who received *Kymriah* achieved either complete remission or complete remission with incomplete blood count recovery within three months. The latter is when there is no evidence of persistent disease but blood counts have not completely recovered.

A dedicated US production site in Morris Plains, New Jersey, processes patients' cells, and hundreds of CAR-T therapies have already been manufactured for patients, including participants in global clinical trials. A process called leukapheresis has been combined with cryopreservation to enable physicians to collect, freeze and ship cells from patients around the world.

In April, the FDA granted breakthrough therapy designation to *Kymriah* for a potential second indication: the treatment of adults with relapsed/refractory diffuse large B-cell lymphoma (DLBCL) who have failed two or more prior therapies. DLBCL is the most common form of lymphoma, and 10–15% of patients do not respond to initial therapy or relapse within three months of treatment. In December, the primary analysis from the Phase II JULIET study sponsored by Novartis and led by Penn researchers showed an overall response rate of 53.1% among patients who failed to respond to prior therapy, or relapsed.

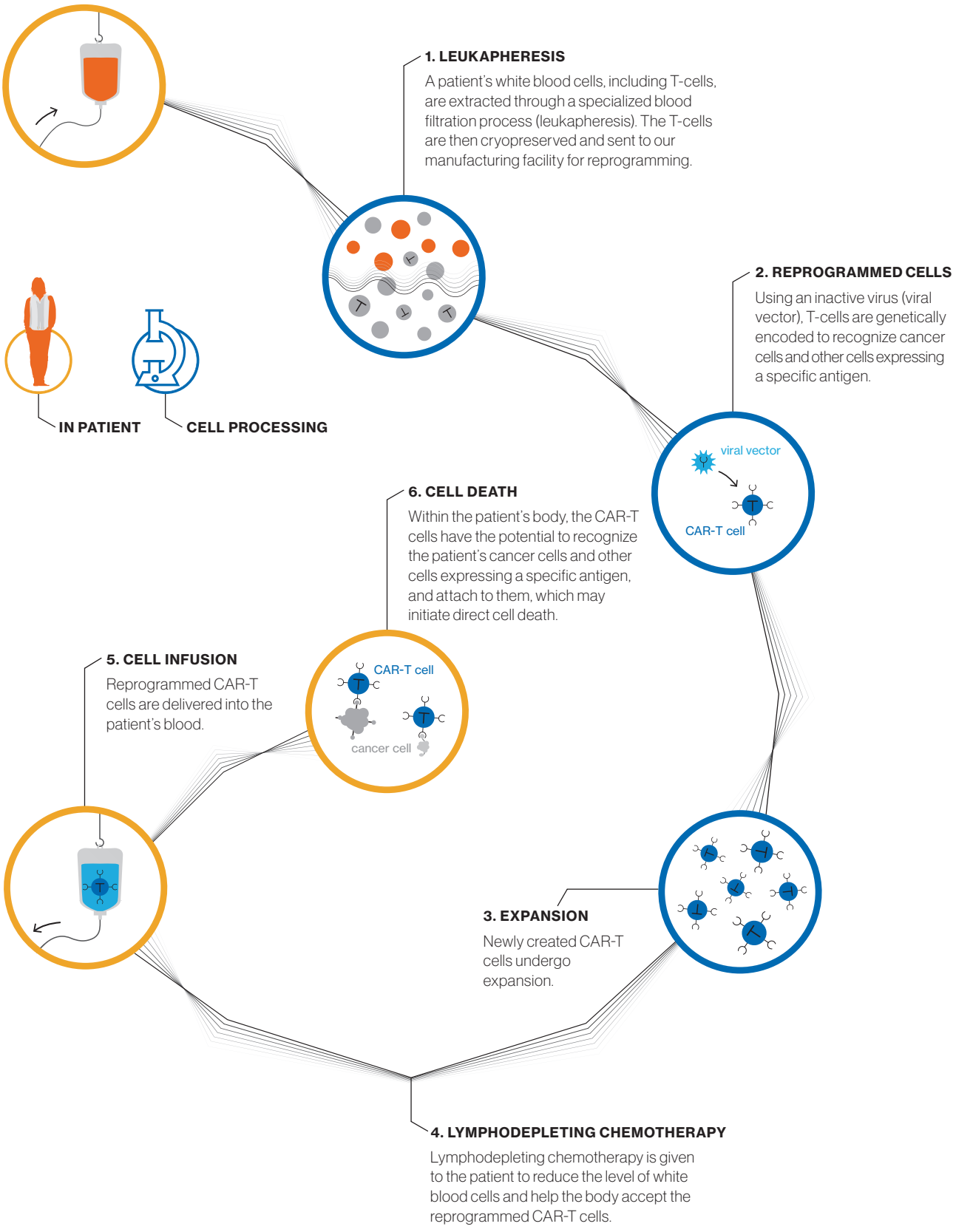
Work on future CAR-T therapies is well underway. Using gene editing technologies from an ongoing collaboration with Intellia Therapeutics Inc., Novartis is researching how to make CAR-T therapies even more effective, durable and safe. One of the latest to reach the clinic in trials at Penn's Abramson Cancer Center is CTL119, which has been tested in relapsed/refractory chronic lymphocytic leukemia (CLL). CLL – the most common type of adult leukemia – evolves slowly over many years, and for the majority of patients, there is no curative therapy.

In May, Novartis and Penn researchers announced the results of a small pilot study of CTL119 in combination with ibrutinib, a targeted therapy for B-cell cancers. In CLL patients who had previously shown incomplete responses to ibrutinib alone, eight of the nine participants had no signs of cancer in their bone marrow three months after treatment.

We currently have a total of six CAR-T therapies that are in clinical trials. They are part of an alliance with Penn to further research and develop these types of therapies.

Chimeric antigen receptor T-cell (CAR-T) therapy

Individualized CAR-T therapy uses a patient's own immune system to fight certain types of cancers. A patient's T-cells are extracted and reprogrammed outside of the body to recognize and fight cancer cells and other cells expressing a particular antigen.



Innovation (continued)

Next-generation immunotherapies

Through acquisitions, licensing deals and academic partnerships, we have built a robust immuno-oncology portfolio to tackle the multiple ways that tumors defend themselves. In recent years, checkpoint inhibitors – drugs that stop cancer cells from "turning off" T-cells – have shown remarkable clinical benefits. However, these treatments do not work for all patients.

To better predict which treatments or treatment combinations will be most effective in the right patient populations, we are focused on developing a comprehensive understanding of the interactions between cancer and the body's immune response. Our programs target the three stages of the immune response that are often suppressed by cancer: recognizing cancer cells as a threat, overcoming the tumor's defenses, and boosting the anti-tumor T-cell response.

We have 18 immuno-oncology assets in the clinic. The most advanced is PDR001 (spartalizumab), an antibody that helps the immune system recognize and attack tumors. It is in 25 clinical trials, as a single agent or in combinations.

Our trials include a Phase III study in advanced melanoma patients with a BRAF V600 mutation, which promotes tumor growth. It aims to evaluate the safety and efficacy of PDR001 in combination with dabrafenib and trametinib, two commonly prescribed targeted therapies for melanoma. PDR001 is also in 11 dose-finding/Phase II trials for the treatment of varied cancers, such as neuroendocrine tumors, non-small cell lung cancer and advanced solid tumors. The first results of these 11 trials are expected to be announced in 2018.

PDR001 binds to a checkpoint protein on T-cells called PD-1. We are concurrently developing second-generation checkpoint inhibitors targeting other proteins called lymphocyte activation gene-3 (LAG-3) and T-cell immunoglobulin and mucin domain-3 (TIM-3), as well as the adenosine G-protein-coupled receptor A2AR. T-cells frequently display LAG-3 or TIM-3 in addition to PD-1, and targeting these proteins may provide strategies for reducing the avenues available for cancers to develop resistance to PD-1 therapies.

In collaboration with Aduro Biotech Inc., we are exploring the potential to prompt immune responses in tumors or indications that lack a pre-existing robust immune response. To this end, we are co-investigating a molecule that activates a pathway called the stimulator of interferon genes (STING), which can trigger anti-tumor immune responses.

Through these programs, our objective is to eventually develop multifaceted – and more effective – combination cancer therapies.

Multiple sclerosis

Multiple sclerosis (MS) is a complex disease, affecting 2.5 million people worldwide, in which the body's own immune system mistakenly attacks the myelin sheath that protects nerves in the brain and spinal cord. In 2017, we advanced our experimental compound portfolio to treat different forms of the disease, confirmed the real-world effectiveness of our flagship therapy *Gilenya* (fingolimod), and furthered an innovative tool that may one day predict how the disease will progress in individuals with MS.

We plan to start the submission of a therapy called BAF312 (siponimod) for FDA review in the first quarter of 2018. BAF312 is our second-generation sphingosine-1-phosphate (S1P) receptor modulator, which is more specific to receptors called types 1 and 5. Targeting the type 1 receptor is important in preventing the release of immune cells into blood (which causes damage), while the type 5 receptor is located on cells in the central nervous system and may play a beneficial role in repair mechanisms.

In the past year, we presented findings from our Phase III EXPAND study, which demonstrated that BAF312 reduces the risk of disability progression in patients with a form of the disease known as secondary progressive multiple sclerosis.

Photo Women in the US city of Philadelphia take part in a yoga event run by Living Beyond Breast Cancer, a group that provides information and support for patients and their families.

relapsing MS based on four key measures: relapses, MRI lesions, disability progression and brain shrinkage. The study demonstrated the value of measuring lesion changes and brain volume when assessing patients, and showed that these can be reliably monitored using routine imaging methods in daily clinical practice.

Additionally, we completed a novel analysis involving the MS biomarker known as the neurofilament light chain (NfL) protein, which is elevated in the blood and cerebrospinal fluid of MS patients. The study compared treatment with fingolimod to interferon beta-1a or placebo. Fingolimod therapy led to early and sustained significant reduction in NfL, further supporting the role of NfL as a sensitive and reliable indicator of neurological damage and treatment response in patients with relapsing-remitting multiple sclerosis, the most common form of the disease.

Unpredictability remains a daunting challenge in MS. Some people experience mild sensory symptoms, while others have marked changes in mobility and cognitive skills. We are harnessing the power of information technology to address this uncertainty. In the US, we are collaborating with the University of California, San Francisco, on the development of the MS BioScreen, an innovative system that enables users to track a wealth of medical data (clinical, imaging and biomarker) using a simple app. Comparison of long-term data may provide insights into disease changes and help physicians make more informed treatment decisions.

Our next-generation B-cell therapy OMB157 (ofatumumab) aims to assist MS patients across the disease spectrum. OMB157 is a fully human monoclonal antibody targeting CD20-positive B-cells that play a central role in the inflammatory cascade leading to the demyelination of neurons (when the myelin sheath of neurons is damaged). This causes relapses and increases disability in MS patients. Unlike other B-cell therapies, ofatumumab can be administered by subcutaneous injections at home. Recruitment for our Phase III ASCLEPIOS studies is on track.

When MS strikes people before age 18, they can experience relapses at double or triple the rate of adult-onset patients and face disability that severely limits their daily living. In September, we announced results from our Phase III PARADIGMS study investigating *Gilenya* in pediatric MS. Data showed that oral *Gilenya* resulted in a significant reduction in relapses versus interferon beta-1a intramuscular injections. This marked the first ever randomized, controlled Phase III study of a disease-modifying therapy in pediatric MS.

Last year a Phase IV study of *Gilenya* also provided important insights into MS and its treatment. This first-of-its-kind trial analyzed data from both patient charts and regular MRI scans. The results, announced in April, confirmed *Gilenya* as a highly efficacious, long-term treatment option for controlling disease activity in

We will start the submission of a therapy called BAF312 (siponimod) for FDA review in the first quarter of 2018

Aided by the widespread use of smartphones, we are also running two large initiatives in the US to capture and analyze real-life data from connected patients. Called elevateMS and Evidation, these initiatives are designed to improve understanding of MS, predict clinical relapses, and identify novel endpoints for use in future clinical studies.

At the same time, we are developing a pioneering tool with the goal of predicting disease progression and influencing treatment early on. Through global collaborations, we are accessing data from hundreds of thousands of patients with MS, and using machine learning to build a predictive algorithm. We will test this formula against real-world clinical decisions. Ultimately, it's our hope that an effective algorithm, available through an app or website, will enable physicians to prescribe the right treatment for the right patient at the right time.

Innovation (continued)

Liver disease

In the wake of the worldwide obesity and type 2 diabetes epidemics, fatty liver disease has become a growing health concern. Global shifts in diet and lifestyle are increasing the prevalence of this condition – which occurs when fat builds up in the liver – and an estimated 1.8 billion people around the world already have a certain type called nonalcoholic fatty liver disease (NAFLD).

Our liver portfolio is anchored on developing treatments for the more severe form of NAFLD, nonalcoholic steatohepatitis (NASH), which affects up to 6.5% of the global population and often goes undetected until its later stages when it can be fatal. In patients with NASH, excess fat in the liver is associated with inflammation. Both drive liver damage, and the resulting scarring (or fibrosis) can progress to late-stage scarring (cirrhosis) as well as liver failure. NASH is a leading cause of liver transplants and often contributes to cardiovascular disease, but there are currently no approved treatments for it.

In the wake of the worldwide obesity and type 2 diabetes epidemics, fatty liver disease has become a growing health concern

Our strategy is to create therapies that reduce the three underlying traits of NASH: fat accumulation, liver inflammation and liver scarring. In particular, we have been developing a class of molecules that boost the liver's natural ability to process and remove excess fat through a protein called the farnesoid X receptor (FXR), which regulates metabolism in the primary liver cells. This effort began as an internal exploratory proposal nearly a decade ago and turned into a quest to find small molecules to enhance the fat-reducing activity of FXR. These FXR agonists have also been shown to reduce liver inflammation and fibrosis.

Novartis now has two FXR agonists in Phase II clinical trials, known as LJN452 (tropifexor) and LMB763. Both have received FDA fast track designation, a process intended to get important new drugs to patients earlier.

We are investigating other promising treatments to suppress liver inflammation and fibrosis, and to improve liver function even in patients with late-stage cirrhosis. In May, Novartis announced it had exercised the option to an exclusive license with Conatus Pharmaceuticals Inc. for the global development and commercialization of the anti-inflammatory drug VAY785 (emricasan). Phase II trials have demonstrated that VAY785 rapidly and durably reduces liver inflammation and cell death.

Three Phase IIb trials are currently underway to study VAY785 in patients with NASH fibrosis. One includes patients with compensated (asymptomatic) liver cirrhosis, and another includes those with decompensated (symptomatic) liver cirrhosis – the most advanced stage of NASH.

We are also exploring potential combination therapies. In April, we announced an agreement with Allergan to initiate a Phase II clinical trial evaluating the combination of a Novartis FXR agonist and Allergan's cenicriviroc to treat NASH. Cenicriviroc is an oral molecule currently in

Photo George Kochilas in his café, a social hub for the elderly residents of Agios Dimitrios in Ikaria, Greece. People on this island have one of the longest life expectancies in the world, thanks to a diet and lifestyle that appear to promote health, well-being and contentment.

Phase III studies that reduces inflammation and fibrosis by blocking two protein receptors involved in the immune response. In a previous Phase IIb study, cenicriviroc showed a significant antifibrotic benefit after one year and was well tolerated.

In addition to developing treatments, we are working on better, non-invasive tools to diagnose NASH. A definitive NASH diagnosis is currently only possible through a liver biopsy, an invasive procedure that can be painful. Novartis is a key participant in LITMUS, a part of the EU Innovative Medicines Initiative and one of the largest international collaborations between academia and industry to find non-invasive markers of NASH and hepatic fibrosis.

Ophthalmology

We continue to develop innovative ophthalmic pharmaceuticals designed to treat the underlying causes and effects of various eye diseases. Among our efforts, we are working to advance investigational therapies that could offer longer-term improvements for people with conditions such as dry eye disease, presbyopia and neovascular age-related macular degeneration (nAMD).

Dry eye disease impacts more than 340 million patients worldwide and can result from a range of genetic diseases and inflammatory disorders. Patients may experience painful, burning, stinging or itching eyes leading to impaired vision, and palliative treatments such as artificial tears provide only temporary relief.


BAILE.

Innovation (continued)

In April, we announced we had exercised an option to in-license a dry eye treatment called ECF843 for ophthalmic indications outside Europe. Developed by Lubris LLC as a new therapeutic approach, ECF843 is a recombinant version of the lubricin protein – a naturally occurring lubricant that dry eye patients are often missing. Lubricin is produced by the body wherever there is friction, particularly in locations such as the eyes and joints. In a small Phase II clinical study, ECF843 showed the potential to rapidly improve dry eye symptoms. A larger Phase II study is planned to start in 2019.

Additionally, we have invested in developing the first pharmaceutical treatment with potential disease-modifying activity for presbyopia. Presbyopia – the age-related loss of near-distance vision – affects 85% of people over 45 years old and is on the rise as the global population ages. This condition is thought to develop when the lens (the part of the eye that changes shape to enable focus) gradually stiffens as proteins in lens fibers link together. Patients typically need reading glasses, bifocals or progressive lenses.

We are working to advance investigational therapies that could offer longer-term improvements for people with conditions such as dry eye disease, presbyopia and neovascular age-related macular degeneration

In late 2016, we announced the acquisition of Encore Vision Inc. following the release of data for a first-in-class topical eye drop that has the potential to restore flexibility to the lens. This therapy, UNR844, contains a compound consisting of two molecules found in the body: lipoic acid and choline. Lipoic acid plays a role in energy metabolism and may also act as an antioxidant, breaking the links between proteins in lens fibers. Choline, in turn, helps lipoic acid penetrate the cornea to reach its site of action in the lens.

In a Phase I/II proof-of-concept study, UNR844 showed significant promise in improving near-distance vision, with the majority of treated patients achieving 20/40 near vision (the level needed to perform most near-vison tasks without reading glasses) after 90 days. There are currently no other disease-modifying treatments available or in clinical development to reverse the loss of near-distance vision. A Phase IIb study of UNR844 is planned for 2018.

Photo Minghshan Gao plays the accordion for choir practice with elderly friends and neighbors at their local community center in Shanghai, China. As Chinese society evolves, elderly people are increasingly taking the lead in caring for each other and for themselves, rather than relying on their families as was common in the past.

We have also advanced RTH258 (brolucizumab), a novel antibody fragment that could significantly reduce the burden associated with the number of treatment injections needed for nAMD. nAMD affects an estimated 20 to 25 million people worldwide and is a leading cause of severe vision loss. It occurs when abnormal levels of a protein called vascular endothelial growth factor (VEGF) trigger the growth of blood vessels under the retina, which can leak and damage central vision. Current treatments are designed to target VEGF and block these effects, but they require eye injections typically around every four to eight weeks.

RTH258 is a small antibody fragment (a single chain) that is only a fraction of the size of typical antibodies. Its innovative architecture and small size are believed to enable the delivery of higher doses and deeper tissue penetration relative to full-sized antibodies, which together may lead to longer-lasting efficacy. In 2017, Novartis announced that in two pivotal Phase III trials studying nAMD, RTH258 met the primary endpoint of non-inferiority in vision against aflibercept in mean change in best-corrected visual acuity. Additionally, RTH258 demonstrated superiority in three secondary endpoints that are considered key markers of nAMD disease: central subfield retinal thickness, retinal fluid and disease activity. A majority of patients were maintained on a 12-week treatment schedule immediately following the loading phase, which was a secondary endpoint. Novartis expects to complete studies to enable filing in 2018.

Asthma

Novartis has been exploring new approaches to the treatment of asthma ever since *Xolair* (omalizumab) was approved in 2002 as the first biological therapy for this inflammatory disease of the airways. There remains a pressing need for new medicines to treat a condition that affects around 334 million people worldwide and causes more than 345 000 deaths per year. The disease has a range of triggers and pathways, and Novartis is developing new options to treat many forms of asthma at all levels of severity.

While *Xolair* is given by subcutaneous injection, asthma has traditionally been treated with inhaled medicines that can be combined depending on the patient's symptoms and the severity of the condition. Although well established, these inhaled compounds and their associated devices remain the focus of intense innovation. Novartis is currently developing QVM149, which – if approved – could be the first triple therapy for asthma, offering patients the combined efficacy of three medicines in a single once-daily inhaled formulation.

QVM149 incorporates indacaterol, the first once-daily, long-acting beta2-agonist; glycopyrronium bromide, a long-acting muscarinic antagonist; and mometasone furoate, a once-daily inhaled corticosteroid. Mometasone furoate is already approved for asthma, while indacaterol and glycopyrronium bromide are approved to treat another common respiratory condition called chronic obstructive pulmonary disease (COPD).

Innovation (continued)

To make this triple combination possible, the surface properties of the inhaled particles had to be engineered to ensure they interact correctly and are deposited in exactly the right part of the lung – a formidable challenge when the particles are less than five-thousandths of a millimeter in diameter. Pivotal Phase III studies are now underway in asthma with different doses of QVM149 as well as with QMF149, a combination of indacaterol and mometasone furoate. The program involves around 6 000 patients and is due for completion in 2019.

Novartis is also applying innovation to the inhalers used to deliver such medicines. A new version of the *Breezhaler* device is being developed that contains electronics to detect whether the medicine has been inhaled correctly, and provide feedback to patients via a smartphone app. The first clinical study with this inhaler is due to begin this year in COPD, and we plan to make it available when QVM149 is launched in asthma. Ultimately the goal is for the device to form part of a system that monitors trigger factors such as lung function and air quality, and that issues alerts when the patient is at increased risk of an attack of breathlessness and wheezing, known as an exacerbation.

A new version of the *Breezhaler* device is being developed that contains electronics to detect whether the medicine has been inhaled correctly, and provide feedback to patients via a smartphone app

Some patients find their asthma remains inadequately controlled and they continue to suffer exacerbations despite using inhaled therapies. We are developing another novel medicine that should provide better control for these patients, potentially decreasing the need to use systemic corticosteroids and delaying the need for a biologic. This is QAW039 (fevipiprant), a once-daily oral tablet given as an add-on to inhaled therapies to reduce the rate of exacerbations and improve the quality of life of patients with uncontrolled asthma.

QAW039 is a first-in-class prostaglandin D_2 receptor antagonist. It works by blocking a pathway that activates some of the key cells involved in asthma inflammation, including eosinophils (a type of white blood cell) and T-helper type 2 cells. Results of a Phase II study showed that QAW039 reduced the number of eosinophil cells in sputum (or phlegm) associated with asthma exacerbations. A pivotal Phase III program is now underway, consisting of five trials involving around 4 000 adult and adolescent patients with moderate-to-severe asthma.

Medicines at an earlier stage of development could potentially treat other patient groups and disease pathways. For example, CSJ117 represents an entirely new form of inhaled biological therapy known as an antibody fragment (or Fab). It targets thymic stromal lymphopoietin, a protein in the cytokine family that plays a key role in the development of allergic asthma.

Novartis is also developing CJM112, an antibody given by subcutaneous injection that targets another inflammatory cytokine called interleukin-17A. This could provide a new therapeutic approach for patients with severe non-allergic asthma, for whom current medications are largely ineffective.

Malaria

The need for innovation in malaria treatment is driven by growing evidence that the parasites causing the disease are becoming resistant to artemisinin, the current mainstay of therapy. Resistant strains requiring longer courses of treatment have emerged in Southeast Asia, and there have also been sporadic reports from Africa, where more than 90% of the estimated 446 000 malaria deaths occur. With nearly half of the world's population at risk from malaria, Novartis and its partner organizations are in a race against time to develop the next generation of therapies before resistance spreads.

Photo Adiarra Traore with her mother Fatoumata Berthe at home in the African village of Bougoula in Mali. Adiarra is taking part in a clinical trial to assess whether a novel compound called KAF156 could be an effective next-generation treatment for malaria. The disease killed an estimated 407 000 people in Africa in 2016, many of whom were children under 5 years old.

One important and promising compound that is now in clinical development is KAF156, the first in a new class of antimalarial compounds called imidazolopiperazines. Results of a proof-of-concept study published in 2016 showed this has the potential to clear malaria infection and block transmission of the disease. KAF156 was found to be fast-acting and potent across multiple stages of the parasite's lifecycle, rapidly clearing both Plasmodium falciparum and Plasmodium vivax forms of the disease. Crucially, it was also effective against strains with genetic markers of resistance to the current standard treatments.

In August 2017, the next stage of development began with the launch of a comprehensive Phase IIb clinical trial program. This uses a complex adaptive design to evaluate the drug at a range of doses and in different age groups, initially in adults and adolescents and then, within the same trial, in children as young as 2 years old. This is vital because children are especially vulnerable to malaria, with one child dying from the disease every two minutes. The study is being conducted at leading centers across nine countries in Africa and Asia where malaria is endemic, and will continue through 2019.

The World Health Organization specifies that malaria should be treated with a combination of drugs that have different modes of action to decrease the potential risk that resistance will emerge. For example, *Coartem*/*Riamet*, launched by Novartis in 1999 and now widely used as the standard of care, is a combination of artemether and lumefantrine. *Coartem* must be given twice daily for three days, whereas KAF156 could be given once daily and even has the potential for single-dose treatment.

The chosen partner drug for KAF156 is lumefantrine, which has a well-established efficacy and safety profile as one of the components of *Coartem* and has never been used as monotherapy. However, lumefantrine must be given twice daily, so Novartis researchers based in Hyderabad, India, embarked on a project to increase its bioavailability – or rate of absorption into the body. They succeeded in altering the chemical formulation of lumefantrine to increase its bioavailability by 48 times. The new formulation can be given once daily, making it a suitable partner for KAF156.

One important and promising compound that is now in clinical development is KAF156, the first in a new class of antimalarial compounds called imidazolopiperazines

Novartis is developing KAF156 with scientific and financial support from Medicines for Malaria Venture (in collaboration with the Bill & Melinda Gates Foundation).

Additionally, we are investigating another compound with a novel mechanism of action against malaria called KAE609 (cipargamin). This belongs to a class of drugs called spiroindolones and has also shown efficacy at single doses. Results of a small Phase II study in Thailand demonstrated that KAE609 rapidly cleared both Plasmodium falciparum and Plasmodium vivax parasites, including some showing a genetic marker of resistance to artemisinin. A further Phase II study is now underway to assess the optimum dosing levels, and the outcome of this will determine future development plans for the compound.

KAE609 was discovered through a joint research program with the Novartis Institute for Tropical Diseases, the Novartis Natural Products Research Group, the Genomics Institute of the Novartis Research Foundation, and the Swiss Tropical and Public Health Institute. Research was supported by the Wellcome Trust, the Singapore Economic Development Board, and Medicines for Malaria Venture (MMV). Novartis is leading the development of KAE609 in collaboration with MMV and with financial support from the Wellcome Trust.

Pipeline

Novartis is consistently rated as having one of the industry's most respected development pipelines, with more than 200 projects in clinical development, as of December 31, 2017.

Many of these projects, which include new molecular entities as well as additional indications and different formulations for marketed products, are for potentially best-in-class or first-in-class medicines that could significantly advance treatment standards for patients worldwide. This table provides an overview of selected projects in confirmatory development, organized according to our development units.

We use the traditional pipeline model as a platform (e.g., Phase I-III). However, we have tailored the process to be simpler, more flexible and more efficient.

Glossary

Project/product Project refers to the Novartis reference code (combination of three letters and three numbers) used for projects in development. Product refers to the brand name for a marketed product.

Common name Official international non-proprietary name or generic name for an individual molecular entity as designated by the World Health Organization

Glossary continued on page 60

Major development projects

Project/product	Common name	Mechanism of action
Oncology		
MTV273	–	BCMA-targeted chimeric antigen receptor T-cell immunotherapy
HDM201	–	p53-HDM2 inhibitor
INC280	capmatinib	c-MET inhibitor
ABL001	asciminib	BCR-ABL inhibitor
ACZ885	canakinumab	Anti-interleukin-1 beta monoclonal antibody
EGF816	–	EGFR mutation modulation
BYL719	alpelisib	PI3K-alpha inhibitor
Jakavi	ruxolitinib	JAK1/2 inhibitor
LCI699	osilodrostat	Cortisol synthesis inhibitor
Promacta/Revolade	eltrombopag	Thrombopoietin receptor agonist
SEG101	crizanlizumab	P-selectin inhibitor
Arzerra	ofatumumab	Anti-CD20 monoclonal antibody
PDR001	spartalizumab	Anti-PD-1 monoclonal antibody
Rydapt	midostaurin	Signal transduction inhibitor
Kisqali	ribociclib	CDK4/6 inhibitor
Tafinlar + Mekinist	dabrafenib + trametinib	BRAF inhibitor + MEK inhibitor
CTL019[4]	tisagenlecleucel	CD19-targeted chimeric antigen receptor T-cell immunotherapy
Afinitor/Votubia	everolimus	mTOR inhibitor
Signifor LAR	pasireotide	Somatostatin analogue

[1] Some filings have received approval in either the US or EU but are awaiting approval in the other market.
[2] Phase and planned filing dates refer to the lead indication in development.
[3] Non-steroidal aromatase inhibitor
[4] Approved in the US as *Kymriah*

Potential indication/disease area	Route of administration	Planned filing dates [1,2]	PHASE I	PHASE II	PHASE III	SUBMISSION
Multiple myeloma	Intravenous infusion	2021				
Acute myeloid lymphoma	Oral	≥2022				
Non-small cell lung cancer (NSCLC) [lead indication]; NSCLC (EGFR mutation)	Oral	2019				
Chronic myeloid leukemia (CML) [lead indication], 3rd line; CML, 1st line	Oral	2020				
NSCLC, 2nd line; NSCLC, 1st line; adjuvant NSCLC	Subcutaneous injection	2021				
NSCLC	Oral	2020				
Hormone receptor-positive (HR+)/human epidermal growth factor receptor 2-negative (HER2-) advanced breast cancer (postmenopausal women), 2nd line (+ fulvestrant)	Oral	2018				
Acute graft-versus-host disease; chronic graft-versus-host disease	Oral	2020				
Cushing's disease	Oral	2018				
Severe aplastic anemia, 1st line	Oral	2018				
Sickle cell disease	Intravenous infusion	2019				
Refractory indolent non-Hodgkin's lymphoma	Intravenous infusion	2020				
Malignant melanoma (*Tafinlar* + *Mekinist*) [lead indication]; malignant melanoma; endocrine neoplasm	Intravenous infusion	2019				
Acute myeloid leukemia (FLT3 wild type)	Oral	≥2022				
HR+/HER2- advanced breast cancer (postmenopausal women), 1st/2nd line (+ fulvestrant); HR+/HER2- advanced breast cancer (premenopausal women), 1st line (+ tamoxifen + goserelin or NSAI[3] + goserelin); HR+/HER2- breast cancer (adjuvant)	Oral	2018				
BRAF V600+ melanoma (adjuvant)	Oral	US/EU registration				
Pediatric/young adult acute lymphoblastic leukemia [lead indication]; r/r diffuse large B-cell lymphoma; r/r follicular lymphoma; chronic lymphocytic leukemia; r/r diffuse large B-cell lymphoma (+ pembrolizumab); r/r diffuse large B-cell lymphoma in 1st relapse	Intravenous infusion	US approved EU registration				
Tuberous sclerosis complex seizures	Oral	EU approved US registration				
Cushing's disease	Long-acting release/ intramuscular injection	EU approved US registration				

Pipeline (continued)

Mechanism of action Specific biochemical interaction with a molecular target such as a receptor or enzyme, through which a drug substance produces its pharmacological effect

Potential indication/indications Disease or condition for which a compound or marketed product is in development and is being studied as a potential therapy

Route of administration Path by which a medicinal preparation is administered into the body, such as oral, subcutaneous or intravenous

Phase I First clinical trials of a new compound, generally performed in a small number of healthy human volunteers, to assess the clinical safety and tolerability, as well as metabolic and pharmacologic properties of the compound

Phase II Clinical studies 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 also may be used to compare a new drug against a current standard of care to evaluate the overall benefit-risk relationship of the new medicine.

Glossary continued on page 62

Major development projects

Project/product	Common name	Mechanism of action
Cardiovascular and metabolism		
LHW090	–	Neprilysin inhibitor
LIK066	–	SGLT1/2 inhibitor
MAA868	–	Factor XI inhibitor
Entresto	valsartan, sacubitril (as sodium salt complex)	Angiotensin receptor/neprilysin inhibitor
ACZ885	canakinumab	Anti-interleukin-1 beta monoclonal antibody
Respiratory		
QBW251	–	CFTR potentiator
QMF149	indacaterol, mometasone furoate (in fixed-dose combination)	Long-acting beta2-adrenergic agonist and inhaled corticosteroid
QAW039	fevipiprant	DP2 antagonist (CRTH2 antagonist)
Xolair	omalizumab	Anti-IgE monoclonal antibody
QVM149	indacaterol, mometasone furoate, glycopyrronium bromide (in fixed-dose combination)	Long-acting beta2-adrenergic agonist, long-acting muscarinic antagonist and inhaled corticosteroid
Immunology and dermatology		
LJN452	tropifexor	FXR agonist
VAY736	–	Anti-BAFF (B-cell-activating factor) monoclonal antibody
VAY785	emricasan	Pan-caspase inhibitor
CFZ533	–	Blocking, non-depleting, anti-CD40 monoclonal antibody
LOU064	–	BTK inhibitor
ZPL389	–	Histamine H4 receptor antagonist
QGE031	ligelizumab	High-affinity anti-IgE monoclonal antibody
Cosentyx	secukinumab	Anti-interleukin-17 monoclonal antibody
Neuroscience		
EMA401	olodanrigan	Angiotensin II type 2 receptor antagonist
BYM338	bimagrumab	Inhibitor of activin type 2 receptor
CAD106	amilomotide	Beta-amyloid-protein therapy
CNP520	–	BACE inhibitor
BAF312	siponimod	Sphingosine-1-phosphate receptor modulator
LMI070	branaplam	SMN2 RNA splicing modulator
OMB157	ofatumumab	Anti-CD20 monoclonal antibody
Gilenya	fingolimod	Sphingosine-1-phosphate receptor modulator
AMG 334	erenumab	Selective CGRP receptor antagonist

[1] Some filings have received approval in either the US or EU but are awaiting approval in the other market.
[2] Phase and planned filing dates refer to the lead indication in development.
[5] Submission pending acceptance by the FDA and EMA

Potential indication/disease area	Route of administration	Planned filing dates [1,2]	PHASE I	PHASE II	PHASE III	SUBMISSION
Resistant hypertension	Oral	≥2022				
Weight loss	Oral	≥2022				
Stroke prevention; atrial fibrillation	Subcutaneous injection	≥2022				
Chronic heart failure with preserved ejection fraction [lead indication]; post-acute myocardial infarction	Oral	2019				
Secondary prevention of cardiovascular events	Subcutaneous injection	US/EU registration [5]				
Chronic obstructive pulmonary disease	Oral	≥2022				
Asthma	Inhalation	2019				
Asthma	Oral	2020				
Nasal polyps	Subcutaneous injection	2020				
Asthma	Inhalation	2019				
Nonalcoholic steatohepatitis	Oral	≥2022				
Autoimmune hepatitis [lead indication]; primary Sjögren's syndrome	Subcutaneous injection	2021				
Nonalcoholic steatohepatitis	Oral	≥2022				
Solid organ transplantation	Intravenous infusion	≥2022				
Chronic spontaneous urticaria	Oral	≥2022				
Atopic dermatitis	Oral	2021				
Chronic spontaneous urticaria; chronic idiopathic urticaria	Subcutaneous injection	2021				
Non-radiographic axial spondyloarthritis; psoriatic arthritis head-to-head study versus adalimumab; ankylosing spondylitis head-to-head study versus proposed Sandoz biosimilar adalimumab	Subcutaneous injection	2019				
Peripheral neuropathic pain	Oral	2021				
Hip fracture recovery [lead indication]; sarcopenia	Intravenous infusion	≥2022				
Alzheimer's disease	Intramuscular injection	≥2022				
Alzheimer's disease	Oral	≥2022				
Secondary progressive multiple sclerosis	Oral	2018				
Spinal muscular atrophy	Oral	2021				
Relapsing multiple sclerosis	Subcutaneous injection	2019				
Pediatric multiple sclerosis	Oral	US/EU registration				
Prophylaxis of migraine	Subcutaneous injection	US/EU registration				

Pipeline (continued)

Advanced development Medical device project for which a positive proof of concept has been established, and clinical and non-clinical studies are being conducted to establish the device's safety, efficacy or performance. This is needed to address regulatory requirements for obtaining marketing authorization.

Submission Application for marketing approval has already been submitted to one or both of the following regulatory agencies: the US Food and Drug Administration (FDA), the European Medicines Agency (EMA). Novartis has not yet received marketing authorization from both regulatory agencies. The application contains comprehensive data and information gathered during human clinical trials and animal studies conducted through the various phases of drug development.

Major development projects

Project/product	Common name	Mechanism of action
Infectious diseases		
KAF156	–	Imidazolopiperazines derivative
KAE609	cipargamin	PfATP4 inhibitor
LAM320	clofazimine	Mycobacterial DNA binding
Ophthalmology		
ECF843	–	Boundary lubricant
UNR844	–	Reduction of disulfide bonds
RTH258	brolucizumab	Anti-vascular endothelial growth factor (VEGF) single-chain antibody fragment
Lucentis	ranibizumab	Anti-VEGF monoclonal antibody fragment
Clareon IOL with *AutonoMe* pre-loaded delivery device	–	N/A
AcrySof IQ PanOptix IOL	–	N/A
AcrySof IQ PanOptix Toric IOL	–	N/A
A02062	–	N/A
A02238	–	N/A
A02972	–	N/A
A02491	–	N/A
A02931	–	N/A
A00717	–	N/A
A01660	–	N/A
Biosimilars		
GP1111	infliximab	TNF-alpha inhibitor
GP2017	adalimumab	TNF-alpha inhibitor
GP2013	rituximab	Anti-CD20 monoclonal antibody
LA-EP2006	pegfilgrastim	Pegylated granulocyte colony-stimulating factor

[1] Some filings have received approval in either the US or EU but are awaiting approval in the other market.
[2] Phase and planned filing dates refer to the lead indication in development.
[6] Resubmission to address FDA complete response letter

Potential indication/disease area	Route of administration	Planned filing dates[1,2]	PHASE I	PHASE II	PHASE III	SUBMISSION
Malaria	Oral	≥2022				
Malaria	Oral	≥2022				
Multidrug-resistant tuberculosis	Oral	2018				
Dry eye	Eye drops	≥2022				
Presbyopia	Eye drops	2021				
Neovascular age-related macular degeneration [lead indication]; diabetic macular edema	Intravitreal injection	2018				
Retinopathy of prematurity	Intravitreal injection	2018				
Next-generation IOL	Cataract implant	US 2019			ADVANCED DEVELOPMENT	
Trifocal IOL	Cataract implant	US 2019			ADVANCED DEVELOPMENT	
Trifocal IOL for astigmatism	Cataract implant	US 2019			ADVANCED DEVELOPMENT	
Extended depth of focus IOL	Cataract implant	US 2019 EU 2019			ADVANCED DEVELOPMENT	
Mid-tier phacoemulsification device	Cataract equipment	US 2018 EU 2018			ADVANCED DEVELOPMENT	
Digital visualization system connected with *Constellation*	Vitreoretinal equipment	US 2018 EU 2018			ADVANCED DEVELOPMENT	
New monthly disposable lens	Vision care	US 2020 EU 2020			ADVANCED DEVELOPMENT	
New weekly disposable lens	Vision care	US 2020 EU 2020			ADVANCED DEVELOPMENT	
Daily disposable line extension	Vision care	EU 2018			ADVANCED DEVELOPMENT	
New daily disposable lens	Vision care	US 2018 EU 2018			ADVANCED DEVELOPMENT	
Inflammatory bowel disease; rheumatoid arthritis; plaque psoriasis (same as originator)	Intravenous	EU registration				
Arthritides (rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis); plaque psoriasis and others (same as originator)	Subcutaneous	US/EU registration				
Non-Hodgkin's lymphoma; chronic lymphocytic leukemia; rheumatoid arthritis; granulomatosis with polyangiitis; microscopic polyangiitis (same as originator)	Intravenous	EU approved US registration				
Chemotherapy-induced neutropenia and others (same as originator)	Subcutaneous	EU registration US 2019[6]				

Photo Home is where the heart is for health worker Chankey Kumar, whose extended family – including (left to right) his nephew, wife and sister-in-law – lives on the outskirts of Meerut in northern India. Mr. Kumar's work takes him to some of the country's poorest communities, where he provides health education on behalf of the Novartis Arogya Parivar (or "healthy family") program.

Corporate responsibility

Corporate responsibility is embedded throughout our company. We focus our corporate responsibility work in two areas: expanding access to healthcare and doing business responsibly.

Access to healthcare

46 m
Patients reached through access programs

685 000
Novartis Access treatments, each providing a one-month supply of medicine, delivered to Kenya, Lebanon, Ethiopia and Cameroon

7.7 m
People reached with health education through our three Healthy Family programs

Patient health and safety

We began building a companywide patient engagement strategy to systematically embed patient engagement in the way we work. In early 2018, we will publish a renewed Commitment to Patients and Caregivers, which outlines the ways we plan to help patients better understand what they can expect from Novartis.

→ page 70

Ethical business practices

We continued our efforts to further strengthen our culture of integrity with a new, harmonized Professional Practices Policy and an updated Human Rights Guideline. We have taken decisive and immediate action to address cases of misconduct.

→ page 73

Innovation

We made progress against infectious and neglected diseases, with compounds to treat malaria, multidrug-resistant Enterobacteriaceae infections and cryptosporidiosis. Our social business model Novartis Access will be expanded into the private sector in select countries.

→ page 74

Photo After drawing a crowd with a performance by street musicians, health educator Chankey Kumar addresses people in the northern Indian village of Mulehra on disease prevention and healthy lifestyles. He works for Arogya Parivar, a program launched by Novartis in 2007 to improve access to healthcare for the country's rural poor. This is done by educating patients and increasing the availability of doctors and medicines in around 14 000 rural communities.

Corporate responsibility at Novartis

Our corporate responsibility (CR) strategy supports our company mission to improve and extend people's lives as well as our vision to be a trusted leader in changing the practice of medicine. We discover and develop breakthrough treatments and find new ways to deliver them to as many people as possible.

Doing business responsibly is fundamental to achieving our vision. We build trust by the way we behave. We continue to strengthen the compliance function, educate our associates on our Values and Behaviors, and change how we interact with customers.

To achieve our mission, we have a responsibility to use our expertise and skills to address the needs of underserved populations. We work to improve the affordability and availability of our medicines by pioneering sustainable and scalable access models. And we seek effective partnerships to help deliver treatments and quality care to as many people as possible.

Integrating access more systematically in our business
In 2016, our access strategy was recognized by the Access to Medicine Index as a solid framework that can be adapted to the needs of people at specific income segments and as a best practice in the industry. We believe, however, that we can be even more systematic in implementing it throughout our business. In 2017, we therefore established a set of Access Principles that clarify our approach to access. These will go into effect in 2018.

At their core is a commitment to integrate patient access strategies into all of our new medicine launches. These strategies will be based on three key principles: systematically assessing our research and development portfolio against the unmet needs of underserved populations, further improving the affordability of our medicines, and systematically assessing our efforts to strengthen local healthcare systems.

We believe that by adopting these Access Principles, we will further embed access in the heart of our business. This will help ensure a more consistent implementation of access programs across products and countries.

Read more about our Access Principles
→ page 18 of our **2017 Corporate Responsibility Report**
→ on our **website**

Corporate responsibility (continued)

Governance of our CR activities
Our governance model for corporate responsibility remains unchanged, with CR being ingrained in the highest levels of our company. Our CR efforts are overseen by the Governance, Nomination and Corporate Responsibilities Committee of the Novartis Board of Directors. We appointed a new Global Head of Corporate Responsibility in 2017, and the role continues to report directly to the CEO of Novartis.

Senior management commitment remains strong, and the Executive Committee of Novartis (ECN) has updated its 2018 balanced scorecard to include the topic of access in the non-financial targets (see page 144 of the Annual Report). The CEO continues to have specific personal CR objectives. In 2018, the CEO and ECN members will have an access objective as part of their individual objectives.

Setting priorities – 2017 CR materiality assessment
In 2017, we conducted a new comprehensive analysis of the most important CR topics for our industry and business. This is part of a regular four-year cycle we have established to help us better understand the issues that matter most to our key internal and external stakeholders.

We asked participants to rank issues by impact on our business. Four clusters were identified as most important: access to healthcare, patient health and safety, ethical business practices and innovation. The analysis was conducted via an online survey with nearly 1 400 internal stakeholders and approximately 200 external stakeholders. The survey was supplemented with 60 follow-up interviews with selected individuals.

We plan to use the results of the materiality analysis to guide our corporate responsibility strategy, track issues of concern, inform and prioritize our programs, and establish meaningful metrics against which to measure our CR performance.

A more detailed review of the results can be found
→ in our **2017 Corporate Responsibility Report** (page 11)

To ensure that our stakeholders are kept informed about both our progress and challenges in the topics they identified as most important, we plan to use these key CR clusters to form the framework of our CR reporting and disclosure efforts moving forward. This includes the structure of the information outlined in this report.

Improving transparency
Our vision is to be a trusted leader in changing the practice of medicine. A big part of gaining this trust is being transparent – being open and clearly disclosing what we do, how we work, where we are successful, and where we face challenges. This applies across all aspects of our business around the world.

For many years, transparent reporting has been a central part of our CR commitment, and we continue to make progress. In 2017, we published on our website a US Transparency and Patient Access Report, which highlights our approach to price adjustments, patient assistance, investment in research and development, and marketing in the US. This is in addition to our ongoing disclosures, including payments to healthcare providers and patient groups, as well as clinical trial results.

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The transparency landscape is rapidly evolving, with more countries – such as South Korea and Canada – starting to introduce legislation that requires public disclosure of payments to doctors. We are keeping pace with the developments and are committed to meeting new transparency requirements.

Novartis was one of the founding partners of the Patent Information Initiative for Medicines (Pat-INFORMED), announced in October. This initiative is a partnership between the World Intellectual Property Organization and the pharmaceutical industry that aims to create a global version of the US Orange Book, which lists all patents that protect drugs approved in the US. This will make it easier for national and international drug procurement agencies to access a basic body of patent information from a single source. Pat-INFORMED will initially provide information on granted patents for small-molecule products within oncology, hepatitis C, cardiovascular, HIV, diabetes and respiratory therapy areas, with the database targeted to be online by mid-2018.

We also aim to be transparent about the results, impact, challenges and key learnings from our access-to-medicine programs. For instance, Boston University, based in the US, is conducting an independent evaluation of our Novartis Access program and will publish baseline results on its website in 2018. We hope the methodology will also help inform the measurement of other access programs in the industry.

We recently released a 10-year report on our Healthy Family social business programs and a two-year report on Novartis Access.

For more disclosures, visit
→ the **transparency section** of our **website**

Photo Allassane Traore undergoes tests at the Bougoula-Hameau clinic in Sikasso, Mali, as part of a major clinical study of KAF156, a potential new therapy for malaria. This mosquito-borne disease is a significant public health concern in many African countries such as Mali. There is an urgent need for more effective medicines amid growing concerns that malaria parasites are developing resistance to available drugs.

Access to healthcare

While significant progress has been made in tackling some of the world's greatest healthcare challenges, billions of people still lack adequate access to medicines and care. We continue our work to expand access to medicines through a variety of approaches that provide tailored and scalable solutions: social business initiatives, zero-profit models, equitable commercial models, patient assistance programs and drug donations. Our generics division, Sandoz, also plays an important role in making high-quality generic medicines and biosimilars available to more people.

Making our medicines more accessible

In 2017, our key programs continued to make inroads in driving accessibility of our medicines. Novartis Access, our program to fight chronic diseases in lower-income countries, signed agreements with three countries to launch the program, bringing the total to six: Kenya, Ethiopia, Rwanda, Uganda, Pakistan and Cameroon. The program offers a portfolio of 15 products to governments, nongovernmental organizations and other public sector healthcare providers at a price of USD 1 per treatment, per month. In 2017, Novartis Access delivered more than 685 000 treatments – each providing a one-month supply of medicine – to Kenya, Ethiopia, Lebanon and Cameroon, bringing the total to more than 800 000 treatments delivered since launch in 2015.

Local brand strategies have been developed for emerging markets to address affordability issues, expand access, and help reduce the time lag between the availability of our innovative products in higher-income countries and lower-income countries. Novartis has launched more than 35 local brands as of end of 2017. Initial estimates indicate that compared to traditional commercial models, this approach enables us to reach from three to five times more patients in low- to middle-income countries.

The launch of our new biologic therapy for psoriasis in India, which used a local brand approach supported by other access solutions, is one example of how this strategy has supported expanded access in a self-pay market. According to a local analysis, cost was one of the barriers to access – but lack of awareness and patient support, and the need for in-clinic administration and frequent hospital visits were highlighted as additional challenges. The team developed and implemented a program for drug administration at home, which was more convenient for patients and helped free up caregivers' time as well as administrative time at the clinics. The program also offered disease counseling for patients. Through these efforts, significantly more patients obtained access to the drug in the first year after launch versus what was achieved with other biologics after several years.

Our Sandoz Division continued to help provide affordable options to branded, innovative medicines by delivering biosimilars and high-quality generic medicines. In 2017, we gained approval for two new biosimilar products in the EU and launched them in several European markets. A biosimilar is a follow-on medicine of an existing biologic whose patent has expired. Biologics are produced through a complex process involving living organisms, and they have revolutionized the treatment of many diseases. To be approved for use, a biosimilar has to match the reference medicine in terms of safety and efficacy in patients, demonstrating no clinically meaningful differences.

As a pioneer and global leader in biosimilars, Sandoz has contributed significantly to increasing patient access by freeing up funds for healthcare systems through much-needed competition, and by driving increased use of biologics. Sandoz biosimilars have been used in clinical practice for more than 10 years, are available in more than 86 countries, and have more than 340 million patient days of experience.

For more information on our access programs, visit
→ **the CR section** of our **website**

Corporate responsibility (continued)

Strengthening healthcare systems
Expanding access to affordable drugs is just the tip of the iceberg in many developing countries. Healthcare systems need other elements to function, such as the capacity to detect, diagnose and treat patients; efficient drug distribution channels; multisector partnerships; and holistic approaches beyond traditional healthcare players. We work with partners on a variety of programs aimed at reinforcing healthcare systems.

The Novartis Foundation is taking on this challenge through its new initiative, Better Hearts Better Cities, to improve cardiovascular health in low-income urban populations. The program seeks to improve the detection, treatment and control of high blood pressure through a multisector approach in a sustainable way at scale. Better Hearts Better Cities has already launched in Ulaanbaatar in Mongolia and in Dakar in Senegal, and plans are underway to launch the program in São Paulo, Brazil, in 2018.

In addition to delivering medicines, Novartis Access offers capacity-building activities to support healthcare systems in preventing, diagnosing and treating chronic diseases. One example is a new collaboration with the American Society for Clinical Pathology and the American Cancer Society to improve cancer treatment in sub-Saharan Africa. This complements the work the Clinton Health Access Initiative is doing to improve access to oncology medicines in the region. Together we aim to strengthen the continuum of care for cancer patients, ranging from training for better diagnosis and care, to improved access to treatment, through to advocacy for national cancer treatment guidelines. Beyond cancer, capacity-building activities to screen and diagnose people for diabetes and hypertension have started in Kenya and Cameroon.

We are partnering with the American Society for Clinical Pathology and the American Cancer Society to improve the management of cancer in sub-Saharan Africa

Formalizing the role of community health workers (CHWs) is increasingly seen as an essential component of building stronger healthcare systems in developing countries. Last Mile Health, which successfully established a CHW program in Liberia in partnership with the government of Liberia, is developing the world's first digital education platform for CHWs and the leaders who support them, called the Community Health Academy. To help launch this academy, Novartis will provide a USD 1 million donation over three years, in addition to input on the curriculum, content and strategic direction for the program.

Patient assistance programs
Fifteen years ago, Novartis introduced the *Glivec* International Patient Assistance Program after recognizing the importance of ensuring patients in lower-income countries have access to breakthrough cancer therapy. In partnership with The Max Foundation, the program has provided treatment to approximately 75 000 people since its inception.

In 2017, Novartis announced the transition of this partnership to a new program called CMLPath to Care™, which aims to support continued access to treatment at no cost for the nearly 34 000 registered patients with chronic myeloid leukemia (CML), gastrointestinal tumors and other rare cancers. The Max Foundation will assume responsibility for delivering treatment to these patients, including supply chain management. Novartis will provide funding and drug donation support. The collaborative agreement runs through the first quarter of 2021 with an option to extend it. During this period, Novartis expects to donate more than USD 29 million to the collaboration, along with approximately 315 million doses of medicine.

In the US, the Novartis Patient Assistance Foundation Inc. provides medicines at no cost to eligible US patients who are experiencing financial hardship and have limited or no prescription drug coverage. In 2017, we increased the income eligibility limits for all branded products available via the program. For example, individual patients earning less than USD 75 000 per year and families of four with an income below USD 150 000 per year may be eligible. We plan to continue to adjust income eligibility limits in accordance with changes to the US federal poverty level and other external factors. In addition, for US patients with commercial insurance, we offer copay assistance programs so eligible patients pay no more than USD 30 for a 30-day prescription (i.e., USD 1 per day) through retail or mail order. This program has been expanded to include all of our branded products without generic alternatives as well as our biosimilar products, subject to any limits imposed by a patient's individual health plan and where allowed by law.

For more information on our patient assistance programs, visit
→ **the CR section** of our **website**

Patient health and safety

Working more closely with patients is an important part of improving health outcomes. Patients are often well positioned to understand the challenges of their disease. By proactively interacting and engaging with patients and the patient and caregiver community, we seek out and use their insights to inform decision-making throughout the product development and commercialization process for our medicines. We also collaborate with the patient community and other stakeholders to evaluate ways to expand access to medicine.

Novartis access approaches: performance indicators 2017

There is no one-size-fits-all solution for access to healthcare. We continue to pursue a combination of approaches – innovative business models that provide tailored and scalable solutions, equitable commercial models, high-quality generics, patient assistance programs, zero-profit models and drug donations, strategic philanthropy and emergency relief – to reach underserved patients.

Social business models

	Patients reached (thousands)		FTEs[1]		People reached (thousands)[2]	
	2017	2016	**2017**	2016	**2017**	2016
Novartis Access	386.5[3]	8.4	25	14		
Healthy Family (in India, Kenya and Vietnam)[4]	579.6	428.7	498	491	7 689.9	7 717.8
Total	**966.1**	**437.1**	**523**	**505**	**7 689.9**	**7 717.8**

Patient assistance programs

	Patients reached (thousands)		Value USD (millions)[5]	
	2017	2016	**2017**	2016
Novartis Patient Assistance Foundation Inc. (US)	55.5	51.2[6]	1 466.4	1 124.7[6]
Oncology/hematology LMIC patient assistance	82.9	83.3	1 571.1	1 579.1
Total	**138.4**	**134.5**	**3 037.5**	**2 703.8**

Zero-profit model

	Patients reached (thousands)		Value USD (millions)[7]	
	2017	2016	**2017**	2016
Malaria/*Coartem*	43 675.0[8]	49 757.9	58.2	80.7
Total	**43 675.0**	**49 757.9**	**58.2**	**80.7**

Donations

	Patients reached (thousands)		Value USD (millions)[5]	
	2017	2016	**2017**	2016
Alcon medical missions[9]	391.9	484.0	61.2	73.0
Leprosy (WHO)	227.0	290.0	6.5	4.4
Fascioliasis/*Egaten*[10]	281.0	276.2	3.9	<1
Medicine donations (emergency relief)			10.9	1.8
Total	**899.9**	**1 050.2**	**82.5**	**79.2**

Healthcare system strengthening

	Value USD (millions)[11]		FTEs[1]		People reached (thousands)[2]	
	2017	2016	**2017**	2016	**2017**	2016
Novartis Foundation	15.0	14.8	14	14	7 080.6[12]	8 908.6
Novartis research capacity-building programs	1.9	3.5	4	6	0.6	1.0
Total	**16.9**	**18.3**	**18**	**20**	**7 081.2**	**8 909.6**

	Patients reached (thousands)		Value USD (millions)[5 7 11]		FTEs[1]		People reached (thousands)[2]	
	2017	2016	**2017**	2016	**2017**	2016	**2017**	2016
Grand total	**45 679.4**	**51 379.7**	**3 195.1**	**2 882.0**	**541**	**525**	**14 771.1**	**16 627.4**

[1] Full-time equivalent positions and contractors
[2] Via training and service delivery and through health awareness activities
[3] The patient number was calculated based on treatments delivered and the following elements: daily treatment doses, treatment duration, treatment adherence and potential treatment overlap (as it is common for chronic patients to take several drugs). The treatment adherence and treatment overlap factors are based on assumptions from developed markets and will be revisited when we gain additional insights from Novartis Access rollout countries.
[4] Prior-year information was restated given the Keluarga Sehat program in Indonesia ended in January 2017; patients identified based on referral cards have also been excluded.
[5] Wholesale acquisition cost (WAC) plus logistics costs for some programs
[6] Numbers have been restated to include the Alcon US patient assistance numbers, as the program transitioned to the Novartis Patient Assistance Foundation Inc. (US) as of August 2016.
[7] *Coartem* was provided without profit for public sector use and to donor-funded programs in the private sector. The value of these shipments is calculated based on the average ex-factory price of non-donor-funded *Coartem* to private sector purchasers in developing countries, minus payments received from the public sector and donor-funded customers in the private sector.
[8] Increased availability of generic options on the market
[9] Retail value for surgical products
[10] Manufacturing, testing and FTE costs
[11] Operating costs
[12] Programs at scale report the catchment of a population in the area where a program has been implemented. Includes expanded nationwide catchment area of the population in 25 districts of Ghana

Corporate responsibility (continued)

In 2017, we began building a companywide patient engagement strategy that is intended to systematically and consistently embed patient engagement in the way we work. As a first step, in early 2018, we will publish an updated Commitment to Patients and Caregivers, which outlines how we plan to help patients and caregivers better understand what they can expect from Novartis. This includes continuing to pursue our commitment to running responsible clinical trials, transparently sharing information about our interactions with healthcare professionals and the patient community, and disclosing all financial and relevant non-financial support (e.g., in-kind donations of goods and services).

Our patient engagement efforts have been successful for several of our development programs, including a study of our promising weight loss drug LIK066. The development team worked with several advocacy groups as they developed and tested the new therapy. The result was the Novartis Patient Advisory Forum on Obesity, which brings patient advocates together with clinicians and researchers to make patient needs a major focus while testing LIK066 and bringing it to market. The patient perspective has informed every element of the Phase IIb clinical trial, from crafting language for the study and consent forms, to ensuring that trial sites are patient-friendly.

In early 2018, we will publish an updated Commitment to Patients and Caregivers, which outlines how we plan to help patients and caregivers better understand what they can expect from Novartis

Combatting counterfeit medicines

We believe counterfeit medicines, including both innovative medicines and generics, pose a significant threat to public health. This is especially true for patients, who are generally unable to distinguish between authentic, falsified and counterfeit products. Solving the issue requires ongoing commitment not only from national governments and international health organizations but also from the pharmaceutical industry and other healthcare stakeholders, such as pharmaceutical distributors.

With regard to our own portfolio, we take a diverse and multipronged approach. This includes continuously monitoring and improving the security of our distribution

chain as well as the security of our product packaging. Serialization is the process of creating a unique number that is applied to each product to provide visibility and full traceability within the supply chain – from the manufacturer to the distributor to the dispensing point (e.g., wholesalers and pharmacists). Serialization is one technology that helps decrease the number of falsified products that enter the legitimate supply chain.

We investigate all reported cases of falsified and counterfeit Novartis products, regardless of where they are made available, including the internet and local markets. We also maintain a global intelligence effort and investigate illegal supply chains to identify the manufacturers, distributors, importers and exporters of falsified and counterfeit medical products, and then report confirmed cases to local law enforcement and health authorities. During 2017, Novartis Global Security, with the support of local law enforcement and health authorities, initiated seizures of counterfeit and falsified products in more than 30 countries globally. As a result, nine illegal pharmaceutical manufacturing facilities and assembly lines were dismantled and more than 7 300 illegal online pharmacies were shut down.

Health education and prevention

Patient education and awareness is an important step in improving health and well-being, and in increasing disease prevention and health-seeking behavior.

The Novartis Foundation has an array of projects focused on interrupting the transmission of leprosy, with the ultimate goal of eliminating the disease. These include efforts to improve early detection by developing a molecular diagnostic test and a remote diagnostic tool, strengthening screening programs, and implementing education campaigns to increase awareness about the disease.

The foundation is also looking at ways to interrupt transmission through leprosy post-exposure prophylaxis (LPEP) by providing preventative treatment to close contacts of newly diagnosed patients – such as family members and friends – to decrease the risk of transmission. This program, initially launched in 2014, is now running in Indonesia, India, Nepal, Myanmar, Tanzania, Sri Lanka and Brazil.

Additionally, the Novartis Foundation is working with many partners to address hypertension around the world. In October, the foundation launched Healthy Schools for Healthy Communities together with the University of Basel and other partners. Known locally as KaziBantu, the initiative aims to address poor health in disadvantaged schools in South Africa and is the first Novartis Foundation program to involve the education sector. The ultimate goal of Healthy Schools for Healthy Communities is to improve the cardiovascular and overall health of schoolchildren and their teachers.

Photo Klaus Artz demonstrates the actibelt® – a high-tech movement monitoring device worn in a belt buckle – at the Novartis Institutes for BioMedical Research in Basel, Switzerland. Helping with the experiment are data scientist Valeria De Luca and senior investigator Ieuan Clay, with data scientist Eli Goldberg observing by video link from the US.

The Novartis Healthy Family programs are also continuing to evolve. Healthy Family launched 10 years ago in India under the name Arogya Parivar; this program offers effective, low-cost medications against infectious and chronic diseases that are prevalent in rural India. Today, the program operates across 11 Indian states, covering some 14 000 villages and small towns that are home to more than 32 million people. Healthy Family programs also operate in Kenya (Familia Nawiri) and Vietnam (Cung Song Khoe), and are roughly the same across countries: A social arm conducts health education activities, while a separate commercial arm is responsible for product promotion.

Since 2010, the three Healthy Family programs have together reached more than 40 million people in rural areas through health education sessions. More than 3 million patients have received diagnoses and treatments at health camps over the same period of time. Novartis plans to expand Healthy Family to more countries and disease areas in the coming years.

In partnership with apparel company Levi's and its supplier Aquarelle, health workers from the Arogya Parivar program in India will train 50 Aquarelle factory workers and supervisors to serve as peer health educators on health topics, including women's health. These trained workers will then be able to deliver basic health education to their 1 000 co-workers in biweekly sessions, supporting the nurse and physician who provide healthcare services at the factory.

Through Familia Nawiri in Kenya, Novartis is collaborating with Nestlé to bring health education and care to coffee farmers. A pilot is underway whereby the cooperatives pay in advance the regular USD 2 fee for coffee farmers to attend Familia Nawiri health camps when they are unable to pay out of pocket. This system enables farmers to access healthcare services when they need them, even if they have no cash in hand. Cooperatives usually pay farmers twice a year and deduct this amount when they pay the farmers for their coffee beans.

Ethical business practices

We believe that operating ethically not only is the right thing to do but also is fundamental to our success as a business. We have taken significant steps to help ensure that our associates act with integrity at all times – no matter what situation they are facing.

Ethical behavior

We are continuing our efforts to further improve and sustain a culture of integrity across our large, complex and multinational organization.

Despite all of the work we have done and continue to do, some of our employees have at times behaved in ways that violated our policies and were inconsistent with our culture and the expectations society has for us and our industry. We have taken swift and decisive action to address this. For example, in South Korea, where we were in breach of industry standards on interactions with healthcare professionals, we created additional internal controls intended to ensure adherence to internal and

Corporate responsibility (continued)

external standards. These include no longer funding healthcare professionals from South Korea to attend overseas academic conferences and meetings. In addition, the company has reinforced the compliance function and redesigned the field force evaluation system, and is currently developing a new customer-facing model to drive performance with integrity.

We are taking additional steps to change the way we interact with healthcare professionals. We believe it is essential for physicians to have the information they need to make informed healthcare decisions, and we support legitimate peer-to-peer medical education, including speaker programs. We have built on our elimination of promotional gifts and placed restrictions on the engagement of healthcare professionals as promotional speakers.

From January 2018, we will sponsor physicians to attend international congresses only when they play an active role on behalf of Novartis. Examples include speaking at or chairing a Novartis-sponsored session or symposium, presenting data from Novartis-sponsored trials, and capturing scientific insights that can be further disseminated to the physician's local community, which will increase support for medical education. We are also fully committed to transparency in these interactions and to ensuring that all payments and transfers of value are reported in a manner that is consistent with local laws and regulations (e.g., the US Sunshine Act and the European Federation of Pharmaceutical Industries and Associations Disclosure Code).

To further support our compliance efforts, we realigned our existing divisional policies to create a new Group-wide Professional Practices Policy. The new policy outlines how all associates should conduct business and interact with customers, including how they should promote medicines to healthcare professionals. It marks a fundamental shift in the way ethics and compliance are handled within Novartis, moving from a rules-based to a principles-based approach. The rollout has started across the entire Novartis organization, and the policy will take effect on March 1, 2018 (except at Alcon, where the effective date will be determined at a later stage).

Respect for human rights

Novartis supports the UN Guiding Principles on Business and Human Rights (UNGP). This commitment is emphasized in our latest Human Rights Guideline.

Implementing the requirements of the UNGP involves assessing our potential and actual impacts on human rights through a human rights impact assessment (HRIA). In 2017, we conducted a global HRIA to identify and prioritize key risks of negative impacts on human rights, and to define key opportunities for addressing these. In November, we piloted our first local human rights impact assessment in Egypt.

More information on the human rights impact assessment can be found
→ on page 40 of our **2017 Corporate Responsibility Report**
Our Modern Slavery Act statement can be found
→ on our **website**

Responsible supply chain management

Novartis engages with an extensive network of third parties worldwide, and their contributions are crucial to our success. The Novartis Supplier Code, which was updated in 2017, sets out our expectations for suppliers on ethical standards such as fair labor practices, health and safety, environmental protection, animal welfare, anti-bribery and data privacy. Through our responsible procurement processes, we actively monitor our suppliers' ability to comply with these standards and work with them to define improvement plans where compliance issues are identified.

In 2017, we conducted 49 audits with suppliers identified as posing an elevated risk. The number of audits was smaller than in previous years. This change was due to various reasons, including supplier consolidation, the fact that some suppliers were still under the audit validity period, and the need to prioritize our resource allocation to closing issues from previous audits.

In late 2016, we launched a new Third-Party Risk Management program designed to help us better identify key risk areas, such as labor rights and environmental protection, while strengthening and streamlining our supplier management, governance and systems. The program aims to develop an integrated approach to third-party risk management through one end-to-end process underpinned by a single technology solution. We plan to begin the rollout in regional phases, starting with Mexico to test the model and IT solution. The global deployment is expected to be finalized in 2019.

Innovation

Innovation is a cornerstone of the Novartis strategy and a foundation of our future. Innovation that produces breakthrough medicines, innovation in the way we run our business, and the innovative use of technologies will be critical in the coming years. Innovation in its many forms supports our efforts to grow in emerging markets and around the world, and can help us respond to patients' unmet medical needs in both the developed and developing worlds.

Fighting neglected infectious diseases

Infectious diseases take a large toll on low- and middle-income countries. We have teams dedicated to researching and developing new treatments in this area. They combine the drug discovery expertise and cutting-edge technologies of Novartis to fight infectious tropical diseases such as malaria, kinetoplastid diseases (human African trypanosomiasis, leishmaniasis, Chagas), and cryptosporidiosis.

Ethics performance indicators

	2017	2016
Novartis associates trained and certified on Code of Conduct[1]	**114 913**	110 774
Misconduct cases reported / allegations substantiated[2]	**2 031 / 1 147**	1 804 / 1 313
Dismissals and resignations related to misconduct[3]	**521**	641
Regulatory inspections without major findings (%)	**99.1**	98.1
Suppliers posing an elevated risk under responsible procurement[4]	**459**	441
Suppliers with active follow-up[4, 5]	**275**	147
Suppliers audited[4]	**49**	76

[1] Active Novartis associates with email addresses, trained via e-learning
[2] The number of misconduct cases reported may change, as matters may be reassessed in the course of the case lifecycle. The number of substantiated allegations may change due to the fact that investigation reports with assessments are received on an ongoing basis, which potentially leads to a difference in numbers at a later stage.
[3] The number of dismissals and resignations related to misconduct may change due to the fact that investigation reports are received and then reviewed for remedial actions on an ongoing basis, which potentially leads to a difference in numbers at a later stage.
[4] Includes new suppliers and new products, services or sites from existing suppliers; potential risks include labor or human rights, HSE and animal welfare
[5] Follow-up includes more information requested, audits or on-site assessments.

Photo Women in the northern Indian village of Mulehra watch a musical performance staged by health workers to attract a receptive audience for their educational messages. The event is one of many organized by Arogya Parivar, a Novartis program to improve health awareness and access to medicines in the country's rural communities.

Corporate responsibility (continued)

In 2017, one significant achievement of our scientists at the Novartis Institute for Tropical Diseases was the discovery and early validation of a drug candidate for treating cryptosporidiosis. Diarrheal diseases, such as cryptosporidiosis, cause more than 800 000 deaths annually, and currently there are no vaccines or effective treatments. The findings – generated in partnership with the University of Georgia and Washington State University in the US – were published in the journal Nature. We are now working to advance the research through collaborations with the global health community.

Novartis and Medicines for Malaria Venture launched a Phase II clinical trial for KAF156, a next-generation antimalarial compound with the potential to treat drug-resistant strains of the malaria parasite

Next-generation malaria treatments
Next-generation antimalarials are urgently needed to tackle rising parasite resistance to current therapies. In August, Novartis and Medicines for Malaria Venture launched a Phase II clinical trial for KAF156, a next-generation antimalarial compound with the potential to treat drug-resistant strains of the malaria parasite. KAF156 is one of two advanced antimalarial development programs led by Novartis; the other is KAE609 (cipargamin), which also entered Phase II clinical trials in late 2017.

Read more about our efforts to find next-generation treatments for malaria
→ on page 56 of the **innovation section**

Fighting antimicrobial resistance
We invested in the discovery of new antibiotics led by infectious disease researchers in Emeryville, California, in the US. In 2017, we reported progress in researching a novel antibiotic candidate, LYS228, for multidrug-resistant infections caused by the Enterobacteriaceae family of Gram-negative pathogens, which the US Centers for Disease Control and Prevention lists as an "urgent threat" to public health.

In 2017, we also joined the AMR Industry Alliance, which formally brings together pharmaceutical, generics, diagnostics and biotech companies in an effort to ensure that we collectively deliver on the specific commitments made in the Industry Declaration on AMR and the subsequent AMR Roadmap, both of which we signed in 2016.

Social business model innovation
Beyond research and development, we are using innovative approaches to reach more patients with our medicines. These include our Healthy Family programs, which have broken even in India, Vietnam and – most recently – Kenya.

For more details on our Healthy Family programs, see
→ page 73 of the **Annual Report**

Building on our Healthy Family programs, we evolved our social business approach and launched Novartis Access in 2015. Novartis Access offers a portfolio of 15 medicines against chronic diseases together with capacity-building activities to help healthcare systems prevent, diagnose and treat these diseases. The volume potential in the countries we are targeting made it possible to offer the portfolio at USD 1 per treatment, per month to governments, nongovernmental organizations and other public sector healthcare providers in lower-income countries.

As of January 2018, Novartis Social Business will be present in the public and private market in seven countries offering Novartis Access medicines as well as the entire Novartis product range registered locally, either as a portfolio or as individual products. We hope this enhanced flexibility will enable us to better respond to country needs and reach people across all income levels. Based on our on-the-ground experience and depending on the outcomes, we may implement this approach in more countries in the future.

Enabling access through innovative technologies
Technology can be an enabler in overcoming barriers to access, especially for patients in remote areas. Our program SMS for Life 2.0, launched in 2016, uses technology to enable healthcare workers to make better decisions to eliminate stock-outs and promptly respond to disease surveillance data. It also offers healthcare worker training. It was deployed in more than 250 healthcare facilities in Nigeria, and we started the rollout in Zambia in 2017, with the goal of reaching more than 500 facilities in the northern provinces. Further expansion in other sub-Saharan and Asian countries is under discussion.

In Ghana, the Novartis Foundation telemedicine project uses mobile technology to centralize expertise and coach community health workers in rural communities to strengthen healthcare capacity, avoiding unnecessary referrals and reducing transport times and costs for patients. The program was selected by health authorities, out of seven other telemedicine models piloted in Ghana, as the preferred option to be scaled on a national level.

Photo Lab technician Niawanlou Dara prepares blood samples from malaria patients at a clinic in Bougoula-Hameau, in the African state of Mali. The samples are being collected for a wide-ranging clinical study to assess the efficacy and safety of an experimental new antimalarial compound called KAF156.

Independent Assurance Report on the Novartis 2017 corporate responsibility reporting

To the Board of Directors of Novartis AG, Basel

We have been engaged to perform assurance procedures to provide limited assurance on the following aspects of the 2017 corporate responsibility (CR) reporting of Novartis AG and its consolidated subsidiaries (Novartis Group) included in the 2017 Annual Report.

Scope and subject matter

Our limited assurance engagement focused on the following data and information disclosed in the consolidated CR reporting of the Novartis Group for the year ended December 31, 2017:

- The "social performance indicators" on page 7, the "people performance indicators" on page 29, the "Novartis access approaches performance indicators" on page 71, and the "ethics performance indicators" on page 75 (CR indicators)
- Reporting processes and related controls in relation to data aggregation of CR indicators

Criteria

The management reporting processes with respect to the CR reporting and CR indicators were assessed against Novartis Group internal policies and procedures, as set forth in the following:

- Guideline on Corporate Responsibility Management at Novartis and the Code of Conduct
- Procedures by which the data for the CR indicators reporting is gathered, collected and aggregated internally

Inherent limitations

The accuracy and completeness of CR indicators are subject to inherent limitations given their nature and methods for determining, calculating and estimating such data. Our Assurance Report should therefore be read in connection with Novartis Group guidelines, definitions and procedures on CR reporting.

Novartis responsibilities

The Board of Directors of Novartis AG is responsible for both the subject matter and the criteria as well as for the selection, preparation and presentation of the information in accordance with the criteria. This responsibility includes the design, implementation and maintenance of related internal control relevant to this reporting process that is free from material misstatement, whether due to fraud or error.

Our responsibilities

Our responsibility is to form an independent opinion, based on our limited assurance procedures, on whether anything has come to our attention to indicate that the CR indicators are not stated, in all material respects, in accordance with the reporting criteria.

We planned and performed our procedures in accordance with the International Standard on Assurance Engagements (ISAE) 3 000 (revised) Assurance Engagements Other Than Audits or Reviews of Historical Financial Information. This standard requires that we plan and perform the assurance engagement to obtain limited assurance on the identified CR indicators prepared, in all material aspects, in accordance with Novartis Group internal policies and procedures.

A limited assurance engagement under ISAE 3 000 (revised) is substantially less in scope than a reasonable assurance engagement in relation to both the risk assessment procedures, including an understanding of internal control, and the procedures performed in response to the assessed risks. Consequently, the nature, timing and extent of procedures for gathering sufficient appropriate evidence are deliberately limited relative to a reasonable assurance engagement and, therefore, less assurance is obtained with a limited assurance engagement than with a reasonable assurance engagement.

Our independence and quality control

We have complied with the independence and other ethical requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior.

Our firm applies International Standard on Quality Control 1 and accordingly maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements.

Summary of work performed

Our assurance procedures included, among others, the following:

- Reviewing the application of the Novartis Group internal CR reporting guidelines
- Interviewing associates responsible for internal reporting and data collection
- Performing tests on a sample basis of evidence supporting selected CR data concerning completeness, accuracy, adequacy and consistency
- Inspecting relevant documentation on a sample basis
- Reviewing and assessing the management reporting

We have not carried out any work on data other than outlined in the scope and subject matter section as previously defined. We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our assurance conclusions.

Limited assurance conclusion

Based on our work described in this report, nothing has come to our attention that causes us to believe that the CR indicators outlined in the scope and subject matter section (including the related controls) have not been prepared, in all material aspects, in accordance with Novartis Group internal policies and procedures.

PricewaterhouseCoopers AG

pwc

Martin Kennard

Raphael Rutishauser

Basel, January 23, 2018

Photo Transplant surgeon Manuel Cobos prepares to conduct surgery at the hospital where he works in Buenos Aires, Argentina. Dr. Cobos is an alumnus of the Novartis Next Generation Scientist program, an internship for talented research scientists from developing regions, including Latin America.

Corporate governance

Contents

Dear shareholder,

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

Progress in pursuing our mission

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

Strong and diverse Board

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

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

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

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

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

CEO succession

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

Strategy and culture

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

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

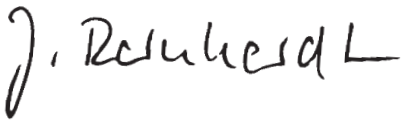
Auditor rotation

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

Shareholder engagement

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

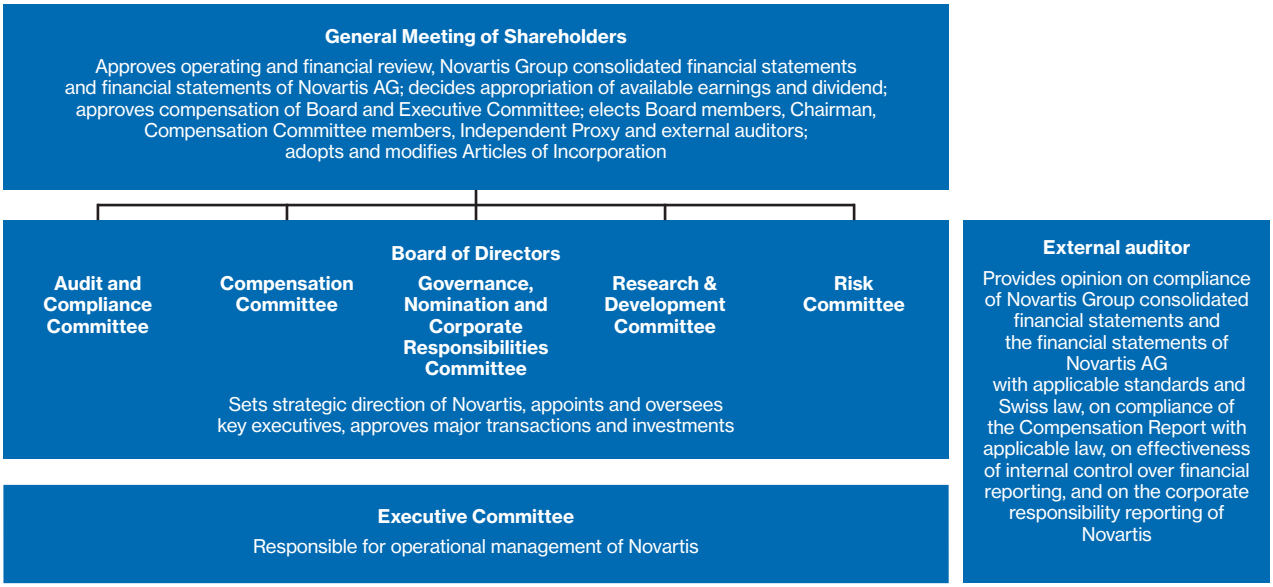
While we achieved quite a lot in 2017, I believe there is more work to be done. Our Board and our Executive Committee must continue to sharpen our strategy, strengthen our corporate culture, and accelerate the evolution of our business model. I am very confident that with your support, we will continue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



Joerg Reinhardt
Chairman of the Board of Directors

Our corporate governance approach

Governance bodies



Leadership structure

Independent, non-executive Chairman and separate CEO

Board governance

Structure

All Board members are non-executive and independent, as defined by our rules. The Board has assigned responsibilities to five committees:

- Audit and Compliance Committee
- Compensation Committee
- Governance, Nomination and Corporate Responsibilities Committee
- Research & Development Committee
- Risk Committee

Composition

Board members have diverse education, experience, nationalities and interpersonal skills. Their biographies (beginning on page 102) describe their specific qualifications.

Processes

The Board's processes significantly influence its effectiveness. The Board has implemented best practices for all such processes. Important elements include Board meeting agendas (to address all important topics), information submitted to the Board (to ensure the Board receives sufficient information from management to perform its supervisory duty and to make decisions that are reserved for it), and boardroom behavior (to promote an efficient and balanced decision-making process).

Board and Executive Committee compensation

Information on Board and Executive Committee compensation is outlined in our Compensation Report, beginning on page 118.

Our shares and our shareholders

Our shares

Share capital of Novartis AG

As of December 31, 2017, the share capital of Novartis AG is CHF 1 308 422 410 fully paid-in and divided into 2 616 844 820 registered shares, each with a nominal value of CHF 0.50 (Novartis share). Novartis AG has neither authorized nor conditional capital. There are no preferential voting shares; all Novartis shares have equal voting rights. No participation certificates, non-voting equity securities (Genussscheine), or profit-sharing certificates have been issued.

Novartis shares are listed on the SIX Swiss Exchange (ISIN CH0012005267, symbol: NOVN) and on the New York Stock Exchange (NYSE) in the form of American depositary receipts (ADRs) representing Novartis American depositary shares (ADSs) (ISIN US66987V1098, symbol: NVS).

The holder of an ADR has the rights enumerated in the deposit agreement (such as the right to give voting instructions and to receive dividends). The ADS depositary of Novartis AG – JPMorgan Chase Bank, N.A., New York – holds the Novartis shares underlying the ADRs and is registered as a shareholder in the Novartis Share Register. An ADR is not a Novartis share and an ADR holder is not a Novartis AG shareholder. ADR holders exercise their voting rights by instructing the depositary to exercise their voting rights. Each ADR represents one Novartis share.

Changes in share capital

During the last three years, the following changes were made to the share capital of Novartis AG:

In 2015, Novartis AG reduced its share capital by CHF 14.6 million (from CHF 1 353 096 500 to CHF 1 338 496 500) by canceling 29.2 million Novartis shares repurchased on the second trading line during 2013 and 2014. In 2016, Novartis AG reduced its share capital by CHF 24.9 million (from CHF 1 338 496 500 to CHF 1 313 557 410) by canceling 49.9 million Novartis shares repurchased on the second trading line during 2015. In 2017, Novartis AG reduced its share capital by CHF 5.1 million (from CHF 1 313 557 410 to CHF 1 308 422 410) by canceling 10.3 million Novartis shares repurchased on the second trading line during 2016.

Capital changes

	Number of shares			
Year	As of Jan 1	Changes in shares	As of Dec 31	Changes in CHF
2015	2 706 193 000	– 29 200 000	2 676 993 000	– 14 600 000
2016	2 676 993 000	– 49 878 180	2 627 114 820	– 24 939 090
2017	2 627 114 820	– 10 270 000	2 616 844 820	– 5 135 000

A table with additional information on changes in the Novartis AG share capital can be found in Note 7 to the financial statements of Novartis AG.

Convertible or exchangeable securities

Novartis AG has not issued convertible or exchangeable bonds, warrants, options or other securities granting rights to Novartis shares, other than options (or similar instruments such as stock appreciation rights) granted under or in connection with equity-based participation plans of Novartis associates. Novartis AG does not grant any new stock options under these plans.

Share repurchase programs

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

At the 2016 AGM, shareholders approved the seventh share repurchase program authorizing the Board to repurchase Novartis shares up to a maximum of CHF 10 billion. In 2016, a total of 10 270 000 Novartis shares were repurchased at an average price of CHF 74.67 per Novartis share, and canceled in 2017. In 2017, a total of 66 220 000 Novartis shares were repurchased at an average price of CHF 78.34 per Novartis share. The Board will propose the cancellation of the Novartis shares repurchased in 2017 to its shareholders at the AGM 2018.

Share developments

SHARE DEVELOPMENTS IN 2017

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

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

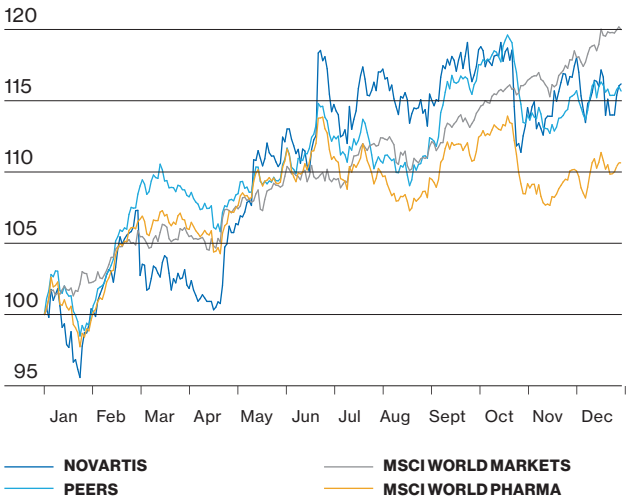
The market capitalization of Novartis AG based on the number of Novartis shares outstanding (excluding Novartis treasury shares) amounted to USD 195.5 billion as of December 31, 2017, compared to USD 172 billion as of December 31, 2016.

CONTINUOUSLY RISING DIVIDEND SINCE 1996

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

Novartis 2017 share price movement

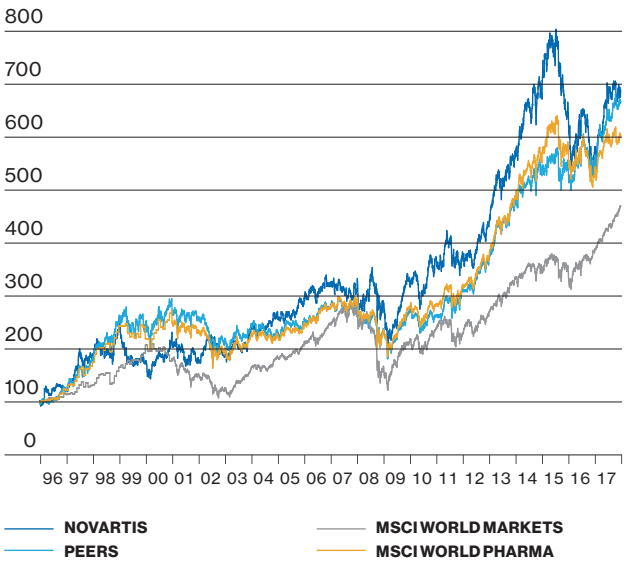
(based on USD amounts)



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

Novartis 1996–2017 total shareholder return

(based on USD amounts)



Source: Datastream, Bloomberg; data are converted into US dollars and re-based to 100 at January 1, 1996. Currency fluctuations have an influence on the representation of the relative performance of Novartis vs. indices and peers. Peers include Abbott, AbbVie, Amgen, AstraZeneca, BMS, Eli Lilly, GSK, J&J, Merck&Co, Pfizer, Roche, Sanofi.

Key Novartis share data

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

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

Per-share information[1]

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

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

Key ratios – December 31

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

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

Key data on ADRs issued in the US

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

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

Share price (CHF)

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

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

Our shareholders

Significant shareholders

According to the Novartis Share Register, as of December 31, 2017, the following registered shareholders (including nominees and the ADS depositary) held more than 2% of the total share capital of Novartis AG, with the right to vote all their Novartis shares based on an exemption granted by the Board (see page 90):[1]

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

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

Disclosure notifications pertaining to shareholdings in Novartis AG that were filed with Novartis AG and the SIX Swiss Exchange are published on the latter's electronic publication platform, and can be accessed via: https://www.six-exchange-regulation.com/en/home/publications/significant-shareholders.html.

Cross shareholdings

Novartis AG has no cross shareholdings in excess of 5% of capital, or voting rights with any other company.

Distribution of Novartis shares

The information in the following tables relates only to registered shareholders and does not include holders of unregistered shares. Also, the information provided in the tables cannot be assumed to represent the entire Novartis AG investor base because nominees and JPMorgan Chase Bank, N.A., as ADS depositary, are registered as shareholders for a large number of beneficial owners.

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

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

Number of shares held

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

[1] Including significant registered shareholders as listed above

Registered shareholders by type

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

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

Registered shareholders by country

As of December 31, 2017	Shareholders in %	Shares in %
Belgium	0.13	3.82
France	2.23	0.38
Germany	5.35	2.13
Japan	0.18	0.71
Switzerland [1]	88.42	42.56
United Kingdom	0.49	22.22
United States	0.34	25.82
Other countries	2.86	2.36
Total	**100.00**	**100.00**

Registered shares held by nominees are shown in the country where the company/affiliate entered in the Novartis Share Register as shareholder has its registered seat.

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

Shareholder rights

Shareholders have the right to receive dividends, to vote and to execute all other rights as granted under Swiss law and the Articles of Incorporation (see in particular articles 17 and 18 of the Articles of Incorporation: www.novartis.com/investors/company-overview/corporate-governance).

RIGHT TO VOTE

Each Novartis share registered with the right to vote entitles the holder to one vote at General Meetings of Shareholders (General Meetings). Novartis shares can only be voted if they are registered with voting rights in the Novartis Share Register by the third business day before the General Meeting (for shareholder registration and voting restrictions, see page 90).

ADR holders may vote by instructing JPMorgan Chase Bank, N.A., the ADS depositary, to exercise the voting rights attached to the registered Novartis shares underlying the ADRs. JPMorgan Chase Bank, N.A., exercises the voting rights for registered Novartis shares underlying ADRs for which no voting instructions have been given by providing a discretionary proxy to an uninstructed independent designee. Such designee has to be a Novartis AG shareholder.

POWERS OF GENERAL MEETINGS OF SHAREHOLDERS

The following powers are vested exclusively in the General Meeting:

- Adoption and amendment of the Articles of Incorporation
- Election and removal of the Chairman of the Board, Board and Compensation Committee members, the Independent Proxy and external auditors
- Approval of the management report (if required) and of the consolidated financial statements
- Approval of the financial statements of Novartis AG, and decision on the appropriation of available earnings shown on the balance sheet, including dividends
- Approval of the maximum aggregate amounts of compensation of the Board (for the period from an AGM until the next AGM) and of the Executive Committee (for the financial year following the AGM)
- Grant of discharge to Board and Executive Committee members
- Decision of other matters that are reserved by law or by the Articles of Incorporation (e.g. advisory vote on the compensation report) to the General Meeting of Shareholders

RESOLUTIONS AND ELECTIONS AT GENERAL MEETINGS

The General Meeting passes resolutions and elections with the absolute majority of the votes represented at the meeting. However, under article 18 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), the approval of two-thirds of the votes represented at the meeting is required for:

- Alteration of the purpose of Novartis AG
- Creation of shares with increased voting powers
- Implementation of restrictions on the transfer of registered shares, and the removal of such restrictions
- Authorized or conditional increase of the share capital
- Increase of the share capital out of equity, by contribution in kind, for the purpose of an acquisition of property or the grant of special rights
- Restriction or suspension of rights or options to subscribe
- Change of location of the registered office of Novartis AG
- Dissolution of Novartis AG

In addition, the law provides for a qualified majority for other resolutions, such as a merger or spin-off.

OTHER SHAREHOLDER RIGHTS

Shareholders representing at least 10% of the Novartis share capital may request that an extraordinary General Meeting be convened. Shareholders representing Novartis shares with an aggregate nominal value of at least CHF 1 million may request that an item be included in a General Meeting agenda. Such requests must be made in writing at least 45 days before the meeting, specify the agenda item to be included, and contain the proposal on which the shareholder requests a vote.

Shareholders can vote their Novartis shares by themselves or appoint another shareholder or the Independent Proxy to vote on their behalf. All shareholders (who are not yet registered on the online platform; see below) receive a General Meeting invitation letter with a proxy appointment form for the appointment of the Independent Proxy. On this form, shareholders can instruct the Independent Proxy to vote on alternative or additional motions related to the agenda items either (i) following the recommendations of the Board for such alternative or additional motions, or (ii) against such alternative or additional motions. They can also abstain from voting.

Novartis AG offers shareholders the opportunity to use an online platform (the Sherpany Platform) to receive invitations to future General Meetings exclusively by email and to electronically give their instructions to the Independent Proxy, grant powers of attorney to other shareholders, and order their admission cards online. The General Meeting registration form enables shareholders who are not yet registered on the Sherpany Platform to order detailed documents related to opening a Sherpany account. They may also do so by contacting the Novartis Share Registry. Shareholders can deactivate their online account at any time and again receive invitations in paper form.

Other rights associated with a registered Novartis share may only be exercised by the shareholder, its legal representative, another shareholder with the right to vote, the Independent Proxy, an usufructuary (a person who is not the owner of the share but who is entitled to exercise shareholder rights), or a nominee who is registered in the Novartis Share Register.

Shareholder registration

Only shareholders, usufructuaries or nominees registered in the Novartis Share Register with voting rights may exercise their voting rights. To be registered with voting rights, a shareholder must declare that he or she acquired the shares in his or her own name and for his or her own account. According to article 5, paragraph 3 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), the Board may register nominees with the right to vote. For restrictions on the registration of nominees, please see below.

The Articles of Incorporation provide that no shareholder shall be registered with the right to vote for more than 2% of the registered share capital. The Board may, upon request, grant an exemption from this restriction. Considerations include whether the shareholder supports the Novartis goal of creating sustainable value and has a long-term investment horizon. Exemptions are in force for the registered significant shareholders listed on page 88 under Our Shareholders – Significant Shareholders, and for Norges Bank (Central Bank of Norway), Oslo, which as of December 31, 2017, was not registered in the share register but according to a disclosure notification filed with Novartis AG, held 2.1% of the share capital of Novartis AG. No further exemptions were requested in 2017.

The same registration and voting restrictions indirectly apply to holders of ADRs.

Given that shareholder representation at General Meetings traditionally has been rather low in Switzerland, Novartis AG considers registration restrictions necessary to prevent a minority shareholder from dominating a General Meeting.

The Articles of Incorporation provide that no nominee shall be registered with the right to vote for more than 0.5% of the registered share capital. The Board may, upon request, grant an exemption from this restriction if the nominee discloses the names, addresses and number of shares of the individuals for whose account it holds 0.5% or more of the registered share capital. Exemptions are in force for the nominees listed on page 88 under Our Shareholders – Significant Shareholders, and for the nominee Citibank, London, which in 2015 requested an exemption, but as of December 31, 2017, was not registered in the Novartis Share Register.

The same restrictions indirectly apply to holders of ADRs.

Registration restrictions in the Articles of Incorporation may only be removed through a resolution of the General Meeting, with approval of at least two-thirds of the votes represented at the meeting (see article 18 lit. c of the Articles of Incorporation: www.novartis.com/investors/company-overview/corporate-governance).

Shareholders, ADR holders, or nominees who are linked to each other or who act in concert to circumvent registration restrictions are treated as one person or nominee for the purposes of the restrictions on registration.

No restrictions on trading of shares

No restrictions are imposed on the transferability of Novartis shares. The registration of shareholders in the Novartis Share Register or in the ADR register kept by JPMorgan Chase Bank, N.A., does not affect the tradability of Novartis shares or ADRs. Registered Novartis shareholders or ADR holders may therefore purchase or sell their Novartis shares or ADRs at any time, including before a General Meeting, regardless of the record date. The record date serves only to determine the right to vote at a General Meeting.

Change-of-control provisions

NO OPTING UP, NO OPTING OUT

According to the Swiss Federal Act on Financial Infrastructures, anyone who – directly, indirectly or acting in concert with third parties – acquires equity securities exceeding 33 1/3% of the voting rights of a company (whether or not such rights are exercisable) is required to make an offer to acquire all listed equity securities of that company. A company may raise this threshold up to 49% of the voting rights ("opting up") or may, under certain circumstances, waive the threshold ("opting out"). Novartis AG has not adopted any such measures.

CHANGE-OF-CONTROL CLAUSES

In accordance with good corporate governance and the rules of the Ordinance against Excessive Compensation in Listed Companies, there are no change-of-control clauses and "golden parachute" agreements benefiting Board members, Executive Committee members, or other members of senior management. Furthermore, employment contracts with Executive Committee members are either for a fixed term not exceeding one year or for an indefinite period of time with a notice period not exceeding 12 months, and do not contain commissions for the acquisition or transfer of enterprises or severance payments.

General compensation provisions

NON-EXECUTIVE MEMBERS OF THE BOARD OF DIRECTORS

Compensation of non-executive members of the Board includes fixed compensation elements only. In particular, non-executive members of the Board shall receive no company contributions to any pension plan, no performance-related elements, and no financial instruments (e.g., options).

MEMBERS OF THE EXECUTIVE COMMITTEE

The members of the Executive Committee receive fixed and variable, performance-related compensation. Fixed compensation is comprised of the base salary and may include other elements and benefits such as contributions to pension plans. Variable compensation may be structured into short-term and long-term compensation elements. Short-term variable compensation elements shall be governed by performance metrics that take into account the performance of Novartis and/or parts thereof, and/or individual targets. Achievements are generally measured based on the one-year period to which the short-term compensation relates. The long-term compensation plans are based on performance metrics that take into account strategic objectives of Novartis (such as financial, innovation, shareholder return and/or other metrics). Achievements are generally measured based on a period of not less than three years.

ADDITIONAL AMOUNT

If the maximum aggregate amount of compensation already approved by the General Meeting is not sufficient to cover the compensation of newly appointed or promoted Executive Committee members, Novartis may pay out compensation, in a total amount up to 40% of the total maximum aggregate amount last approved for the Executive Committee per compensation period, to newly appointed or promoted Executive Committee members. For detailed information on the compensation of the Board and the Executive Committee, see articles 29-35 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance) and the Compensation Report, beginning on page 118.

Our Board of Directors

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

Chairman: J. Reinhardt
Vice Chairman: E. Vanni

Board of Directors

N. Andrews
D. Azar
T. Buechner
S. Datar
E. Doherty
A. Fudge
F. van Houten
P. Landolt[1]
A. von Planta
C. Sawyers
W. Winters

Audit and Compliance Committee	Compensation Committee	Governance, Nomination and Corporate Responsibilities Committee	Research & Development Committee	Risk Committee
E. Doherty (Chairman)	E. Vanni (Chairman)	A. von Planta (Chairman)	J. Reinhardt (Chairman)	S. Datar (Chairman)
D. Azar[2]	S. Datar	A. Fudge	N. Andrews	N. Andrews
S. Datar	A. Fudge	P. Landolt	D. Azar	T. Buechner
A. von Planta	W. Winters	C. Sawyers	C. Sawyers	E. Doherty
E. Vanni		E. Vanni		A. Fudge
				A. von Planta

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

Election and term of office

Board members, the Chairman, and Compensation Committee members are elected annually and individually as a matter of law by the shareholders at the General Meeting. Board members whose term of office has expired are immediately eligible for re-election.

The average tenure of Board members is six years, with two-thirds of Board members having a tenure of less than six years. A Board member must retire after reaching age 70. Under special circumstances, shareholders may grant an exemption from this rule and re-elect a Board member for additional terms of office. There is no mandatory term limit for Board members, enabling the company to benefit from the insight and knowledge that long-serving Board members have developed about the company's operations and practices.

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

Board profile

Board composition

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

Profile of individual Board members

Board members should have the following personal qualities:

- Interact with other Board members to build an effective and complementary Board
- Establish trusting relationships
- Apply independence of thought and judgment
- Be challenging but supportive in the boardroom
- Influence without creating conflict by applying a constructive, non-confrontational style
- Listen well and offer advice based on sound judgment
- Be able and willing to commit adequate time to Board and committee responsibilities
- Be open to personal feedback and seek to be responsive
- Do not have existing board memberships or hold other positions that could lead to a permanent conflict of interest
- Understand and respect the boundaries of the role, leaving the operational management of the company to the CEO and the Executive Committee

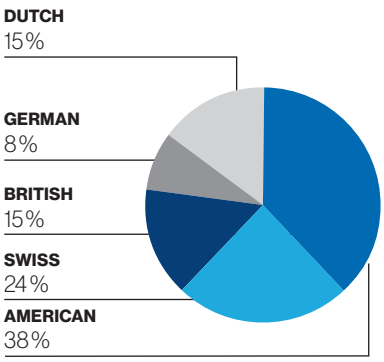
Board members' biographies (pages 102–105) highlight the specific qualifications that led the Board to conclude members are qualified to serve on the Board, which is diverse in terms of background, credentials, interests and skills.

Board diversity

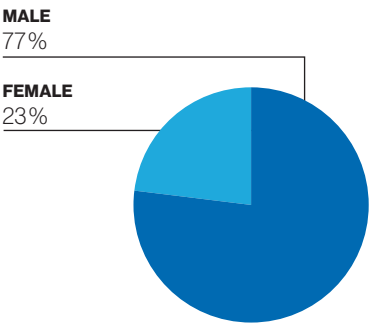
The diversity of a Board is critical to its effectiveness. When the Governance, Nomination and Corporate Responsibilities Committee (GNCRC) of Novartis identifies new Board member candidates to be proposed to shareholders for election, the maintenance and improvement of the Board's diversity is an important criterion. The Board's aspiration is to have a diverse Board in all aspects. This includes nationality, gender, background and experience, age, tenure, viewpoints, interests, and technical and interpersonal skills. Background and experience in the following fields should be represented on the Board: leadership and management; healthcare, life sciences and medicine; research and development; engineering and technology; marketing; banking, finance and accounting; human resources; legal and public affairs; and risk management.

Diversity

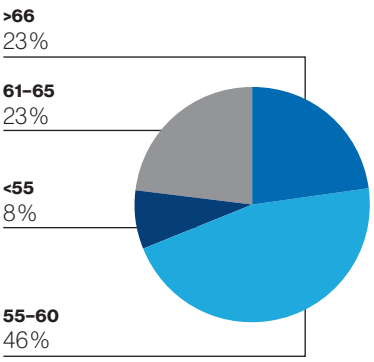
Nationality



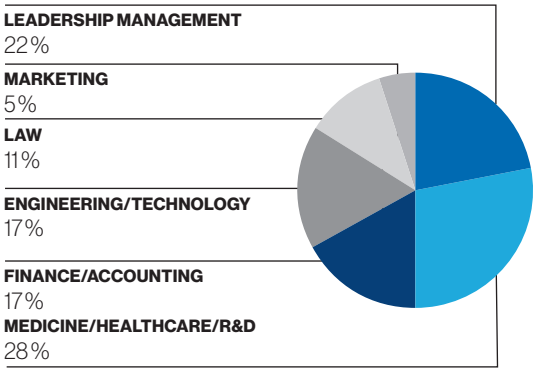
Gender



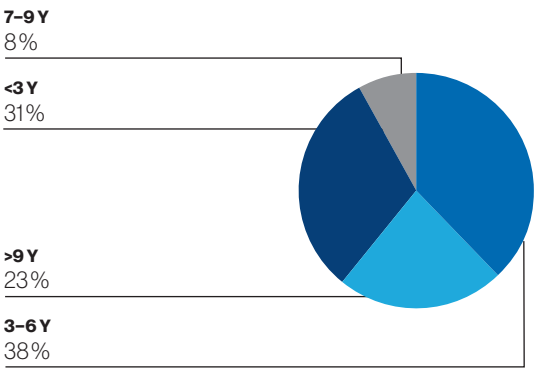
Age



Background/Experience



Tenure



Succession planning

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

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

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

Role of the Board and its committees

The Board is responsible for the overall direction and supervision of management, and holds the ultimate decision-making authority for Novartis AG, with the exception of decisions reserved for shareholders.

The Board has delegated certain of its responsibilities to five committees, as set out on the next pages. In some cases, these responsibilities are of an advisory or preparatory nature (A/P). In other cases, they have been fully delegated to the committee (FD), or the committee has decision-making power that is subject to final Board approval (FBA). The committees enable the Board to work in an efficient and effective manner, ensuring a thorough review and discussion of issues, while giving the Board more time for deliberation and decision-making. Moreover, committees ensure that only Board members who are independent oversee audit and compliance, governance and compensation – as only independent Board members are delegated in the respective committees.

Responsibilities	Members	Number of meetings held in 2017/ approximate average duration (hrs) of each meeting/ attendance	Documents/ link
Board of Directors		**9/6:00**	
The primary responsibilities of the Board of Directors include: — Setting the strategic direction of the Group — Appointing, overseeing and dismissing key executives, and planning their succession — Approving transactions and investments of fundamental importance to Novartis and all in excess of USD 500 Mio — Determining the organizational structure and governance of the Group — Determining and overseeing financial planning, accounting, reporting and controlling — Approving annual financial statements and corresponding financial results releases	**Joerg Reinhardt**[1]	**9**	Articles of Incorporation of Novartis AG Regulations of the Board of Directors, its Committees and the Executive Committee of Novartis AG (Board regulations) www.novartis.com/investors/company-overview/corporate-governance
	Enrico Vanni	9	
	Nancy C. Andrews	9	
	Dimitri Azar	9	
	Ton Buechner	8	
	Srikant Datar	9	
	Elizabeth Doherty	9	
	Ann Fudge	9	
	Frans van Houten[2]	5	
	Pierre Landolt	9	
	Andreas von Planta	9	
	Charles L. Sawyers	9	
	William T. Winters	8	
Audit and Compliance Committee		**7/3:00**	
The primary responsibilities of this committee include: — Supervising external auditors (FD)**, and selecting and nominating external auditors for election by the meeting of shareholders (FBA)*** — Overseeing internal auditors (FD)** — Overseeing accounting policies, financial controls, and compliance with accounting and internal control standards (FD)** — Approving quarterly financial statements and financial results releases (FBA)*** — Overseeing internal control and compliance processes and procedures (FD)** — Overseeing compliance with laws, and external and internal regulations (FD)** The Audit and Compliance Committee has the authority to retain external consultants and other advisors.	**Elizabeth Doherty**[1,3]	**7**	Charter of the Audit and Compliance Committee www.novartis.com/investors/company-overview/corporate-governance
	Dimitri Azar[4]	7	
	Srikant Datar[3]	7	
	Andreas von Planta	7	
	Enrico Vanni	7	
Compensation Committee		**6/2:30**	
The primary responsibilities of this committee include: — Designing, reviewing and recommending to the Board the compensation policies and programs (FBA)*** — Advising the Board on the compensation of Board members and the CEO (A/P)* — Deciding on the compensation of Executive Committee members (FD)** — Preparing the Compensation Report and submitting it to the Board for approval (FBA)*** The Compensation Committee has the authority to retain external consultants and other advisors.	**Enrico Vanni**[1]	**6**	Charter of the Compensation Committee www.novartis.com/investors/company-overview/corporate-governance
	Srikant Datar	6	
	Ann Fudge	6	
	William T. Winters	6	

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

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

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

[1] Chairman

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

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

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

The Novartis corporate culture and role of the Board

The corporate culture of Novartis is a key focus of the Board. The Board works to ensure that the Novartis strategy, operating model and compensation system are aligned with Novartis Values and Behaviors, as endorsed by the Board, and that the Novartis compensation system supports the desired corporate culture of Novartis. The Board also reviews the regular evaluation of the corporate culture throughout Novartis.

Functioning of the Board

The Board takes decisions as a whole, supported by its five committees. Each committee has a written charter outlining its duties and responsibilities, and is led by a Board-elected Chairman.

The Board and its committees meet regularly throughout the year. The Chairmen set their meeting agendas. Any Board member may request a Board or committee meeting, and the inclusion of an agenda item. Before meetings, Board members receive materials to help them prepare the discussions and decision-making.

Chairman

Joerg Reinhardt has been the independent, non-executive Chairman since August 1, 2013. He has both industry and Novartis experience, and meets the company's independence criteria. As independent Chairman, he can lead the Board to represent the interests of all stakeholders, being accountable to them and creating sustainable value through effective governance, the right strategy, and delivery of the expected level of performance. The independent chairmanship also ensures an appropriate balance of power between the Board and the Executive Committee.

In this role, Mr. Reinhardt:

- Provides leadership to the Board
- Supports and mentors the CEO
- Supported by the GNCRC, ensures effective succession plans for the Board and the Executive Committee
- Ensures that the Board and its committees work effectively
- Sets the agenda, style and tone of Board discussions, promoting constructive dialogue and effective decision-making
- Supported by the GNCRC, ensures that all Board committees are properly established, composed and operated
- Ensures that the Board's performance is annually evaluated
- Ensures onboarding programs for new Board members, and continuing education and specialization for all Board members
- Ensures effective communication with the company's shareholders
- Promotes effective relationships and communication between Board and Executive Committee members

Vice Chairman

Enrico Vanni has been the independent, non-executive Vice Chairman since February 22, 2013.

In this role, Mr. Vanni:

- Leads the Board in case and as long as the Chairman is incapacitated
- Chairs the sessions of independent Board members, and leads independent Board members if and as long as the Chairman is not independent
- Leads the yearly session of the Board members evaluating the performance of the Chairman, during which the Chairman is not present

Board meetings

The Board has meetings with Executive Committee members, as well as private meetings without them. Because all Board members are independent, no separate meetings of the independent Board members were held in 2017. Subject to additional special meetings, the Board and Board committee meetings take place in January, April, June, August, October and December. Typically these meetings last two days, with the first day allocated to Board committee meetings, and the second day allocated to the meeting of the full Board.

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

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

Key activities of our Board and committees in 2017

In 2017, the Board addressed in its meetings among others the following key standard topics: strategy; Group targets; mergers and acquisitions, business development and licensing review; financial and business reviews; major projects; investments and transactions; corporate governance; and culture. Topics addressed during private meetings included Board self-evaluation and the performance assessment of the Executive Committee members, as well as CEO and Executive Committee succession planning.

In addition, in 2017 our Board and its committees focused on a number of special topics, including:

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

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

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

Governance, Nomination and Corporate Responsibilities Committee:
Shareholder feedback from our corporate governance roadshow; emerging corporate governance practices and whether to adopt them; succession planning for the Board, Board committees and committee Chairmen; CEO succession; reviews of our corporate responsibility activities; Novartis access-to-medicine portfolio; and the company's performance in Environmental, Social and Governance (ESG) ratings and indices

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

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

Honorary Chairmen

Dr. Alex Krauer and Dr. Daniel Vasella have been appointed Honorary Chairmen in recognition of their significant achievements on behalf of Novartis. They are not provided with Board documents and do not attend Board meetings.

Independence of Board members

The independence of Board members is a key corporate governance issue. An independent Board member is one who is independent of management and has no business or relationship that could materially interfere with the exercise of objective, unfettered and independent judgment. Only with a majority of Board members being independent can the Board fulfill its obligation to represent the interests of shareholders, being accountable to them and creating sustainable value through the effective governance of Novartis. Accordingly, Novartis established independence criteria based on international best practice standards as outlined on the Novartis website: https://www.novartis.com/sites/www.novartis.com/files/independence-criteria-board-of-directors-and-its-committees.pdf

- The majority of Board members and any member of the Audit and Compliance Committee, the Compensation Committee, and the GNCRC must meet the company's independence criteria. These include, inter alia, (i) a Board member not having received direct compensation of more than USD 120 000 per year from Novartis, except for dividends or Board compensation, within the last three years; (ii) a Board member not having been an employee of Novartis within the last three years; (iii) a family member not having been an executive officer of Novartis within the last three years; (iv) a Board member or family member not being employed by the external auditor of Novartis; (v) a Board member or family member not being a board member, employee or 10% shareholder of an enterprise that has made payments to, or received payments from, Novartis in excess of the greater of USD 1 million or 2% of that enterprise's gross revenues. For members of the Audit and Compliance Committee and the Compensation Committee, even stricter rules apply.
- In addition, Board members are bound by the Novartis Conflict of Interest Policy, which prevents a Board member's potential personal interests from influencing the decision-making of the Board.
- The GNCRC annually submits to the Board a proposal concerning the determination of the independence of each Board member. For this assessment, the committee considers all relevant facts and circumstances of which it is aware – not only the explicit formal independence criteria. This includes an assessment of whether a Board member is truly independent, in character and judgment, from any member of senior management and from any of his/her current or former colleagues.

In its meeting on December 14, 2017, the Board determined that all of its members are independent.

Relationship of non-executive Board members with Novartis

No Board member is or was a member of the management of Novartis AG or of any other Novartis Group company in the last three financial years up to December 31, 2017. There are no significant business relationships of any Board member with Novartis AG or with any other Novartis Group company.

Mandates outside the Novartis Group

According to article 34 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), no Board member may hold more than 10 additional mandates in other companies, of which no more than four shall be in other listed companies. Chairmanships of the boards of directors of other listed companies count as two mandates. Each of these mandates is subject to Board approval.

The following mandates are not subject to these limitations:

a) Mandates in companies that are controlled by Novartis AG
b) Mandates that a Board member holds at the request of Novartis AG or companies controlled by it. No Board member shall hold more than five such mandates.
c) Mandates in associations, charitable organizations, foundations, trusts and employee welfare foundations. No Board member may hold more than 10 such mandates.

"Mandates" means those in the supreme governing body of a legal entity that is required to be registered in the commercial register or a comparable foreign register. Mandates in different legal entities that are under joint control are deemed one mandate.

The Board may issue regulations that determine additional restrictions, taking into account the position of the respective member.

Loans and credits

No loans or credits are granted to members of the Board.

Board performance and effectiveness evaluation

Process

The Board conducts an annual review to evaluate its performance, the performance of the committees and of Board members. As part of this process, each Board member completes a questionnaire on the performance and effectiveness of the Board and the Chairman, and on his/her committees, which lays the groundwork for a qualitative review led by the Chairman. The Chairman has discussions with each Board member and then with the entire Board. Also, the Board, without its Chairman, discusses the performance of the Chairman. Any suggestion for improvement is recorded and actions are agreed upon.

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

Content and results

The performance review examines the performance and effectiveness, strengths and weaknesses of individual Board members and of the full Board and each Board committee.

This review covers topics including Board composition; purpose, scope and responsibilities; processes and governance of the Board and its committees; meetings and pre-reading material; team effectiveness; and leadership and culture.

The review also evaluates the ability and willingness of each Board member to commit adequate time and effort to his/her responsibilities as provided for in the charter of the GNCRC.

The results were discussed at the January 2018 meetings. It was concluded that the Board and its committees operate effectively.

Information and control systems of the Board vis-à-vis management

Information on management

The Board ensures that it receives sufficient information from the Executive Committee to perform its supervisory duty and to make decisions that are reserved for it. The Board obtains this information through several means:

- The CEO informs the Board regularly about current developments.
- Executive Committee meeting minutes are made available to the Board.
- Meetings or teleconferences are held as required between Board members and the CEO.
- The Board regularly meets with all Executive Committee members.
- The Board receives detailed quarterly updates from each division and business unit head.
- By invitation, other members of management attend Board meetings to report on areas of the business for which they are responsible.
- Board members are entitled to request information from Executive Committee members or any other Novartis associate, and they may visit any Novartis site.

Board committees

Board committees regularly meet with management and, at times, external consultants to review the business, better understand applicable laws and policies affecting the Group, and support the Board and management in meeting the requirements and expectations of stakeholders and shareholders.

In particular, the Chief Financial Officer (CFO), the Group General Counsel, and representatives of the external auditors are invited to partly attend each Audit and Compliance Committee meeting. Additionally, the heads of Internal Audit, Financial Reporting & Accounting, Integrity and Compliance, and Quality, as well as the Head of the Global Business Practices Office, report on a regular basis to the Audit and Compliance Committee. This committee reviews financial reporting processes on behalf of the Board. For each quarterly and annual release of financial information, the Disclosure Review Committee is responsible for ensuring the accuracy and completeness of disclosures. The Disclosure Review Committee, which is a management committee, is chaired by the CFO and includes the CEO; the Group General Counsel; the heads of the divisions, business units, Novartis Operations, Novartis Technical Operations, Global Drug Development, and the Novartis Institutes for BioMedical Research (NIBR), as well as their finance heads; and the heads of the following corporate functions: Treasury, Tax, Financial Reporting & Accounting, Internal Audit and Investor Relations. The Audit and Compliance Committee reviews decisions made by the Disclosure Review Committee before the quarterly and annual releases are published.

The Risk Committee oversees the risk management system and processes, and also reviews the risk portfolio of the Group to ensure appropriate and professional risk management. For this purpose, the Group Risk Office and the risk owners of the divisions report on a regular basis to the Risk Committee. The Group General Counsel, the Head of Group Risk, the Head of Internal Audit, the Chief Ethics and Compliance Officer, and other senior executives are invited to these meetings on a regular basis.

Novartis management information system

Novartis produces comprehensive, consolidated (unaudited) financial statements on a monthly basis for the total Group and its operating divisions. These are typically available within 10 days of the end of the month, and include the following:

- Consolidated income statement of the month, quarter-to-date and year-to-date in accordance with International Financial Reporting Standards (IFRS), as well as adjustments to arrive at core results, as defined by Novartis (see page 179). The IFRS and core figures are compared to the prior-year period and targets in both USD and on a constant currency basis
- Consolidated balance sheet as of the month-end in accordance with IFRS in USD
- Consolidated cash flow on a monthly, quarter-to-date and year-to-date basis in accordance with IFRS in USD
- Supplementary data on a monthly, quarterly and year-to-date basis such as free cash flow, gross and net debt, headcount, personnel costs, working capital, and earnings per share on a USD basis where applicable

Constant currencies, core results, free cash flow, net debt and related target figures are non-IFRS measures. An explanation of non-IFRS measures can be found on pages 179-183 of the operating and financial review 2017.

This information is made available to Board members on a monthly basis. An analysis of key deviations from the prior year or target is also provided.

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

On an annual basis, in the fourth quarter of the year, the Board receives and approves the operating and financial targets for the following year.

In the middle of the year, the Board also reviews and approves the strategic plan for the next five years, which includes a projected consolidated income statement in USD prepared in accordance with IFRS and non-IFRS measures as defined by Novartis ("core results").

The Board does not have direct access to the company's financial and management reporting systems but can, at any time, request more detailed financial information on any aspect that is presented to it.

Internal audit

The Internal Audit function carries out operational and system audits in accordance with an audit plan approved by the Audit and Compliance Committee. This function helps organizational units accomplish objectives by providing an independent approach to the evaluation, improvement and effectiveness of their internal control framework. It prepares reports on the audits it has performed, and reports actual or suspected irregularities to the Audit and Compliance Committee and to the CEO. The Audit and Compliance Committee regularly invites the Head of Internal Audit to its meetings to review the internal audit scope, audit plans and results. In 2017, the Head of Internal Audit attended four meetings of the Audit and Compliance Committee.

Risk management

The Group Risk Office is overseen by the Board's independent Risk Committee. The Compensation Committee works closely with the Risk Committee to ensure that the compensation system does not lead to excessive risk-taking by management (for details, see our Compensation Report, beginning on page 118).

Organizational and process measures have been designed to identify and mitigate risks at an early stage. Organizationally, the responsibility for risk assessment and management is allocated to the divisions, organizational units and functions, with specialized corporate functions – such as Group Finance; Group Legal; Group Quality Assurance; Corporate Health, Safety and Environment; Business Continuity Management; Integrity and Compliance; and the Business Practices Office – providing support and controlling the effectiveness of the risk management in these respective areas.

Board of Directors

Joerg Reinhardt, Ph.D.

Chairman of the Board of Directors | Nationality: German | Year of Birth: 1956

Joerg Reinhardt, Ph.D., has been Chairman of the Board of Directors since 2013. He is also Chairman of the Research & Development Committee and Chairman of the Board of Trustees of the Novartis Foundation.

From 2010 to mid-2013, Mr. Reinhardt was chairman of the board of management and the executive committee of Bayer HealthCare, Germany. Prior to that, he was Chief Operating Officer of Novartis from 2008 to 2010, and Head of the Vaccines and Diagnostics Division of Novartis from 2006 to 2008. Since 2017, Mr. Reinhardt has been a non-executive board member of Swiss Re, Switzerland. Additionally, he was a member of the board of directors of Lonza Group AG in Switzerland from 2012 to 2013, Chairman of the Board of the Genomics Institute of the Novartis Research Foundation in the United States from 2000 to 2010, and a member of the supervisory board of MorphoSys AG in Germany from 2001 to 2004.

Mr. Reinhardt graduated with a doctorate in pharmaceutical sciences from Saarland University in Germany. He joined Sandoz Pharma Ltd. in 1982 and held various positions at Sandoz and later Novartis, including Head of Development.

Enrico Vanni, Ph.D.

Vice Chairman of the Board of Directors | Nationality: Swiss | Year of Birth: 1951

Enrico Vanni, Ph.D., has been a member of the Board of Directors since 2011 and qualifies as an independent Non-Executive Director. He is Vice Chairman of the Board of Directors and Chairman of the Compensation Committee. He is also a member of the Audit and Compliance Committee and the Governance, Nomination and Corporate Responsibilities Committee.

Mr. Vanni retired as director of McKinsey & Company in 2007. He is a board member of several companies in industries from healthcare to private banking, including Advanced Oncotherapy PLC in the United Kingdom, and non-listed companies such as Lombard Odier SA, Banque Privée BCP (Suisse) SA, and Denzler & Partners SA – all based in Switzerland. He previously served on the boards of Eclosion2 in Switzerland from 2009 to 2017, of Alcon Inc. in Switzerland from 2010 to 2011, and of Actavis PLC in Ireland in 2010.

Mr. Vanni holds an engineering degree in chemistry from the Federal Polytechnic School of Lausanne, Switzerland; a doctorate in chemistry from the University of Lausanne; and a Master of Business Administration from INSEAD in Fontainebleau, France. He began his career as a research engineer at the International Business Machines Corp. (IBM) in California, United States, and joined McKinsey in Zurich in 1980. He managed the Geneva office for McKinsey from 1988 to 2004, and consulted for companies in the pharmaceutical, consumer and finance sectors. He led McKinsey's European pharmaceutical practice and served as a member of the firm's partner review committee prior to his retirement. From 2008 to 2015, he was an independent consultant, supporting leaders of pharmaceutical and biotechnology companies on core strategic challenges facing the healthcare industry.

Nancy C. Andrews, M.D., Ph.D.

Member of the Board of Directors | Nationality: American | Year of Birth: 1958

Nancy C. Andrews, M.D., Ph.D., has been a member of the Board of Directors since 2015. She qualifies as an independent Non-Executive Director and is a member of the Research & Development Committee and the Risk Committee.

Dr. Andrews is dean emerita of the Duke University School of Medicine and vice chancellor emerita for academic affairs at Duke University in the United States. She served as dean and vice chancellor from 2007 to 2017. She is a professor of pediatrics, pharmacology and cancer biology at Duke, and was elected as a fellow of the American Association for the Advancement of Science and to membership in the US National Academy of Sciences, the National Academy of Medicine, and the American Academy of Arts and Sciences. She is chair of the board of directors of the American Academy of Arts and Sciences and of the Burroughs Wellcome Fund, a member of the Massachusetts Institute of Technology (MIT) Corporation, and former president of the American Society for Clinical Investigation. Additionally, she serves on the council of the National Academy of Medicine and on the Scientific Management Review Board of the US National Institutes of Health.

Dr. Andrews holds a doctorate in biology from MIT and a doctor of medicine from Harvard Medical School, both in the US. She completed her residency and fellowship trainings in pediatrics and hematology/oncology at Boston Children's Hospital and the Dana-Farber Cancer Institute, also in the US, and served as an attending physician at Boston Children's Hospital. Prior to joining Duke, Dr. Andrews was director of the Harvard/MIT M.D.-Ph.D. Program, and dean of basic sciences and graduate studies as well as professor of pediatrics at Harvard Medical School. From 1993 to 2006, she was a biomedical research investigator at the Howard Hughes Medical Institute in the US. Her research expertise is in iron homeostasis and mouse models of human diseases.

Dimitri Azar, M.D.

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

Dimitri Azar, M.D., has been a member of the Board of Directors since 2012. He qualifies as an independent Non-Executive Director and is a member of the Audit and Compliance Committee and the Research & Development Committee.

Dr. Azar is senior director of ophthalmological innovation at Verily Life Sciences. He has also served as dean of the University of Illinois at Chicago (UIC) College of Medicine in the United States since 2011, and as professor of ophthalmology, bioengineering and pharmacology at UIC since 2006. From 2006 to 2011, he was head of the Department of Ophthalmology and Visual Sciences at UIC. He is a member of the American Ophthalmological Society, former president of the Chicago Ophthalmological Society, and president-elect of the Chicago Medical Society. Additionally, he is on the board of the Tear Film and Ocular Surface Society, the board of Verb Surgical Inc., and the scientific board of Verily – all based in the US.

Dr. Azar began his career at the American University of Beirut Medical Center in Lebanon, and completed his fellowship and residency training at the Massachusetts Eye and Ear Infirmary at Harvard Medical School in the US. His research on matrix metalloproteinases in corneal wound healing and angiogenesis has been funded by the US National Institutes of Health since 1993. Dr. Azar practiced at the Wilmer Eye Institute at the Johns Hopkins Hospital School of Medicine in the US, and then returned to the Massachusetts Eye and Ear Infirmary as director of cornea and external disease. He became professor of ophthalmology with tenure at Harvard Medical School in 2003. Dr. Azar holds a master's degree from Harvard and an Executive Master of Business Administration from the University of Chicago Booth School of Business in the US.

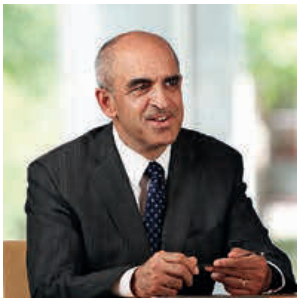
Ton Buechner

Member of the Board of Directors | Nationality: Dutch | Year of Birth: 1965

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

Mr. Buechner most recently served as chairman and CEO of the executive board of Dutch multinational AkzoNobel from 2012 to 2017. Prior to joining AkzoNobel, he spent almost two decades at the Sulzer Corporation in Switzerland, where he was appointed divisional president in 2001 and served as president and CEO from 2007 to 2011. Mr. Buechner's early career was spent in the oil and gas construction industry, and included roles at Allseas Engineering in the Netherlands and at Aker Kvaerner in Singapore. He is a member of the supervisory board of Voith GmbH in Germany.

Mr. Buechner is an engineer by training. He received his master's degree in civil engineering from Delft University of Technology in the Netherlands in 1988, specializing in offshore construction technology and coastal engineering. Mr. Buechner holds a Master of Business Administration from IMD business school in Lausanne, Switzerland.



Srikant Datar, Ph.D.

Member of the Board of Directors | Nationality: American | Year of Birth: 1953

Srikant Datar, Ph.D., has been a member of the Board of Directors since 2003 and qualifies as an independent Non-Executive Director. He is Chairman of the Risk Committee, as well as a member of the Audit and Compliance Committee and the Compensation Committee. The Board of Directors has appointed him as Audit Committee Financial Expert.

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

Mr. Datar graduated in 1973 with distinction in mathematics and economics from the University of Bombay in India. He is a chartered accountant, and holds two master's degrees and a doctorate from Stanford University in the US. Mr. Datar has worked as an accountant and planner in industry, and as a professor at Carnegie Mellon University, Stanford University and Harvard University, all in the US. His research interests are in the areas of cost management, measurement of productivity, new product development, innovation, time-based competition, incentives and performance evaluation. He is the author of many scientific publications and has received several academic awards and honors. Mr. Datar has also advised and worked with numerous companies in research, development and training.

Board of Directors (continued)

Elizabeth (Liz) Doherty

Member of the Board of Directors | Nationality: British | Year of Birth: 1957

Elizabeth (Liz) Doherty has been a member of the Board of Directors since February 2016. She qualifies as an independent Non-Executive Director and is the Chairman of the Audit and Compliance Committee and a member of the Risk Committee. The Board of Directors has appointed her as Audit Committee Financial Expert.

Ms. Doherty is a non-executive director and chairman of the audit committee of Dunelm Group PLC in the United Kingdom, and a member of the supervisory board and audit committee of Corbion NV in the Netherlands. She is a fellow of the Chartered Institute of Management Accountants; a non-executive board member of the UK Ministry of Justice; a non-executive board member of Her Majesty's Courts and Tribunals Service in the UK; and an advisor to GBfoods and Affinity Petcare SA, subsidiaries of Agrolimen SA. She previously served as a non-executive director and audit committee member at Delhaize Group in Belgium and Nokia Corp. in Finland, and as a non-executive director at SABMiller PLC in the UK.

Ms. Doherty received her bachelor's degree in liberal studies in science (physics) from the University of Manchester in the UK. She began her career as an auditor and has held senior finance and accounting roles at Unilever PLC and Tesco PLC. Her previous positions also include interim chief financial officer (CFO) of Cognita Schools Ltd. from 2014 to 2015, CFO and board member of Reckitt Benckiser Group PLC from 2011 to 2013, interim CFO of City Inn in 2010, and CFO of Brambles Ltd. from 2007 to 2009.

Ann Fudge

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

Ann Fudge has been a member of the Board of Directors since 2008. She qualifies as an independent Non-Executive Director and is a member of the Risk Committee; the Compensation Committee; and the Governance, Nomination and Corporate Responsibilities Committee.

Ms. Fudge is vice chairman and senior independent director of Unilever NV, London and Rotterdam. She is also chair of the United States Program Advisory Panel of the Bill & Melinda Gates Foundation; a director of Northrop Grumman Corporation in the US; a trustee of Boston-based WGBH public media; and a member of the visiting committee of Harvard Business School in the US. She served on the board of General Electric Co. in the US from 1999 to 2015.

Ms. Fudge received her bachelor's degree from Simmons College in the US and her Master of Business Administration from Harvard Business School. She is former chairman and CEO of Young & Rubicam Brands, New York. Before that, she served as president of the Beverages, Desserts and Post Division of Kraft Foods Inc.

Frans van Houten

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

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

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

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

Pierre Landolt, Ph.D.

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

Pierre Landolt, Ph.D., has been a member of the Board of Directors since 1996. He qualifies as an independent Non-Executive Director and is a member of the Governance, Nomination and Corporate Responsibilities Committee.

Mr. Landolt is chairman of the Sandoz Family Foundation, overseeing its development in several investment fields. He is also chairman of the Swiss private bank Landolt & Cie SA. In Switzerland, he is chairman of Emasan AG and Vaucher Manufacture Fleurier SA, and vice chairman of Parmigiani Fleurier SA. Additionally, he is vice chairman of the Montreux Jazz Festival Foundation and a board member of Amazentis SA, Switzerland, and the Eneas Fund, Cayman Islands. In Brazil, Mr. Landolt is president of AxialPar Ltda. and Moco Agropecuaria Ltda., the Instituto Fazenda Tamanduá and the Instituto Estrela de Fomento ao Microcrédito.

Mr. Landolt graduated with a bachelor's degree in law from the University of Paris-Assas. From 1974 to 1976, he worked for Sandoz Brazil. In 1977, he acquired an agricultural estate in the semi-arid Northeast Region of Brazil, and within several years he converted it into a model farm in organic and biodynamic production. Since 1997, Mr. Landolt has been associate and chairman of AxialPar Ltda., Brazil, an investment company focused on sustainable development. In 2007, he co-founded Amazentis SA, a startup company active in the convergence space of medication and nutrition. In 2011, Mr. Landolt received the title of Docteur des Sciences Économiques Honoris Causa from the University of Lausanne in Switzerland.

Andreas von Planta, Ph.D.

Member of the Board of Directors | Nationality: Swiss | Year of Birth: 1955

Andreas von Planta, Ph.D., has been a member of the Board of Directors since 2006. He qualifies as an independent Non-Executive Director and is Chairman of the Governance, Nomination and Corporate Responsibilities Committee. He is also a member of the Risk Committee and the Audit and Compliance Committee.

Mr. von Planta provides counsel to the law firm Lenz & Staehelin AG, where he was a partner from 1988 through 2017. He is a board member of Helvetia Holding AG in Switzerland, and also serves on the boards of various Swiss subsidiaries of foreign companies and other non-listed Swiss companies, including Burberry (Suisse) SA, Lenz & Staehelin, A.P. Moller Finance SA, HSBC Private Bank (Suisse) SA, Socotab Frana SA and Raymond Weil SA. Additionally, he is chairman of the regulatory board of the SIX Swiss Exchange AG.

Mr. von Planta holds a doctorate in law from the University of Basel in Switzerland, and a Master of Laws from Columbia Law School in the United States. He passed his bar examinations in Basel in 1982, and specializes in corporate law, corporate governance, corporate finance, company reorganizations, and mergers and acquisitions. He previously served as chairman of Clinique Générale-Beaulieu SA from 2011 to 2016, and as a director there from 2008 to 2016. Additionally, he was chairman of Swiss National Insurance Company Ltd. (Nationale Suisse) from 2011 to 2015, a director at Nationale Suisse from 1997 to 2015, and a director at Holcim Ltd. from 2003 to 2014.

Charles L. Sawyers, M.D.

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

Charles L. Sawyers, M.D., has been a member of the Board of Directors since 2013. He qualifies as an independent Non-Executive Director and is a member of the Research & Development Committee and the Governance, Nomination and Corporate Responsibilities Committee.

In the United States, Dr. Sawyers is chair of the Human Oncology and Pathogenesis Program at Memorial Sloan Kettering Cancer Center, professor of medicine and of cell and developmental biology at the Weill Cornell Graduate School of Medical Sciences, and an investigator at the Howard Hughes Medical Institute. He was appointed to the US National Cancer Advisory Board, and is former president of the American Association for Cancer Research and of the American Society for Clinical Investigation. He is also a member of the US National Academy of Sciences, the National Academy of Medicine, and the American Academy of Arts and Sciences. He serves as a science advisor for the following companies: Agios Pharmaceuticals Inc., Housey Pharmaceutical Research Laboratories, Nextech Invest Ltd., Blueprint Medicines Corporation, BeiGene Ltd., The Column Group, ORIC Pharmaceuticals Inc., KSQ Therapeutics Inc., Foghorn Therapeutics Inc., and PMV Pharmaceuticals Inc.

Dr. Sawyers received his doctor of medicine from the Johns Hopkins University School of Medicine in the US, and worked at the Jonsson Comprehensive Cancer Center at the University of California, Los Angeles, for nearly 18 years before joining Memorial Sloan Kettering in 2006. An internationally acclaimed cancer researcher, he co-developed the Novartis cancer drug *Gleevec/Glivec* and has received numerous honors and awards, including the Lasker-DeBakey Clinical Medical Research Award in 2009.

William T. Winters

Member of the Board of Directors | Nationality: British/American | Year of Birth: 1961

William T. Winters has been a member of the Board of Directors since 2013. He qualifies as an independent Non-Executive Director and is a member of the Compensation Committee.

Mr. Winters is CEO and a board member of Standard Chartered, based in London. He also serves on the board of Colgate University in the United States, and on the boards of the International Rescue Committee and the Print Room theater in the United Kingdom.

Mr. Winters received his bachelor's degree from Colgate University and his Master of Business Administration from the Wharton School of the University of Pennsylvania in the US. From 2011 to 2015, he was chairman and CEO of Renshaw Bay, an alternative asset management firm. Prior to that, he was co-CEO of JPMorgan's investment bank from 2003 to 2010. He joined JPMorgan in 1983 and has held management roles across several market areas and in corporate finance. Additionally, he was a commissioner on the UK Independent Commission on Banking in 2010 and 2011, and was awarded the title of Commander of the Order of the British Empire in 2013.

Honorary Chairmen

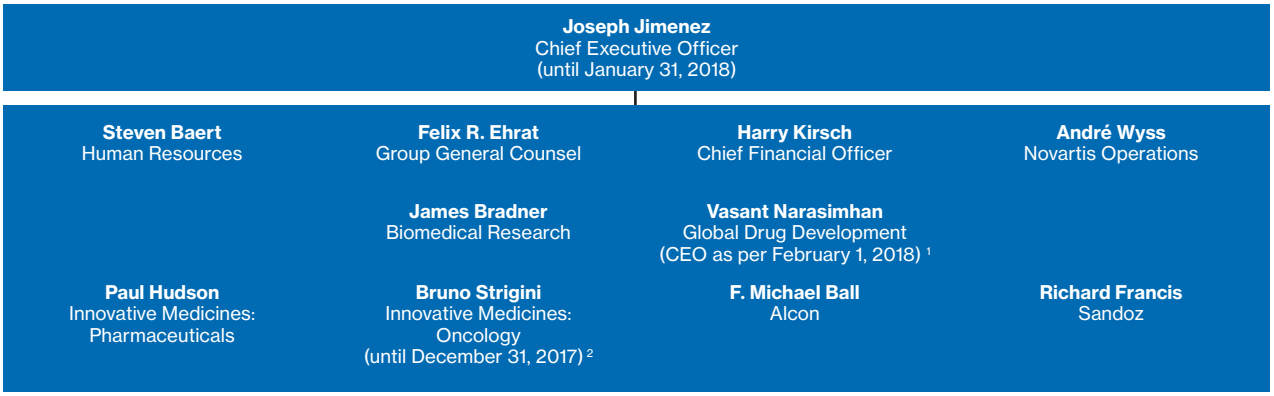
Alex Krauer, Ph.D.
Daniel Vasella, M.D.

Corporate Secretary

Charlotte Pamer-Wieser, Ph.D.

Our management

Composition of the Executive Committee



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

Executive Committee composition

The Executive Committee is headed by the CEO. Its members are appointed by the Board.

There are no contracts between Novartis and third parties whereby Novartis would delegate any business management tasks to such third parties.

Executive Committee role and functioning

The Board has delegated to the Executive Committee overall responsibility for and oversight of the operational management of Novartis. This includes:

- Recruiting, appointing and promoting senior management
- Ensuring the efficient operation of the Group and the achievement of optimal results
- Promoting an active internal and external communications policy
- Developing policies and strategic plans for Board approval, and implementing those approved
- Submitting the following to the Board for approval: investments, divestments, transactions, contracts and litigations with a value exceeding USD 500 million, important capital market and other financing transactions, as well as all (other) matters of fundamental significance for the Novartis Group
- Preparing and submitting quarterly and annual reports to the Board and its committees
- Informing the Board of all matters of fundamental significance to the businesses
- Dealing with any other matters delegated by the Board

The Executive Committee is supported by a sub-committee: The Disclosure Committee (members are the CEO, CFO and Group General Counsel) determines whether an event constitutes information that is material to the Group, determines the appropriate disclosure and update of such information, and reviews media releases concerning such information.

CEO

In addition to other Board-assigned duties, the CEO leads the Executive Committee, building and maintaining an effective executive team. With the support of the Executive Committee, the CEO:

- Is responsible for the operational management of Novartis
- Develops strategy proposals to be recommended to the Board, and ensures that approved strategies are implemented
- Plans human resourcing to ensure that Novartis has the capabilities and means to achieve its plans, and that robust management succession and management development plans are in place and presented to the Board
- Develops an organizational structure, and establishes processes and systems to ensure the efficient organization of resources
- Ensures that financial results, business strategies and, when appropriate, targets and milestones are communicated to the investment community – and generally develops and promotes effective communication with shareholders and other stakeholders
- Ensures that the business performance is consistent with business principles as well as high legal and ethical standards, and that the culture of Novartis is consistent with the Novartis Values and Behaviors
- Leads the Innovative Medicines Division
- Develops processes and structures to ensure that capital investment proposals are reviewed thoroughly, that associated risks are identified, and that appropriate steps are taken to manage these risks
- Develops and maintains an effective framework of internal controls over risk in relation to all business activities of the company
- Ensures that the flow of information to the Board is accurate, timely and clear

Mandates outside the Novartis Group

According to article 34 of the Articles of Incorporation (www.novartis.com/investors/company-overview/corporate-governance), no Executive Committee member may hold more than six additional mandates in other companies, of which no more than two additional mandates shall be in other listed companies. Each of these mandates is subject to Board approval. Executive Committee members are not allowed to hold chairmanships of the boards of directors of other listed companies.

The following mandates are not subject to these limitations:

a) Mandates in companies that are controlled by Novartis AG.
b) Mandates that an Executive Committee member holds at the request of Novartis AG or companies controlled by it. No Executive Committee member shall hold more than five such mandates.
c) Mandates in associations, charitable organizations, foundations, trusts and employee welfare foundations. No Executive Committee member may hold more than 10 such mandates.

"Mandates" means those in the supreme governing body of a legal entity that is required to be registered in the commercial register or a comparable foreign register. Mandates in different legal entities that are under joint control are deemed one mandate.

The Board may issue regulations that determine additional restrictions, taking into account the position of the respective member.

Loans and credits

No loans or credits shall be granted to members of the Executive Committee.

Executive Committee

Joseph Jimenez

Chief Executive Officer of Novartis | Nationality: American | Year of Birth: 1959

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

Mr. Jimenez previously held the position of Division Head, Novartis Pharmaceuticals. He joined Novartis in 2007 as Division Head, Novartis Consumer Health. Before that, from 1998 to 2006, he served as president and CEO of the North American and European businesses for the H.J. Heinz Company. He also served on the board of directors of Colgate-Palmolive Co. from 2009 to 2015, and of AstraZeneca PLC from 2002 to 2007.

Mr. Jimenez is a member of the board of directors of General Motors Co. He graduated in 1982 with a bachelor's degree from Stanford University and in 1984 with a Master of Business Administration from the University of California, Berkeley, both in the United States.

Steven Baert

Head of Human Resources of Novartis | Nationality: Belgian | Year of Birth: 1974

Steven Baert has been Head of Human Resources (CHRO) of Novartis since 2014. He is a member of the Executive Committee of Novartis.

Mr. Baert joined Novartis in 2006 as Head of Human Resources Global Functions in Switzerland. He has held several other senior HR roles, including Head of Human Resources for Emerging Growth Markets, and Global Head, Human Resources, Oncology. Mr. Baert also served as Head of Human Resources, United States and Canada, for Novartis Pharmaceuticals Corporation. Prior to joining Novartis, he held HR positions at Bristol-Myers Squibb Co. and Unilever.

Mr. Baert represents Novartis on the board of the GSK Consumer Healthcare joint venture. He holds a Master of Business Administration from the Vlerick Business School in Belgium and a Master of Laws from the Katholieke Universiteit Leuven, also in Belgium. Additionally, he has a Bachelor of Laws from the Katholieke Universiteit Brussels.

F. Michael (Mike) Ball

CEO, Alcon | Nationality: American | Year of Birth: 1955

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

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

Mr. Ball has served on the boards of several companies based in the United States, including Kythera Biopharmaceuticals Inc. (2013 to 2015), Hospira (2011 to 2015), IntraLase Corp. (2005 to 2006), and sTec Inc. (2000 to 2013). He holds a Bachelor of Science and a Master of Business Administration from Queen's University in Canada.

James (Jay) Bradner, M.D.

President of the Novartis Institutes for BioMedical Research (NIBR) | Nationality: American | Year of Birth: 1972

James (Jay) Bradner, M.D., joined Novartis in January 2016 and became President of the Novartis Institutes for BioMedical Research (NIBR) in March 2016. He is a member of the Executive Committee of Novartis.

Prior to joining Novartis, Dr. Bradner was on the faculty of Harvard Medical School in the Department of Medical Oncology at the Dana-Farber Cancer Institute in the United States from 2005 through 2015. He is a co-founder of five biotechnology companies and has authored more than 180 scientific publications and 30 US patent applications.

Dr. Bradner is a graduate of Harvard University and the University of Chicago Medical School in the US. He completed his residency in medicine at Brigham and Women's Hospital and his fellowship in medical oncology and hematology at the Dana-Farber Cancer Institute. He has been honored with many awards and was elected into the American Society for Clinical Investigation in 2011 and the Alpha Omega Alpha Honor Medical Society in 2013.

Felix R. Ehrat, Ph.D.

Group General Counsel of Novartis | Nationality: Swiss | Year of Birth: 1957

Felix R. Ehrat, Ph.D., has been Group General Counsel of Novartis since 2011. He is a member of the Executive Committee of Novartis.

Mr. Ehrat is a leading practitioner of corporate, banking, and mergers and acquisitions law, as well as an expert in corporate governance and arbitration. He started his career as an associate at Bär & Karrer Ltd. in Zurich in 1987, and served as senior partner from 2003 to 2011, and as executive chairman of the board from 2007 to 2011. Since 2011, he has also held various other leadership positions at the Novartis Group level, including in compliance and country management. He is chairman of Globalance Bank AG and a board member of Geberit AG and Avenir Suisse (a think tank for economic and social issues), all headquartered in Switzerland. He previously served as chairman and board member of several listed and non-listed companies based in Switzerland and elsewhere.

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

Richard Francis

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

Richard Francis has been CEO of Sandoz since 2014. He is a member of the Executive Committee of Novartis.

Mr. Francis joined Novartis from Biogen Idec, where he held global and country leadership positions during his 13-year career with the company. Most recently, he was senior vice president of the company's United States commercial organization. From 1998 to 2001, he was at Sanofi in the United Kingdom, and held various marketing roles across the company's urology, analgesics and cardiovascular products. He also held sales and marketing positions at Lorex Synthélabo and Wyeth.

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

Paul Hudson

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

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

Mr. Hudson joined Novartis from AstraZeneca PLC, where he most recently was president, AstraZeneca United States and executive vice president, North America. He also served as representative director and president of AstraZeneca K.K. in Japan; as president of AstraZeneca's business in Spain; and as vice president and primary care director, United Kingdom. Before joining AstraZeneca in 2006, Mr. Hudson held roles of increasing responsibility at Schering-Plough, including leading biologics global marketing. He began his career in sales and marketing roles at GlaxoSmithKline UK and Sanofi-Synthélabo UK.

Mr. Hudson holds a degree in economics from Manchester Metropolitan University in the UK and a diploma in marketing from the Chartered Institute of Marketing, also in the UK.

Harry Kirsch

Chief Financial Officer of Novartis | Nationality: Swiss, German | Year of Birth: 1965

Harry Kirsch has been Chief Financial Officer (CFO) of Novartis since 2013. He is a member of the Executive Committee of Novartis.

Mr. Kirsch joined Novartis in 2003 and, prior to his current position, served as CFO of the company's Pharmaceuticals Division. Under his leadership, the division's core operating income margin increased, in constant currencies, every quarter of 2011 and 2012 despite patent expirations. At Novartis, he also served as CFO of Pharma Europe, and as Head of Business Planning & Analysis and Financial Operations for the Pharmaceuticals Division. Mr. Kirsch joined Novartis from Procter & Gamble (P&G) in the United States, where he was CFO of P&G's global pharmaceutical business. Prior to that, he held finance positions in various categories of P&G's consumer goods business, technical operations, and Global Business Services organization.

Mr. Kirsch represents Novartis on the board of the GSK Consumer Healthcare joint venture. He holds a diploma degree in industrial engineering and economics from the University of Karlsruhe in Germany.

Executive Committee (continued)

Vasant (Vas) Narasimhan, M.D.

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

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

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

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

Bruno Strigini

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

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

Mr. Strigini joined Novartis in 2014 as President of Oncology. Prior to Novartis, he was President of MSD for Europe and Canada (Merck & Co. in the United States and Canada) from 2009 to 2014. He previously worked at Schering-Plough from 2006 to 2009 as group vice president and president of EUCAN Region II (encompassing Austria, Belgium, Greece, the Netherlands, Portugal, Switzerland, Central and Eastern Europe, the Middle East and Africa). Before that, he held positions at UCB Celltech and SmithKline Beecham.

Mr. Strigini holds a Master of Business Administration from IMD business school in Switzerland, a doctorate in pharmacy from the University of Montpellier in France, and a master's degree in microbiology from Heriot-Watt University in the United Kingdom. He is an elected member of the French National Academy of Pharmacy, and in 2014, he was awarded a doctor honoris causa from Universidad Internacional Menéndez Pelayo in Spain.

André Wyss

President of Novartis Operations and Country President for Switzerland | Nationality: Swiss | Year of Birth: 1967

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

Mr. Wyss has been with Novartis since 1984 when he was a chemistry apprentice in manufacturing at Sandoz. Before being appointed President of Novartis Operations, he served as Head of Novartis Business Services, building and implementing a shared services organization across Novartis. Prior to that, he held several other leadership positions, including US Country Head and President of Novartis Pharmaceuticals Corporation; Head of the Pharmaceuticals Division for the AMAC region (Asia-Pacific, Middle East and African countries); Group Emerging Markets Head; and Country President and Head of Pharmaceuticals, Greece.

Mr. Wyss received a graduate degree in economics from the School of Economics and Business Administration (HWV) in Switzerland in 1995. He is a member of the board of economiesuisse.

Secretary

Bruno Heynen

Our independent external auditors

Duration of the mandate and terms of office of the auditors

Based on a recommendation by the Audit and Compliance Committee, the Board nominates an independent auditor for election at the AGM. PricewaterhouseCoopers (PwC) assumed its existing auditing mandate for Novartis in 1996. Martin Kennard, auditor in charge, began serving in his role in 2017, and Stephen Johnson, global relationship partner, began serving in his role in 2014. The Audit and Compliance Committee together with PwC ensures that these partners are rotated at least every five years.

Information to the Board and the Audit and Compliance Committee

PwC is responsible for providing an opinion on whether the consolidated financial statements comply with IFRS and Swiss law, and whether the separate parent company financial statements of Novartis AG comply with Swiss law. Additionally, PwC is responsible for opining on the effectiveness of internal control over financial reporting, on the Compensation Report and on the corporate responsibility reporting of Novartis.

The Audit and Compliance Committee, acting on behalf of the Board, is responsible for overseeing the activities of PwC. In 2017, this committee held seven meetings. PwC was invited to six of these meetings to attend during the discussion of agenda items that dealt with accounting, financial reporting or auditing matters, and any other matters relevant to its audit.

On an annual basis, PwC provides the Audit and Compliance Committee with written disclosures required by the US Public Company Accounting Oversight Board, and the committee and PwC discuss PwC's independence from Novartis.

The Audit and Compliance Committee recommended to the Board to approve the audited consolidated financial statements and the separate parent company financial statements of Novartis AG for the year ended December 31, 2017. The Board proposed the acceptance of these financial statements for approval by the shareholders at the next AGM.

The Audit and Compliance Committee regularly evaluates the performance of PwC and, based on this, once a year determines whether PwC should be proposed to the shareholders for election. Also once a year, the auditor in charge and the global relationship partner report to the Board on PwC's activities during the current year and on the audit plan for the coming year. They also answer any questions or concerns that Board members have about the performance of PwC, or about the work it has conducted or is planning to conduct.

To assess the performance of PwC, the Audit and Compliance Committee holds private meetings with the CFO and the Head of Internal Audit and, if necessary, obtains an independent external assessment. Criteria applied for the performance assessment of PwC include an evaluation of its technical and operational competence; its independence and objectivity; the sufficiency of the resources it has employed; its focus on areas of significant risk to Novartis; its willingness to probe and challenge; its ability to provide effective, practical recommendations; and the openness and effectiveness of its communications and coordination with the Audit and Compliance Committee, the Internal Audit function, and management.

Approval of audit and non-audit services

The Audit and Compliance Committee approves a budget for audit services, whether recurring or non-recurring in nature, and for audit-related services not associated with internal control over financial reporting. PwC reports quarterly to the Audit and Compliance Committee regarding the extent of services provided in accordance with the applicable pre-approval, and the fees for services performed to date. The Audit and Compliance Committee individually approves all audit-related services associated with internal control over financial reporting, tax services and other services prior to the start of work.

Audit and additional fees

PwC fees for professional services related to the 12-month periods ended December 31, 2017 and December 31, 2016 are as follows:

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

Audit services include work performed to issue opinions on consolidated financial statements and parent company financial statements of Novartis AG, to issue opinions related to the effectiveness of the Group's internal control over financial reporting, and to issue reports on local statutory financial statements. Also included are audit services that generally can only be provided by the statutory auditor, such as the audit of the Compensation Report, audits of non-recurring transactions, audits of the adoption of new accounting policies, audits of information systems and the related control environment, reviews of quarterly financial results, as well as procedures required to issue consents and comfort letters.

Audit-related services include other assurance services provided by the independent auditor but not restricted to those that can only be provided by the statutory auditor. They include services such as audits of pension and other employee benefit plans, contract audits of third-party arrangements, corporate responsibility assurance, other audit-related services, and in 2017 audit services related to the Alcon strategic review.

Tax services represent tax compliance, assistance with historical tax matters, and other tax-related services.

Other services include procedures related to corporate integrity agreements, training in the finance area, benchmarking studies, and license fees for use of accounting and other reporting guidance databases.

Our corporate governance framework

Laws and regulations

Novartis AG is subject to the laws of Switzerland, in particular Swiss company and securities laws, and to the securities laws of the US as applicable to foreign private issuers of securities.

In addition, Novartis AG is subject to the rules of the SIX Swiss Exchange, including the Directive on Information Relating to Corporate Governance.

Novartis AG is also subject to the rules of the NYSE as applicable to foreign private issuers of securities. The NYSE requires Novartis AG to describe any material ways in which its corporate governance differs from that of domestic US companies listed on the exchange. These differences are:

- Novartis AG shareholders do not receive written reports directly from Board committees.
- External auditors are appointed by shareholders at the AGM, as opposed to being appointed by the Audit and Compliance Committee.
- While shareholders cannot vote on all equity compensation plans, they are entitled to hold separate, yearly binding shareholder votes on Board and Executive Committee compensation.
- The Board has set up a separate Risk Committee that is responsible for business risk oversight, as opposed to delegating this responsibility to the Audit and Compliance Committee.
- The full Board is responsible for overseeing the performance evaluation of the Board and Executive Committee.
- The full Board is responsible for setting objectives relevant to the CEO's compensation and for evaluating his performance.

Swiss Code of Best Practice for Corporate Governance

Novartis applies the Swiss Code of Best Practice for Corporate Governance.

Novartis corporate governance standards

Novartis has incorporated the aforementioned corporate governance standards into the Articles of Incorporation and the Regulations of the Board of Directors, its Committees and the Executive Committee of Novartis AG (www.novartis.com/investors/company-overview/corporate-governance).

The GNCRC regularly reviews these standards and principles, taking into account best practices, and recommends improvements to the corporate governance framework for consideration by the full Board.

Additional corporate governance information can be found on the Novartis website: www.novartis.com/investors/company-overview/corporate-governance

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

Further information

Group structure of Novartis

Novartis AG and Group companies

Under Swiss company law, Novartis AG is organized as a corporation that has issued shares of common stock to investors. The registered office of Novartis AG is Lichtstrasse 35, CH-4056 Basel, Switzerland.

Business operations are conducted through Novartis Group companies. Novartis AG, a holding company, owns or controls directly or indirectly all entities worldwide belonging to the Novartis Group. Except as described below, the shares of these companies are not publicly traded. The principal Novartis subsidiaries and associated companies are listed in Note 31 to the Group's consolidated financial statements.

Divisions

The businesses of Novartis are divided on a worldwide basis into three operating divisions: Innovative Medicines, with the two business units Novartis Pharmaceuticals and Novartis Oncology; Sandoz (generics); and Alcon (eye care). These businesses are supported by a number of global organizations including NIBR, which focuses on discovering new drugs; the Global Drug Development organization, which oversees the clinical development of new medicines; and Novartis Operations, which includes Novartis Technical Operations (the global manufacturing organization) and Novartis Business Services (which consolidates support services across Novartis).

Majority holdings in publicly traded Group companies

The Novartis Group owns 73.4% of Novartis India Ltd., with its registered office in Mumbai, India, and listed on the Bombay Stock Exchange (ISIN INE234A01025, symbol: HCBA). The total market value of the 26.6% free float of Novartis India Ltd. was USD 75.3 million at December 31, 2017, using the quoted market share price at year-end. Applying this share price to all the shares of the company, the market capitalization of the whole company was USD 283.2 million, and that of the shares owned by Novartis was USD 207.9 million.

Significant minority shareholding owned by the Novartis Group

The Novartis Group owns 33.3% of the bearer shares of Roche Holding AG, with its registered office in Basel, Switzerland, and listed on the SIX Swiss Exchange (ISIN CH0012032113, symbol: RO). The market value of the Group's interest in Roche Holding AG, as of December 31, 2017, was USD 13.4 billion. The total market value of Roche Holding AG was USD 217.6 billion. Novartis does not exercise control over Roche Holding AG, which is independently governed, managed and operated.

The Novartis Group owns a 36.5% share of a joint venture created by GlaxoSmithKline PLC (GSK) and Novartis, which combined the Novartis OTC and GSK Consumer Healthcare businesses. Novartis holds four of the 11 seats on the joint venture's board. Furthermore, Novartis has certain minority rights and exit rights, including a put option that is exercisable as of March 2, 2018 until latest 2035.

Political contributions and lobbying

Novartis makes political contributions to support political dialogue on issues of relevance to the company.

Political contributions made by Novartis are not intended to give rise to any obligations of the party receiving it, or with the expectation of a direct or immediate return for Novartis. Such contributions are fully compliant with applicable laws, regulations and industry codes. Novartis only makes political contributions in countries where such contributions from corporations are considered to reflect good corporate citizenship. Moreover, Novartis only makes modest political contributions so as to not create any dependency from the political parties receiving these contributions.

In 2017, Novartis made political contributions totaling approximately USD 2.0 million, thereof approximately USD 600 000 in Switzerland, USD 1 365 000 in the US, and USD 65 000 in Australia. In addition, in the US, a political action committee established by Novartis used funds received from Novartis employees (but not from the company) to make political contributions totaling approximately USD 220 000.

In Switzerland, Novartis supports political parties that have a political agenda and that hold positions supporting the strategic interests of Novartis, its shareholders and other stakeholders. Swiss political parties are completely privately financed, and the contributions of companies are a crucial part thereof. This private financing of parties is a deeply rooted trait of the Swiss political culture, and contributing to that system is an important element of being a good corporate citizen.

In 2016, Novartis issued a guideline on responsible lobbying, describing the overarching principles of transparency in lobbying activities. For more information on responsible lobbying, see the public policy and advocacy section of the Novartis website (www.novartis.com/our-company/corporate-responsibility/doingbusiness-responsibly/transparency-disclosure/public-policy-advocacy).

Shareholder relations

The CEO, with the CFO and Investor Relations team, supported by the Chairman, are responsible for ensuring effective communication with shareholders to keep them informed of the company's strategy, prospects, business operations and governance. Through communication, the Board also learns about and addresses shareholders' expectations and concerns.

Novartis communicates with its shareholders through the AGM, meetings with groups of shareholders and individual shareholders, and written and electronic communications.

At the AGM, the Chairman and other Board members, the CEO and other Executive Committee members, and representatives of the external auditors are present and can answer shareholders' questions. Other meetings with shareholders may be attended by the Chairman, CEO, CFO, Executive Committee members, and other members of senior management.

Topics discussed with shareholders may include strategy, business performance and corporate governance, while fully respecting all applicable laws and stock exchange rules.

Information for our stakeholders

Introduction

Novartis is committed to open and transparent communication with shareholders, financial analysts, customers, suppliers and other stakeholders. Novartis aims to disseminate material developments in its businesses in a broad and timely manner that complies with the rules of the SIX Swiss Exchange and the NYSE.

Communications

Novartis publishes this Annual Report to provide information on the Group's results and operations. In addition, Novartis prepares an annual report on Form 20-F that is filed with the US Securities and Exchange Commission (SEC). Novartis discloses financial results in accordance with IFRS on a quarterly basis, and issues press releases from time to time regarding business developments.

Novartis furnishes press releases related to financial results and material events to the SEC via Form 6-K. An archive containing recent Annual Reports, annual reports on Form 20-F, quarterly results releases, and all related materials – including presentations and conference call webcasts – is on the Novartis website at www.novartis.com/investors.

Novartis also publishes a consolidated Corporate Responsibility Performance Report, available on the Novartis website at www.novartis.com/our-company/corporate-responsibility, which details progress and demonstrates the company's commitment to be a leader in corporate responsibility. This report reflects the best-in-class reporting standard, the Global Reporting Initiative's G4 guidelines, and fulfills the company's reporting requirement as a signatory of the UN Global Compact.

Information contained in reports and releases issued by Novartis is only correct and accurate at the time of release. Novartis does not update past releases to reflect subsequent events, and advises against relying on them for current information.

Investor Relations program

An Investor Relations team manages the Group's interactions with the international financial community. Several events are held each year to provide institutional investors and analysts with various opportunities to learn more about Novartis.

Investor Relations is based at the Group's headquarters in Basel. Part of the team is located in the US to coordinate interaction with US investors. More information is available on the Novartis website: www.novartis.com/investors. Investors are also welcome to subscribe to a free email service on this site.

Website information

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

Photo Transplant surgeon Manuel Cobos carries out an operation in Buenos Aires, Argentina. Dr. Cobos spent the summer of 2016 as an intern in the Novartis Next Generation Scientist program, which helps widen the experience and skills of researchers from emerging countries.

Compensation Report

Contents

Dear Shareholder,

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

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

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

2017 company performance

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

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

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

2017 CEO realized pay

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

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

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

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

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

Compensation Report transparency

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

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

Changes to our executive compensation system

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

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

Changes to our Board compensation system from the 2018 AGM

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

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

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

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

2018 CEO succession

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

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

On behalf of Novartis and the Compensation Committee, thank you for your continued support and feedback, which we consider extremely valuable in driving improvements in our compensation systems and practices.

I invite you to send your comments to me at the following email address: investor.relations@novartis.com.

Respectfully,

Enrico Vanni, Ph.D.
Chairman of the Compensation Committee

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

2017 Executive Committee compensation system

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

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

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

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

2017 CEO pay for performance – outcomes

2017 ANNUAL INCENTIVE – NOVARTIS PERFORMANCE

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

2015–2017 LONG-TERM INCENTIVES

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

2017 total realized pay for the CEO

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

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

[1] The shown amounts represent the underlying share value of the total number of shares vested (including dividend equivalents) to the CEO for the LTPP and LTRPP performance cycle 2015-2017.

CEO succession – compensation elements

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

KEY COMPENSATION TERMS

Joseph Jimenez (retiring CEO)

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

Vasant Narasimhan (appointed CEO)

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

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

Board compensation at a glance (pages 146 to 150)

2017 Board compensation system

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

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

2017 Board compensation

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

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

[1] Includes an amount of CHF 15 622 for mandatory employer contributions for all Board members paid by Novartis to Swiss governmental social security systems. This amount is out of total employer contributions of CHF 298 206, and provides a right to the maximum future insured government pension benefit for the Board member.

Compensation governance at a glance (page 152)

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

DECISION ON	DECISION-MAKING AUTHORITY
Compensation of Chairman and other Board members	Board of Directors
Compensation of CEO	Board of Directors
Compensation of other Executive Committee members	Compensation Committee

EXECUTIVE COMMITTEE COMPENSATION RISK MANAGEMENT PRINCIPLES

- Rigorous performance management process
- Balanced mix of short-term and long-term variable compensation elements
- Performance evaluation under the Annual Incentive includes an individual balanced scorecard and assessed Values and Behaviors
- Performance-based Long-Term Incentives only, with three-year overlapping cycles
- All variable compensation is capped at 200% of target
- Contractual notice period of 12 months
- Post-contractual non-compete limited to a maximum of 12 months from the end of employment (annual base salary and Annual Incentive of the prior year only) as per contract, if applicable
- Good and bad leaver provisions apply to variable compensation of leavers
- No severance payments or change-of-control clauses
- Clawback and malus principles apply to all elements of variable compensation
- Share ownership requirements; no hedging or pledging of Novartis share ownership position

Executive Committee compensation philosophy and principles

Novartis compensation philosophy

Our compensation philosophy aims to ensure that Executive Committee members are rewarded according to their success in implementing the company strategy as well as their contribution to company performance and long-term value creation.

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

Alignment with company strategy

The Novartis strategy is to use science-based innovation to deliver better patient outcomes. We aim to lead in growing areas of pharmaceuticals and oncology medicines, generics and biosimilars, and eye care.

To align the compensation system with this strategy and to ensure that Novartis is a high-performing organization, the company operates both a short-term Annual Incentive and two Long-Term Incentive plans with a balanced set of measures and targets.

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

Executive Committee compensation

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

Approach to benchmarking

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

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

GLOBAL HEALTHCARE PEER GROUP

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

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

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

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

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

Executive Committee compensation policies

Executive Committee appointments compensation policy

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

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

Treatment of variable compensation for Executive Committee member leavers

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

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

Malus and clawback

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

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

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

Executive Committee performance management process

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

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

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

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

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

- The CEO discusses his targets with the Chairman of the Board; 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 and Compensation Committee.

- The CEO's performance is assessed by the Board.
- For Executive Committee members, the CEO discusses performance for each individual with the Chairman before making recommendations to the Board.
- Periodic assessments, including at the mid-year stage, ensure progress is suitably tracked.

- A recommendation for the CEO's variable pay is made by the Compensation Committee to the Board for final determination.
- The CEO's recommendations for other Executive Committee members are considered and approved by the Compensation Committee, after which the Board is notified of the outcomes.

2017 Executive Committee compensation

System and performance outcomes

Annual base salary

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

Pension and other benefits

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

Annual Incentive – 2017

PLAN OVERVIEW

Grant formula

Annual base salary **x** Target incentive % **=** Target Annual Incentive

On-target opportunities

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

Performance measures

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

Balanced scorecard

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

Values and Behaviors

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

Payout matrix

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

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

Form of award

- At the end of the performance period, 50% is paid in cash and the remaining 50% is paid in Novartis restricted shares or RSUs, deferred for three years (see table on page 125 for details on leaver treatment).
- Executives may choose to receive all or part of the cash portion of their Annual Incentive in Novartis shares or American Depositary Receipts (ADRs; US only) that will not be subject to forfeiture conditions. In the US, awards may also be delivered in cash under the US-deferred compensation plan.
- Clawback and malus provisions apply to all Annual Incentive awards.

Dividend rights, voting rights and settlement

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

DISCLOSURE OF CEO ANNUAL INCENTIVE

Principles

Targets and achievements of the Annual Incentive are disclosed in arrears due to commercial sensitivity of the targets. However, to ensure that shareholders can understand the basis for CEO Annual Incentive awards, a detailed balanced scorecard is disclosed annually after the end of the performance cycle.

2017 CEO BALANCED SCORECARD

Balanced scorecard performance is measured in constant currencies to reflect operational performance that can be influenced. The Board uses a stringent process to set ambitious financial targets and incentivize superior performance.

	CEO achievements – 2017	Target	Achievement vs. target
Group financial targets (60%)	Group net sales	USD 48.4 billion	Above
	Corporate net result	USD -1.5 billion	Above
	Group net income	USD 7.0 billion	Above
	Group free cash flow as a % of sales	19%	Strongly above
	Overall assessment of Group financial targets in constant currencies		**Above**
Individual objectives (40%)	**Additional financial targets** In constant currencies, operating income and earnings per share, as well as core operating income and core earnings per share, were above target. Annual total shareholder return in USD was 20.4%. Pharmaceuticals, Alcon and Sandoz exceeded their market share growth targets, while Oncology was slightly below target.		Above
	Ensure world-class commercial execution The Innovative Medicines Division delivered strong performance. *Cosentyx* was well ahead of target, while *Entresto* was in line with expectations. Oncology sales were slightly below target, mainly due to a slower launch uptake of *Kisqali*. Sandoz sales were below target, impacted by industry pricing pressure in the US, partly offset by continued strong growth outside the US. Strong sales in biosimilars reinforced global leadership in the field.		Largely met
	Transform Alcon into an agile medical device company Alcon made good progress and returned to growth in 2017, with four quarters of successive growth. Sales and core operating income results were ahead of target. Seven key approvals were achieved (e.g., *AcrySof IQ ReSTOR* +2.5 D Multifocal Toric IOL launched in the US, *CyPass* Micro-Stent launched in the EU), and fundamentals in both the commercial organization and the supply chain were significantly improved.		Met
	Strengthen R&D Pipeline milestone targets were achieved or surpassed, including 16 major approvals and 16 major submissions. Novartis received six breakthrough therapy designations from the FDA. 15 positive readouts from major studies were delivered (e.g., CAR-T 19, RTH258, CANTOS and BAF312). Sandoz had five key filings of biosimilars. The Novartis Institutes for BioMedical Research launched an initiative to better explore new targets, showing positive results, and Global Drug Development efficacy improved significantly.		Strongly above
	Expand access to healthcare, and corporate responsibility Access to healthcare programs were expanded, with agreements now signed in six countries to bring a portfolio of 15 products to participating governments and organizations for the price of USD 1 per treatment, per month. Over USD 530 000 of such treatments were delivered in 2017. Global endorsement of a new action plan to accelerate leprosy elimination was reached. Novartis reached new milestones in efforts to eliminate malaria. USD 850 million in treatments have now been delivered since 2001, and Novartis initiated clinical trials for KAF156, a novel compound against multidrug-resistant malaria. Novartis signed its first US windfarm power purchase agreement to offset carbon emissions.		Met
	Create a stronger company for the future NTO, NBS and GDD delivered or over-delivered on productivity targets. Compliance and integrity were strengthened. The global compliance program Step Change was fully transitioned and embedded into the organization. Novartis announced the acquisition of Advanced Accelerator Applications SA in Oncology and invested in a number of digital technologies in R&D, commercial and operations. 99% of health authority quality inspections were deemed good or acceptable. Reputation improved further, with good progress in a number of important industry rankings. Culture, particularly collaboration across the organization, further improved. Talent was upgraded in all divisions, and diversity targets for leadership were met.		Met
	Overall assessment of individual objectives		**Above**
Overall assessment of CEO balanced scorecard			**Above target**

ANNUAL INCENTIVE PAYOUT FOR THE 2017 PERFORMANCE YEAR

CEO payout	In reaching its recommendation to the Board on the CEO's 2017 Annual Incentive payout factor, the Compensation Committee recognized that overall, he exceeded expectations. **Overall, the Board approved an Annual Incentive payout of 125% of target, i.e. CHF 3 937 542 for the CEO.**

Long-Term Performance Plan – 2015-2017 cycle

The Long-Term Performance Plan (LTPP) is the first of two Long-Term Incentive plans, which rewards creation of long-term value and innovation, in line with our business strategy.

PLAN OVERVIEW

Grant formula

At the start of the performance cycle, performance share units (PSUs) are granted under each of the Long-Term Incentive plans, as follows:

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

On-target opportunity and payout range

On-target opportunities:
- **CEO:** 200% of annual base salary
- **Other Executive Committee members:** between 140% and 190% of annual base salary

Payout range: from 0% to 200% of the on-target amount based on performance

Form of award

PSUs granted at the beginning of the cycle will vest at the end of the three-year performance cycle and are converted into Novartis shares.
PSUs carry dividend equivalents that are paid in shares at the end of the cycle to the extent that performance conditions have been met.

Payout formula:

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

Policy information on page 125 provides details on the treatment of Long-Term Incentive awards for leavers.

For the 2015-2017 cycle, the tables below provide details on the achievements and payouts for each of the two performance measures of the LTPP. The Novartis Cash Value Added performance measure (75% weighting) applies equally for the CEO and the other Executive Committee members. The innovation performance measure (25% weighting) is specific to the respective head of the division or unit, and is a weighted average of the divisions or units for the CEO and Group function heads.

PERFORMANCE MEASURE 1: NOVARTIS CASH VALUE ADDED (NCVA) FOR 2015-2017 CYCLE (75% OF LTPP)

Description

NCVA incentivizes sales growth and margin improvement as well as asset efficiency. It is calculated as follows:

Operating income + Amortization, impairments, and adjusting for gains / losses from non-operating assets	–	Taxes – Capital charge (based on WACC[1]) on gross operational assets	=	NCVA[2]

[1] WACC = weighted average cost of capital
[2] NCVA = (cash flow return on investment % – WACC) x gross operational assets in constant currencies

The NCVA performance factor is based on a 1:3 payout curve, where a 1% deviation in realization versus target leads to a 3% change in payout (for example, a realization of 105% leads to a payout factor of 115%). Accordingly, if performance over the three-year vesting period falls below 67% of target, no payout is made for this portion of the LTPP. If performance over the three-year vesting period is above 133% of target, payout for this portion of the LTPP is capped at 200% of target.

Group performance outcome for the 2015-2017 cycle

During the 2015-2017 cycle, Novartis delivered an NCVA of USD 8.3 billion, 4.4% ahead of a target of USD 7.9 billion in constant currencies. This was mainly due to a much stronger operational performance in 2017, driven especially by *Cosentyx* and *Entresto*, and Alcon returning to growth. Following the application of the 1:3 payout curve, the 104.4% achievement versus target generates a performance factor of 113% of target for this part of the LTPP.
When determining the NCVA target for 2015-2017 in comparison to the 2014-2016 cycle, the Board took into account predominantly the loss of exclusivity of *Glivec/Gleevec*, a total of USD 2.8 billion of sales in 2017 compared to 2014. They also considered the impact of the negative currency effects (strengthening of the US dollar), which were partly offset by lower costs of capital resulting from lower interest rates.

PERFORMANCE MEASURE 2: INNOVATION MEASURE FOR CYCLE 2015-2017 (25% OF LTPP)

Description	Innovation is a key value driver for shareholders and is critical to our future. At the beginning of the cycle, the Research & Development Committee determines the most important target milestones, considering the following: • The expected future potential revenue • The potential qualitative impact of research and development on science and medicine • The potential impact of research and development on the treatment or care of patients At the end of the cycle, the Compensation Committee determines the payout factor based on the performance assessment made by the Research & Development Committee. Payout range 0–150% based on achievement of target milestones; payout range 150–200% for truly exceptional performance.
Group performance outcome for the 2015-2017 cycle	During the 2015-2017 performance cycle, Novartis delivered solid performance versus target on innovation, which accelerated over the three-year performance period. Some of the successes in the Innovative Medicines Division included approvals of *Cosentyx* (ankylosing spondylitis and psoriatic arthritis) and *Kisqali* (metastatic breast cancer), as well as the AMG 334 (migraine) submission. The serelaxin (acute heart failure) pivotal study readout was disappointing. Sandoz achievements included the rituximab US and EU filings, as well as epoetin alfa EU approval. Sandoz did not achieve approval in the US and EU for pegfilgrastim. Alcon achieved EU approval for the *Clareon* IOL with *AutonoMe* pre-loaded delivery system, and EU approval for *Dailies Total1* Multifocal. NIBR discovered several unanticipated targets using shRNA/CRISPR and phenotypic screens, translational clinical research and integrative genomics. The achievements made over the three-year performance cycle will have a positive impact on Novartis, the scientific and medical community, and patient outcomes. Following input from the Research and Development Committee, the Board approved an innovation performance factor for the Group of 115% of target.

LTPP PAYOUT FOR THE 2015-2017 PERFORMANCE CYCLE

CEO payout	**Overall, the Board approved an LTPP payout of 114% of target for the CEO, i.e. CHF 5 068 337** (including CHF 446 250 of dividend equivalents accrued and CHF -66 618 in share price evolution over the performance cycle).

DISCLOSURE OF LTPP TARGETS

Principles	LTPP targets (NCVA and long-term innovation) are considered commercially sensitive at the time of setting and therefore are not disclosed on a prospective basis. However, to ensure that shareholders are able to understand the link between pay and performance, we will disclose the targets, achievements and payout after the end of the performance cycle.

Long-Term Relative Performance Plan – 2015-2017 cycle

The Long-Term Relative Performance Plan (LTRPP) is the second of two Long-Term Incentive plans, which rewards competitive shareholder return relative to the global healthcare peer group.

PLAN OVERVIEW

Grant formula

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

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

On-target opportunity and payout range

On-target opportunities:
- **CEO:** 125% of annual base salary
- **Other Executive Committee members:** between 30% and 80% of annual base salary

Payout range: from 0% to 200% of the on-target amount based on performance

Form of award

PSUs granted at the beginning of the cycle will vest at the end of the three-year performance cycle and are converted into Novartis shares.
PSUs carry dividend equivalents that paid in shares at the end of the cycle to the extent that performance conditions have been met.

Payout formula:

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

Policy information on page 125 provides details on the treatment of Long-Term Incentive awards for leavers.

RELATIVE TSR PERFORMANCE FOR CYCLE 2015-2017 (100% OF LTRPP)

Description

Performance is based on our TSR relative to a global healthcare peer group. Outperformance of this peer group is a key indicator of the extent to which Novartis is delivering long-term value for shareholders.

The peer group and payout matrix for the 2015-2017 performance cycle are as follows:

2015-2017 peer group (12 companies, excluding Novartis)[1]		
Abbot	AbbVie	Amgen
AstraZeneca	Bristol-Myers Squibb	Eli Lilly & Co.
GlaxoSmithKline	Johnson & Johnson	Merck & Co.
Pfizer	Roche	Sanofi

Novartis position in the peer group	Payout range[2] (% of target)
Position 1 – 3	160 – 200%
Position 4 – 6	100 – 140%
Position 7 – 10	20 – 80%
Position 11 – 13	0%

[1] From the LTRPP 2017-2019 performance cycle onward, a revised peer group of 15 global healthcare companies applies, as listed on page 123.
[2] From the LTRPP 2018-2020 performance cycle onward, there will be no vesting for below median performance.

The payout matrix includes a significant reduction (including scope to reduce to nil) when Novartis does not outperform the majority of the companies in the group.

At the end of the performance cycle, all companies are ranked in order of highest to lowest TSR in USD. The Compensation Committee uses its discretion to determine the payout factor within the ranges shown above, and takes into consideration factors such as absolute TSR, overall economic conditions, currency fluctuations and other unforeseeable economic situations.

Group performance outcome for the 2015-2017 cycle

Absolute annual TSR in USD was 20.4%. Absolute TSR over the three-year cycle was 0.1% in USD (-1.4% in CHF). Relative TSR performance in USD was rank number 12 out of 13 companies (rank number four among five European comparators).

The Board awarded a performance factor of 0%.

LTRPP PAYOUT FOR THE 2015-2017 PERFORMANCE CYCLE

CEO payout

Overall, the Board approved an LTRPP payout of 0% of target for the CEO, i.e. no payout.

Realized compensation

To aid shareholders' understanding of the link between pay and short-term and long-term performance, the Compensation Committee has decided to disclose the realized compensation for the CEO individually and, for the first time, the other members of the Executive Committee on an aggregated basis. Disclosing realized compensation means that the Annual Incentive and the Long-Term Incentives are disclosed at the end of their respective performance cycles, reflecting **actual** payouts based on performance.

The total actual payout may vary year-on-year depending on multiple factors, including the composition of the Executive Committee and the tenure of its members (as new members may not have vested Long-Term Incentives), compensation increases, payout of variable compensation based on actual performance, share price fluctuations of Long-Term Incentives, and dividend equivalents.

2017 realized compensation for the CEO and other Executive Committee members

The table below reports the fixed and other compensation for the year, including the Annual Incentive for the 2017 performance year, as well as the realized Long-Term Incentives for the 2015-2017 performance cycle. The portion of the Annual Incentive paid in shares for the year 2017 is disclosed using the underlying value of Novartis shares at the date of grant, while the realized value of the LTPP and LTRPP payouts (including dividend equivalents) is calculated using the share price on the date of vesting.

		2017 annual base salary	2017 pension benefits	2017 Annual Incentive[1]		Long-Term Incentives		Other 2017 Compensation[2]	
						LTPP 2015–2017 cycle	LTRPP 2015–2017 cycle		
	Currency	Cash (amount)	Amount	Cash	Equity[1]	Equity (value at vesting date)[2]	Equity (value at vesting date)[2]	Amount[3]	Total realized compensation (incl. Share price movement)[4]
Executive Committee members active on December 31, 2017									
Joseph Jimenez (CEO)	CHF	2 100 000	166 397	1 968 750	1 968 792	5 068 337	0	72 186	11 344 462
Aggregate realized compensation of the other 10 ECN members	CHF	9 310 740	1 675 398	5 841 107	7 743 069	8 355 739	0	3 248 419	36 174 472
Total[5]	**CHF**	**11 410 740**	**1 841 795**	**7 809 857**	**9 711 861**	**13 424 076**	**0**	**3 320 605**	**47 518 934**

See page 134 for 2016 comparative figures.
[1] The portion of the Annual Incentive delivered in equity is rounded up to the nearest share, based on the closing share price on the grant date (January 18, 2018) of CHF 82.90 per Novartis share and USD 86.41 per ADR.
[2] The amounts represent the underlying share value of the 160 733 PSUs vesting on January 21, 2018 to the CEO and other Executive Committee members for the performance cycle 2015-2017, inclusive of earned dividend equivalents for the three-year cycle. The value is determined using the closing share price on the last trading day (January 19, 2018) before the vesting date of CHF 83.38 per Novartis share and USD 86.94 per ADR. For two members of the Executive Committee, the vesting value is reported pro-rata based on the period they were an Executive Committee member during the performance cycle.
[3] Includes any other perquisites, benefits in kind, international assignment benefits as per the global mobility policy (e.g., housing, international health insurance, children's school fees, tax equalization).
[4] All amounts are before deduction of the social security contribution and income tax due by the Executive Committee member.
[5] Amounts for Executive Committee members paid in USD were converted at a rate of CHF 1.00 = USD 1.015, which is the same average exchange rate used in the Group's 2017 consolidated financial statements.

The aggregate amount of realized compensation for the members of the Executive Committee shown in the table above is CHF 47 518 934 million. This figure is below past and expected future levels, despite the fact that the Annual Incentive and the LTPP paid out above target on average for the members, mainly due to the following factors:

- There was no payout for the LTRPP for any of the Executive Committee members in 2017, due to relative TSR over the 2015-2017 performance cycle.
- Five members of the Executive Committee either did not receive LTPP vesting or received limited LTPP vesting in 2017. This is because they were either recent external hires who did not receive a grant three years earlier, or internal promotions who received lower Long-Term Incentive grants based on their compensation prior to Executive Committee appointment.

At the start of the 2015-2017 performance cycle, the CEO was granted 48 626 target performance share units under the LTPP at a share price of CHF 84.75, for a total target grant value of CHF 4 121 054. As shown in the table above, the realized value of the LTPP for the CEO was CHF 5 068 337. Compared to the target value at the grant date, this includes CHF 567 651 relating to the performance over the cycle, CHF -66 618 due to share price movement and CHF 446 250 of dividend equivalents.

At the start of the 2015-2017 performance cycle, the other members of the Executive Committee were granted 80 325 target performance share units under the LTPP at a share price of CHF 84.75 (ADR price of USD 98.75 for Executive Committee members on a US employment contract at an exchange rate of CHF 1 = USD 1.040 at grant), for a total target grant value of CHF 6 887 395 (which is pro-rated for two Executive Committee members based on the period they were an Executive Committee member during the performance cycle). As shown in the table

above, the realized value of the LTPP for the other members of the Executive Committee was CHF 8 355 739. Compared to the target value at the grant date, this includes CHF 931 727 relating to the performance over the cycle, CHF -195 650 due to share price and foreign exchange movements and CHF 732 267 of dividend equivalents.

The column titled "Other 2017 Compensation" in the 2017 total realized compensation of the Executive Committee includes the following amounts:

- CHF 470 925 relating to the vesting of a buy-out award made to Richard Francis when he joined Novartis in 2014 to replace a time-vesting long-term incentive that he lost by leaving his previous employer upon joining Novartis.
- CHF 40 174 relating to the vesting of a buy-out award made to Paul Hudson to replace a time-vesting long-term incentive he lost upon joining Novartis in 2016, and CHF 729 047 relating to the vesting of a buy-out award made to him to replace a performance-vesting long-term incentive that he lost with his previous employer upon joining Novartis. This latter award was granted with performance conditions attached, to mirror the forfeited award. The performance conditions applied were the same as those for the LTPP for the 2014-2016 performance cycle (NCVA and long-term innovation).

All abovementioned buy-out awards were disclosed at the time of grant in previous Compensation Reports.

2016 realized compensation for the CEO and other Executive Committee members (comparative information)

For comparative purposes, 2016 realized compensation is provided below. The main reason for the higher aggregate realized pay in 2016 was the overlap in compensation for outgoing and newly appointed Executive Committee members in 2016. Three members who stepped down in 2016 received ongoing contractual payments during their notice periods while their successors were already in place.

		2016 annual base salary	2016 pension benefits	2016 Annual Incentive[1]		Long-Term Incentives		Other 2016 Compensation[2]	
						LTPP 2014–2016 cycle	LTRPP 2014–2016 cycle		
	Currency	Cash (amount)	Amount	Cash	Equity[1]	Equity (value at vesting date)[2]	Equity (value at vesting date)[2]	Amount[3]	Total realized compensation (incl. Share price movement)[4]
Executive Committee members active on December 31, 2016 and members who stepped down during financial year 2016									
Joseph Jimenez (CEO)	CHF	2 093 417	160 283	1 417 500	1 417 510	4 950 334	442 013	75 628	10 556 685
Aggregate realized compensation of the other 13 ECN members[5]	CHF	8 778 483	1 675 484	4 825 680	6 516 148	12 190 674	733 656	9 684 126	44 404 251
Total[6]	**CHF**	**10 871 900**	**1 835 767**	**6 243 180**	**7 933 658**	**17 141 008**	**1 175 669**	**9 759 754**	**54 960 936**

[1] The portion of the Annual Incentive delivered in equity is rounded up to the nearest share, based on the closing share price on the grant date (January 17, 2017) of CHF 71.35 per Novartis share and USD 71.99 per ADR.
[2] The amounts represent the underlying share value of the PSUs vesting to Executive Committee members for the performance cycle 2014-2016, based on the closing share price on the vesting date (January 17, 2017) of CHF 71.35 per Novartis share and USD 71.99 per ADR, plus earned dividend equivalents during the three-year cycle.
[3] Includes any other perquisites, benefits in kind, international assignment benefits as per the global mobility policy (e.g., housing, international health insurance, children's school fees, tax equalization). In addition, for the three Executive Committee members who stepped down during 2016, it includes, inter alia, their pro-rata compensation from the date they stepped down from the Executive Committee to December 31, 2016.
[4] All amounts are before deduction of the social security contribution and income tax due by the Executive Committee member.
[5] This represents realized compensation of ten Executive Committee members who were active on December 31, 2016 as well as three members who stepped down during 2016.
[6] Amounts for Executive Committee members paid in USD were converted at a rate of CHF 1.00 = USD 1.015, which is the same average exchange rate used in the Group's 2016 consolidated financial statements.

The column titled "Other 2016 Compensation" 2016 total realized compensation of the Executive Committee includes the following amounts:

- CHF 1 059 750 relating to the vesting of a buy-out award made to Richard Francis when he joined Novartis in 2014 to replace a time-vesting long-term incentive that he lost by leaving his previous employer.
- CHF 191 300 relating to a cash buy-out award made to Paul Hudson when he joined Novartis in 2016 to replace a short-term incentive that he lost by leaving his previous employer.
- USD 844 250 relating to a cash buy-out award made to James Bradner when he joined Novartis in 2016 to replace lost entitlements at one of his former scientific companies.

All abovementioned buy-out awards were disclosed at the time of grant in previous Compensation Reports.

Compensation at grant value

In accordance with the Swiss Ordinance against Excessive Compensation in Listed Companies, Novartis continues to disclose total compensation at grant value for the CEO and other Executive Committee members. The tables below disclose for the CEO and other Executive Committee members:

- Fixed 2017 compensation (base salary and benefits).
- The actual cash portion and the deferred portion granted in equity of the 2017 Annual Incentive.
- LTPP and LTRPP 2017-2019 performance cycle awards, which are reported at target value at grant date under the **assumption** that the awards will vest at 100% achievement and excluding any share price movement and dividend equivalents that may be accrued over the performance cycle. The future payout will only be determined after the performance cycle concludes in three years (i.e., end of 2019), with a payout range of 0–200% of the target value.
- Other compensation for 2017, which includes other benefits and the full amount of compensation for lost entitlements from former employers, either paid in cash or granted in equity in the year.

To assess CEO pay for performance in 2017, including the Annual Incentive payout for the 2017 performance year and the Long-Term Incentive payouts for the 2015-2017 performance cycle, shareholders should refer to the 2017 realized compensation table on page 133.

2017 compensation at grant value for the CEO and other Executive Committee members

		Fixed compensation and pension benefits		Variable compensation					
		Actual compensation paid or granted for 2017				Long-Term Incentive 2017-2019 cycle grants at target			
		2017 annual base salary	2017 pension benefits	2017 Annual Incentive (performance achieved)		LTPP 2017–2019 cycle	LTRPP 2017–2019 cycle	Other 2017 compensation	Total compensation paid, promised or granted 2017
	Currency	Cash (amount)	Amount [1]	Cash	Equity (value at grant date) [2]	PSUs (target value at grant date) [3]	PSUs (target value at grant date) [3]	Amount [4]	Amount [5]
Executive Committee members active on December 31, 2017									
Joseph Jimenez (CEO)	CHF	2 100 000	166 397	1 968 750	1 968 792	4 200 018	2 625 038	72 186	13 101 181
Steven Baert	CHF	775 000	154 652	663 000	663 034	1 170 069	468 056	119 218	4 013 029
F. Michael Ball	USD	1 120 000	203 546	873 600	873 605	1 792 047	784 043	293 289	5 940 130
James Bradner	USD	1 066 385	117 394	898 800	898 837	1 819 043	856 033	45 855	5 702 347
Felix R. Ehrat	CHF	928 333	137 334	223 200	892 833	1 581 045	558 028	15 034	4 335 807
Richard Francis	CHF	841 667	176 362	425 000	425 028	1 360 002	510 010	1 112 948	4 851 017
Paul Hudson	CHF	958 333	203 485	950 400	950 449	1 536 023	672 046	197 101	5 467 837
Harry Kirsch	CHF	1 038 333	153 854	800 800	800 814	1 768 053	832 012	58 710	5 452 576
Vasant Narasimhan	CHF	841 667	168 562	807 500	807 529	1 360 002	510 010	50 603	4 545 873
Bruno Strigini (until December 31, 2017) [6]	CHF	898 333	210 613	225 000	225 074	1 440 057	540 048	50 000	3 589 125
André Wyss	CHF	875 000	154 339	0	1 232 060	1 408 021	528 061	70 526	4 268 007
Total [7]	**CHF**	**11 410 740**	**1 841 795**	**7 809 857**	**9 711 861**	**19 381 014**	**8 859 147**	**2 080 458**	**61 094 873**

Based on assumption of 100% payout at target. Actual payout (0–200% of target) will be known at the end of the three-year cycle in January 2020.

See page 136 for 2016 comparative figures.

[1] Includes mandatory employer contributions of CHF 4 336 for the CEO and CHF 50 227 for the other Executive Committee members paid by Novartis to governmental social security systems. This amount is out of total employer contributions of CHF 2 710 445 paid in 2017 for all Executive Committee members, and provides a right to the maximum future insured government pension benefit for the Executive Committee member.

[2] The portion of the Annual Incentive delivered in equity is rounded up to the nearest share, based on the closing share price on the grant date (January 18, 2018) of CHF 82.90 per Novartis share and USD 86.41 per ADR.

[3] The amounts represent the underlying share value of the target number of PSUs granted to Executive Committee members for the performance cycle 2017-2019, based on the closing share price on the grant date (January 17, 2017) of CHF 71.35 per Novartis share and USD 71.99 per ADR.

[4] Includes any other perquisites, benefits in kind, and international assignment benefits as per the global mobility policy (e.g., housing, international health insurance, children's school fees, tax equalization).

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

[6] Bruno Strigini stepped down from the Executive Committee at the end of the 2017 business year. The LTPP and LTRPP grants for the 2017-19 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis per his contractual agreement and subject to the plan rules .

[7] Amounts in USD for F. Michael Ball and James Bradner were converted at a rate of CHF 1.00 = USD 1.015, which is the same average exchange rate used in the Group's 2017 consolidated financial statements.

When comparing the Executive Committee compensation at grant in 2017 to the compensation at grant in 2016, it may be noted that the two members of the Executive Committee who joined in July 2016, Mr. Hudson and Mr. Strigini, were compensated in 2017 for the first time on a full year basis, including their Annual Incentive based on 2017 performance and full Long-Term Incentive grants.

2016 compensation at grant value for the CEO and other Executive Committee members

For comparative purposes, the table below provides the compensation at grant value for 2016.

		Fixed compensation and pension benefits		Variable compensation					
		Actual compensation paid or granted for 2016				Long-Term Incentive 2016-2018 cycle grants at target			
		2016 annual base salary	2016 pension benefits	2016 Annual Incentive (performance achieved)		LTPP 2016–2018 cycle	LTRPP 2016–2018 cycle	Other 2016 compensation	Total compensation paid, promised or granted 2016
	Currency	Cash (amount)	Amount [1]	Cash	Equity (value at grant date) [2]	PSUs (target value at grant date) [3]	PSUs (target value at grant date) [3]	Amount [4]	Amount [5]
Executive Committee members active on December 31, 2016 [6]									
Joseph Jimenez (CEO)	CHF	2 093 417	160 283	1 417 500	1 417 510	4 200 031	2 625 079	75 628	11 989 448
Steven Baert	CHF	721 667	147 442	554 730	554 746	1 050 048	350 042	139 159	3 517 834
F. Michael Ball (from February 1, 2016)	USD	1 012 308	60 574	553 574	553 603	1 742 284	762 269	4 040 748	8 725 360
James Bradner (from March 1, 2016)	USD	888 462	58 859	579 393	579 448	1 687 473	794 195	1 155 169	5 742 999
Felix R. Ehrat	CHF	915 833	148 122	202 400	809 680	1 564 033	552 002	14 852	4 206 922
Richard Francis	CHF	786 667	188 738	520 000	520 070	1 280 062	480 033	1 116 054	4 891 624
Paul Hudson (from July 1, 2016)	CHF	475 000	108 818	288 945	288 968	0	0	3 090 313	4 252 044
Harry Kirsch	CHF	1 025 000	141 510	736 450	736 475	1 751 009	824 018	51 361	5 265 823
Vasant Narasimhan (from February 1, 2016)	CHF	764 993	157 348	537 531	537 551	1 093 245	364 468	102 868	3 558 004
Bruno Strigini (from July 1, 2016)	CHF	445 000	109 057	211 863	211 910	1 074 442	268 670	45 696	2 366 638
André Wyss	CHF	830 834	146 289	0	1 275 025	1 360 001	425 040	95 595	4 132 784
Subtotal [7]	**CHF**	**9 931 091**	**1 425 275**	**5 585 643**	**7 468 241**	**16 751 942**	**7 422 814**	**9 850 656**	**58 435 662**
Executive Committee members who stepped down during 2016 [8]									
David Epstein (until June 30, 2016)	USD	699 767	290 385	428 400	428 412	1 285 264	642 632	4 529 809	8 304 669
Mark C. Fishman (until February 29, 2016)	USD	175 154	107 706	195 000	0	0	0	126 454	604 314
Jeff George (until January 31, 2016)	USD	80 000	18 558	44 000	43 986	0	0	2 996 905	3 183 449
Subtotal [7]	**CHF**	**940 809**	**410 492**	**657 537**	**465 417**	**1 266 270**	**633 135**	**7 540 067**	**11 913 726**
Total [7]	**CHF**	**10 871 900**	**1 835 767**	**6 243 180**	**7 933 658**	**18 018 212**	**8 055 949**	**17 390 723**	**70 349 389**

Based on assumption of 100% payout at target. Actual payout (0–200% of target) will be known at the end of the three-year cycle in January 2019.

[1] Includes mandatory employer contributions of CHF 4 336 for the CEO and CHF 70 880 for the other Executive Committee members paid by Novartis to governmental social security systems. This amount is out of total employer contributions of CHF 3 263 989 paid in 2016 for all Executive Committee members, and provides a right to the maximum future insured government pension benefit for the Executive Committee member.

[2] The portion of the Annual Incentive delivered in equity is rounded up to the nearest share, based on the closing share price on the grant date (January 17, 2017) of CHF 71.35 per Novartis share and USD 71.99 per ADR.

[3] The amounts represent the underlying share value of the target number of PSUs granted to Executive Committee members for the performance cycle 2016-2018, based on the closing share price on the grant date (January 20, 2016) of CHF 79.70 per Novartis share and USD 80.49 per ADR. For F. Michael Ball, the target PSUs were granted on February 1, 2016, at the closing share price of the same date (USD 77.27 per ADR).

[4] Includes any other perquisites, benefits in kind, international assignment benefits as per the global mobility policy (e.g., housing, international health insurance, children's school fees, tax equalization), compensation granted for forfeited entitlements at previous employers and, for F. Michael Ball, a one-off performance award with target value at grant date of USD 3.9 million. In addition, for Executive Committee members who stepped down during 2016, it includes, inter alia, their pro-rata compensation from the date they stepped down from the Executive Committee to December 31, 2016 (see also note 8 below).

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

[6] For those members who joined the Executive Committee in 2016, the information under the columns "annual base salary", "pension benefits" and "Annual Incentive" includes their pro-rata compensation from the date they joined the Executive Committee to December 31, 2016. The information under "LTPP" and "LTRPP" columns reflects their pro-rata compensation at target for the period to December 31, 2018.

[7] Amounts in USD for Mr. Ball, James Bradner, David Epstein, Mark C. Fishman and Jeff George were converted at a rate of CHF 1.00 = USD 1.015, which is the same average exchange rate used in the Group's 2016 consolidated financial statements.

[8] For those members who stepped down from the Executive Committee in 2016, the information under the columns "annual base salary", "pension benefits", "Annual Incentive", "LTPP" and "LTRPP" reflects the pro-rata value during 2016 for the period they were an Executive Committee member. The information under the column "Other 2016 compensation" includes, inter alia, the aggregated pro-rata value from the date they stepped down from the Executive Committee to December 31, 2016.

Interim update on the Alcon CEO's 2016 one-off performance award (performance cycle 2016-2018)

As disclosed in last year's Compensation Report, the Alcon CEO received a one-off award of 50 000 performance share units in February 2016, subject to the achievement of targets linked to the turnaround of Alcon during the 2016-2018 performance cycle. The targets of this one-off performance award are separate from the Annual Incentive or the LTPP and LTRPP targets.

The performance metrics are based on financial and non-financial targets of Alcon, including sales growth ahead of peers, core operating income growth ahead of sales growth, core operating income margin at the average of peers, and successful launches of new products. Should the Alcon CEO achieve these ambitious targets, Alcon will be performing at a very competitive level in the market.

After 2016, performance was tracking significantly below target. Toward the end of 2017 (the second year of the three-year performance cycle), Alcon began to close that gap versus target. Sales growth is accelerating and core operating income is growing ahead of sales. Innovation targets are being met and products in development are beginning to emerge.

We will disclose the targets and final payout of this Long-Term Incentive award after the full three-year performance cycle concludes and once we are able to assess Alcon's performance relative to peers.

2017 CEO and Executive Committee member total target compensation increases

During 2017, the CEO did not receive an increase in his total target compensation. Most other members of the Executive Committee were awarded increases of between 0% and 3%. Exceptions are outlined below. For context, the average of all Novartis employee annual base salary increases was 1% in Switzerland and 3% in the US.

Consistent with our Executive Committee appointments compensation policy (see page 124), four members were appointed to the Executive Committee in recent years with total target compensation below the market median level of compensation against comparable roles at external peer companies. In making its decisions, the Compensation Committee took into account the annual benchmarking analysis, for each of these roles, provided by Willis Towers Watson. The total target compensation for these members has been assessed over the last two to three years, and increases in line with proven performance have been made, as described below.

Vasant Narasimhan
Vasant Narasimhan was promoted to Global Head of Drug Development and Chief Medical Officer, and joined the Executive Committee in early 2016. The Board assessed his performance since appointment as outstanding. He strengthened the pipeline by receiving 11 development approvals and completing 13 major submissions. He also strengthened the interface between the Novartis Institutes for BioMedical Research and Global Drug Development. Therefore, for 2017, his annual base salary was increased by 6.3%, and his target aggregate incentive opportunity was increased from 290% of annual base salary to 320%. Overall, his 2017 total target compensation* increased by 14% compared to 2016. The 2018 compensation details for Dr. Narasimhan following his appointment as CEO, effective February 2018, are disclosed on page 143.

Steven Baert
Steven Baert was promoted to Head of Human Resources (HR) in 2014. During 2016, he played a leading role in the design and transformation of the Novartis operating model, the execution of the portfolio transformation, and various other key HR functions. In this context, Mr. Baert received an annual base salary increase of 4% at the onset of 2017, and his target aggregate incentive opportunity was increased from 290% of annual base salary to 310% for 2017. Overall, his 2017 total target compensation* increased by 9% compared to 2016.

André Wyss
André Wyss was promoted to President of Novartis Operations in 2016. He led Novartis Business Services (NBS) to perform notably ahead of target for the second consecutive year on all customer and financial performance metrics during 2016. He has strengthened the Novartis Business Services organization by improving the governance and optimizing processes. He has ensured great quality of service, as reflected by customer satisfaction scores. At the onset of 2017, his annual base salary was increased by 4% and his target aggregate incentive opportunity was increased from 310% of annual base salary to 320% for 2017. Overall, his 2017 total target compensation* increased by 6% compared to 2016.

Richard Francis
Richard Francis was appointed Sandoz CEO in 2014. He led his team during difficult circumstances to deliver each quarter in 2016 at a high level against ambitious targets in sales and profitability, and without jeopardizing sustainability. Biosimilars sales were significantly ahead of target following the filings for rituximab and etanercept in Europe, and they will continue to be key to the success of Sandoz. Pricing pressures persist on retail generics, especially in the US. Mr. Francis' annual base salary was increased by 6% at the onset of 2017, reflecting his strong leadership since his appointment and his development in the role during 2016. His target aggregate incentive opportunity remained unchanged at 320% of base salary for 2017. Overall, his 2017 total target compensation* increased by 6% compared to 2016.

* Total target compensation comprises annual base salary plus the value at target of the Annual Incentive and Long-Term Incentive awards.

Additional disclosures

This section provides additional disclosures, including information about the shareholdings of the CEO and the other Executive Committee members.

Number of equity instruments granted to the CEO and other Executive Committee members for financial year 2017[1]

	Variable compensation		
	2017 Annual Incentive (performance achieved)	LTPP 2017–2019 cycle	LTRPP 2017–2019 cycle
	Equity (number)[2]	PSUs (target number)[3]	PSUs (target number)[3]
Executive Committee members active on December 31, 2017			
Joseph Jimenez (CEO)	23 749	58 865	36 791
Steven Baert	7 998	16 399	6 560
F. Michael Ball	10 110	24 893	10 891
James Bradner	10 402	25 268	11 891
Felix R. Ehrat	10 770	22 159	7 821
Richard Francis	5 127	19 061	7 148
Paul Hudson	11 465	21 528	9 419
Harry Kirsch	9 660	24 780	11 661
Vasant Narasimhan	9 741	19 061	7 148
Bruno Strigini (until December 31, 2017)[4]	2 715	20 183	7 569
André Wyss	14 862	19 734	7 401
Total	**116 599**	**271 931**	**124 300**

See page 140 for 2016 comparative figures.

[1] The values of the awards are reported in the table "2017 compensation at grant value for the CEO and other Executive Committee members" on page 135.

[2] Vested shares, restricted shares and/or RSUs granted under the Annual Incentive for performance period 2017

[3] Target number of PSUs granted under the LTPP and LTRPP as applicable for the performance cycle 2017-2019

[4] Bruno Strigini stepped down from the Executive Committee at the end of the 2017 business year. The LTPP and LTRPP grants for the 2017-19 performance cycle, included in the table above, will vest at the end of the performance cycle on a pro-rata basis per his contractual agreement and subject to the plan rules

Number of equity instruments granted to the CEO and other Executive Committee members for financial year 2016[1] (comparative information)

	Variable compensation			
	2016 Annual Incentive (performance achieved)	LTPP 2016–2018 cycle	LTRPP 2016–2018 cycle	Other
	Equity (number)[2]	PSUs (target number)[3]	PSUs (target number)[3]	Equity/PSUs (number)
Executive Committee members active on December 31, 2016				
Joseph Jimenez (CEO)	19 867	52 698	32 937	0
Steven Baert	7 775	13 175	4 392	0
F. Michael Ball (from February 1, 2016)	7 690	22 548	9 865	50 000
James Bradner (from March 1, 2016)	8 049	20 965	9 867	3 607
Felix R. Ehrat	11 348	19 624	6 926	0
Richard Francis	7 289	16 061	6 023	0
Paul Hudson (from July 1, 2016)[4]	4 050	0	0	34 502
Harry Kirsch	10 322	21 970	10 339	0
Vasant Narasimhan (from February 1, 2016)	7 534	13 717	4 573	0
Bruno Strigini (from July 1, 2016)	2 970	13 549	3 388	0
André Wyss	17 870	17 064	5 333	0
Subtotal	**104 764**	**211 371**	**93 643**	**88 109**
Executive Committee members who stepped down during 2016				
David Epstein (until June 30, 2016)	5 951	15 968	7 984	29 902
Mark C. Fishman (until February 29, 2016)[4]	0	0	0	0
Jeff George (until January 31, 2016)[4]	611	0	0	6 724
Subtotal	**6 562**	**15 968**	**7 984**	**36 626**
Total	**111 326**	**227 339**	**101 627**	**124 735**

[1] The values of the awards are reported in the table "2016 compensation at grant value for the CEO and other Executive Committee members" on page 136.
[2] Vested shares, restricted shares and/or RSUs granted under the Annual Incentive for performance period 2016
[3] Target number of PSUs granted under the LTPP and LTRPP as applicable for the performance cycle 2016-2018
[4] Paul Hudson, Mark C. Fishman and Jeff George were not granted LTPP and LTRPP awards for the performance cycle 2016-2018.

Share ownership requirements for the CEO and other Executive Committee members

Executive Committee members are required to own at least a minimum multiple of their annual base salary in Novartis shares or restricted share units (RSUs) within five years of hire or promotion, as set out in the table below.

In the event of a substantial rise or drop in the share price, the Board may, at its discretion, amend that time period accordingly.

FUNCTION	OWNERSHIP LEVEL
CEO	5 x base compensation
Other Executive Committee members	3 x base compensation

The determination of equity amounts against the share ownership requirements is defined to include vested and unvested Novartis shares or American depositary receipts (ADRs), as well as RSUs acquired under the company's compensation plans. However, unvested matching shares granted under former matching programs such as the Leveraged Share Savings Plan (LSSP) and the Employee Share Ownership Plan (ESOP), and any unvested PSUs are excluded. The determination also includes other shares as well as vested options of Novartis shares or ADRs that are owned directly or indirectly by "persons closely linked" to an Executive Committee member. The Compensation Committee reviews compliance with the share ownership guideline on an annual basis.

Shares, ADRs and other equity rights owned by Executive Committee members at December 31, 2017[1]

The following table shows, in alphabetical order after the CEO, the total number of shares, ADRs and other equity rights owned by the CEO and the other Executive Committee members and "persons closely linked" to them as of December 31, 2017.

As of December 31, 2017, no members of the Executive Committee, either individually or together with "persons closely linked" to them, owned 1% or more of the outstanding shares or ADRs of Novartis. As of the same date, no members of the Executive Committee held any share options to purchase Novartis shares, with the exception of André Wyss, who held 373 000 options, purchased on a private basis.

As of December 31, 2017, all members who have served at least five years on the Executive Committee have met or exceeded their personal Novartis share ownership requirements.

	Vested shares and ADRs	Unvested shares and other equity rights[2]	Equity ownership level as a multiple of annual base salary[3]	Unvested target PSUs (e.g., LTPP / LTRPP)[4]	Matching shares under the LSSP[5]	**Total at December 31, 2017**
Joseph Jimenez (CEO)	287 699	62 693	14x	225 685	0	576 077
Steven Baert	10 955	21 410	3x	33 715	0	66 080
F. Michael Ball	0	7 690	1x	101 532	0	109 222
James Bradner	0	13 234	1x	34 130	0	47 364
Felix R. Ehrat	189 940	23 541	19x	79 764	19 950	313 195
Richard Francis	35 117	17 305	5x	40 453	0	92 875
Paul Hudson	6 616	6 498	1x	29 695	0	42 809
Harry Kirsch	64 769	30 309	8x	58 792	6 277	160 147
Vasant Narasimhan	16 279	58 887	7x	23 413	3 426	102 005
Bruno Strigini	27 871	39 844	6x	38 930	0	106 645
André Wyss	51 183	22 784	7x	40 456	0	114 423
Total	**690 429**	**304 195**		**706 565**	**29 653**	**1 730 842**

[1] Includes holdings of "persons closely linked" to Executive Committee members (see definition on page 142)

[2] Includes unvested shares and ADRs as well as other equity rights applicable for the determination of equity amounts for the share ownership requirements, as per the definition above

[3] The multiple is calculated based on the full year annual base salary and the closing share price as at the end of the 2017 Financial Year. The share price on the final trading day of 2017 was CHF 82.40 / USD 83.96 as at December 29, 2017.

[4] Target number of PSUs are disclosed pro-rata to December 31, 2017, unless the award qualified for full vesting under the relevant plan rules.

[5] Matching shares under the Leveraged Share Savings Plan (LSSP) are disclosed pro-rata to December 31, 2017, unless the award qualified for full vesting under the plan rules. LSSP participation for Executive Committee members ceased in 2014 and no new LSSP awards have been made since then. Outstanding awards will vest five years from the grant date, subject to the LSSP plan rules.

Fixed and variable compensation

CEO and other Executive Committee members' annual base salary and variable compensation mix at grant value for financial year 2017.

	Annual base salary[1]	Variable compensation[2]
Joseph Jimenez (CEO)	16.3%	83.7%
Steven Baert	20.7%	79.3%
F. Michael Ball	20.6%	79.4%
James Bradner	19.3%	80.7%
Felix R. Ehrat	22.2%	77.8%
Richard Francis	23.6%	76.4%
Paul Hudson	18.9%	81.1%
Harry Kirsch	19.8%	80.2%
Vasant Narasimhan	19.5%	80.5%
Bruno Strigini	27.0%	73.0%
André Wyss	21.6%	78.4%
Total	**20.0%**	**80.0%**

[1] Excludes pension and other benefits

[2] See table "2017 compensation at grant value for the CEO and other Executive Committee members" on page 135 with regard to the disclosure principles of variable compensation.

Other payments to Executive Committee members

During 2017, no other payments or waivers of claims other than those set out in the tables (including their footnotes) contained in this Compensation Report were made to Executive Committee members or to "persons closely linked" to them.

Payments to former Executive Committee members

Two former Executive Committee members stepped down in 2016 and ceased employment in 2017 following a 12-month contractual notice period. During 2017, they received pro-rata payments of salary, pension and other benefits, and an Annual Incentive totaling CHF 2 305 599 per their employment contracts.

Five former Executive Committee members received payments totaling CHF 5 988 375 in line with the company's Long-Term Incentive plan rules. The payments related to the vesting of LTPP for the 2015-2017 performance cycle, based on actual performance outcomes plus dividend equivalents. No payments were or will be made for the 2015-2017 LTRPP performance cycle.

In addition, in line with the company's global mobility policy, during 2017 three former members received tax equalization payments totaling CHF 718 151 related to incentive compensation granted during an international assignment.

No other payments (or waivers of claims) were made to former Executive Committee members or to "persons closely linked" to them during 2017.

Loans to Executive Committee members

Our policy does not allow loans to be granted to current or former members of the Executive Committee or to "persons closely linked" to them. Therefore no loans were granted in 2017, and none were outstanding as of December 31, 2017.

Persons closely linked

"Persons closely linked" are (i) their spouse, (ii) their children below age 18, (iii) any legal entities that they own or otherwise control, and (iv) any legal or natural person who is acting as their fiduciary.

Note 26 to the Group's audited consolidated financial statements

The total expense for the year for compensation awarded to Executive Committee and Board members, using International Financial Reporting Standards (IFRS) measurement rules, is presented in the Financial Report in Note 26 to the Group's audited consolidated financial statements (see page 240).

Award and delivery of equity to Novartis associates

During 2017, 15.4 million unvested restricted shares (or ADRs), RSUs and target PSUs were granted, and 10.7 million Novartis vested shares (or ADRs) were delivered to Novartis associates under various equity-based participation plans. Current unvested equity instruments (restricted shares, RSUs and target PSUs) – as well as outstanding equity options held by associates – represent 1.98% of issued shares. Novartis delivers treasury shares to associates to fulfill these obligations, and aims to offset the dilutive impact from its equity-based participation plans.

2018 Executive Committee compensation

2018 CEO succession – compensation elements

Retiring CEO, Joseph Jimenez

In September 2017, Mr. Jimenez notified the Board that he had decided to retire, following eight years as CEO. He steps down as CEO on January 31, 2018, and will continue to support the Board and new CEO until his retirement date and the end of his 12-month notice period on August 31, 2018.

He will retire in full compliance with the terms of his employment contract and the Novartis incentive plan rules. He will receive his annual base salary and pro-rated Annual Incentive until August 31, 2018. There will be no increase to his target compensation in 2018. No new Long-Term Incentive awards will be made in January 2018.

In line with the incentive plan rules, there will be no accelerated vesting of his unvested equity. The deferred equity under the Annual Incentive for the performance years 2015 and 2016 will respectively vest in January 2019 and 2020 per the rules of the Deferred Share Bonus Plan. His Long-Term Incentives for the 2016-2018 and 2017-2019 performance cycles will vest on the normal vesting dates (January 2019 and January 2020, respectively), to the extent that the company performance conditions are met. As Mr. Jimenez meets the retirement conditions under the Long-Term Incentive plan rules, these two outstanding Long-Term Incentives will not be pro-rated in line with the plan rules. Clawback and malus, and non-compete restrictions as defined by the plan rules will apply.

No severance or non-compete payments will be made to Mr. Jimenez.

Appointed CEO, Vasant Narasimhan

Dr. Narasimhan will become CEO effective February 1, 2018. The Board determined Dr. Narasimhan's compensation by taking into account his experience and skills, CEO compensation levels at our 15 global healthcare peer companies, advice from the Compensation Committee's independent advisor, and the fact that this is his first Group CEO role.

As of February 1, 2018, Dr. Narasimhan's annual base salary will be CHF 1.55 million. Short- and Long-Term Incentive opportunities at target are a percentage of annual base salary as follows: Annual Incentive at 150% (CHF 2.32 million); LTPP at 200% (CHF 3.10 million); and LTRPP at 125% (CHF 1.94 million). Dr. Narasimhan's total target compensation is CHF 8.91 million. He will also receive pension and other benefits in line with all other Swiss-based employees.

The Board decided to keep Dr. Narasimhan's compensation strongly performance-based (83% is subject to performance conditions), with an emphasis on equity, to align his interests strongly with those of shareholders. His equity ownership requirement will be five times his annual base salary.

Dr. Narasimhan's initial compensation is 26% lower than that of his predecessor. It is the Board's intention to keep Dr. Narasimhan's annual base salary under review in the coming three to four years, with a view to increasing it subject to strong performance and proven ability in the role.

Dr. Narasimhan's employment contract and compensation are in line with the requirements of the Ordinance against Excessive Compensation in Listed Companies.

Other Executive Committee member appointments and departures

Retiring CEO Oncology, Bruno Strigini

Mr. Strigini stepped down from the Executive Committee on December 31, 2017. During his contractual notice period, which ends on December 31, 2018, he will receive his annual base salary and Annual Incentive in accordance with plan rules. No new grants of Long-Term Incentives will be made in 2018.

Mr. Strigini's outstanding Long-Term Incentives will be pro-rated for time employed during the performance period. There will be no accelerated vesting, as awards will remain subject to performance over the full cycle. Clawback and malus, and non-compete restrictions as defined by the plan rules will apply. No severance or non-compete payments will be made.

Appointed CEO Oncology, Elizabeth Barrett

Novartis announced the appointment of Elizabeth Barrett as the new CEO of Oncology, starting on February 1, 2018. Her annual base salary will be CHF 850 000, her target Annual Incentive of 100%, and her target Long-Term Incentives totaling 260%.

Elizabeth will receive compensation for loss of entitlements with her previous employer on a like-for-like basis, subject to evidence and in line with our Executive Committee members appointment compensation policy regarding buy-outs. The value of the replacement cash and equity awards will be determined on the date of her entry into the company. Therefore, details of this buy-out will be communicated in the 2018 Compensation Report.

Changes to the 2018 Executive Committee compensation system

In 2017, the Compensation Committee conducted a review of the Executive Committee compensation system, taking into account developments in market practice, and alignment with the strategic objectives and talent agenda at Novartis.

The Compensation Committee believes the compensation system supports the company's strategy and ensures a strong link between pay and performance.

In view of market changes since the current system was implemented in 2014, the Board and Compensation Committee have decided to make evolutionary changes to provide greater simplicity and further enhance the link between pay and performance. Changes are also based on constructive feedback from shareholders as part of our ongoing dialogue and consideration of their views. They will take effect from January 2018.

2018 Annual Incentive

A simplified Annual Incentive balanced scorecard will be introduced that places additional weighting on financial performance (60% weighting) and that also focuses on key strategic objectives in the areas of innovation, access to healthcare, people and culture, data and digital (40% weighting). Values and Behaviors remain a key component of the Annual Incentive and are embedded in our culture. As such, members of the Executive Committee are expected to demonstrate these to the highest standard.

From 2018, the CEO balanced scorecard metrics will be as follows:

CEO BALANCED SCORECARD – KEY METRICS
Group financial targets (60% weighting)
• Group net sales
• Group operating income
• Group FCF as % of sales
• Share of peers
Strategic objectives (40% weighting)
• Innovation
• Access to healthcare
• People and culture
• Data and digital

The payout schedule for the Annual Incentive will be amended to reflect the simplified structure as follows:

PERFORMANCE	PAYOUT
Outstanding	170–200%
Exceeds expectations	130–160%
Meets expectations	80–120%
Partially meets expectations	40–70%
Below expectations	0–30%

LTRPP payout for cycles starting in 2018 onward

The performance condition for the LTRPP has been made more stringent from the 2018-2020 performance cycle onward. Going forward, Executive Committee members will receive no payout if relative TSR is below the median of the companies in our global healthcare peer group. The Board retains the right to apply its judgment in determining the final payout, considering factors such as absolute TSR, currency fluctuations and overall economic conditions.

The payout matrix for the 2018-2020 performance cycle onward will be as follows:

NOVARTIS POSITION IN THE PEER GROUP	PAYOUT RANGE (% OF TARGET)
Positions 1–2	170–200%
Positions 3–5	130–160%
Positions 6–8	80–120%
Positions 9–16	0%

Change in Executive Committee retirement rules for the LTPP and LTRPP from 2019

In line with evolving governance practices, we have revised our Long-Term Incentive plan rules for retiring Executive Committee members, applicable to grants made from 2019 onward. Going forward, members who fulfill the retirement conditions under the plan rules will receive pro-rata vesting, rather than full vesting, of outstanding Long-Term Incentives. These incentives will continue to have performance conditions applied, and will vest at the end of the cycle on the normal vesting date. The timing of this change respects the one-year notice period required in the Executive Committee member employment contracts.

Two members of the Executive Committee (the CEO of Alcon and the General Counsel), who have already met the retirement conditions under the plan rules for LTPP and LTRPP, will be grandfathered under the current rules (with the exception of the one-off performance award granted to the CEO of Alcon in 2016, which vests pro-rata on retirement, as per his contract).

2018 Executive Committee total target compensation increases

To aid transparency and as part of our commitment to good governance, the Compensation Committee has decided to voluntarily disclose the 2018 Executive Committee total target compensation increases at the start of the year.

Details of the 2018 compensation for Mr. Jimenez as the retiring CEO and Dr. Narasimhan as the appointed CEO are provided on page 143.

The other members of the Executive Committee will not be awarded any increases for 2018 with the exception of two members for reasons set out below. For context, average associate merit increases were 1% in Switzerland and 3% in the US.

James Bradner
James Bradner was hired externally as the President of Novartis Institute of Biomedical Research (NIBR) in 2015. Since he joined the organization he has delivered strong performance and has played a key role in increasing cooperation between NIBR and Global Drug Development. His compensation was adjusted to recognize his performance and also catch up towards US peers (NIBR, as well as most of its competitors are based and headquartered in the US). In this context, Mr. Bradner will receive an annual base salary increase in line with other US associates of 3% as from March 1, 2018. He will not receive increases to target incentives. Overall, his 2018 total target compensation will be increased by 2.8% compared to 2017.

Paul Hudson
Paul Hudson was hired externally as the CEO of the Pharmaceuticals division in June 2016. He led the division to overachieve its targets for 2017, contributing substantially to Novartis' overall performance for the year. His leadership focused the division on new product performance, securing future revenue for Novartis. He has also enhanced the division's culture and engagement. His compensation was adjusted to recognize these factors, as well as to gradually bring his compensation in line with his global peers. In this context, Mr. Hudson will receive an annual base salary increase of 3.1% as from March 1, 2018, and his target Long Term incentive will be increased from 230% of annual base salary to 250% as from 2018. No changes will be made to his Annual Incentive. Overall, his 2018 total target compensation will be increased by 7.8% compared to 2017.

2018 Executive Committee compensation system review

The current Executive Committee compensation system has been in place since January 2014. Each year, the Board and Compensation Committee review it to ensure it is in line with business needs and evolving best practice. In 2018, the review will focus particularly on the performance measures for the Long Term Incentive, to ensure they are appropriately aligned to the company's strategy and goals of the new CEO. The Compensation Committee will engage in dialogue with Novartis' major shareholders and will consult its independent advisor on this topic.

2017 Board compensation

Board compensation philosophy and benchmarking

In line with market practice in Switzerland, the Board sets compensation for its members at a level that allows for the attraction of high-caliber individuals with global experience, including a mix of Swiss and international members. Board members do not receive variable compensation, underscoring their focus on corporate strategy, supervision and governance. Each year at the AGM, shareholders are requested to approve, in a binding vote, the total compensation of the Board until the following AGM.

The Board sets the level of compensation for its Chairman and the other members to be in line with relevant benchmark companies, which include other large Switzerland-based multinational companies: ABB, Credit Suisse, LafargeHolcim, Nestlé, Roche and UBS. This peer group has been chosen for Board compensation due to the comparability of Swiss legal requirements, including broad personal and individual liabilities under Swiss law (and new criminal liability under Swiss rules regarding Board and Executive Committee compensation related to the Ordinance against Excessive Compensation in Listed Companies), and under US law (due to the company's secondary listing on the New York Stock Exchange).

The Board reviews the compensation of its members, including the Chairman, each year based on a proposal by the Compensation Committee and on advice from its independent advisor, including relevant benchmarking information.

Compensation of the Chairman of the Board

As Chairman, Joerg Reinhardt receives total annual compensation valued at CHF 3.8 million. The total compensation is comprised equally of cash and shares, as follows:

- Cash compensation: CHF 1.9 million per year.
- Share compensation: annual value equal to CHF 1.9 million of unrestricted Novartis shares.

For 2017, the Chairman voluntarily waived the increase in compensation to which he is contractually entitled, which is an amount not lower than the average annual compensation increase awarded to associates based in Switzerland (1% for 2017).

Compensation of the other Board members

The annual fee rates for Board membership and additional functions are included in the table below. These were approved by the Board with effect from the 2014 AGM, and align our aggregate Board compensation with the current levels of other large Swiss companies.

2017 Board member annual fee rates

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

In addition, the following policies apply regarding Board compensation:

- 50% of compensation is delivered in cash, paid on a quarterly basis in arrears. Board members may choose to receive more of their compensation in shares instead of cash.
- At least 50% of compensation is delivered in shares in two installments: one six months after the AGM and one 12 months after the AGM.
- Board members bear the full cost of their employee social security contributions, if any, and do not receive share options or pension benefits.

Board member total compensation earned for financial year 2017

The following tables disclose the 2017 Board member total compensation and prior-year comparative information. Board compensation is reported as the amount earned in the financial year.

	Board membership	Vice Chairman	Audit and Compliance Committee	Compensation Committee	Governance, Nomination and Corporate Responsibilities Committee	Research & Development Committee	Risk Committee	Shares (number) [1]	Cash (CHF) (A)	Shares (CHF) (B)	Other (CHF) (C) [2]	Total (CHF) (A)+(B)+(C) [3]
Board members active on December 31, 2017												
Joerg Reinhardt [4]	Chair					Chair		24 407	1 900 000	1 900 000	4 336	3 804 336
Enrico Vanni	•	•	•	Chair	•			3 210	250 000	250 000	3 475	503 475
Nancy Andrews	•					•	•	2 311	180 000	180 000	–	360 000
Dimitri Azar	•		•			•		2 504	195 000	195 000	–	390 000
Ton Buechner	•						• [5]	4 039	–	325 000	–	325 000
Srikant Datar	•		• [7]	•			Chair [5]	2 989	227 500	227 500	–	455 000
Elizabeth Doherty	•		Chair [5]				• [5]	2 591	217 500	217 500	–	435 000
Ann Fudge	•			•	•		•	2 504	195 000	195 000	–	390 000
Frans van Houten (from February 28, 2017)	•							1 305	75 000	175 000	–	250 000
Pierre Landolt [6]	•				•			4 238	–	330 000	3 475	333 475
Andreas von Planta	•		•		Chair		• [8]	2 989	227 500	227 500	4 336	459 336
Charles L. Sawyers	•				•	•		2 311	180 000	180 000	–	360 000
William T. Winters	•			•				4 238	–	330 000	–	330 000
Total								**59 636**	**3 647 500**	**4 732 500**	**15 622**	**8 395 622**

See next page for 2016 comparative figures.

[1] The shown amounts represent the gross number of shares delivered to each Board member in 2017 for the respective Board member's service period. The number of shares reported in this column represent: (i) the second and final equity installment delivered in February 2017 for the services from the 2016 AGM to the 2017 AGM, and (ii) the first of two equity installments delivered in August 2017 for the services from the 2017 AGM to the 2018 AGM. The second and final equity installment for the services from the 2017 AGM to the 2018 AGM will take place in February 2018.
[2] Includes an amount of CHF 15 622 for mandatory employer contributions for all Board members paid by Novartis to Swiss governmental social security systems. This amount is out of total employer contributions of CHF 298 206, and provides a right to the maximum future insured government pension benefit for the Board member.
[3] All amounts are before deduction of the social security contribution and income tax due by the Board member.
[4] No additional committee fees for chairing the Research & Development Committee were delivered to Dr. Reinhardt.
[5] From February 28, 2017
[6] According to Pierre Landolt, the Sandoz Family Foundation is the economic beneficiary of the compensation.
[7] Until February 27, 2017, Chair of the Audit and Compliance Committee
[8] Until February 27, 2017, Chair of the Risk Committee

Board member total compensation earned for financial year 2016 (comparative information)

	Board membership	Vice Chairman	Audit and Compliance Committee	Compensation Committee	Governance, Nomination and Corporate Responsibilities Committee	Research & Development Committee	Risk Committee	Shares (number) [1]	Cash (CHF) (A)	Shares (CHF) (B)	Other (CHF) (C) [2]	Total (CHF) (A)+(B)+(C) [3]
Board members active on December 31, 2016												
Joerg Reinhardt [4]	Chair					Chair		25 020	1 900 000	1 900 000	4 336	3 804 336
Enrico Vanni	•	•	•	Chair	• [5]	• [6]		3 291	250 000	250 000	4 336	504 336
Nancy Andrews	•					•	• [5]	2 265	177 500	177 500	–	355 000
Dimitri Azar	•		•			•		2 567	195 000	195 000	–	390 000
Ton Buechner (from February 24, 2016)	•							1 864	–	250 000	–	250 000
Srikant Datar	•		Chair	•			•	3 159	240 000	240 000	–	480 000
Elizabeth Doherty (from February 24, 2016)	•		•					1 118	150 000	150 000	–	300 000
Ann Fudge	•			•	•		•	2 567	195 000	195 000	–	390 000
Pierre Landolt [7]	•				• [8]			4 553	–	335 000	3 475	338 475
Andreas von Planta	•		•		Chair [5]		Chair	3 055	237 500	237 500	4 336	479 336
Charles L. Sawyers	•				•	•		2 369	180 000	180 000	–	360 000
William T. Winters	•			•				4 344	–	330 000	–	330 000
Subtotal								**56 172**	**3 525 000**	**4 440 000**	**16 483**	**7 981 483**
Board members who stepped down at the 2016 AGM												
Verena A. Briner (until February 23, 2016)	•						•	1 147	27 500	27 500	579	55 579
Subtotal								**1 147**	**27 500**	**27 500**	**579**	**55 579**
Total								**57 319**	**3 552 500**	**4 467 500**	**17 062**	**8 037 062**

[1] The shown amounts represent the gross number of shares delivered to each Board member in 2016 for the respective Board member's service period. The number of shares reported in this column represent: (i) the second and final equity installment delivered in February 2016 for the services from the 2015 AGM to the 2016 AGM, and (ii) the first of two equity installments delivered in August 2016 for the services from the 2016 AGM to the 2017 AGM. The second and final equity installment for the services from the 2016 AGM to the 2017 AGM will take place in February 2017.
[2] Includes an amount of CHF 17 062 for mandatory employer contributions for all Board members paid by Novartis to Swiss governmental social security systems. This amount is out of total employer contributions of CHF 387 308, and provides a right to the maximum future insured government pension benefit for the Board member.
[3] All amounts are before deduction of the social security contribution and income tax due by the Board member.
[4] Does not include EUR 1 045 800 paid to Joerg Reinhardt on January 31, 2016, for lost entitlements at his former employer. This amount is the third and final of three installments totaling EUR 2 665 051, which compensates him for lost entitlements at his former employer. The lost entitlements of EUR 2 665 051 were included in full on page 124 of the 2014 Compensation Report. No additional committee fees for chairing the Research & Development Committee were delivered to Dr. Reinhardt.
[5] From February 24, 2016.
[6] Until February 23, 2016.
[7] According to Pierre Landolt, the Sandoz Family Foundation is the economic beneficiary of the compensation.
[8] Until February 23, 2016, Chair of the Governance, Nomination and Corporate Responsibilities Committee.

Reconciliation between the reported Board compensation and the amount approved by shareholders at the AGM

CHF	Compensation earned for the respective financial year (A)[1]	Compensation earned for the period from January 1 to the AGM (2 months) of the financial year (B)	Compensation to be earned for the period from January 1 to the AGM (2 months) in the year following the financial year (C)	Total compensation earned from AGM to AGM (A)-(B)+(C)	Amount approved by shareholders at the respective AGM	Amount within the amount approved by shareholders at the respective AGM
	2017	**January 1, 2017 to 2017 AGM**	**January 1, 2018 to 2018 AGM[2]**	**2017 AGM to 2018 AGM**	**2017 AGM**	**2017 AGM**
Joerg Reinhardt	3 804 336	633 334	633 334	3 804 336	3 805 000	Yes
Other Board members	4 591 286	713 334	773 334	4 651 286	4 720 000	Yes
Total	**8 395 622**	**1 346 668**	**1 406 668**	**8 455 622**	**8 525 000**	**Yes**
	2016	January 1, 2016 to 2016 AGM	January 1, 2017 to 2017 AGM	2016 AGM to 2017 AGM	2016 AGM	2016 AGM
Joerg Reinhardt	3 804 336	633 334	633 334	3 804 336	3 805 000	Yes
Other Board members	4 232 726	653 334	713 334	4 292 726	4 355 000	Yes
Total	**8 037 062**	**1 286 668**	**1 346 668**	**8 097 062**	**8 160 000**	**Yes**

[1] See page 147 for 2017 Board member compensation.
[2] To be confirmed and reported in the 2018 Compensation Report

Additional disclosures

Share ownership requirements for Board members

The Chairman is required to own a minimum of 30 000 Novartis shares, and other members of the Board are required to own at least 4 000 Novartis shares within three years after joining the Board, to ensure their interests are aligned with those of shareholders. Board members are prohibited from hedging or pledging their ownership positions in Novartis shares that are part of their guideline share ownership requirement, and are required to hold these shares for 12 months after retiring from the Board. As of December 31, 2017, all current and former members of the Board who were required to meet the minimum share ownership requirements did so. From the 2018 AGM, the requirement will be increased (see details on page 151).

Shares, ADRs and share options owned by Board members

The total number of vested Novartis shares and ADRs owned by members of the Board and "persons closely linked" to them as of December 31, 2017, is shown in the table below.

As of December 31, 2017, no members of the Board, either individually or together with "persons closely linked" to them, owned 1% or more of the outstanding shares (or ADRs) of Novartis." As of the same date, no members of the Board held any share options to purchase Novartis shares.

	Number of shares At December 31, 2017[1,2]
Joerg Reinhardt	518 310
Enrico Vanni	20 101
Nancy Andrews	4 042
Dimitri Azar	13 094
Ton Buechner	4 428
Srikant Datar	37 239
Elizabeth Doherty	2 761
Ann Fudge	15 457
Frans van Houten	978
Pierre Landolt[3]	61 029
Andreas von Planta	130 634
Charles L. Sawyers	7 763
William T. Winters	12 397
Total	**828 233**

[1] Includes holdings of "persons closely linked" to Board members (see definition on page 142)
[2] Each share provides entitlement to one vote.
[3] According to Pierre Landolt, the Sandoz Family Foundation is the economic beneficiary of the shares

Loans to Board members

Our policy does not allow loans to be granted to current or former members of the Board or to "persons closely linked" to them. Therefore no loans were granted in 2017, and none were outstanding as of December 31, 2017.

Other payments to Board members

During 2017, no payments (or waivers of claims) other than those set out in the Board member compensation table (including its footnotes) on page 147 were made to current members of the Board or to "persons closely linked" to them.

Payments to former Board members

During 2017, no payments (or waivers of claims) were made to former Board members or to "persons closely linked" to them, except for the payments reported in Note 26 to the Group's audited consolidated financial statements (page 240).

2018 Board compensation

Board and committee membership fees

For the year 2018, the Chairman has voluntarily waived his contractual compensation increase entitlement, which is an amount not lower than the average annual compensation increase awarded to associates based in Switzerland.

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

The Board membership fee will decrease, and the committee membership fees will increase. The Board took into consideration external benchmarking information in the Swiss market and independent advice. The change is cost-neutral for the company, as the new fee structure results in the same average fee per Board member, excluding the Chairman. The total aggregated Board fees will decrease in 2018 due to the reduction in the number of Board members, following the departure of Mr. Pierre Landolt, who will reach the age limit for Board membership specified in the Articles of Incorporation.

CHF	AGM 2018-2019 annual fee
Chairman of the Board	3 800 000
Board membership	280 000
Vice Chairman	50 000
Chair of the Audit and Compliance Committee	130 000
Chair of the Compensation Committee	90 000
Chair of the following committees: • Governance, Nomination and Corporate Responsibilities Committee • Research & Development Committee • Risk Committee	70 000
Membership of the Audit and Compliance Committee	70 000
Membership of the following committees: • Compensation Committee • Governance, Nomination and Corporate Responsibilities Committee • Research & Development Committee • Risk Committee	40 000

Share ownership requirements

The Chairman's share ownership requirement of 30 000 shares will remain unchanged for 2018.

For the other Board members, and following a review of market practices at our peer group companies, the Board has decided to increase the share ownership requirement from 4 000 to 5 000 shares, effective from the 2018 AGM. The increase will also strengthen the alignment of interests with those of our shareholders.

To allow sufficient time for Board members to achieve the increased requirement, they will have four years from appointment to acquire the minimum 5 000 shares under the new policy. In addition, Board members will continue to be required to hold these shares for 12 months after retiring from the Board.

Compensation governance

Legal framework

The Swiss Code of Obligations and the Corporate Governance Guidelines of the SIX Swiss Exchange require listed companies to disclose certain information about the compensation of Board and Executive Committee members, their equity participation in the Group, and loans made to them. This Annual Report fulfills that requirement. In addition, the Annual Report is in line with the principles of the Swiss Code of Best Practice for Corporate Governance of the Swiss Business Federation (economiesuisse).

Risk management principles

The Compensation Committee, with support from its independent advisor, reviews market trends in compensation and changes in corporate governance rules and best practices. Together with the Risk Committee, it also reviews the Novartis compensation systems to ensure that they do not encourage inappropriate or excessive risk taking, and instead encourage behaviors that support sustainable value creation.

A summary of the risk management principles is outlined below.

RISK MANAGEMENT PRINCIPLES

- Rigorous performance management process, with approval of targets and evaluation of performance for the CEO by the Board
- Balanced mix of short-term and long-term variable compensation elements
- Performance evaluation under the Annual Incentive includes an individual balanced scorecard and assessed Values and Behaviors
- Clawback and malus principles apply to all elements of variable compensation
- Performance-vesting Long-Term Incentives only, with three-year overlapping cycles
- All variable compensation is capped at 200% of target
- Contractual notice period of 12 months
- Post-contractual non-compete limited to a maximum of 12 months from the end of employment (annual base salary and Annual Incentive of the prior year only) as per contract, if applicable
- Good and bad leaver provisions apply to variable compensation of leavers
- No severance payments or change-of-control clauses
- Share ownership requirements; no hedging or pledging of Novartis share ownership position by Board and Executive Committee members

Executive Committee employment contracts provide for a notice period of up to 12 months and contain no change-of-control clauses or severance provisions (e.g., agreements concerning special notice periods, longer-term contracts, "golden parachutes," waiver of lock-up periods for equities and bonds, shorter vesting periods, and additional contributions to occupational pension schemes).

For share ownership requirements, please refer to page 141 – share ownership requirements for the CEO and other Executive Committee members.

Compensation decision-making authorities

Authority for decisions related to compensation is governed by the Articles of Incorporation, Board Regulations and the Compensation Committee Charter, which are all published on the company website: www.novartis.com/investors/company-overview/corporate-governance.

The Compensation Committee serves as the supervisory and governing body for compensation policies and plans within Novartis, and has overall responsibility for determining, reviewing and proposing compensation policies and plans for approval by the Board in line with the Compensation Committee Charter. A summary of discussions and conclusions of each committee meeting is delivered to the full Board. A summary of the compensation decision-making authorities is set out below.

Compensation authorization levels within the parameters set by the shareholders' meeting

DECISION ON	DECISION-MAKING AUTHORITY
Compensation of Chairman and other Board members	Board of Directors
Compensation of CEO	Board of Directors
Compensation of other Executive Committee members	Compensation Committee

Committee member independence

The Compensation Committee is composed exclusively of members of the Board who meet the independence criteria set forth in the Board Regulations. From the 2016 AGM, the Compensation Committee had the following four members: Ann Fudge, Srikant Datar, Enrico Vanni and William Winters. Mr. Vanni has served as a member since 2011 and as Chair since 2012.

Role of the Compensation Committee's independent advisor

The Compensation Committee retained Frederic W. Cook & Co. Inc., appointed in 2011, as its independent external compensation advisor until June 2017. During the year, as part of its normal governance practices, the Compensation Committee conducted a market review of compensation advisors, with a focus on companies with extensive experience in European markets. Following a tendering process and an analysis to ensure that there were no conflicts-of-interest, the Compensation Committee appointed Mercer Limited as its independent compensation advisor with effect from July 2017.

Compensation Committee meetings held in 2017

In 2017, the Compensation Committee held six formal meetings, and one additional joint meeting with the Research & Development Committee to review and endorse for approval by the Board the innovation targets and achievements of the LTPP and Annual Incentive. The Compensation Committee annual performance evaluation was undertaken by an external specialist firm (Egon Zehnder) as part of a wider review of the Board and each of its committees in 2017. In addition, the Compensation Committee reviewed its charter, as it does every year, and recommended updates to the Board to reflect the ongoing evolution of compensation governance practices.

Report of the statutory auditor on the Compensation Report of Novartis AG

To the General Meeting of Novartis AG, Basel

We have audited the 2017 CEO and other Executive Committee members' realized compensation on pages 133-134 and the 2017 CEO and other Executive Committee members' compensation at grant value on pages 135-136, and additional disclosures on pages 139-142 as well as the 2017 Board Compensation on pages 146-149 and the additional disclosures on page 150 of the accompanying Compensation Report of Novartis AG for the year ended December 31, 2017.

Board of Directors' responsibility
The Board of Directors is responsible for the preparation and overall fair presentation of the Compensation Report in accordance with Swiss law and the Ordinance against Excessive Compensation in Listed Companies (Ordinance). The Board of Directors is also responsible for designing the compensation system and defining individual compensation packages.

Auditor's responsibility
Our responsibility is to express an opinion on the accompanying Compensation Report. We conducted our audit in accordance with Swiss Auditing Standards. These standards require that we comply with ethical requirements, and plan and perform the audit to obtain reasonable assurance about whether the Compensation Report complies with Swiss law and articles 14–16 of the Ordinance.

An audit involves performing procedures to obtain audit evidence on the disclosures made in the Compensation Report with regard to compensation, loans and credits in accordance with articles 14–16 of the Ordinance. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatements in the Compensation Report, whether due to fraud or error. This audit also includes evaluating the reasonableness of the methods applied to value components of compensation, as well as assessing the overall presentation of the Compensation Report. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Opinion
In our opinion, the Compensation Report of Novartis AG for the year ended December 31, 2017 complies with Swiss law and articles 14–16 of the Ordinance.

PricewaterhouseCoopers AG

Martin Kennard
Audit expert
Auditor in charge

Stephen Johnson
Global relationship partner

Basel, 23 January 2018

Photo Women in a village near Meerut, India, are typical of those who stand to benefit from Arogya Parivar, a social business program run by Novartis to improve healthcare provision among 42 million people living in rural India. Arogya Parivar, which means "healthy family" in Hindi, is designed to bring health education and medical care to poor communities in a commercially sustainable way.

Financial Report

Contents

FINANCIAL REPORT

Operating and financial review 2017

This operating and financial review should be read together with the Group's consolidated financial statements in this Annual Report, which have been prepared in accordance with International Financial Reporting Standards (IFRS) as published by the International Accounting Standards Board, and with the sections on performance and innovation on pages 22 to 63 of this Annual Report.

Risk overview

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

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

For more detail on these trends and how they could impact our results, see details starting on page 175.

Results of operations

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

The Group's core results – including core operating income, core net income and core earnings per share – exclude fully the amortization and impairment charges of intangible assets except software, and certain acquisition-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 and financial assets, as well as income and expense items that management deems exceptional and that are or are expected to accumulate within the year to be over a USD 25 million threshold. A reconciliation between IFRS results and core results is shown on pages 181-183.

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

The core results, constant currencies and other non-IFRS measures are explained in more detail starting on page 179 and are not intended to be substitutes for the equivalent measures of financial performance prepared in accordance with IFRS. These measures may differ from similarly titled non-IFRS measures of other companies.

Group overview

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

By division, our 2017 sales were varied. In constant currencies (cc), which removes the impact of exchange rate movements, Innovative Medicines Division sales increased by 2% cc (+1% in USD). Sandoz is expanding access to biosimilars, and we have a leading portfolio with five biosimilars now on the market, however Sandoz net sales were down by 2% cc (–1% in USD) due to fierce price competition in the United States. Alcon made significant progress on its turnaround, returning to growth and building momentum toward the end of the year delivering sales growth of 4% cc (+4% USD).

Net sales in 2017 for Novartis were USD 49.1 billion, up 1% in reported terms and up 2% in constant currencies. Sales volumes increased 7%, as growth drivers such as *Cosentyx* (USD 2.1 billion; +84%, +82% cc), *Entresto* (USD 507 million; +198%, +195% cc), *Promacta/Revolade* (USD 867 million; +37%, +37% cc) and *Tafinlar + Mekinist* (USD 873 million; +30%, 29% cc) were partly offset by the negative impact of generic competition (-3 percentage points) and pricing (-2 percentage points).

Operating income in 2017 was USD 8.6 billion (+4%, +7% cc) as growth drivers, productivity, lower amortization and a gain from achievement of a sales milestone related to the 2015 Vaccines divestment to GSK more than offset generic erosion. Operating income margin was 17.6% of net sales.

Net income was USD 7.7 billion (+15%, +12% cc), benefiting from growth in operating income and higher income from our stake in GSK Consumer Healthcare Holdings Ltd. The prior year also included USD 0.3 billion exceptional charges related to Venezuela. For more information see page 166.

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

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

Key figures

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

nm = not meaningful

Net sales by segment

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

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

Additional comments on the changes in the net sales by division can be found starting on page 22.

Operating income

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

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

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

Additional comments on the changes in operating income by division can be found starting on page 22.

Corporate income and expense, which includes the cost of Group management and central services, amounted to a net expense of USD 331 million (+30%, +27% cc) in 2017 compared to a net expense of USD 471 million in the prior year. The favorable decrease in expense was mainly due to a gain from achievement of a sales milestone related to the 2015 Vaccines divestment to GSK, partly offset by lower gains from divestment in real estate and lower contributions from the captive insurance companies.

Core operating income key figures[1]

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

[1] An explanation of non-IFRS measures and reconciliation tables can be found starting on page 179.

The adjustments made to operating income to arrive at core operating income amounted to USD 4.2 billion (2016: USD 4.7 billion), less than in the prior year due to lower amortization and a gain from achievement of a sales milestone related to the 2015 Vaccines divestment to GSK.

Excluding these items, Core operating income was USD 12.9 billion (–1%, 0% cc). Core operating income margin in constant currencies decreased 0.3 percentage points, mainly due to generic competition for *Gleevec/Glivec*, and higher launch investments, which were partially offset by expanded gross margin and productivity improvements. Currency exchange rates had an additional negative impact of 0.3 percentage points, yielding a net decrease of 0.6 percentage points to 26.2% of net sales. Additional comments on the changes in the core operating income by division can be found starting on page 22.

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

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

Research and development of Innovative Medicines Division

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

(USD millions unless indicated otherwise)	Year ended Dec 31, 2017	Year ended Dec 31, 2016	Change in USD %	Change in constant currencies %
Research and Exploratory Development[1]	– 2 749	– 2 739	0	0
Confirmatory Development[1]	– 4 881	– 4 970	2	2
Total Innovative Medicines Division Research and Development expense	**– 7 630**	**– 7 709**	**1**	**1**
As % of Innovative Medicines net sales to third parties	23.1	23.7		
Core Research and Exploratory Development[1,2]	– 2 623	– 2 637	1	1
Core Confirmatory Development[1,2]	– 4 426	– 4 475	1	1
Total Core Innovative Medicines Division Research and Development expense	**– 7 049**	**– 7 112**	**1**	**1**
As % of Innovative Medicines net sales to third parties	21.3	21.8		

[1] Certain prior year amounts have been reclassified for comparative purposes.
[2] Core excludes impairments, amortization and certain other items.

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

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

Non-operating income and expense

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

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

nm = not meaningful

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

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

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

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

Other financial income and expense amounted to an income of USD 39 million compared to an expense of USD 447 million in the prior-year, mainly on account of exceptional charges related to Venezuela of USD 305 million in 2016, as well as higher currency losses in 2016. For more information see "Effects of currency fluctuations" on page 166.

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

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

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

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

Core non-operating income and expense

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

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

nm = not meaningful

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

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

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

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

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

The comparability of the year-on-year results of our operations for the total Group can be significantly affected by acquisitions and divestments. The transactions of significance during 2017 and 2016 are mentioned below.

Significant transactions in 2017

INNOVATIVE MEDICINES – ACQUISITION OF ZIARCO GROUP LIMITED

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

INNOVATIVE MEDICINES – ACQUISITION OF ENCORE VISION, INC.

On January 20, 2017, Novartis acquired Encore Vision, Inc. (Encore), a privately-held company in Fort Worth, Texas, in the United States, focused on the development of a novel treatment in presbyopia. The fair value of the total purchase consideration was USD 456 million. The amount consisted of an initial cash payment of USD 366 million and the net present value of the contingent consideration of USD 90 million, due to Encore shareholders, which they are eligible to receive upon the achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 389 million and goodwill of USD 67 million. Results of operations since the date of acquisition were not material.

Significant transactions in 2016

ALCON – ACQUISITION OF TRANSCEND MEDICAL, INC.

On February 17, 2016, Alcon entered into an agreement to acquire Transcend Medical, Inc. (Transcend), a privately-held, US-based company focused on developing minimally-invasive surgical devices to treat glaucoma. The transaction closed on March 23, 2016, and the fair value of the total purchase consideration was USD 332 million. The amount consisted of an initial cash payment of USD 240 million and the net present value of the contingent consideration of USD 92 million due to Transcend shareholders, which they are eligible to receive upon the achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 294 million and goodwill of USD 38 million. The 2016 results of operations since the date of acquisition were not material.

INNOVATIVE MEDICINES – ACQUISITION OF REPRIXYS PHARMACEUTICALS CORPORATION

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

The fair value of the total purchase consideration for acquiring the 81% stake Novartis did not already own amounted to USD 268 million. The amount consisted of an initial cash payment of USD 194 million and the net present value of the contingent consideration of USD 74 million due to Reprixys shareholders, which they are eligible to receive upon the achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 332 million. No goodwill was recognized. The 2016 results of operations since the date of acquisition were not material.

For further details on significant transactions, see Note 2 to the Group consolidated financial statements.

Free cash flow

Novartis defines free cash flow as cash flow from operating activities and cash flow associated with the purchase or sale of property, plant and equipment, intangible assets, other non-current assets and financial assets, excluding marketable securities. Cash flows in connection with the acquisition or divestment of subsidiaries, associated companies and non-controlling interests in subsidiaries are not taken into account to determine free cash flow. The free cash flow measure, which is a non-IFRS measure, is discussed more on page 180. The following is a summary of the free cash flow:

(USD millions)	2017	2016	Change
Operating income	**8 629**	**8 268**	**361**
Reversal of non-cash items			
Depreciation, amortization and impairments	6 332	6 175	157
Change in provisions and other non-current liabilities	160	956	– 796
Other	– 360	– 264	– 96
Operating income adjusted for non-cash items	**14 761**	**15 135**	**– 374**
Interest and other financial receipts	1 084	942	142
Interest and other financial payments	– 980	– 878	– 102
Taxes paid	– 1 611	– 2 111	500
Payments out of provisions and other net cash movements in non-current liabilities	– 877	– 1 536	659
Change in inventory and trade receivables less trade payables	– 393	– 1 051	658
Change in other net current assets and other operating cash flow items	637	974	– 337
Cash flows from operating activities	**12 621**	**11 475**	**1 146**
Purchase of property, plant & equipment	– 1 696	– 1 862	166
Proceeds from sales of property, plant & equipment	92	161	– 69
Purchase of intangible assets	– 1 050	– 1 017	– 33
Proceeds from sales of intangible assets	640	847	– 207
Purchase of financial assets	– 468	– 247	– 221
Proceeds from sales of financial assets	330	247	83
Purchase of other non-current assets	– 42	– 149	107
Proceeds from sales of other non-current assets	1		1
Free cash flow	**10 428**	**9 455**	**973**

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

Liquidity, cash flow and capital resources

The following table summarizes the Group's cash flow:

(USD millions)	2017	2016	Change
Cash flows from operating activities	12 621	11 475	1 146
Cash flows used in investing activities from continuing operations	– 2 979	– 2 693	– 286
Cash flows used in investing activities from discontinued operations	– 140	– 748	608
Cash flows used in financing activities	– 7 733	– 5 314	– 2 419
Effect of exchange rate changes on cash and cash equivalents	84	– 387	471
Net change in cash and cash equivalents	**1 853**	**2 333**	**– 480**
Change in marketable securities, commodities, time deposits and derivative financial instruments	– 145	– 3	– 142
Change in current and non-current financial debts and derivative financial instruments	– 4 730	– 1 871	– 2 859
Change in net debt	**– 3 022**	**459**	**– 3 481**
Net debt at January 1	– 16 025	– 16 484	459
Net debt at December 31	**– 19 047**	**– 16 025**	**– 3 022**

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

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

In 2016, cash flows used in investing activities from continuing operations amounted to USD 2.7 billion. This amount included cash outflows for the purchase of property, plant and equipment of USD 1.9 billion, for intangible assets of USD 1.0 billion, for financial assets and other non-current assets of USD 0.4 billion and for acquisitions and divestments of businesses, net (including the Transcend Medical, Inc. and Reprixys Pharmaceuticals Corporation acquisitions) of USD 0.8 billion. This was partly offset by cash inflows from the sale of property, plant and equipment, intangible assets and financial assets of USD 1.3 billion and from the net proceeds from sales of marketable securities and commodities of USD 0.1 billion.

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

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

The 2016 cash flows used in financing activities amounted to USD 5.3 billion, which included cash outflows for the dividend payment of USD 6.5 billion and for net treasury share transactions of USD 0.9 billion. The net cash inflows from current and non-current financial debts of USD 2.1 billion was mainly from the increase in short-term borrowings of USD 1.8 billion and from the issuance of two euro denominated bonds for total proceeds of USD 1.9 billion, partially offset by the repayment at maturity of a euro denominated bond of USD 1.7 billion.

Group net debt

Group net debt consists of:

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

Group net debt increased to USD 19.0 billion at the end of 2017 from USD 16.0 billion at the end of 2016, mainly due to increased borrowings.

Total financial debt increased by USD 4.7 billion to USD 28.5 billion at December 31, 2017, from USD 23.8 billion at December 31, 2016.

Non-current financial debt increased by USD 5.3 billion to USD 23.2 billion at December 31, 2017 from USD 17.9 billion at December 2016, mainly due to the issuance of bonds in the first quarter that are denominated in US dollar and euro for a notional amount of USD 3.0 billion and EUR 1.85 billion (USD 2.0 billion), respectively.

Current financial debt decreased by USD 0.6 billion to USD 5.3 billion at December 31, 2017, from USD 5.9 billion at December 31, 2016, mainly due to a reduction in short-term borrowings. Overall current financial debt consists of the current portion of non-current financial debt of USD 0.4 billion and other short-term borrowings of USD 4.9 billion, including derivatives and 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 1.3 billion) of unsecured commercial paper notes. Commercial paper notes totaling USD 2.3 billion under these three programs were outstanding as per December 31, 2017. Novartis further has a committed credit facility of USD 6.0 billion, entered into on September 23, 2015. This credit facility is provided by a syndicate of banks and is intended to be used as a backstop for the US commercial paper programs. It matures in September 2020 and was undrawn as per December 31, 2017.

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

We are not aware of any significant demands to change the level of liquidity needed to support our normal business activities. We make use of various borrowing facilities provided by several financial institutions. We also successfully issued various bonds in previous years (including 2016 and 2017), and raised funds through our commercial paper programs. In addition, reverse repurchasing agreements are contracted and Novartis has entered into credit support agreements with various banks for derivative transactions.

The maturity schedule of our net debt can be found in Note 28 to the consolidated financial statements on page 249.

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

Liquidity and financial debt by currency

(as of December 31)

	Liquidity in % 2017[1]	Liquidity in % 2016[1]	**Financial debt in % 2017**[2]	Financial debt in % 2016[2]
US dollar (USD)	77	77	63	66
Euro (EUR)	8	9	20	13
Swiss franc (CHF)	5	5	11	13
Japanese yen (JPY)	1		4	5
Other	9	9	2	3
	100	100	100	100

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

Contractual obligations

The following table summarizes the Group's contractual obligations and other commercial commitments, as well as the effect these obligations and commitments are expected to have on the Group's liquidity and cash flow in future periods:

	Payments due by period				
(USD millions)	Total	Less than 1 year	2–3 years	4–5 years	After 5 years
Non-current financial debt, including current portion	**23 583**	359	5 170	4 679	13 375
Interest on non-current financial debt, including current portion	**6 244**	620	977	788	3 859
Operating leases	**3 169**	309	384	255	2 221
Unfunded pensions and other post-employment benefit plans	**2 179**	121	249	257	1 552
Research & Development potential milestone commitments	**4 306**	780	1 535	1 154	837
Property, plant & equipment purchase commitments	**318**	247	71		
Acquisition of business and intangible asset commitments[1]	**4 000**	4 000			
Total contractual cash obligations	**43 799**	**6 436**	**8 386**	**7 133**	**21 844**

[1] For acquisition of business commitments, please refer to Note 2 to the Group consolidated financial statements.

The Group intends to fund the Research & Development, Property, plant & equipment and intangible asset purchase commitments with internally generated resources.

The Group intends to fund the acquisition of business (USD 3.9 billion) mainly through external short- and long-term debt.

Effects of currency fluctuations

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

The following provides an overview of net sales and operating expenses for our operations based on IFRS values for 2017 and 2016 for currencies most important to the Group:

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

Operating expenses in the above table include Cost of goods sold, Marketing & Sales, Research & Development, General & Administration, Other income and Other expense.

We prepare our consolidated financial statements in US dollars. As a result, fluctuations in the exchange rates between the US dollar and other currencies can have a significant effect on both the Group's results of operations as well as on the reported value of our assets, liabilities and cash flows. This in turn may significantly affect reported earnings (both positively and negatively) and the comparability of period-to-period results of operations.

For purposes of our consolidated balance sheets, we translate assets and liabilities denominated in other currencies into US dollars at the prevailing market exchange rates as of the relevant balance sheet date. For purposes of the Group's consolidated income and cash flow statements, revenue, expense and cash flow items in local currencies are translated into US dollars at average exchange rates prevailing during the relevant period. As a result, even if the amounts or values of these items remain unchanged in the respective local currency, changes in exchange rates have an impact on the amounts or values of these items in our consolidated financial statements.

Because our expenditures in Swiss francs are significantly higher than our revenues in Swiss francs, volatility in the value of the Swiss franc can have a significant impact on the reported value of our earnings, assets and liabilities, and the timing and extent of such volatility can be difficult to predict. In addition, there is a risk that certain countries could take steps that could significantly impact the value of their currencies.

There is also a risk that certain countries could devalue their currency. If this occurs, it could impact the effective prices we would be able to charge for our products and also have an adverse impact on both our consolidated income statement and balance sheet. The Group is exposed to a potential adverse devaluation risk on its intercompany funding and total investment in certain subsidiaries operating in countries with exchange controls.

The most significant country in this respect was Venezuela, where the Group incurred significant foreign exchange losses in 2015 and 2016.

Subsidiaries whose functional currencies have experienced a cumulative inflation rate of more than 100% over the past three years apply the rules of IAS 29 "Financial Reporting in Hyperinflationary Economies". Gains and losses incurred upon adjusting the carrying amounts of non-monetary assets and liabilities for inflation are recognized in the income statement. The subsidiaries in Venezuela restate non-monetary items in the balance sheet in line with the requirements of IAS 29.

The Group's subsidiaries in Venezuela are experiencing a significant reduction in approvals for remittance of US dollars outside the country at the exchange rate available for imports of specific goods and services of national priority, including medicines and medical supplies. Since November 2016, the Group has applied the floating rate of DICOM (Sistema de Divisa Complementaria) to translate the financial statements of its Venezuelan subsidiaries. This change from the rate applicable for imports of specific goods and services of national priority to the floating rate of DICOM resulted in a USD 0.3 billion revaluation loss on the outstanding intercompany balances in 2016. The net outstanding intercompany payable balance of Venezuela subsidiaries was not significant at December 31, 2017 and at December 31, 2016, due to reserves against the intercompany balances.

The Group manages its global currency exposure by engaging in hedging transactions where management deems appropriate, after taking into account the natural hedging afforded by our global business activity. For 2017, we entered into various contracts that change in value with movements in foreign exchange rates to preserve the value of assets, commitments and expected transactions. We use forward contracts and foreign currency options to hedge. For more information on how these transactions affect our consolidated financial statements and on how foreign exchange rate exposure is managed, see Notes 1, 5, 15 and 28 to the Group's consolidated financial statements.

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	**2017**	2016	Change in %	**2017**	2016	Change in %
Australian dollar (AUD)	0.766	0.744	3	0.779	0.722	8
Brazilian real (BRL)	0.313	0.288	9	0.302	0.307	– 2
Canadian dollar (CAD)	0.771	0.755	2	0.797	0.741	8
Swiss franc (CHF)	1.016	1.015	0	1.024	0.978	5
Chinese yuan (CNY)	0.148	0.151	– 2	0.154	0.144	7
Euro (EUR)	1.129	1.107	2	1.195	1.051	14
British pound (GBP)	1.288	1.355	– 5	1.347	1.227	10
Japanese yen (JPY (100))	0.892	0.922	– 3	0.888	0.854	4
Russian ruble (RUB (100))	1.715	1.498	14	1.734	1.648	5

The following table provides a summary of the currency impact on key Group figures due to their conversion into USD, the Group's reporting currency, of the financial data from entities reporting in non-US dollars. Constant currency (cc) calculations apply the exchange rates of the prior year to the current year financial data for entities reporting in non-US dollars.

Currency impact on key figures

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

For additional information on the effects of currency fluctuations, see Note 28 to the Group's consolidated financial statements.

Condensed consolidated balance sheets

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

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

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

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

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

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

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

Based on our current incurred loss provisioning approach, we consider that our provisions for doubtful trade receivables are adequate. We continue to monitor the level of trade receivables particularly in Greece, Italy, Portugal, Spain, Brazil, Russia, Saudi Arabia and Turkey. Should there be a substantial deterioration in our economic exposure with respect to those countries, we may change the terms of trade on which we operate.

The majority of the outstanding trade receivables from these closely monitored countries are due directly from local governments or from government-funded entities, except for Russia, Brazil and Turkey, which are due from private entities. The gross trade receivables from these countries at December 31, 2017 amount to USD 1.7 billion (2016: USD 1.7 billion), of which USD 124 million are past due for more than one year (2016: USD 82 million), and for which provisions of USD 95 million have been recorded (2016: USD 63 million). At December 31, 2017, amounts past due for more than one year are not significant in any of these countries.

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

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

There is also a risk that certain countries could devalue their currency. Currency exposures are described in more detail in the "Effects of currency fluctuations" section on page 166.

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

Current income tax liabilities increased by USD 0.1 billion to USD 1.7 billion. While there is some uncertainty about the final taxes to be assessed in our major countries, we believe that our estimated amounts for current income tax liabilities, including amounts related to uncertain tax positions, are appropriate based on currently known facts and circumstances.

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

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

Novartis believes that its total provisions are adequate based upon currently available information. However, given the inherent difficulties in estimating liabilities in this area, Novartis may incur additional costs beyond the amounts provided. Management believes that such additional amounts, if any, would not be material to the Group's financial condition but could be material to the results of operations or cash flows in a given period.

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

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

Summary of equity movements attributable to Novartis AG shareholders

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

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

Critical accounting policies and estimates

Our significant accounting policies are set out in Note 1 to the Group's consolidated financial statements, which are prepared in accordance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB).

Given the uncertainties inherent in our business activities, we must make certain estimates and assumptions that require difficult, subjective and complex judgments. Because of uncertainties inherent in such judgments, actual outcomes and results may differ from our assumptions and estimates, which could materially affect the Group's consolidated financial statements. Application of the following accounting policies requires certain assumptions and estimates that have the potential for the most significant impact on our consolidated financial statements.

Deductions from revenues

As is typical in the pharmaceutical industry, our gross sales are subject to various deductions which are primarily composed of rebates and discounts to retail customers, government agencies, wholesalers, health insurance companies and managed healthcare organizations. These deductions represent estimates of the related obligations, requiring the use of judgement when estimating the effect of these sales deductions on gross sales for a reporting period. These adjustments are deducted from gross sales to arrive at net sales.

The following summarizes the nature of some of these deductions and how the deduction is estimated. After recording these, net sales represent our best estimate of the cash that we expect to ultimately collect. The US market has the most complex arrangements related to revenue deductions.

United States specific healthcare plans and program rebates

The United States Medicaid Drug Rebate Program is administered by State governments using State and Federal funds to provide assistance to certain vulnerable and needy individuals and families. Calculating the rebates to be paid related to this program involves interpreting relevant regulations, which are subject to challenge or change in interpretative guidance by government authorities. Provisions for estimating Medicaid rebates are calculated using a combination of historical experience, product and population growth, product pricing and the mix of contracts and specific terms in the individual State agreements.

The United States Federal Medicare Program, which funds healthcare benefits to individuals age 65 or older and certain disabilities, provides prescription drug benefits under Part D section of the program. This benefit is provided and administrated through private prescription drug plans. Provisions for estimating Medicare Part D rebates are calculated based on the terms of individual plan agreements, product sales and population growth, product pricing and the mix of contracts.

We offer rebates to key managed healthcare and private plans in an effort to sustain and increase market share of our products, and to ensure patient access. These programs provide a rebate after the plans have demonstrated they have met all terms and conditions set forth in their contract with us. These rebates are estimated based on the terms of individual agreements, historical experience, product pricing, and projected product growth rates. These provisions are adjusted based on established processes and experiences from filing data with individual states and plans.

There is often a time lag of several months between us recording the revenue deductions and our final accounting for them.

Non-United States specific healthcare plans and program rebates

In certain countries other than the US, we provide rebates to governments and other entities. These rebates are often mandated by laws or government regulations.

In several countries, especially in Europe and Australia, we enter into innovative pay-for-performance arrangements with certain healthcare providers. Under these agreements, we may be required to make refunds to the healthcare providers or to provide additional medicines free of charge if anticipated treatment outcomes do not meet predefined targets. Potential refunds and the delivery of additional medicines at no cost are estimated and recorded as a deduction of revenue at the time the related revenues are recorded. Estimates are based on historical experience and clinical data. In cases where historical experience and clinical data are not sufficient for a reliable estimation of the outcome, revenue recognition would be deferred until such history would be available. In addition, we offer global patient assistance programs.

There is often a time lag of several months between us recording the revenue deductions and our final accounting for them.

Non-healthcare plans and program rebates, returns and other deductions

We offer rebates to purchasing organizations and other direct and indirect customers to sustain and increase market share, and to ensure patient access to our products. Since rebates are contractually agreed upon, the related provisions are estimated based on the terms of the individual agreements, historical experience, and projected product growth rates.

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

When we sell a product providing a customer the right to return it, we record a provision for estimated sales returns based on our sales return policy and historical

return rates. Other factors considered include actual product recalls, expected marketplace changes, the remaining shelf life of the product, and the expected entry of generic products. In 2017, sales returns amounted to approximately 1% of gross product sales. If sufficient experience is not available, sales are only recorded based on evidence of product consumption or when the right of return has expired.

We enter into distribution service agreements with major wholesalers, which provide a financial disincentive for the wholesalers to purchase product quantities in excess of current customer demand. Where possible, we adjust shipping patterns for our products to maintain wholesalers' inventory levels consistent with underlying patient demand.

We offer cash discounts to customers to encourage prompt payment. Cash discounts are estimated and accrued at the time of invoicing and are deducted from revenue.

Following a decrease in the price of a product, we generally grant customers a "shelf stock adjustment" for their existing inventory for the relevant product. Provisions for shelf stock adjustments, which are primarily relevant within the Sandoz Division, are determined at the time of the price decline or at the point of sale, if the impact of a price decline on the products sold can be reasonably estimated based on the customer's inventory levels of the relevant product.

Other sales discounts, such as consumer coupons and co-pay discount cards, are offered in some markets. The estimated amounts of these discounts are recorded at the time of sale, or when the coupons are issued, and are estimated utilizing historical experience and the specific terms for each program. If a discount for a probable future transaction is offered as part of a sales transaction then an appropriate portion of revenue is deferred to cover this estimated obligation.

We adjust provisions for revenue deductions periodically to reflect actual experience. To evaluate the adequacy of provision balances, we use internal and external estimates of the inventory in transit, the level of inventory in the distribution and retail channels actual claims data received and the time lag for processing rebate claims. External data sources include reports from wholesalers and third-party market data purchased by Novartis.

The following table shows the worldwide extent of our revenue deductions provisions and related payment experiences for the Innovative Medicines, Sandoz and Alcon Divisions:

Provisions for deductions from revenue

				Income statement charge			
(USD millions)	Revenue deductions provisions at January 1	Effect of currency translation and business combinations	Payments/ utilizations	Adjustments of prior years	Current year	Change in provisions offset against gross trade receivables	Revenue deductions provisions at December 31
2017							
US-specific healthcare plans and program rebates	1 461		– 3 684	– 62	3 875		1 590
Non-US-specific healthcare plans and program rebates	1 020	131	– 1 954	80	2 186	– 107	1 356
Non-healthcare plans and program-related rebates, returns and other deductions	1 702	65	– 11 814	– 127	12 045	– 145	1 726
Total 2017	**4 183**	**196**	**– 17 452**	**– 109**	**18 106**	**– 252**	**4 672**
2016							
US-specific healthcare plans and program rebates	1 165		– 3 203	7	3 492		1 461
Non-US-specific healthcare plans and program rebates	1 024	– 31	– 1 844	– 26	1 883	14	1 020
Non-healthcare plans and program-related rebates, returns and other deductions	1 601	– 19	– 11 142	– 117	11 383	– 4	1 702
Total 2016	**3 790**	**– 50**	**– 16 189**	**– 136**	**16 758**	**10**	**4 183**

The table below shows the gross to net sales reconciliation for our Innovative Medicines Division:

Gross to net sales reconciliation

	Income statement charge			
	Charged through revenue deduction provisions USD millions	Charged directly without being recorded in revenue deduction provisions USD millions	Total USD millions	In % of gross sales
2017				
Innovative Medicines gross sales subject to deductions			**43 994**	**100.0**
US-specific healthcare plans and program rebates	– 3 303		– 3 303	– 7.5
Non-US-specific healthcare plans and program rebates	– 1 722	– 956	– 2 678	– 6.1
Non-healthcare plans and program-related rebates, returns and other deductions	– 2 698	– 2 290	– 4 988	– 11.3
Total Innovative Medicines gross to net sales adjustments	**– 7 723**	**– 3 246**	**– 10 969**	**– 24.9**
Innovative Medicines net sales 2017			**33 025**	**75.1**
2016				
Innovative Medicines gross sales subject to deductions			**42 630**	**100.0**
US-specific healthcare plans and program rebates	– 3 051		– 3 051	– 7.2
Non-US-specific healthcare plans and program rebates	– 1 352	– 885	– 2 237	– 5.2
Non-healthcare plans and program-related rebates, returns and other deductions	– 2 736	– 2 044	– 4 780	– 11.2
Total Innovative Medicines gross to net sales adjustments	**– 7 139**	**– 2 929**	**– 10 068**	**– 23.6**
Innovative Medicines net sales 2016			**32 562**	**76.4**

Surgical equipment revenue

Surgical equipment is often sold together with other products and services under a single contract. The total consideration is allocated to the separate elements based on their relative fair values. Revenue is recognized once the recognition criteria have been met for each element of the contract.

For surgical equipment, in addition to cash and installment sales, revenue is recognized under finance and operating lease arrangements. Arrangements in which Novartis transfers substantially all the risks and rewards incidental to ownership to the customer are treated as finance lease arrangements. Revenue from finance lease arrangements is recognized at amounts equal to the fair values of the equipment, which approximate the present values of the minimum lease payments under the arrangements. As interest rates embedded in lease arrangements are approximately market rates, revenue under finance lease arrangements is comparable to revenue for outright sales. Finance income for arrangements in excess of twelve months is deferred and subsequently recognized based on a pattern that approximates the use of the effective interest method and recorded in "Other income". Operating lease revenue for equipment rentals is recognized on a straight-line basis over the lease term.

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

We review long-lived intangible assets and property, plant and equipment for impairment whenever events or changes in circumstance indicate that the asset's balance sheet carrying amount may not be recoverable. Goodwill, the Alcon brand name and other currently not amortized intangible assets are reviewed for impairment at least annually.

An asset is generally considered impaired when its balance sheet carrying amount exceeds its estimated recoverable amount, which is defined as the higher of its fair value less costs of disposal and its value in use. Usually, Novartis adopts the fair value less costs of disposal method for its impairment evaluation. In most cases no directly observable market inputs are available to measure the fair value less costs of disposal. Therefore, an estimate of fair value less costs of disposal is derived indirectly and is based on net present value techniques utilizing post-tax cash flows and discount rates. In the limited cases where the value in use method is applied, net present value techniques are utilized using pre-tax cash flows and discount rates.

Fair value reflects estimates of assumptions that market participants would be expected to use when pricing the asset and for this purpose management considers the range of economic conditions that are expected to exist over the remaining useful life of the asset. The estimates used in calculating net present values are highly sensitive, and depend on assumptions specific to the nature of the Group's activities with regard to:

- amount and timing of projected future cash flows;
- behavior of competitors (launch of competing products, marketing initiatives, etc.);
- probability of obtaining regulatory approvals;
- future tax rates;
- appropriate royalty rate for the Alcon brand name;
- appropriate terminal growth rate; and
- appropriate discount rate.

Due to the above factors and those further described in Note 1, actual cash flows and values could vary significantly from forecasted future cash flows and related values derived using discounting techniques.

The recoverable amount of the grouping of cash generating units to which goodwill and indefinite life intangible assets are allocated is based on fair value less costs of disposal. The valuations are derived from applying discounted future cash flows based on key assumptions, including the terminal growth rate and discount rate. For additional information see Note 10 starting on page 214.

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

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

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

Goodwill and other intangible assets represent a significant part of our consolidated balance sheet, primarily due to acquisitions. Although no significant additional impairments are currently anticipated, impairment evaluation could lead to material impairment charges in the future. For more information, see Note 10 to the Group's consolidated financial statements.

Additionally, net impairment charges for property, plant and equipment during 2017 amounted to USD 157 million (2016: USD 102 million).

Trade receivables

Trade receivables are initially recognized at their invoiced amounts including any related sales taxes less adjustments for estimated revenue deductions such as rebates, charge-backs and cash discounts.

Provisions for doubtful trade receivables are established once there is an indication that it is likely that a loss will be incurred. These provisions represent the difference between the trade receivable's carrying amount in the consolidated balance sheet and the estimated net collectible amount. Significant financial difficulties of a customer, such as probability of bankruptcy, financial reorganization, default or delinquency in payments are considered indicators that recovery of the trade receivable is doubtful. Trade receivable balances include sales to drug wholesalers, retailers, private health systems, government agencies, managed care providers, pharmacy benefit managers and government-supported healthcare systems. Novartis continues to monitor sovereign debt issues and economic conditions in Greece, Italy, Portugal, Spain, Brazil, Russia, Saudi Arabia, Turkey and other countries, and evaluates trade receivables in these countries for potential collection risks. Substantially all of the trade receivables overdue from Greece, Italy, Portugal, Spain and Saudi Arabia are due directly from local governments or from government-funded entities. Deteriorating credit and economic conditions as well as other factors in these countries have resulted in, and may continue to result in an increase in the average length of time that it takes to collect these trade receivables and may require Novartis to re-evaluate the collectability of these trade receivables in future periods.

Contingent consideration

In a business combination or divestment of a business, it is necessary to recognize contingent future payments to previous owners, representing contractually defined potential amounts as a liability or asset. Usually for Novartis these are linked to milestone or royalty payments related to certain assets and are recognized as a financial liability or financial asset at their fair value, which is then re-measured at each subsequent reporting date. These estimations typically depend on factors such as technical milestones or market performance and are adjusted for the probability of their likelihood of payment, and if material, are appropriately discounted to reflect the impact of time.

Changes in the fair value of contingent consideration liabilities in subsequent periods are recognized in the consolidated income statement in "Cost of goods sold" for currently marketed products and in "Research & Development" for In-Process Research and Development (IPR&D). Changes in contingent consideration assets are recognized in "Other income" or "Other expense", depending on its nature.

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

Impairment of associated companies accounted for at equity

Novartis considers investments in associated companies for impairment evaluation whenever objective evidence indicates the net investment may be impaired, including when a quoted share price indicates a fair value less than the per-share balance sheet carrying value for the investment.

If the recoverable amount of the investment is estimated to be lower than the balance sheet carrying amount an impairment charge is recognized for the difference in the consolidated income statement under "Income from associated companies".

Retirement and other post-employment benefit plans

We sponsor pension and other post-employment benefit plans in various forms that cover a significant portion of our current and former associates. For post-employment plans with defined benefit obligations, we are required to make significant assumptions and estimates about future events in calculating the expense and the present value of the liability related to these plans. These include assumptions about the interest rates we apply to estimate future defined benefit obligations and net periodic pension expense, as well as rates of future pension increases. In addition, our actuarial consultants provide our management with historical statistical information such as withdrawal and mortality rates in connection with these estimates.

Assumptions and estimates used by the Group may differ materially from the actual results we experience due to changing market and economic conditions, higher or lower withdrawal rates, and longer or shorter life spans of participants among other factors. For example, in 2017, a decrease in the interest rate we apply in determining the present value of the defined benefit obligations of one-quarter of one percent would have increased our year-end defined benefit pension obligation for plans in Switzerland, United States, United Kingdom, Germany and Japan, which represent 94% of the Group total defined benefit pension obligation, by approximately USD 0.8 billion. Similarly, if the 2017 interest rate had been one quarter of one percentage point lower than actually assumed, the net periodic pension cost for pension plans in these countries, which represent about 82% of the Group's total net periodic pension cost for pension plans, would have increased by approximately USD 23 million. Depending on events, such differences could have a material effect on our total equity. For more information on obligations under retirement and other post-employment benefit plans and underlying actuarial assumptions, see Note 24 to the Group's consolidated financial statements.

Provisions and Contingencies

A number of Group companies are involved in various government investigations and legal proceedings (intellectual property, sales and marketing practices, product liability, commercial, employment and wrongful discharge, environmental claims, etc.) arising out of the normal conduct of their businesses. For more information, see Note 19 and Note 27 to the Group's consolidated financial statements.

We record provisions for legal proceedings when it is probable that a liability has been incurred and the amount can be reliably estimated. These provisions are adjusted periodically as assessments change or additional information becomes available. For significant product liability cases, the provision is actuarially determined based on factors such as past experience, amount and number of claims reported, and estimates of claims incurred but not yet reported.

Provisions are recorded for environmental remediation costs when expenditure on remedial work is probable and the cost can be reliably estimated. Remediation costs are provided for under "Non-current liabilities" in the Group's consolidated balance sheet.

Provisions relating to estimated future expenditure for liabilities do not usually reflect any insurance or other claims or recoveries, since these are only recognized as assets when the amount is reasonably estimable and collection is virtually certain.

Research & Development

Internal Research & Development costs are fully charged to the consolidated income statement in the period in which they are incurred. We consider that regulatory and other uncertainties inherent in the development of new products preclude the capitalization of internal development expenses as an intangible asset usually until marketing approval from the regulatory authority is obtained in a relevant major market, such as for the United States, the European Union, Switzerland or Japan.

Healthcare contributions

In many countries, our subsidiaries are required to make contributions to the countries' healthcare costs as part of programs other than the ones mentioned above under deductions from revenues. The amounts to be paid depend on various criteria such as the subsidiary's market share or sales volume compared to certain targets. Considerable judgment is required in estimating these contributions, as not all data is available when the estimates need to be made.

The largest of these healthcare contributions relates to the US Healthcare Reform fee, which was introduced in 2011. This fee is an annual levy to be paid by US pharmaceutical companies, including various Novartis subsidiaries, based on each company's qualifying sales as a percentage of the prior year's government-funded program sales. This pharmaceutical fee levy is recognized in "Other expense".

In addition, effective 2013, the United States government implemented a medical device sales tax that is levied on the Alcon Division's United States sales of products which that considered surgical devices under the law. This medical device tax is initially included in the cost of inventory as, for Alcon, the tax is usually levied on intercompany sales. It is expensed as cost of goods sold when the inventory is sold to third parties. In December 2015, Congress enacted a law that included a two-year moratorium on applying the medical device excise tax, which expired on December 31, 2017. On January 22, 2018, the US Congress extended the moratorium for an additional two years.

Taxes

We prepare and file our tax returns based on an interpretation of tax laws and regulations, and we record estimates based on these judgments and interpretations. Our tax returns are subject to examination by the competent taxing authorities, which may result in an assessment being made requiring payments of additional tax, interest or penalties. Since Novartis uses its intellectual property globally to deliver goods and services, the transfer prices within the Group as well as arrangements between subsidiaries to finance research and development and other activities may be challenged by the national tax authorities in any of the jurisdictions in which Novartis operates. Therefore, inherent uncertainties exist in our estimates of our tax positions, but we believe that our estimated amounts for current and deferred tax assets or liabilities, including any amounts related to any uncertain tax positions, are appropriate based on currently known facts and circumstances.

New accounting pronouncements

See Note 1 to the Group's consolidated financial statements.

Internal control over financial reporting

The Group's management has assessed the effectiveness of internal control over financial reporting. The Group's independent statutory auditor also issued an opinion on the effectiveness of internal control over financial reporting. Both the Group's management and its external auditors concluded that the Group maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017.

Factors affecting results of operations

We believe that our strategy, which is anchored in our company's tradition of leadership in innovation, positions us well to take advantage of trends shaping the future of the industry. These trends range from advances in science and technology that are opening new frontiers for research and development (R&D), to the growing and graying of populations that are boosting demand for chronic disease treatments (see page 15).

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

Approach to risk management

The Risk Committee of the Board ensures the Group has implemented an appropriate and effective risk management system and process. It reviews with management and Internal Audit the identification, prioritization and management of the risks, the accountabilities and roles of the functions involved in risk management, the risk portfolio and the related actions implemented by management. The Risk Committee informs the Board of Directors on a periodic basis.

The Group Risk Office coordinates and aligns the risk management processes, and reports to the Risk Committee on a regular basis on risk assessment and risk management. Organizational and process measures have been designed to identify and mitigate risks at an early stage. Organizationally, the responsibility for risk assessment and management is allocated to the divisions, organizational units, and functions, with specialized Corporate functions, such as Group Finance, Group Legal, Group Quality Assurance, Corporate Health, Safety and Environment, Business Continuity Management, Integrity & Compliance and the Business Practices Office providing support and controlling the effectiveness of risk management in these areas.

Financial risk management is described in more detail in Note 28 to the Group consolidated financial statements.

Risk factors

Loss of exclusivity for patented products

Pharmaceutical companies routinely face generic competition when their products lose patent or other intellectual property protection, and Novartis is no exception. Major products of our Innovative Medicines Division, as well as certain products of our Alcon and Sandoz Divisions, are protected by patent or other intellectual property rights, allowing us to exclusively market those products. The loss of exclusivity has had, and will continue to have, an adverse effect on our results. In 2017, the impact of generic competition on our net sales amounted to approximately USD 2.0 billion.

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

To counter the impact of patent expirations, we continuously invest in R&D to rejuvenate our portfolio. For example, in 2017, we invested 18.3% of total net sales in

R&D. One measure of the output of our efforts is the performance of our growth drivers, including *Cosentyx* and *Entresto*, the launches of *Kisqali*, *Kymriah* and *Rydapt* in 2017, and the newly launched Sandoz biosimilars. Novartis also has a number of late-stage product candidates in its pipeline with the potential to come to market in the next few years.

Ability to deliver new products

Our ability to maintain and grow our business and to replace revenue and income lost to generic and other competition depends in part on the success of our R&D activities in identifying and developing new treatments, that address unmet medical needs, are accepted by patients and physicians, and are reimbursed by payors.

Developing new healthcare products and bringing them to market is a costly, lengthy and uncertain process. R&D for a new product in our Innovative Medicines Division can take 15 years or more, from discovery to commercial launch. With time limits on intellectual property protections, the longer it takes to develop a product, the less time we may have to recoup our costs. During each stage of development, there is a significant risk that we will encounter obstacles. They may cause a delay or add substantial expense, limit the potential for commercial success, or force us to abandon a product in which we have invested substantial amounts of time and money.

In addition, as healthcare costs continue to rise, governments and payors around the world are increasingly focused on health outcomes, rewarding new products that represent truly breakthrough innovation versus those that offer an incremental benefit over other products in the same therapeutic class. This has led to requests for more clinical trial data than has been required in the past, the inclusion of significantly higher numbers of patients in clinical trials, and more detailed analyses of the trials. As a result, despite significant efforts by health authorities such as the FDA to accelerate the development of new drugs, the already lengthy and expensive process of obtaining regulatory approvals and reimbursement for pharmaceutical products has become even more challenging.

Our Sandoz Division faces similar challenges, particularly in the development of biosimilars. While Sandoz was a pioneer in introducing biosimilars to the European market in 2006, and was the first company to win approval for a biosimilar under the new regulatory pathway in the United States in 2015, many countries still lack fully developed regulatory frameworks for the development and approval of biosimilars. Further delays in establishing regulatory frameworks, or any other difficulties that may arise in the development or marketing of biosimilars, could put at risk the significant investments that Sandoz has made, and will continue to make, in this area.

Our Alcon Division faces medical device development and approval processes that are often similarly difficult. As part of its growth plan, Alcon has taken steps to accelerate innovation. It has started to see the results of its efforts, with the approval and launch of intraocular lens innovations in 2016 and 2017, including *Clareon* and *PanOptix* IOLs, *AutonoMe* and *Ultrasert* IOL delivery systems, and, *ReSTOR* Toric IOL with *ACTIVEFOCUS* optical design, as well as *CyPass* micro-stent and a multifocal version of *Dailies Total1*. But there is no certainty that Alcon will continue to be successful in these efforts, and if it is not, there could be a material adverse effect on the success of the Alcon Division, and on the Group as a whole.

In spite of our significant investments, there can be no guarantee that our R&D activities will produce commercially viable new products that will enable us to grow our business and replace revenue and income lost to competition.

Commercial success of key products

Our ability to grow depends not only on our pipeline delivery, but also on our commercial success, particularly with respect to our key growth drivers, which we consider to be an indicator of our ability to renew our portfolio. The commercial success of these products could be impacted at any time by a number of factors, including new competitors, changes in doctors' prescribing habits, pricing pressure, manufacturing issues, and loss of intellectual property protection. In addition, our revenue could be significantly impacted by the timing and rate of commercial acceptance of new products.

All of our businesses face intense competition from new products and scientific advances from competitors. Physicians, patients and payors may choose competitor products instead of ours if they perceive them to be better in terms of efficacy, safety, cost or convenience.

In particular, our Alcon Division and our US Sandoz business each has suffered declines in sales and profits in recent years due at least in part to increased competition for its products, although Alcon's results improved in 2017, returning to growth. There can be no certainty either that Sandoz US sales will recover, or that Alcon's improved results will be repeated in the coming years. In any event, such competition and the costs of our efforts to improve these businesses' performance, as well as other factors, can be expected to affect the business, financial condition or results of operations of these organizations, at least in the near term. In addition, despite the devotion of significant resources to our efforts to improve the performance of Alcon and Sandoz US, those efforts may ultimately prove insufficient.

Pricing and reimbursement

Around the world, governments and payors continue to struggle with rising healthcare costs as aging populations contribute to increased prevalence of chronic diseases. There have also been examples of significant controversies about prices for pharmaceuticals that some members of the public have considered excessive. These factors have intensified the pressures we face regarding the prices we charge for our drugs, and our ability to establish satisfactory rates of reimbursement for our products by governments, insurers and other payors.

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

We expect scrutiny to continue in 2018, and the following years, as governments and insurers around the world strive to reduce healthcare costs through steps such as restricting access to higher-priced new medicines, increasing coinsurance or copays owed by patients for medicines, increasing the use of generics, and imposing price cuts. In this environment, we believe it is more

important than ever to demonstrate the value that true innovation brings to the healthcare system.

To manage these pressures, we are investing in real-world data and analytics to provide additional evidence of the health benefits of our products, exploring new technologies and patient management services, and partnering with payors to develop and scale outcomes-based commercial models. For example, we are working with customers on flexible pricing approaches where we are fully compensated only if a drug succeeds in meeting certain performance targets.

Business practices

In recent years, there has been a trend of increasing government investigations and litigation against companies operating in our industry, including in the United States and other countries. We are obligated to comply with the laws of all countries in which we operate, as well as any new requirements that may be imposed upon us. But beyond legal requirements, we strive to meet evolving public expectations for ethical behavior. We have a significant global compliance program in place, and we devote substantial time and resources to efforts to ensure that our business is conducted in a legal and publicly acceptable manner. Despite these efforts, any failure to comply with the law could lead to substantial liabilities that may not be covered by insurance and could affect our business and reputation.

Governments and regulatory authorities worldwide are also increasingly challenging practices previously considered to be legal and compliant. For example, sponsoring doctors to attend medical conferences has long been used by pharmaceutical companies to help raise awareness of the latest advances in medicine. One of our goals in 2017 was to find better and more inclusive ways to reach a broader cross-section of this community. We have therefore started to employ technology to supplement face-to-face meetings and bring the experience of international congresses to the local level.

Responding to these challenges and new regulations is costly. Investigations and litigation may affect our reputation, create a risk of potential exclusion from government reimbursement programs in the United States and other countries, and potentially lead to large damage payments and agreements intended to regulate company behavior. This is why we continued to strengthen the Integrity & Compliance function in 2017. The function now has 473 employees, and is headed by our Chief Ethics and Compliance Officer, who reports directly to the CEO of Novartis. The Chief Ethics and Compliance Officer is also Head of Litigation, reporting to the Group General Counsel of Novartis. By bringing the Integrity & Compliance and Legal functions closer together, we can evaluate facts that might be at issue in lawsuits to determine if additional compliance actions or policies are warranted. We expect this will help us constantly improve our compliance activities.

Supply continuity

The production of pharmaceutical products and medical devices can be highly complex, and any manufacturing issue compromising supply or quality could have serious consequences for the health of patients. For this reason, there are strict regulatory requirements surrounding our manufacturing processes, which, in addition to our own high quality standards, introduce a greater chance for disruptions and liabilities. Any significant failure by us or our third party suppliers to comply with these requirements or the health authorities' expectations, may cause us to shut down the production facilities or production lines. Alternately, we may be forced to shut them down by a government health authority.

Beyond regulatory requirements, many of our products involve technically sophisticated manufacturing processes or require specialized raw materials. For example, biologic products, produced from living plant or animal micro-organisms comprise a significant portion of our product portfolio. For biologic products, slight deviations in the production process could lead to production failures or recalls. Our portfolio also includes a number of sterile products such as oncology treatments, which are technically complex to manufacture and require strict environmental controls. There is a greater chance of production failures and supply interruptions for such products.

Given the complexity of our manufacturing processes, we have worked for several years to adopt a single high-quality standard across the company. We believe these efforts are having an impact. The results of inspections by regulatory agencies in 2017 were consistent with the year before. Out of a total of 217 inspections, all but two (99%) were without major findings.

Foreign exchange fluctuations

Changes in exchange rates between the US dollar, our reporting currency, and other currencies can have a significant effect on our reported sales, costs and earnings, as well as on the reported value of our assets, liabilities and cash flows.

For example, because our expenditures in Swiss francs are significantly higher than our revenue in Swiss francs, volatility in the value of the Swiss franc can have a significant impact on our reported results, and the timing and extent of such volatility can be difficult to predict.

There is also a risk that certain countries could take steps that could significantly impact the value of their currencies, such as withdrawing from trade agreements or common currencies. In addition, countries facing local financial difficulties, including countries experiencing high inflation rates and highly indebted countries facing large capital outflows, may impose controls on the exchange of foreign currency. Such exchange controls could limit our ability to distribute retained earnings from our local affiliates, or to pay intercompany payables due from those countries.

To mitigate the risk posed by foreign exchange fluctuations, we engage in hedging transactions where management deems appropriate, after taking into account the natural hedging afforded by our global business activity.

Intangible assets and goodwill

We carry a significant amount of goodwill and other intangible assets on our consolidated balance sheet, primarily due to acquisitions, including the acquisition of Alcon and the oncology assets acquired from GSK. As a result, we may incur significant impairment charges if the fair value of intangible assets and groupings of cash generating units containing goodwill are less than their carrying value on the Group's consolidated balance sheet at any point in time.

We regularly review our long-lived intangible and tangible assets for impairment. In 2017, for example, we recorded intangible asset impairment charges of USD 709 million, including the cost of discontinuing the development of RLX030 (serelaxin). Impairment testing may lead to additional impairment charges in the future. Any significant impairment charges could have a material adverse effect on our results of operations and financial condition.

Tax

Our worldwide operations are taxed under the laws of the jurisdictions in which we operate. However, the integrated nature of our worldwide operations can produce conflicting claims from revenue authorities in different countries as to the profits to be taxed in the individual countries, including disputes relating to transfer pricing. The majority of the jurisdictions in which we operate have double tax treaties with other foreign jurisdictions, which provide a framework for mitigating the impact of double taxation on our revenues and capital gains. However, mechanisms developed to resolve such conflicting claims are largely untried, and can be expected to be very lengthy.

In recent years, tax authorities around the world have increased their scrutiny of company tax filings, and have become more rigid in exercising any discretion they may have. As part of this, the Organization for Economic Co-operation and Development (OECD) has proposed a number of tax law changes under its Base Erosion and Profit Shifting (BEPS) Action Plans to address issues of transparency, coherence and substance.

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

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

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

In general, such tax reform efforts, including with respect to tax base or rate, transfer pricing, intercompany dividends, cross border transactions, controlled corporations, and limitations on tax relief allowed on the interest on intercompany debt, will require us to continually assess our organizational structure against tax policy trends, and could lead to an increased risk of international tax disputes and an increase in our effective tax rate, and could adversely affect our financial results.

IT security, data integrity and data privacy

We are heavily dependent on critical, complex and interdependent information technology (IT) systems, including internet-based systems, to support business processes.

The size and complexity of our IT systems, and in some instances their age, make them potentially vulnerable to external and internal security incidents, breakdowns, malicious intrusions, cybercrimes, including State-sponsored cybercrimes, malware, misplaced and lost data, programming and human errors, and other similar events. Although we have devoted and continue to devote significant resources and management attention to cybersecurity and to business continuity efforts, like many companies, we have experienced certain of these events and expect to continue to experience them in the future, as the external cyber-attack threaat only keeps growing. We believe that the data security incidents we have experienced to date have not resulted in significant disruptions to our operations, and have not had a significant adverse effect on our results of operations, or on third parties. However, we may not be able to prevent breakdowns or breaches in our systems and we may not be able to prevent such events from having a material adverse effect on our business, financial condition, results of operation, or reputation.

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

Transformational technologies and business models

Rapid progress in digital technologies and in the development of new business models is substantially transforming numerous industries around the world, while sometimes quickly rendering established businesses uncompetitive or obsolete. To take advantage of these opportunities, Novartis has embarked upon a digital transformation strategy, with the goal of making Novartis

an industry leader in leveraging advanced analytics and other new technologies. At the same time, there is a risk that other companies with specialized expertise or business models may enter the healthcare field, potentially disrupting our relationships with patients, healthcare professionals, customers, distributors and suppliers, with unknown potential consequences for us.

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

Non-IFRS measures as defined by Novartis

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

Despite the use of these measures by management in setting goals and measuring the Group's performance, these are non-IFRS measures that have no standardized meaning prescribed by IFRS. As a result, such measures have limits in their usefulness to investors.

Because of their non-standardized definitions, the non-IFRS measures (unlike IFRS measures) may not be comparable to the calculation of similar measures of other companies. These non-IFRS measures are presented solely to permit investors to more fully understand how the Group's management assesses underlying performance. These non-IFRS measures are not, and should not be viewed as, a substitute for IFRS measures.

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

Core results

The Group's core results – including core operating income, core net income and core earnings per share – exclude fully the amortization and impairment charges of intangible assets, except software, and certain acquisition-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 and financial assets, as well as income and expense items that management deems exceptional and that are or are expected to accumulate within the year to be over a USD 25 million threshold.

Novartis believes that investor understanding of the Group's performance is enhanced by disclosing core measures of performance since they exclude items that can vary significantly from year to year, the core measures enable better comparison of business performance across years. For this same reason, Novartis uses these core measures in addition to IFRS and other measures as important factors in assessing the Group's performance.

The following are examples of how these core measures are utilized:

- In addition to monthly reports containing financial information prepared under IFRS, senior management receives a monthly analysis incorporating these core measures.
- Annual budgets are prepared for both IFRS and core measures.

A limitation of the core measures is that they provide a view of the Group's operations without including all events during a period, such as the effects of an acquisition, divestments, or amortization/impairments of purchased intangible assets and restructurings.

Constant currencies

Changes in the relative values of non-US currencies to the US dollar can affect the Group's financial results and financial position. To provide additional information that may be useful to investors, including changes in sales volume, we present information about our net sales and various values relating to operating and net income that are adjusted for such foreign currency effects.

Constant currency calculations have the goal of eliminating two exchange rate effects so that an estimate can be made of underlying changes in the consolidated income statement excluding the impact of fluctuations in exchange rates:

- The impact of translating the income statements of consolidated entities from their non-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, 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 to the prior year is shown as a positive growth.

Free cash flow

Free cash flow is presented as additional information because management believes it is a useful supplemental indicator of the Group's ability to operate without reliance on additional borrowing or use of existing cash. Free cash flow is a measure of the net cash generated that is available for debt repayment, investment in strategic opportunities and for returning to shareholders. Free cash flow is a non-IFRS measure, which means it should not be interpreted as a measure determined under IFRS. Free cash flow is not intended to be a substitute measure for cash flow from operating activities as determined under IFRS.

Novartis defines free cash flow as cash flow from operating activities and cash flow associated with the purchase or sale of property, plant and equipment, as well as intangible, other non-current and financial assets, excluding marketable securities. The definition of free cash flow used by Novartis does not include amounts related to changes in investments in associated companies or related acquisitions or divestments of subsidiaries.

Net debt

Net debt is presented as additional information because management believes it is a useful supplemental indicator of the Group's ability to pay dividends, to meet financial commitments and to invest in new strategic opportunities, including strengthening its balance sheet. Net debt is a non-IFRS measure, which means it should not be interpreted as a measure determined under IFRS.

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

Novartis Cash Value Added

Novartis Cash Value Added (NCVA) is a metric that is based on what the company assesses to be its cash flow return less a capital charge on gross operating assets. NCVA is used as the primary internal financial measure for determining payouts under the Long-Term Performance Plan introduced in 2014. More information on NCVA is presented as part of the Compensation Report on page 130.

Additional information

EBITDA

Novartis defines earnings before interest, tax, depreciation and amortization (EBITDA) as operating income from continuing operations excluding depreciation of property, plant and equipment (including any related impairment charges) and amortization of intangible assets (including any related impairment charges).

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

Enterprise value

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

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

2017 and 2016 reconciliation from IFRS results to core results

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

[1] Adjusted for charges of USD 0.3 billion in 2016 related mainly to devaluation losses in Venezuela.
[2] Earnings per share (EPS) is calculated on the amount of net income attributable to shareholders of Novartis AG.

2017 and 2016 reconciliation from Group IFRS results to Group core results

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

[1] Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms; Income from associated companies includes USD 376 million for the Novartis share of the estimated Roche core items.

[2] Impairments: Cost of goods sold and Research & Development include impairment charges related to intangible assets; Research & Development and Other expense include impairment charges related to financial assets; Research & Development, Other income and Other expense include reversals and charges related to the impairment of property, plant and equipment.

[3] Acquisition or divestment of businesses and related items, including restructuring and integration charges: Other income and Other expense include transitional service-fee income and expenses and other items related to the portfolio transformation.

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

[5] Taxes on the adjustments between IFRS and core results take into account, for each individual item included in the adjustment, the tax rate that will finally be applicable to the item based on the jurisdiction where the adjustment will finally have a tax impact. Generally, this results in amortization and impairment of intangible assets and acquisition-related restructuring and integration items having a full tax impact. There is usually a tax impact on other items, although this is not always the case for items arising from legal settlements in certain jurisdictions. Adjustments related to income from associated companies are recorded net of any related tax effect. Due to these factors and the differing effective tax rates in the various jurisdictions, the tax on the total adjustments of USD 4.4 billion to arrive at the core results before tax amounts to USD 760 million. The average tax rate on the adjustments is 17.1%.

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

2016 (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	**31 916**	**3 758**	**96**		**36**	**35 806**
Operating income	**8 268**	**3 801**	**786**	**– 33**	**165**	**12 987**
Income before taxes	**7 817**	**4 097**	**786**	**– 33**	**648**	**13 315**
Taxes[5]	– 1 119					– 2 001
Net income	**6 698**					**11 314**
Basic EPS (USD)[6]	**2.82**					**4.75**
The following are adjustments to arrive at Core Gross Profit						
Other revenues	918				– 50	868
Cost of goods sold	– 17 520	3 758	96		86	– 13 580
The following are adjustments to arrive at Core Operating Income						
Marketing & Sales	– 11 998				7	– 11 991
Research & Development	– 9 039	43	495		99	– 8 402
General & Administration	– 2 194				74	– 2 120
Other income	1 927		– 10	– 297	– 867	753
Other expense	– 2 344		205	264	816	– 1 059
The following are adjustments to arrive at Core Income before taxes						
Income from associated companies	703	296			135	1 134
Other financial income and expense	– 447				348	– 99

[1] Amortization of intangible assets: Cost of goods sold includes recurring amortization of acquired rights to in-market products and other production-related intangible assets; Research & Development includes the recurring amortization of acquired rights for technology platforms; Income from associated companies includes USD 296 million for the Novartis share of the estimated Roche core items.

[2] Impairments: Cost of goods sold and Research & Development include impairment charges related to intangible assets; Other income includes impairment reversals of property, plant and equipment; Other expense includes impairment charges related to property, plant and equipment, and financial assets.

[3] Acquisition or divestment of businesses and related items, including restructuring and integration charges: Other income and Other expense include transitional service-fee income and expenses and other items related to the portfolio transformation; Other income also includes a gain from the revaluation of a previously held financial investment in a newly acquired company.

[4] Other items: Other revenues include an early release of deferred income associated with a collaboration agreement; Cost of goods sold, Other income and Other expense include net restructuring and other charges related to the Group-wide rationalization of manufacturing sites; Research & Development, Marketing & Sales, Other income and Other expense include other restructuring income and charges; Cost of goods sold and Research & Development include adjustments of contingent considerations; General & Administration, Other income and Other expense include items related to setup costs for Novartis Business Services; Other income and Other expense also include legal settlements and changes in provisions; Other income also includes gains from product divestments, other income related to the portfolio transformation and a gain related to the sale of real estate; Other expense also includes a charge as a result of a pension plan amendment, a charge for an indirect tax settlement and other costs; Income from associated companies includes USD 135 million for the Novartis share of the estimated GSK Consumer Healthcare Holdings Ltd. core items; Other financial income and expense relates mainly to devaluation losses in Venezuela.

[5] Taxes on the adjustments between IFRS and core results take into account, for each individual item included in the adjustment, the tax rate that will finally be applicable to the item based on the jurisdiction where the adjustment will finally have a tax impact. Generally, this results in amortization and impairment of intangible assets and acquisition-related restructuring and integration items having a full tax impact. There is usually a tax impact on other items, although this is not always the case for items arising from legal settlements in certain jurisdictions. Adjustments related to income from associated companies are recorded net of any related tax effect. Due to these factors and the differing effective tax rates in the various jurisdictions, the tax on the total adjustments for continuing operations of USD 5.5 billion to arrive at the core results before tax amounts to USD 882 million. The average tax rate on the adjustments is 16.0%.

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

Summary of quarterly and Group financial data

Summary of quarterly financial data for 2017 and 2016

(USD millions unless indicated otherwise)	Q1	Q2	Q3	Q4	2017	Q1	Q2	Q3	Q4	2016
Net sales to third parties	**11 539**	**12 242**	**12 413**	**12 915**	**49 109**	**11 600**	**12 470**	**12 126**	**12 322**	**48 518**
Other revenues	246	252	279	249	1 026	210	209	215	284	918
Cost of goods sold	– 4 105	– 4 258	– 4 323	– 4 489	– 17 175	– 4 212	– 4 451	– 4 368	– 4 489	– 17 520
Gross profit	**7 680**	**8 236**	**8 369**	**8 675**	**32 960**	**7 598**	**8 228**	**7 973**	**8 117**	**31 916**
Marketing & Sales	– 2 989	– 3 240	– 3 168	– 3 464	– 12 861	– 2 741	– 3 067	– 2 944	– 3 246	– 11 998
Research & Development	– 2 169	– 2 062	– 2 239	– 2 502	– 8 972	– 2 041	– 2 190	– 2 224	– 2 584	– 9 039
General & Administration	– 483	– 566	– 510	– 577	– 2 136	– 564	– 582	– 456	– 592	– 2 194
Other income	445	480	424	620	1 969	777	239	530	381	1 927
Other expense	– 562	– 568	– 519	– 682	– 2 331	– 578	– 535	– 610	– 621	– 2 344
Operating income	**1 922**	**2 280**	**2 357**	**2 070**	**8 629**	**2 451**	**2 093**	**2 269**	**1 455**	**8 268**
Income from associated companies	215	215	262	416	1 108	127	203	217	156	703
Interest expense	– 180	– 192	– 197	– 208	– 777	– 185	– 180	– 174	– 168	– 707
Other financial income and expense	– 10	12	14	23	39	– 41	– 3	– 38	– 365	– 447
Income before taxes	**1 947**	**2 315**	**2 436**	**2 301**	**8 999**	**2 352**	**2 113**	**2 274**	**1 078**	**7 817**
Taxes	– 282	– 336	– 353	– 325	– 1 296	– 341	– 307	– 329	– 142	– 1 119
Net income	**1 665**	**1 979**	**2 083**	**1 976**	**7 703**	**2 011**	**1 806**	**1 945**	**936**	**6 698**
Attributable to:										
Shareholders of Novartis AG	*1 666*	*1 980*	*2 081*	*1 976*	*7 703*	*2 011*	*1 804*	*1 940*	*957*	*6 712*
Non-controlling interests	– 1	– 1	2	0	0	0	2	5	– 21	– 14
Basic earnings per share (USD)	*0.70*	*0.84*	*0.89*	*0.85*	*3.28*	*0.85*	*0.76*	*0.81*	*0.40*	*2.82*
Net sales to third parties by segment										
Innovative Medicines	**7 692**	**8 275**	**8 302**	**8 756**	**33 025**	**7 729**	**8 387**	**8 173**	**8 273**	**32 562**
Sandoz	**2 430**	**2 451**	**2 584**	**2 595**	**10 060**	**2 445**	**2 577**	**2 517**	**2 605**	**10 144**
Alcon	**1 417**	**1 516**	**1 527**	**1 564**	**6 024**	**1 426**	**1 506**	**1 436**	**1 444**	**5 812**
Net sales to third parties	**11 539**	**12 242**	**12 413**	**12 915**	**49 109**	**11 600**	**12 470**	**12 126**	**12 322**	**48 518**
Operating income by segment										
Innovative Medicines	**1 721**	**2 075**	**2 179**	**1 807**	**7 782**	**2 180**	**1 866**	**2 020**	**1 360**	**7 426**
Sandoz	**343**	**330**	**390**	**305**	**1 368**	**346**	**380**	**354**	**365**	**1 445**
Alcon	**– 43**	**– 19**	**– 50**	**– 78**	**– 190**	**31**	**7**	**– 50**	**– 120**	**– 132**
Corporate	– 99	– 106	– 162	36	– 331	– 106	– 160	– 55	– 150	– 471
Operating income	**1 922**	**2 280**	**2 357**	**2 070**	**8 629**	**2 451**	**2 093**	**2 269**	**1 455**	**8 268**
Core operating income	**3 010**	**3 235**	**3 382**	**3 223**	**12 850**	**3 261**	**3 332**	**3 381**	**3 013**	**12 987**
Core net income	**2 690**	**2 866**	**3 017**	**2 818**	**11 391**	**2 788**	**2 930**	**2 938**	**2 658**	**11 314**
Core basic earnings per share (USD)	*1.13*	*1.22*	*1.29*	*1.21*	*4.86*	*1.17*	*1.23*	*1.23*	*1.12*	*4.75*

Summary of Group financial data 2013–2017

(USD millions unless indicated otherwise)		2017	2016	2015	2014	2013
Net sales to third parties from continuing operations		**49 109**	**48 518**	**49 414**	**52 180**	**51 869**
Change relative to preceding year	%	1.2	– 1.8	– 5.3	0.6	1.5
Innovative Medicines net sales		33 025	32 562	33 345	34 828	34 953
Change relative to preceding year	%	1.4	– 2.3	– 4.3	– 0.4	1.4
Sandoz net sales		10 060	10 144	10 070	10 736	10 528
Change relative to preceding year	%	– 0.8	0.7	– 6.2	2.0	1.2
Alcon net sales		6 024	5 812	5 999	6 616	6 388
Change relative to preceding year	%	3.6	– 3.1	– 9.3	3.6	2.9
Operating income from continuing operations		**8 629**	**8 268**	**8 977**	**11 089**	**10 983**
Change relative to preceding year	%	4.4	– 7.9	– 19.0	1.0	– 4.6
As % of net sales	%	17.6	17.0	18.2	21.3	21.2
As % of average equity	%	11.6	10.9	12.1	15.3	15.3
As % of average net operating assets	%	9.4	9.0	10.5	13.8	13.4
Net income from continuing operations		**7 703**	**6 698**	**7 028**	**10 727**	**9 309**
Change relative to preceding year	%	15.0	– 4.7	– 34.5	15.2	– 2.3
As % of net sales	%	15.7	13.8	14.2	20.6	17.9
As % of average equity	%	10.3	8.8	9.5	14.8	13.0
Net income/loss from discontinued operations				10 766	– 447	– 17
Net income		**7 703**	**6 698**	**17 794**	**10 280**	**9 292**
As % of average equity	%	10.3	8.8	24.1	14.1	12.9
Dividends of Novartis AG[1]		**6 702**	**6 495**	**6 475**	**6 643**	**6 810**
As % of net income from continuing operations[2]	%	87	97	92	62	74
As % of net income[2]	%	87	97	36	65	74
Cash flows from operating activities from continuing operations		**12 621**	**11 475**	**12 085**	**13 898**	**12 617**
Change relative to preceding year	%	10.0	– 5.0	– 13.0	10.2	– 8.6
As % of net sales	%	25.7	23.7	24.5	26.6	24.3
Cash flows from operating activities		**12 621**	**11 475**	**11 879**	**13 897**	**13 174**
Free cash flow from continuing operations		**10 428**	**9 455**	**9 259**	**10 934**	**9 521**
Change relative to preceding year	%	10.3	2.1	– 15.3	14.8	– 15.4
As % of net sales	%	21.2	19.5	18.7	21.0	18.4
Free cash flow		**10 428**	**9 455**	**9 029**	**10 762**	**9 945**
Purchase of property, plant & equipment[3]		**1 696**	**1 862**	**2 367**	**2 624**	**2 903**
Change relative to preceding year	%	– 8.9	– 21.3	– 9.8	– 9.6	18.1
As % of net sales	%	3.5	3.8	4.8	5.0	5.6
Depreciation of property, plant & equipment[3]		**1 520**	**1 489**	**1 470**	**1 586**	**1 554**
As % of net sales	%	3.1	3.1	3.0	3.0	3.0
Core Research & Development[3]		**8 313**	**8 402**	**8 738**	**8 723**	**8 885**
As % of net sales	%	16.9	17.3	17.7	16.7	17.1
Core Innovative Medicines Division Research & Development		**7 049**	**7 112**	**7 502**	**7 432**	**7 611**
As % of Innovative Medicines Division net sales	%	21.3	21.8	22.5	21.3	21.8
Total assets		**133 079**	**130 124**	**131 556**	**125 387**	**126 254**
Liquidity		9 485	7 777	5 447	13 862	9 222
Equity		74 227	74 891	77 122	70 844	74 472
Debt/equity ratio		0.38:1	0.32:1	0.28:1	0.29:1	0.24:1
Current ratio		1.21:1	1.12:1	0.96:1	1.39:1	1.16:1
Net operating assets		**93 274**	**90 916**	**93 606**	**77 393**	**83 268**
Change relative to preceding year	%	2.6	– 2.9	20.9	– 7.1	3.0
As % of net sales	%	189.9	187.4	189.4	148.3	160.5
Personnel costs[3, 4]		**13 932**	**13 681**	**13 540**	**14 569**	**13 760**
As % of net sales	%	28.4	28.2	27.4	27.9	26.5
Full-time equivalent associates at year-end[3, 4]		**121 597**	**118 393**	**118 700**	**117 809**	**119 362**
Net sales per full-time equivalent associate (average)[4]	USD	409 259	409 274	417 861	440 020	447 488

[1] 2017 dividend proposal for shareholder approval at the Annual General Meeting on March 2, 2018, based on an estimated number of shares outstanding on dividend payment date. The dividend amount in USD for 2017 is calculated by converting into USD the proposed total gross dividend amount in CHF at the CHF-USD exchange rate of December 31, 2017.
[2] Based on net income attributable to the shareholders of Novartis AG
[3] Continuing operations
[4] Own employees

Novartis Group consolidated financial statements

Consolidated income statements

(For the years ended December 31, 2017, 2016 and 2015)

(USD millions unless indicated otherwise)	Note	2017	2016	2015
Net sales to third parties from continuing operations	3	**49 109**	**48 518**	**49 414**
Sales to discontinued segments				26
Net sales from continuing operations	3	**49 109**	**48 518**	**49 440**
Other revenues		1 026	918	947
Cost of goods sold		– 17 175	– 17 520	– 17 404
Gross profit from continuing operations		**32 960**	**31 916**	**32 983**
Marketing & Sales		– 12 861	– 11 998	– 11 772
Research & Development		– 8 972	– 9 039	– 8 935
General & Administration		– 2 136	– 2 194	– 2 475
Other income		1 969	1 927	2 049
Other expense		– 2 331	– 2 344	– 2 873
Operating income from continuing operations	3	**8 629**	**8 268**	**8 977**
Income from associated companies	4	1 108	703	266
Interest expense	5	– 777	– 707	– 655
Other financial income and expense	5	39	– 447	– 454
Income before taxes from continuing operations		**8 999**	**7 817**	**8 134**
Taxes	6	– 1 296	– 1 119	– 1 106
Net income from continuing operations		**7 703**	**6 698**	**7 028**
Net income from discontinued operations	29			10 766
Net income		**7 703**	**6 698**	**17 794**
Attributable to:				
Shareholders of Novartis AG		*7 703*	*6 712*	*17 783*
Non-controlling interests		*0*	*– 14*	*11*
Basic earnings per share (USD) from continuing operations		3.28	2.82	2.92
Basic earnings per share (USD) from discontinued operations				4.48
Total basic earnings per share (USD)	7	**3.28**	**2.82**	**7.40**
Diluted earnings per share (USD) from continuing operations		3.25	2.80	2.88
Diluted earnings per share (USD) from discontinued operations				4.41
Total diluted earnings per share (USD)	7	**3.25**	**2.80**	**7.29**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated statements of comprehensive income

(For the years ended December 31, 2017, 2016 and 2015)

(USD millions)	Note	2017	2016	2015
Net income		**7 703**	**6 698**	**17 794**
Other comprehensive income to be eventually recycled into the consolidated income statement:				
Fair value adjustments on marketable securities, net of taxes	8.1	38	– 113	28
Fair value adjustments on deferred cash flow hedges, net of taxes	8.1	12	15	20
Total fair value adjustments on financial instruments, net of taxes	8.1	50	– 98	48
Novartis share of other comprehensive income recognized by associated companies, net of taxes		– 37	671	– 48
Net investment hedge		– 237		
Currency translation effects	8.2	2 210	– 2 391	– 1 662
Total of items to eventually recycle		1 986	– 1 818	– 1 662
Other comprehensive income never to be recycled into the consolidated income statement:				
Actuarial gains/(losses) from defined benefit plans, net of taxes	8.3	851	– 515	– 147
Total comprehensive income		**10 540**	**4 365**	**15 985**
Attributable to:				
Shareholders of Novartis AG		*10 538*	*4 382*	*15 977*
Continuing operations		*10 538*	*4 382*	*5 238*
Discontinued operations				*10 739*
Non-controlling interests		*2*	*– 17*	*8*

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated balance sheets

(At December 31, 2017 and 2016)

(USD millions)	Note	2017	2016
Assets			
Non-current assets			
Property, plant & equipment	9	16 464	15 641
Goodwill	10	31 750	30 980
Intangible assets other than goodwill	10	29 997	31 340
Investments in associated companies	4	15 370	14 304
Deferred tax assets	11	8 229	10 034
Financial assets	12	2 243	2 196
Other non-current assets	12	818	698
Total non-current assets		**104 871**	**105 193**
Current assets			
Inventories	13	6 867	6 255
Trade receivables	14	8 600	8 202
Income tax receivables		202	156
Marketable securities, commodities, time deposits and derivative financial instruments	15	625	770
Cash and cash equivalents	15	8 860	7 007
Other current assets	16	3 054	2 541
Total current assets		**28 208**	**24 931**
Total assets		**133 079**	**130 124**
Equity and liabilities			
Equity			
Share capital	17	969	972
Treasury shares	17	– 100	– 76
Reserves		73 299	73 936
Issued share capital and reserves attributable to Novartis AG shareholders		**74 168**	**74 832**
Non-controlling interests		59	59
Total equity		**74 227**	**74 891**
Liabilities			
Non-current liabilities			
Financial debts	18	23 224	17 897
Deferred tax liabilities	11	5 168	6 657
Provisions and other non-current liabilities	19	7 057	8 470
Total non-current liabilities		**35 449**	**33 024**
Current liabilities			
Trade payables		5 169	4 873
Financial debts and derivative financial instruments	20	5 308	5 905
Current income tax liabilities		1 723	1 603
Provisions and other current liabilities	21	11 203	9 828
Total current liabilities		**23 403**	**22 209**
Total liabilities		**58 852**	**55 233**
Total equity and liabilities		**133 079**	**130 124**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated statements of changes in equity

(For the years ended December 31, 2017, 2016 and 2015)

(USD millions)	Note	Share capital	Treasury shares	Retained earnings	Total value adjustments	Issued share capital and reserves attributable to Novartis shareholders	Non-controlling interests	Total equity
Total equity at January 1, 2015		**1 001**	**– 103**	**72 433**	**– 2 565**	**70 766**	**78**	**70 844**
Net income				17 783		17 783	11	17 794
Other comprehensive income	8			– 48	– 1 758	– 1 806	– 3	– 1 809
Total comprehensive income				**17 735**	**– 1 758**	**15 977**	**8**	**15 985**
Dividends	17.1			– 6 643		– 6 643		– 6 643
Purchase of treasury shares	17.2		– 33	– 6 086		– 6 119		– 6 119
Reduction of share capital		– 10	15	– 5				
Exercise of options and employee transactions	17.2		14	1 578		1 592		1 592
Equity-based compensation	17.2		6	809		815		815
Decrease of treasury share repurchase obligation under a share buyback trading plan	17.4			658		658		658
Changes in non-controlling interests	17.3						– 10	– 10
Fair value adjustments related to divestments	8			– 100	100			
Total of other equity movements		**– 10**	**2**	**– 9 789**	**100**	**– 9 697**	**– 10**	**– 9 707**
Total equity at December 31, 2015		**991**	**– 101**	**80 379**	**– 4 223**	**77 046**	**76**	**77 122**
Net income				6 712		6 712	– 14	6 698
Other comprehensive income	8			671	– 3 001	– 2 330	– 3	– 2 333
Total comprehensive income				**7 383**	**– 3 001**	**4 382**	**– 17**	**4 365**
Dividends	17.1			– 6 475		– 6 475		– 6 475
Purchase of treasury shares	17.2		– 7	– 985		– 992		– 992
Reduction of share capital		– 19	25	– 6				
Exercise of options and employee transactions	17.2		2	212		214		214
Equity-based compensation	17.2		5	659		664		664
Impact of change in ownership of consolidated entities	17.5			– 7		– 7		– 7
Fair value adjustments related to divestments	8			– 12	12			
Total of other equity movements		**– 19**	**25**	**– 6 614**	**12**	**– 6 596**		**– 6 596**
Total equity at December 31, 2016		**972**	**– 76**	**81 148**	**– 7 212**	**74 832**	**59**	**74 891**
Net income				7 703		7 703		7 703
Other comprehensive income	8			– 37	2 872	2 835	2	2 837
Total comprehensive income				**7 666**	**2 872**	**10 538**	**2**	**10 540**
Dividends	17.1			– 6 495		– 6 495		– 6 495
Purchase of treasury shares	17.2		– 36	– 5 538		– 5 574		– 5 574
Reduction of share capital		– 3	5	– 2				
Exercise of options and employee transactions	17.2		2	253		255		255
Equity-based compensation	17.2		5	607		612		612
Changes in non-controlling interests	17.3						– 2	– 2
Total of other equity movements		**– 3**	**– 24**	**– 11 175**		**– 11 202**	**– 2**	**– 11 204**
Total equity at December 31, 2017		**969**	**– 100**	**77 639**	**– 4 340**	**74 168**	**59**	**74 227**

The accompanying Notes form an integral part of the consolidated financial statements.

Consolidated cash flow statements

(For the years ended December 31, 2017, 2016 and 2015)

(USD millions)	Note	2017	2016	2015
Net income from continuing operations		**7 703**	**6 698**	**7 028**
Reversal of non-cash items	22.1	7 058	8 437	9 070
Dividends received from associated companies and others		987	899	432
Interest received		97	43	34
Interest paid		– 708	– 723	– 646
Other financial receipts				714
Other financial payments		– 272	– 155	– 23
Taxes paid [1]		– 1 611	– 2 111	– 2 454
Cash flows before working capital and provision changes from continuing operations		**13 254**	**13 088**	**14 155**
Payments out of provisions and other net cash movements in non-current liabilities		– 877	– 1 536	– 1 207
Change in net current assets and other operating cash flow items	22.2	244	– 77	– 863
Cash flows from operating activities from continuing operations		**12 621**	**11 475**	**12 085**
Cash flows used in operating activities from discontinued operations [1]				– 188
Total cash flows from operating activities		**12 621**	**11 475**	**11 897**
Purchase of property, plant & equipment		– 1 696	– 1 862	– 2 367
Proceeds from sales of property, plant & equipment		92	161	237
Purchase of intangible assets		– 1 050	– 1 017	– 1 138
Proceeds from sales of intangible assets		640	847	621
Purchase of financial assets		– 468	– 247	– 264
Proceeds from sales of financial assets		330	247	166
Purchase of other non-current assets		– 42	– 149	– 82
Proceeds from sales of other non-current assets		1		1
Divestments of interests in associated companies		29		
Acquisitions and divestments of businesses, net	22.3	– 784	– 765	– 16 507
Purchase of marketable securities and commodities		– 580	– 530	– 595
Proceeds from sales of marketable securities and commodities		549	622	262
Cash flows used in investing activities from continuing operations		**– 2 979**	**– 2 693**	**– 19 666**
Cash flows used in/from investing activities from discontinued operations [1]	22.4	– 140	– 748	8 882
Total cash flows used in investing activities		**– 3 119**	**– 3 441**	**– 10 784**
Dividends paid to shareholders of Novartis AG		– 6 495	– 6 475	– 6 643
Acquisition of treasury shares		– 5 490	– 1 109	– 6 071
Proceeds from exercise options and other treasury share transactions		252	214	1 581
Increase in non-current financial debts	22.5	4 933	1 935	4 596
Repayment of non-current financial debts	22.5	– 188	– 1 696	– 3 086
Change in current financial debts	22.5	– 755	1 816	451
Impact of change in ownership of consolidated entities		0	– 6	0
Dividends paid to non-controlling interests and other financing cash flows		10	7	– 4
Cash flows used in financing activities		**– 7 733**	**– 5 314**	**– 9 176**
Effect of exchange rate changes on cash and cash equivalents		84	– 387	– 286
Net change in cash and cash equivalents		**1 853**	**2 333**	**– 8 349**
Cash and cash equivalents at January 1		7 007	4 674	13 023
Cash and cash equivalents at December 31		**8 860**	**7 007**	**4 674**

The accompanying Notes form an integral part of the consolidated financial statements.

[1] In 2016, the total net tax payment amounted to USD 2 299 million, of which USD 188 million was included in the cash flows used in investing activities from discontinued operations. In 2015, the total net tax payment amounted to USD 3 325 million, of which a refund of USD 94 million was included in the cash flows used in operating activities from discontinued operations, and a USD 965 million payment in the cash flows from investing activities of discontinued operations.

Notes to the Novartis Group consolidated financial statements

1. Significant accounting policies

The Novartis Group (Novartis or Group) is a multinational group of companies specializing in the research, development, manufacturing and marketing of a broad range of healthcare products led by innovative pharmaceuticals and also including eye care products and cost-saving generic pharmaceuticals. It is headquartered in Basel, Switzerland.

The consolidated financial statements of the Group are prepared in accordance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB). They are prepared in accordance with the historical cost convention except for items that are required to be accounted for at fair value.

The Group's financial year-end is December 31, which is also the annual closing date of the individual entities' financial statements incorporated into the Group's consolidated financial statements.

The preparation of financial statements requires management to make certain estimates and assumptions, either at the balance sheet date or during the year that affect the reported amounts of assets and liabilities, including any contingent amounts, as well as of revenues and expenses. Actual outcomes and results could differ from those estimates and assumptions.

Listed below are accounting policies of significance to Novartis or, in cases where IFRS provides alternatives, the option adopted by Novartis.

Scope of consolidation

The consolidated financial statements include all entities, including structured entities, over which Novartis AG, Basel, Switzerland, directly or indirectly has control (generally as a result of owning more than 50% of the entity's voting interest). Consolidated entities are also referred to as "subsidiaries".

In cases where Novartis does not fully own a subsidiary, it has elected to value any remaining outstanding non-controlling interest at the time of acquiring control of the subsidiary at its proportionate share of the fair value of the net identified assets.

The contribution of a business to an associate or joint venture is accounted for by applying the option under IFRS that permits the accounting for the retained interest of the business contributed at its net book value at the time of the contribution.

Investments in associated companies (generally defined as investments in entities in which Novartis holds between 20% and 50% of voting shares or over which it otherwise has significant influence) and joint ventures are accounted for using the equity method, except for selected venture fund investments for which the Group has elected to apply the method of fair value through the consolidated income statement.

Foreign currencies

The consolidated financial statements of Novartis are presented in US dollars (USD). The functional currency of subsidiaries is generally the local currency of the respective entity. The functional currency used for the reporting of certain Swiss and foreign finance entities is USD instead of their respective local currencies. This reflects the fact that the cash flows and transactions of these entities are primarily denominated in these currencies.

For subsidiaries not operating in hyperinflationary economies, the subsidiary's results, financial position and cash flows that do not have USD as their functional currency are translated into USD using the following exchange rates:

- Income, expense and cash flows using for each month the average exchange rate with the US dollar values for each month being aggregated during the year.
- Balance sheets using year-end exchange rates.
- Resulting exchange rate differences are recognized in other comprehensive income.

The only hyperinflationary economy applicable to Novartis is Venezuela. The financial statements of the major subsidiaries in this country are first adjusted for the effect of inflation, with any gain or loss on the net monetary position recorded in the related functional lines in the consolidated income statement and then translated into USD.

Acquisition of assets

Acquired assets are initially recognized on the balance sheet at cost if they meet the criteria for capitalization. If acquired as part of a business combination, the fair value of identified assets represents the cost for these assets. If separately acquired, the cost of the asset includes the purchase price and any directly attributable costs for bringing the asset into the condition to operate as intended. Expected costs for obligations to dismantle and remove property, plant and equipment when it is no longer used are included in their cost.

Property, plant and equipment

Property, plant and equipment are depreciated on a straight-line basis in the consolidated income statement over their estimated useful lives. Leasehold land is depreciated over the period of its lease, whereas freehold land is not depreciated. The related depreciation expense is included in the costs of the functions using the asset.

Property, plant and equipment are assessed for impairment whenever there is an indication that the balance sheet carrying amount may not be recoverable using cash flow projections for the useful life.

The following table shows the respective useful lives for property, plant and equipment:

	Useful life
Buildings	20 to 40 years
Machinery and other equipment	
Machinery and equipment	7 to 20 years
Furniture and vehicles	5 to 10 years
Computer hardware	3 to 7 years

Government grants obtained for construction activities, including any related equipment, are deducted from the gross acquisition cost to arrive at the balance sheet carrying value of the related assets.

Goodwill and intangible assets

Goodwill

Goodwill arises in a business combination and is the excess of the consideration transferred to acquire a business over the underlying fair value of the net identified assets acquired. It is allocated to groups of cash-generating units (CGUs) which are usually represented by the reported segments. Goodwill is tested for impairment annually at the level of these groups of CGUs, and any impairment charges are recorded under "Other Expense" in the consolidated income statement.

Intangible assets available-for-use

Novartis has the following classes of available-for-use intangible assets: Currently marketed products; Marketing know-how; Technologies; Other intangible assets (including computer software) and the Alcon brand name.

Currently marketed products represent the composite value of acquired intellectual property, patents, and distribution rights and product trade names.

Marketing know-how represents the value attributable to the expertise acquired for marketing and distributing Alcon surgical products.

Technologies represent identified and separable acquired know-how used in the research, development and production processes.

Significant investments in internally developed and acquired computer software are capitalized and included in the "Other" category and amortized once available for use.

The Alcon brand name is shown separately, as it is the only Novartis intangible asset that is available for use with an indefinite useful life. Novartis considers that it is appropriate that the Alcon brand name has an indefinite life since Alcon-branded products have a history of strong revenue and cash flow performance, and Novartis has the intent and ability to support the brand with spending to maintain its value for the foreseeable future.

Except for the Alcon brand name, intangible assets available for use are amortized over their estimated useful lives on a straight-line basis and evaluated for potential impairment whenever facts and circumstances indicate that their carrying value may not be recoverable. The Alcon brand name is not amortized, but evaluated for potential impairment annually.

The following table shows the respective useful lives for available-for-use intangible assets and the location in the consolidated income statement in which the respective amortization and any potential impairment charge is recognized:

	Useful life	Income statement location for amortization and impairment charges
Currently marketed products	5 to 20 years	"Cost of goods sold"
Marketing know-how	25 years	"Cost of goods sold"
Technologies	10 to 20 years	"Cost of goods sold" or "Research and Development"
Other (including computer software)	3 to 7 years	In the respective functional expense
Alcon brand name	Not amortized, indefinite useful life	Not applicable

Intangible assets not yet available-for-use

Acquired research and development intangible assets, which are still under development and have accordingly not yet obtained marketing approval, are recognized as In-Process Research & Development (IPR&D).

IPR&D is not amortized, but evaluated for potential impairment on an annual basis or when facts and circumstances warrant. Any impairment charge is recorded in the consolidated income statement under "Research & Development". Once a project included in IPR&D has been successfully developed, it is transferred to the "Currently marketed products" category.

Impairment of goodwill and intangible assets

An asset is considered impaired when its balance sheet carrying amount exceeds its estimated recoverable amount, which is defined as the higher of its fair value less costs of disposal and its value in use. Usually, Novartis applies the fair value less costs of disposal method for its impairment assessment. In most cases, no directly observable market inputs are available to measure the fair value less costs of disposal. Therefore, an estimate is derived indirectly and is based on net present value techniques utilizing post-tax cash flows and discount rates. In the limited cases where the value in use method would be applied, net present value techniques would be applied using pre-tax cash flows and discount rates.

Fair value less costs of disposal reflects estimates of assumptions that market participants would be expected to use when pricing the asset or CGUs, and for this purpose, management considers the range of economic conditions that are expected to exist over the remaining useful life of the asset.

The estimates used in calculating the net present values are highly sensitive and depend on assumptions specific to the nature of the Group's activities with regard to:

- Amount and timing of projected future cash flows
- Long-term sales forecasts for periods of up to 25 years
- Actions of competitors (launch of competing products, marketing initiatives, etc.)
- Sales erosion rates after the end of patent or other intellectual property rights protection and timing of the entry of generic competition
- Outcome of R&D activities (compound efficacy, results of clinical trials, etc.)
- Amount and timing of projected costs to develop IPR&D into commercially viable products
- Probability of obtaining regulatory approval
- Future tax rate
- Appropriate royalty rate for the Alcon Brand name
- Appropriate terminal growth rate
- Appropriate discount rate

Generally, for intangible assets with a definite useful life Novartis uses cash flow projections for the whole useful life of these assets. For goodwill and the Alcon brand name, Novartis generally utilizes cash flow projections for a five-year period based on management forecasts, with a terminal value based on cash flow projections usually in line with inflation rates for later periods. Probability-weighted scenarios are typically used.

Discount rates used consider the Group's estimated weighted average cost of capital, adjusted for specific country and currency risks associated with cash flow projections to approximate the weighted average cost of capital of a comparable market participant.

Due to the above factors, actual cash flows and values could vary significantly from forecasted future cash flows and related values derived using discounting techniques.

Impairment of associated companies accounted for at equity

Novartis considers investments in associated companies for impairment evaluation whenever objective evidence indicates the net investment may be impaired, including when a quoted share price indicates a fair value less than the per-share balance sheet carrying value for the investment.

If the recoverable amount of the investment is estimated to be lower than the balance sheet carrying amount an impairment charge is recognized for the difference in the consolidated income statement under "Income from associated companies".

Cash and cash equivalents, marketable securities, commodities and non-current financial assets

Cash and cash equivalents include highly liquid investments with original maturities of three months or less, which are readily convertible to known amounts of cash. Bank overdrafts are usually presented within current financial debts on the consolidated balance sheet, except in cases where a right of offset has been agreed with a bank, which then allows for presentation on a net basis.

Marketable securities are financial assets consisting principally of equity and debt securities as well as fund investments. Marketable securities held for short-term purposes are principally traded in liquid markets and are classified as marketable securities on the consolidated balance sheet. Marketable securities held for long-term strategic purposes are classified as non-current financial assets on the consolidated balance sheet.

Marketable securities are initially recorded at fair value on their trade date, which is different from the settlement date when the transaction is ultimately effected. Quoted securities are re-measured at each reporting date to fair value based on current market prices. If the market for a financial asset is not active or no market is available, fair values are established using valuation techniques. The majority of non-quoted investments are valued initially at fair value through the established purchase price between a willing buyer and seller. Non-quoted investments are subsequently adjusted based on values derived from using discounted cash flow analysis or other pricing models. These investment values are what is known as "Level 3" in the fair value hierarchy.

The Group has classified all its equity and quoted debt securities as well as fund investments as available-for-sale, as they are not acquired to generate profit from short-term fluctuations in price. Unrealized gains, except exchange gains related to quoted debt instruments, are recorded as a fair value adjustment in the consolidated statement of comprehensive income. They are recognized in the consolidated income statement when the financial asset is sold, at which time the gain is transferred either to "Other financial income and expense", for the marketable securities held for short-term non-strategic purposes, or to "Other income", for all other equity securities and fund investments. Exchange gains related to quoted debt instruments are immediately recognized in the consolidated income statement under "Other financial income and expense".

A security is assessed for impairment when its market value at the balance sheet date is less than initial cost reduced by any previously recognized impairment. Impairments on equity securities, quoted debt securities and fund investments, and exchange rate losses on quoted debt securities in a foreign currency that are held for short-term non-strategic purposes are recorded in "Other financial income and expense". Impairments are recorded for all other equity securities and other fund investments in "Other expense" in the consolidated income statement.

Commodities include gold bullion or coins which are valued at the lower of cost or fair value using current market prices. The changes in fair value below cost are immediately recorded in "Other financial income and expense".

Other non-current financial assets, including loans held for long-term strategic purposes, are carried at amortized cost, which reflects the time value of money less any allowances for uncollectable amounts. For these financial assets, impairments and exchange rate losses are included in "Other expense" in the consolidated income statement and exchange rate gains and interest income using the effective interest rate method are included in "Other income" in the consolidated income statement.

Derivative financial instruments

Derivative financial instruments are initially recognized in the balance sheet at fair value and are re-measured to their current fair value at the end of each subsequent reporting period. The valuation of a forward exchange rate contract is based on the discounted cash flow model, using interest curves and spot rates at the reporting date as observable inputs.

Options are valued based on a modified Black-Scholes model using volatility and exercise prices as major observable inputs.

The Group utilizes derivative financial instruments for the purpose of hedging to reduce the volatility in the Group's performance due to the exposure of various types of business risks. To mitigate these risks, the Group enters into certain derivative financial instruments. The risk reduction is obtained because the derivative's value or cash flows are expected, wholly or partly, to offset changes in the value or cash flows of the recognized assets or liabilities. The overall strategy is aiming to mitigate the currency and interest exposure risk of positions that are contractually agreed and to partially mitigate the exposure risk of selected anticipated transactions.

Certain derivative financial instruments meet the criteria for hedge accounting treatment. A prerequisite for obtaining this accounting-hedge relationship is extensive documentation on inception and proving on a regular basis that the economic hedge is effective for accounting purposes. Other derivative financial instruments do not meet the criteria to qualify for hedge accounting. Changes in the fair value of those derivative instruments are recognized immediately in "Other financial income and expense" in the consolidated income statement.

In addition, the Group has designated certain long-term debt components as hedges of the translation risk arising on certain net investments in foreign operations. On consolidation, foreign currency differences arising on long-term debt designated as net investment hedges of a foreign operation are recognized in other comprehensive income and accumulated in currency translation effects, to the extent that the hedge is effective. The foreign currency differences arising from hedge ineffectiveness are recognized in the income statement in "Other financial income and expense".

When a hedged net investment is disposed of, the proportionate portion of the cumulative amount recognized in equity in relation to the hedged net investment is transferred to the income statement as an adjustment to the profit or loss on disposal.

Inventories

Inventory is valued at acquisition or production cost determined on a first-in first-out basis. This value is used for the "Cost of goods sold" in the consolidated income statement. Unsalable inventory is fully written off in the consolidated income statement under "Cost of goods sold".

Trade receivables

Trade receivables are initially recognized at their invoiced amounts, including any related sales taxes less adjustments for estimated revenue deductions such as rebates, chargebacks and cash discounts.

Provisions for doubtful trade receivables are established once there is an indication that it is likely that a loss will be incurred. These provisions represent the difference between the trade receivable's carrying amount in the consolidated balance sheet and the estimated net collectible amount. Significant financial difficulties of a customer, such as probability of bankruptcy, financial reorganization, default or delinquency in payments are considered indicators that recovery of the trade receivable is doubtful. Charges for doubtful trade receivables are recognized in the consolidated income statement within "Marketing & Sales" expenses.

Legal and environmental liabilities

Novartis and its subsidiaries are subject to contingencies arising in the ordinary course of business such as patent litigation, environmental remediation liabilities and other product-related litigation, commercial litigation, and governmental investigations and proceedings. Provisions are recorded where a reliable estimate can be made of the probable outcome of legal or other disputes against the subsidiary.

Contingent consideration

In a business combination or divestment of a business, it is necessary to recognize contingent future payments to previous owners, representing contractually defined potential amounts as a liability or asset. Usually for Novartis, these are linked to milestone or royalty payments related to certain assets and are recognized as a financial liability or financial asset at their fair value, which is then re-measured at each subsequent reporting date. These estimations typically depend on factors such as technical milestones or market performance and are adjusted for the probability of their likelihood of payment, and if material, are appropriately discounted to reflect the impact of time.

Changes in the fair value of contingent consideration liabilities in subsequent periods are recognized in the consolidated income statement in "Cost of goods sold" for currently marketed products and in "Research & Development" for IPR&D. Changes in contingent consideration assets are recognized in "Other income" or "Other expense", depending on its nature.

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

Defined benefit pension plans and other post-employment benefits

The liability in respect of defined benefit pension plans and other post-employment benefits is the defined benefit obligation calculated annually by independent actuaries using the projected unit credit method. The current service cost for such post-employment benefit plans is included in the personnel expenses of the various functions where the associates are employed, while the net interest on the net defined benefit liability or asset is recognized as "Other expense" or "Other income".

Treasury shares

Treasury shares are initially recorded at fair value on their trade date which is different from the settlement date, when the transaction is ultimately effected. Treasury shares are deducted from consolidated equity at their nominal value of CHF 0.50 per share. Differences between the nominal amount and the transaction price on purchases or sales of treasury shares with third parties, or the value of services received for the shares allocated to associates as part of share-based compensation arrangements, are recorded in "Retained earnings" in the consolidated statement of changes in equity.

Revenue recognition

Revenue

Revenue is recognized on the sale of Novartis Group products and services and recorded as "Net sales" in the consolidated income statement when there is persuasive evidence that a sales arrangement exists; title, risks and rewards for the products are transferred to the customer; the price is determinable; and collectability is reasonably assured. When contracts contain customer acceptance provisions, sales are recognized upon the satisfaction of acceptance criteria. If products are stockpiled at the request of the customer, revenue is only recognized once the products have been inspected and accepted by the customer, and there is no right of return or replenishment on product expiry.

Surgical equipment may be sold together with other products and services under a single contract. The total consideration is allocated to the separate elements based on their relative fair values. Revenue is recognized once the recognition criteria have been met for each element of the contract.

For surgical equipment, in addition to cash and installment sales, revenue is recognized under finance and operating lease arrangements. Arrangements in which Novartis transfers substantially all the risks and rewards incidental to ownership to the customer are treated as finance lease arrangements. Revenue from finance lease arrangements is recognized at amounts equal to the fair values of the equipment, which approximate the present values of the minimum lease payments under the arrangements. As interest rates embedded in lease arrangements are approximately market rates, revenue under finance lease arrangements is comparable to revenue for outright sales. Finance income for arrangements in excess of twelve months is deferred and subsequently recognized based on a pattern that approximates the use of the effective interest method and recorded in "Other income". Operating lease revenue for equipment rentals is recognized on a straight-line basis over the lease term.

Provisions for rebates and discounts granted to government agencies, wholesalers, retail pharmacies, managed healthcare organizations and other customers are recorded as a deduction from revenue at the time the related revenues are recorded or when the incentives are offered. They are calculated on the basis of historical experience and the specific terms in the individual agreements.

Provisions for refunds granted to healthcare providers under innovative pay-for-performance agreements are recorded as a revenue deduction at the time the related sales are recorded. They are calculated on the basis of historical experience and clinical data available for the product, as well as the specific terms in the individual agreements. In cases where historical experience and clinical data are not sufficient for a reliable estimation of the outcome, revenue recognition is deferred until such history is available.

Cash discounts are offered to customers to encourage prompt payment and are recorded as revenue deductions.

Following a decrease in the price of a product, we generally grant customers a "shelf stock adjustment" for their existing inventory for the involved product. Provisions for shelf stock adjustments, which are primarily relevant within the Sandoz Division, are determined at the time of the price decline or at the point of sale, if the impact of a price decline on the products sold can be reasonably estimated based on the customer's inventory levels of the relevant product.

When there is historical experience of Novartis agreeing to customer returns and Novartis can reasonably estimate expected future returns, a provision is recorded for estimated sales returns. In doing so, the estimated rate of return is applied, determined based on historical experience of customer returns and considering any other relevant factors. This is applied to the amounts invoiced, also considering the amount of returned products to be destroyed versus products that can be placed back in inventory for resale. Where shipments are made on a re-sale or return basis, without sufficient historical experience for estimating sales returns, revenue is only recorded when there is evidence of consumption or when the right of return has expired.

Provisions for revenue deductions are adjusted to actual amounts as rebates, discounts and returns are processed. The provision represents estimates of the related obligations, requiring the use of judgment when estimating the effect of these sales deductions.

Other revenue
"Other revenue" includes royalty and profit sharing income and revenue from activities such as manufacturing services or other services rendered, to the extent such revenue is not recorded under net sales.

Research & Development

Internal Research & Development (R&D) costs are fully charged to "Research & Development" in the consolidated income statement in the period in which they are incurred. The Group considers that regulatory and other uncertainties inherent in the development of new products preclude the capitalization of internal development expenses as an intangible asset until marketing approval from a regulatory authority is obtained in a major market such as the United States, the European Union, Switzerland or Japan.

Payments made to third parties, such as contract research and development organizations in compensation for subcontracted R&D, that is deemed to not transfer intellectual property to Novartis are expensed as internal R&D expenses in the period in which they are incurred. Such payments are only capitalized if they meet the criteria for recognition of an internally generated intangible asset, usually when marketing approval has been achieved from a regulatory authority in a major market.

Payments made to third parties to in-license or acquire intellectual property rights, compounds and products, including initial upfront and subsequent milestone payments, are capitalized, as are payments for other assets, such as technologies to be used in R&D activities. If additional payments are made to the originator company to continue to perform R&D activities, an evaluation is made as to the nature of the payments. Such additional payments will be expensed if they are deemed to be compensation for subcontracted R&D services not resulting in an additional transfer of intellectual property rights to Novartis. Such additional payments will be capitalized if they are deemed to be compensation for the transfer to Novartis of additional intellectual property developed at the risk of the originator company. Subsequent internal R&D costs in relation to IPR&D and other assets are expensed, since the technical feasibility of the internal R&D activity can only be demonstrated by the receipt of marketing approval for a related product from a regulatory authority in a major market.

Costs for post-approval studies performed to support the continued registration of a marketed product are recognized as marketing expenses. Costs for activities that are required by regulatory authorities as a condition for obtaining marketing approval are capitalized and recognized as currently marketed products.

Inventory produced ahead of regulatory approval is fully provisioned and the charge is included in "Other expense" in the consolidated income statement, as its ultimate use cannot be assured. If this inventory can be subsequently sold, the provision is released to "Other income" in the consolidated income statement either on approval by the appropriate regulatory authority or, exceptionally in Europe, on recommendation by the Committee for Medicinal Products for Human Use (CHMP), if approval is virtually certain.

Share-based compensation

Vested Novartis shares and American Depositary Receipts (ADRs) that are granted as compensation are valued at their market value on the grant date and are immediately expensed in the consolidated income statement.

The fair values of unvested restricted shares, restricted share units (RSUs) and performance share units (PSUs) in Novartis shares and ADRs granted to associates as compensation are recognized as an expense over the related vesting period. The expense recorded in the consolidated income statement is included in the personnel expenses of the various functions where the associates are employed.

Unvested restricted shares, restricted ADRs and RSUs are only conditional on the provision of services by the plan participant during the vesting period. They are valued using their fair value on the grant date. As RSUs do not entitle the holder to dividends the fair value is based on the Novartis share price at the grant date adjusted for the net present value of the dividends expected to be paid during the holding period. The fair value of these grants, after making adjustments for assumptions related to their forfeiture during the vesting period, is expensed on a straight-line basis over the respective vesting period.

PSUs are subject to certain performance criteria being achieved during the vesting period and require plan participants to provide services during the vesting period. PSUs granted under plans defined as "Long-Term Performance Plans" are subject to performance criteria based on Novartis internal performance metrics. The expense is determined taking into account assumptions concerning performance during the period against targets and expected forfeitures due to plan participants not meeting their service conditions. These assumptions are periodically adjusted. Any change in estimates for past services is recorded immediately as an expense or income in the consolidated income statement and amounts for future periods are expensed over the remaining vesting period. As a result, at the end of the vesting period, the total charge during the whole vesting period represents the amount that will finally vest. The number of equity instruments that finally vest is determined at the vesting date.

PSUs granted under the Long-Term Relative Performance Plan (LTRPP) are conditional on the provision of services by the plan participant during the vesting period as well as on the Total Shareholder Return (TSR) performance of Novartis relative to a specific peer group of companies over the vesting period. These performance conditions are based on variables that can be observed in the market. IFRS requires that these observations are taken into account in determining the fair value of these PSUs at the date of grant. Novartis has determined the fair value of these PSUs at the date of grant using a "Monte Carlo" simulation model. The total fair value of this grant is expensed on a straight-line basis over the vesting period. Adjustments to the number of equity instruments granted are only made if a plan participant does not fulfill the service conditions.

If a plan participant leaves Novartis for reasons other than retirement, disability or death, then unvested restricted shares, restricted ADRs, RSUs and PSUs are

forfeited, unless determined otherwise by the provision of the plan rules or by the Compensation Committee of the Novartis Board of Directors, for example, in connection with a reorganization or divestment.

Measuring the fair values of PSUs granted under the LTRPP, requires estimates. The Monte Carlo simulation used for determining the fair value of the PSUs related to the LTRPP requires as input parameters the probability of factors related to uncertain future events; the term of the award; the grant price of underlying shares or ADRs; expected volatilities; the expected correlation matrix of the underlying equity instruments with those of the peer group of companies and the risk-free interest rate.

Government grants

Grants from governments or similar organizations are recognized at their fair value when there is a reasonable assurance that the grant will be received and the Group will comply with all attached conditions.

Government grants related to income are deferred and recognized in the consolidated income statement over the period necessary to match them with the related costs that they are intended to compensate.

The accounting policy for property, plant and equipment describes the treatment of any related grants.

Restructuring charges

Restructuring provisions are recognized for the direct expenditures arising from the restructuring, where the plans are sufficiently detailed and where appropriate communication to those affected has been made.

Charges to increase restructuring provisions are included in "Other expense" in the consolidated income statements. Corresponding releases are recorded in "Other income" in the consolidated income statement.

Taxes

Taxes on income are provided in the same periods as the revenues and expenses to which they relate and include any interest and penalties incurred during the period. Deferred taxes are determined using the comprehensive liability method and are calculated on the temporary differences that arise between the tax base of an asset or liability and its carrying value in the balance sheet prepared for consolidation purposes, except for those temporary differences related to investments in subsidiaries and associated companies, where the timing of their reversal can be controlled and it is probable that the difference will not reverse in the foreseeable future. Since the retained earnings are reinvested, withholding or other taxes on eventual distribution of a subsidiary's retained earnings are only taken into account when a dividend has been planned.

The estimated amounts for current and deferred tax assets or liabilities, including any amounts related to any uncertain tax positions, are based on currently known facts and circumstances. Tax returns are based on an interpretation of tax laws and regulations, and reflect estimates based on these judgments and interpretations. The tax returns are subject to examination by the competent taxing authorities, which may result in an assessment being made requiring payments of additional tax, interest or penalties. Inherent uncertainties exist in the estimates of the tax positions.

Non-current assets held for sale

Non-current assets are classified as assets held for sale when their carrying amount is to be recovered principally through a sale transaction and a sale is considered highly probable. They are stated at the lower of carrying amount and fair value less costs of disposal. Assets held for sale, included within a disposal group or discontinued operations are not depreciated or amortized.

Status of adoption of significant new or amended IFRS standards or interpretations

The adoption of new or amended standards and interpretations that are effective for the financial year beginning on January 1, 2017, did not have a material impact on the Group's consolidated financial statements.

The following new IFRS standards will, based on a Novartis analysis, be of significance to the Group, but have not yet been early adopted:

IFRS 9 FINANCIAL INSTRUMENTS

IFRS 9 Financial Instruments will substantially change the classification and measurement of financial instruments. The new standard requires impairments to be based on a forward-looking model, changes the approach to hedging financial exposures and related documentation, changes the recognition of certain fair value changes and amends disclosures requirements.

The impairment of financial assets, including trade and lease receivables, will be assessed using an expected credit loss model rather than the current incurred loss model. Given the nature of Novartis' financial assets, the Group does not expect a significant impact to our provisions for doubtful accounts or impairments from this change.

The new hedge accounting model introduced by the standard requires hedge accounting relationships to be based upon the Group's own risk management strategy and objectives, and to be discontinued only when the relationships no longer qualify for hedge accounting. Based on the impact of adoption assessment performed, Novartis expects that the existing hedge relationship will continue to be designated as such under the new hedge accounting requirements.

The Group will implement the new standard on January 1, 2018 and will apply the modified retrospective method, which requires the recognition of the cumulative effect of initially applying IFRS 9, as at January 1, 2018, to retained earnings and not restate prior years.

The most significant impact to the Group, upon adoption of IFRS 9, will be the treatment of the unrealized gains and losses from changes in fair value on certain of

the Group's financial instruments, which are classified as available-for-sale marketable securities and financial investments. The unrealized gains and losses (to the extent of previous recognized unrealized gains), which the Group currently recognizes in the consolidated statement of other comprehensive income, will in the future be recognized in the consolidated income statement. This approach will be applied to equity securities where the fair value through other comprehensive income irrevocable option will not be applied. If this accounting had been applied prior to January 1, 2018, the adoption date, the cumulative effect to be recorded as an increase to retained earnings, as at January 1, 2018, is estimated at USD 0.2 billion.

IFRS 15 REVENUE FROM CONTRACTS WITH CUSTOMERS

IFRS 15 Revenue from contracts with customers amends revenue recognition requirements and establishes principles for reporting information about the nature, amount, timing and uncertainty of revenue and cash flows arising from contracts with customers. The standard replaces IAS 18 Revenue and IAS 11 Construction contracts and related interpretations.

Results of our impact assessment:

- The Group's "Net sales" are derived from the sale of drug substances, vision care products, surgical equipment, other products and services, where control transfers to our customers and our performance obligations are satisfied at the time of shipment to or receipt of the products by the customer or when the services are performed. We do not expect IFRS 15 to significantly change the timing or amount of revenue recognized under these arrangements.
- The Group's "Other revenue" consists of royalty income from the out-licensing of intellectual property (IP), which is recognized as earned and from manufacturing services and other services, where revenue is recognized when control transfers to the third party and our performance obligations are satisfied. We do not expect IFRS 15 to significantly change the timing or amount of revenue recognized from these manufacturing and other services arrangements, nor from these royalty arrangements, as the standard's royalty exception will apply for IP licenses.

"Other revenue" also includes revenue from profit sharing arrangements with our collaboration partners. Furthermore, the Group receives milestone payments related to sale or out-licensing of IP. Novartis does not expect IFRS 15 to significantly change the timing or amount of revenue recognized under these arrangements.

The Group will implement the new standard on January 1, 2018 and will apply the modified retrospective method, which requires the recognition of the cumulative effect of initially applying IFRS 15, as at January 1, 2018, to retained earnings and not restate prior years. However, since the results of the Group's impact assessment indicates that IFRS 15 is not expected to significantly change the amount or timing of revenue recognition in 2017 or prior periods, an insignificant cumulative adjustment to increase retained earnings will be made.

IFRS 16 LEASES

IFRS 16 Leases substantially changes the financial statements as the majority of leases for which the company is the lessee will become on-balance sheet liabilities with corresponding right of use assets on the balance sheet. The standard replaces IAS 17 Leases and is effective on January 1, 2019. The current undiscounted operating lease commitments of USD 3.2 billion as of December 31, 2017, and disclosed in Note 27 provide, subject to the provision of the standard, an indicator of the impact of the implementation of IFRS 16 on the Group's consolidated balance sheet.

Upon adoption of the new standard, a portion of the annual operating lease costs, which is currently fully recognized as a functional expense, will be recorded as interest expense. In addition, the portion of the annual lease payments recognized in the cash flow statement as a reduction of the lease liability will be recognized as an outflow from financing activities, which currently are fully recognized as an outflow from operating activities. Given the leases involved and assuming the current low interest rate environment continues, the Group does not currently expect these effects to be significant.

There are no other IFRS standards or interpretations not yet effective that would be expected to have a material impact on the Group.

2. Significant transactions

Significant transactions in 2017

INNOVATIVE MEDICINES – ACQUISITION OF ZIARCO GROUP LIMITED

On January 20, 2017, Novartis acquired Ziarco Group Limited (Ziarco), a privately held company in the United Kingdom, focused on the development of novel treatments in dermatology. This acquisition adds a once-daily oral H4 receptor antagonist in development for atopic dermatitis, commonly known as eczema, to complement the Novartis dermatology portfolio and pipeline. The fair value of the total purchase consideration was USD 420 million. The amount consisted of an initial cash payment of USD 325 million and the net present value of the contingent consideration of USD 95 million, due to Ziarco shareholders, which they are eligible to receive upon the achievement of specified development milestones. The purchase price allocation resulted in net identifiable

assets of USD 395 million and goodwill of USD 25 million. Results of operations since the date of acquisition were not material.

INNOVATIVE MEDICINES – ACQUISITION OF ENCORE VISION, INC.

On January 20, 2017, Novartis acquired Encore Vision, Inc. (Encore), a privately-held company in Fort Worth, Texas, in the United States, focused on the development of a novel treatment in presbyopia. The fair value of the total purchase consideration was USD 456 million. The amount consisted of an initial cash payment of USD 366 million and the net present value of the contingent consideration of USD 90 million, due to Encore shareholders, which they are eligible to receive upon the achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 389 million and goodwill of USD 67 million. Results of operations since the date of acquisition were not material.

Significant transaction entered into in 2017 and closed in January 2018

INNOVATIVE MEDICINES – ACQUISITION OF ADVANCED ACCELERATOR APPLICATIONS, S.A.

On October 30, 2017, Novartis entered into a binding memorandum of understanding with Advanced Accelerator Applications S.A., (AAA), a NASDAQ-listed company headquartered in Saint-Genis-Pouilly, France, under which Novartis agreed to commence a tender offer for 100% of the share capital of AAA subject to certain conditions. Novartis commenced the tender offer on December 7, 2017, to purchase all of the outstanding ordinary shares for a price of USD 41 per share and USD 82 per American Depositary Share (ADS), each representing two ordinary shares of AAA, which expired on January 19, 2018. The offer values AAAs equity at USD 3.9 billion, on a fully diluted basis. The transaction to acquire AAA is being funded mainly through external short- and long-term debt.

As of the expiration of the tender offer, approximately 97% of the then outstanding fully diluted ordinary shares, including ordinary shares represented by ADSs, were validly tendered. On January 22, 2018, Novartis accepted and paid USD 3.9 billion for the ordinary shares, including ordinary shares represented by ADSs, tendered in the offer.

On January 22, 2018 Novartis also commenced a subsequent offering period that will expire on January 31, 2018, unless extended.

AAA is a radiopharmaceutical company that develops, produces and commercializes molecular nuclear medicines, including Lutathera® (lutetium (177Lu) oxodotreotide), a first-in-class RLT product for neuroendocrine tumors (NETs) and a portfolio of diagnostic products. Radiopharmaceuticals, such as Lutathera®, are unique medicinal formulations containing radioisotopes, which are used clinically for both diagnosis and therapy.

Significant transactions in 2016

ALCON – ACQUISITION OF TRANSCEND MEDICAL, INC.

On February 17, 2016, Alcon entered into an agreement to acquire Transcend Medical, Inc. (Transcend), a privately-held, US-based company focused on developing minimally-invasive surgical devices to treat glaucoma. The transaction closed on March 23, 2016, and the fair value of the total purchase consideration was USD 332 million. The amount consisted of an initial cash payment of USD 240 million and the net present value of contingent consideration of USD 92 million due to the Transcend shareholders, which they are eligible to receive upon the achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 294 million and goodwill of USD 38 million. The 2016 results of operations since the date of acquisition were not material.

INNOVATIVE MEDICINES – ACQUISITION OF REPRIXYS PHARMACEUTICALS CORPORATION

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

The fair value of the total purchase consideration for acquiring the 81% stake Novartis did not already own amounted to USD 268 million. The amount consisted of an initial cash payment of USD 194 million and the net present value of the contingent consideration of USD 74 million due to Reprixys shareholders, which they are eligible to receive upon the achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 332 million. No goodwill was recognized. The 2016 results of operations since the date of acquisition were not material.

Significant transactions in 2015

Portfolio transformation transactions

TRANSACTION WITH ELI LILLY AND COMPANY

On January 1, 2015, Novartis closed its transaction with Eli Lilly and Company, USA (Lilly) announced in April 2014 to divest its Animal Health business for USD 5.4 billion in cash. This resulted in a pre-tax gain of USD 4.6 billion, which is recorded in operating income from discontinued operations.

TRANSACTIONS WITH GLAXOSMITHKLINE PLC

On March 2, 2015, Novartis closed its transactions with GlaxoSmithKline plc, Great Britain (GSK) announced in April 2014, with the following consequences:

INNOVATIVE MEDICINES – ACQUISITION OF GSK ONCOLOGY PRODUCTS

Novartis acquired GSK's oncology products and certain related assets for an aggregate cash consideration of USD 16.0 billion. Up to USD 1.5 billion of this cash consideration at the acquisition date is contingent on certain development milestones. The fair value of this potentially refundable consideration as at the acquisition date is USD 0.1 billion. In addition, under the terms of the agreement, Novartis is granted a right of first negotiation

over the co-development or commercialization of GSK's current and future oncology R&D pipeline, excluding oncology vaccines. The right of first negotiation is for a period of 12.5 years from the acquisition closing date. The purchase price allocation of the fair value of the consideration of USD 15.9 billion resulted in net identified assets of USD 13.5 billion and goodwill of USD 2.4 billion. In 2015, from the date of the acquisition the business generated net sales of USD 1.8 billion. Management estimates net sales for the entire year 2015 would have amounted to USD 2.1 billion had the oncology products been acquired at the beginning of the 2015 reporting period. The 2015 net results from operations on a reported basis since the acquisition date were not material.

VACCINES – DIVESTMENT

Novartis divested its Vaccines business (excluding its Vaccines influenza business) to GSK for up to USD 7.1 billion plus royalties. The USD 7.1 billion consists of USD 5.25 billion paid at closing and up to USD 1.8 billion in future milestone payments. The fair value of the contingent future milestones and royalties as at the acquisition date is USD 1.0 billion, resulting in a fair value of consideration received of USD 6.25 billion. Included in this amount is a USD 450 million milestone payment received in late March 2015. The sale of this business resulted in a pre-tax gain of USD 2.8 billion, which is recorded in operating income from discontinued operations.

Novartis's Vaccines influenza business was excluded from the GSK Vaccines business acquisition. However, GSK entered into a future option arrangement with Novartis in relation to the Vaccines influenza business, pursuant to which Novartis could have unilaterally required GSK to acquire the entire or certain parts of its Vaccines influenza business for consideration of up to USD 250 million (the Influenza Put Option) if the divestment to CSL Limited, Australia (CSL), discussed below, had not been completed. The option period was 18 months from the closing date of the GSK transaction, but terminated with the sale of the Vaccines influenza business to CSL on July 31, 2015. Novartis paid GSK a fee of USD 5 million in consideration for the grant of the Influenza Put Option.

CONSUMER HEALTH – COMBINATION OF NOVARTIS OTC WITH GSK CONSUMER HEALTHCARE

Novartis and GSK agreed to create a combined consumer healthcare business through the combination between Novartis OTC and GSK Consumer Healthcare businesses. On March 2, 2015, a new entity, GlaxoSmithKline Consumer Healthcare Holdings Ltd. (GSK Consumer Healthcare) was formed via contribution of businesses from both Novartis and GSK. Novartis has a 36.5% interest in the newly created entity. Novartis has valued the contribution of 63.5% of its OTC Division in exchange for 36.5% of the GSK Consumer Healthcare business at fair value. Based on the estimates of fair values exchanged, an investment in an associated company of USD 7.6 billion was recorded. The resulting pre-tax gain, net of transaction related costs, of USD 5.9 billion is recorded in operating income from discontinued operations.

Novartis has four of eleven seats on the GSK Consumer Healthcare Board of Directors. Furthermore, Novartis has customary minority rights and also exit rights at a pre-defined, market based pricing mechanism.

The investment is accounted for using the equity method of accounting using estimated results for the last quarter of the year. Any differences between this estimate and actual results, when available, will be adjusted in the Group's consolidated financial statements in the following year.

ADDITIONAL GSK RELATED COSTS

The GSK transaction resulted in USD 0.6 billion of additional transaction-related costs that were expensed, thereof USD 0.3 billion paid in 2015.

TRANSACTION WITH CSL

On October 26, 2014, Novartis entered into an agreement with CSL to sell its Vaccines influenza business to CSL for USD 275 million. Entering into the separate divestment agreement with CSL resulted in the Vaccines influenza business being classified as a separate disposal group consisting of a group of cash generating units within the Vaccines Division, requiring the performance of a separate valuation of the Vaccines influenza business net assets. This triggered the recognition of an exceptional impairment charge in 2014 of USD 1.1 billion as the estimated net book value of the Vaccines influenza business net assets was above the USD 275 million consideration. The transaction with CSL was completed on July 31, 2015, resulting in a partial reversal of the impairment recorded in 2014 in the amount of USD 0.1 billion, which is included in operating income from discontinued operations.

Other significant transactions in 2015

INNOVATIVE MEDICINES – ACQUISITION OF SPINIFEX PHARMACEUTICALS, INC.

On June 29, 2015, Novartis entered into an agreement to acquire Spinifex Pharmaceuticals, Inc. (Spinifex), a United States and Australia based, privately held development stage company, focused on developing a peripheral approach to treat neuropathic pain. The transaction closed on July 24, 2015, and the fair value of the total purchase consideration was USD 312 million. The amount consisted of an initial cash payment of USD 196 million and the net present value of the contingent consideration of USD 116 million due to previous Spinifex shareholders, which they are eligible to receive upon achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 263 million and goodwill of USD 49 million. The 2015 results of operations since the date of acquisition were not material.

INNOVATIVE MEDICINES – ACQUISITION OF ADMUNE THERAPEUTICS LLC

On October 16, 2015, Novartis entered into an agreement to acquire Admune Therapeutics LLC (Admune), a US-based, privately held company, broadening Novartis'

pipeline of cancer immunotherapies. The fair value of the total purchase consideration amounted to USD 258 million. This amount consists of an initial cash payment of USD 140 million and the net present value of the contingent consideration of USD 118 million due to Admune's previous owners, which they are eligible to receive upon the achievement of specified development and commercialization milestones. The purchase price allocation resulted in net identifiable assets of USD 258 million. No goodwill was recognized. The 2015 results of operations since the date of acquisition were not material.

3. Segmentation of key figures 2017, 2016 and 2015

The businesses of Novartis are divided operationally on a worldwide basis into three identified reporting segments, Innovative Medicines, Sandoz and Alcon. In addition, we separately report Corporate activities.

Reporting segments are presented in a manner consistent with the internal reporting to the chief operating decision maker, which is the Executive Committee of Novartis. The reporting segments are managed separately because they each research, develop, manufacture, distribute, and sell distinct products that require differing marketing strategies.

The Executive Committee of Novartis is responsible for allocating resources and assessing the performance of the reporting segments.

Innovative Medicines researches, develops, manufactures, distributes and sells patented prescription medicines. The Innovative Medicines Division is organized into two global business units: Novartis Oncology business unit, which consists of the global business franchises Oncology and Novartis Pharmaceuticals business unit, which consists of the global business franchises Ophthalmology, Neuroscience, Immunology and Dermatology, Respiratory, Cardio-Metabolic and Established Medicines.

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

Alcon researches, discovers, develops, manufactures, distributes and sells eye care products. The Alcon Division is the global leader in eye care, with product offerings in eye care devices and vision care. The Alcon Division is organized globally in two global business franchises as follows: In Surgical, Alcon develops, manufactures, distributes and sells ophthalmic surgical equipment, instruments, disposable products and intraocular lenses. In Vision Care, Alcon develops, manufactures, distributes and sells contact lenses and lens care products.

Income and expenses relating to Corporate include the costs of the Group headquarters and those of corporate coordination functions in major countries. In addition, Corporate includes other items of income and expense that are not attributable to specific segments, such as certain revenues from intellectual property rights, certain expenses related to post-employment benefits, environmental remediation liabilities, charitable activities, donations and sponsorships. Usually, no allocation of Corporate items is made to the segments. As a result, Corporate assets and liabilities principally consist of net liquidity (cash and cash equivalents, marketable securities less financial debts), investments in associated companies and current and deferred taxes and non-segment specific environmental remediation and post-employment benefit liabilities. Corporate also includes the Alcon brand name intangible asset as it is used to market products of the Alcon Division and products within the Ophthalmology business franchise of the Innovative Medicines Division.

Our divisions are supported by the Novartis Institutes for BioMedical Research, Global Drug Development, Novartis Technical Operations and Novartis Business Services organizations.

- The Novartis Institutes for BioMedical Research (NIBR) conducts research activities of the Innovative Medicines Division and also collaborates with Sandoz.
- Global Drug Development organization was established in July 2016 and oversees all drug development activities for our Innovative Medicines Division and the biosimilars portfolio of our Sandoz Division.
- Novartis Technical Operations organization was established in July 2016, to centralize management of our manufacturing operations across our Innovative Medicines and Sandoz Divisions.
- Novartis Business Services (NBS) was established in January 2015 as a shared services organization and delivers business support services across the Group, such as information technology, real estate and facility services, procurement, product lifecycle services, human resources and financial reporting and accounting operations.

Following the portfolio transformation transactions in 2015, described in Note 2, Novartis has separated the Group's reported financial data into "continuing" operations and "discontinued" operations:

Continuing operations comprise:

- Innovative Medicines: innovative patent-protected prescription medicines
- Sandoz: generic and biosimilar pharmaceuticals
- Alcon: eye care devices and vision care
- Corporate activities

Discontinued operations comprise:

- Vaccines: preventive human vaccines. Excluded are certain intellectual property rights and related other revenues of the Vaccines Division, which are now reported under Corporate activities.
- Consumer Health: OTC (over-the-counter medicines) and Animal Health. These two divisions were managed separately. However, neither was material enough to the Group to be disclosed separately as a reporting segment.
- Corporate: certain transactional and other expenses related to the portfolio transformation.

The accounting policies mentioned in Note 1 are used in the reporting of segment results. Inter-segmental sales are made at amounts that are considered to approximate arm's length transactions. The Executive Committee of Novartis evaluates segmental performance and allocates resources among the segments based on a number of measures including net sales, operating income and net operating assets. Segment net operating assets consist primarily of property, plant and equipment, intangible assets, goodwill, inventories and trade and other operating receivables less operating liabilities.

Segmentation – Consolidated income statements

	Innovative Medicines		Sandoz		Alcon		Corporate (including eliminations)		Group	
(USD millions)	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016
Net sales to third parties	**33 025**	**32 562**	**10 060**	**10 144**	**6 024**	**5 812**			**49 109**	**48 518**
Sales to other segments	668	624	118	104	3		– 789	– 728		
Net sales	**33 693**	**33 186**	**10 178**	**10 248**	**6 027**	**5 812**	**– 789**	**– 728**	**49 109**	**48 518**
Other revenues	898	815	37	37	3	4	88	62	1 026	918
Cost of goods sold	– 9 007	– 9 331	– 5 800	– 5 971	– 3 231	– 3 092	863	874	– 17 175	– 17 520
Gross profit	**25 584**	**24 670**	**4 415**	**4 314**	**2 799**	**2 724**	**162**	**208**	**32 960**	**31 916**
Marketing & Sales	– 9 089	– 8 435	– 1 811	– 1 681	– 1 961	– 1 882			– 12 861	– 11 998
Research & Development	– 7 630	– 7 709	– 774	– 814	– 568	– 516			– 8 972	– 9 039
General & Administration	– 986	– 978	– 315	– 300	– 383	– 410	– 452	– 506	– 2 136	– 2 194
Other income	1 027	1 091	204	185	47	48	691	603	1 969	1 927
Other expense	– 1 124	– 1 213	– 351	– 259	– 124	– 96	– 732	– 776	– 2 331	– 2 344
Operating income	**7 782**	**7 426**	**1 368**	**1 445**	**– 190**	**– 132**	**– 331**	**– 471**	**8 629**	**8 268**
Income from associated companies	– 1		23	6			1 086	697	1 108	703
Interest expense									– 777	– 707
Other financial income and expense									39	– 447
Income before taxes									**8 999**	**7 817**
Taxes									– 1 296	– 1 119
Net income									**7 703**	**6 698**
Attributable to:										
Shareholders of Novartis AG									*7 703*	*6 712*
Non-controlling interests									*0*	*– 14*
Included in net income are:										
Interest income									110	43
Depreciation of property, plant & equipment	– 916	– 883	– 270	– 260	– 217	– 229	– 117	– 117	– 1 520	– 1 489
Amortization of intangible assets	– 2 291	– 2 470	– 447	– 450	– 942	– 929	– 10	– 12	– 3 690	– 3 861
Impairment charges on property, plant & equipment, net	– 84	– 93	– 73	– 2		– 5		– 2	– 157	– 102
Impairment charges on intangible assets, net	– 591	– 522	– 61	– 65	– 57	– 4			– 709	– 591
Impairment charges and fair value gains on financial assets, net	– 42	– 55			– 29		– 185	– 77	– 256	– 132
Additions to restructuring provisions	– 122	– 236	– 61	– 46	– 8	– 36	– 3	– 25	– 194	– 343
Equity-based compensation of Novartis equity plans	– 593	– 582	– 52	– 47	– 71	– 53	– 208	– 164	– 924	– 846

(USD millions)	Innovative Medicines 2016	Innovative Medicines 2015	Sandoz 2016	Sandoz 2015	Alcon 2016	Alcon 2015	Corporate (including eliminations) 2016	Corporate (including eliminations) 2015	Group 2016	Group 2015
Net sales to third parties from continuing operations	**32 562**	**33 345**	**10 144**	**10 070**	**5 812**	**5 999**			**48 518**	**49 414**
Sales to other segments	624	518	104	128			– 728	– 620		26
Net sales from continuing operations	**33 186**	**33 863**	**10 248**	**10 198**	**5 812**	**5 999**	**– 728**	**– 620**	**48 518**	**49 440**
Other revenues	815	792	37	25	4	23	62	107	918	947
Cost of goods sold	– 9 331	– 9 204	– 5 971	– 5 844	– 3 092	– 3 145	874	789	– 17 520	– 17 404
Gross profit from continuing operations	**24 670**	**25 451**	**4 314**	**4 379**	**2 724**	**2 877**	**208**	**276**	**31 916**	**32 983**
Marketing & Sales	– 8 435	– 8 430	– 1 681	– 1 679	– 1 882	– 1 663			– 11 998	– 11 772
Research & Development	– 7 709	– 7 685	– 814	– 782	– 516	– 468			– 9 039	– 8 935
General & Administration	– 978	– 1 031	– 300	– 346	– 410	– 450	– 506	– 648	– 2 194	– 2 475
Other income	1 091	1 149	185	109	48	54	603	737	1 927	2 049
Other expense	– 1 213	– 1 639	– 259	– 381	– 96	– 69	– 776	– 784	– 2 344	– 2 873
Operating income from continuing operations	**7 426**	**7 815**	**1 445**	**1 300**	**– 132**	**281**	**– 471**	**– 419**	**8 268**	**8 977**
Income from associated companies			6	2			697	264	703	266
Interest expense									– 707	– 655
Other financial income and expense									– 447	– 454
Income before taxes from continuing operations									**7 817**	**8 134**
Taxes									– 1 119	– 1 106
Net income from continuing operations									**6 698**	**7 028**
Net income from discontinued operations										10 766
Net income									**6 698**	**17 794**
Attributable to:										
Shareholders of Novartis AG									*6 712*	*17 783*
Non-controlling interests									*– 14*	*11*
Included in net income from continuing operations are:										
Interest income									43	33
Depreciation of property, plant & equipment	– 883	– 839	– 260	– 277	– 229	– 237	– 117	– 117	– 1 489	– 1 470
Amortization of intangible assets	– 2 470	– 2 384	– 450	– 450	– 929	– 912	– 12	– 9	– 3 861	– 3 755
Impairment charges on property, plant & equipment, net	– 93	39	– 2	– 97	– 5	– 1	– 2	– 21	– 102	– 80
Impairment charges on intangible assets, net	– 522	– 138	– 65	– 27	– 4	– 1			– 591	– 166
Impairment charges and fair value gains on financial assets, net	– 55	– 32					– 77	– 72	– 132	– 104
Additions to restructuring provisions	– 236	– 232	– 46	– 93	– 36	– 25	– 25	– 49	– 343	– 399
Equity-based compensation of Novartis equity plans	– 582	– 620	– 47	– 53	– 53	– 66	– 164	– 164	– 846	– 903

Segmentation – Consolidated balance sheets

	Innovative Medicines		Sandoz		Alcon		Corporate (including eliminations)		Group	
(USD millions)	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016
Total assets	**54 075**	51 911	**18 231**	17 611	**22 014**	22 970	**38 759**	37 632	**133 079**	130 124
Total liabilities	**– 11 457**	– 10 007	**– 3 459**	– 3 168	**– 1 893**	– 2 520	**– 42 043**	– 39 538	**– 58 852**	– 55 233
Total equity									**74 227**	74 891
Net debt									**19 047**	16 025
Net operating assets	**42 618**	41 904	**14 772**	14 443	**20 121**	20 450			**93 274**	90 916
Included in assets and liabilities are:										
Total property, plant & equipment	10 857	10 410	2 525	2 374	2 403	2 163	679	694	16 464	15 641
Additions to property, plant & equipment [1]	877	996	326	316	431	396	94	127	1 728	1 835
Total goodwill and intangible assets	31 571	31 630	10 993	10 774	16 176	16 914	3 007	3 002	61 747	62 320
Additions to goodwill and intangible assets [1]	984	865	64	45	82	63	16	5	1 146	978
Total investment in associated companies	41	16	7	18			15 322	14 270	15 370	14 304
Additions to investment in associated companies	6	4					40	37	46	41
Cash and cash equivalents, marketable securities, commodities, time deposits and derivative financial instruments							9 485	7 777	9 485	7 777
Financial debts and derivative financial instruments							28 532	23 802	28 532	23 802
Current income tax and deferred tax liabilities							6 891	8 260	6 891	8 260

[1] Excluding impact of business combinations

The following table shows countries that accounted for more than 5% of at least one of the respective Group totals, as well as regional information for net sales for the years ended December 31, 2017, 2016 and 2015, and for selected non-current assets for the years ended December 31, 2017 and 2016:

	Net sales[1]						Total of selected non-current assets[2]			
(USD millions)	**2017**	**%**	2016	%	2015	%	**2017**	**%**	2016	%
Country										
Switzerland	836	2	830	2	774	2	43 920	47	44 413	48
United States	16 935	34	17 117	35	18 079	37	28 476	30	28 484	31
United Kingdom	1 160	2	1 182	2	1 277	3	7 957	9	6 892	7
Germany	3 690	8	3 634	7	3 262	7	3 128	3	2 733	3
France	2 490	5	2 390	5	2 269	5	284		199	
Japan	3 177	6	3 267	7	3 163	6	148		145	
Other	20 821	43	20 098	42	20 590	40	9 668	11	9 399	11
Group	**49 109**	**100**	48 518	100	49 414	100	**93 581**	**100**	92 265	100
Region										
Europe	17 492	36	17 079	35	16 472	33	61 699	66	59 879	65
Americas	20 899	42	20 998	43	22 414	45	29 113	31	29 831	32
Asia/Africa/Australasia	10 718	22	10 441	22	10 528	22	2 769	3	2 555	3
Group	**49 109**	**100**	48 518	100	49 414	100	**93 581**	**100**	92 265	100

[1] Net sales from operations by location of third-party customer
[2] Total of property, plant and equipment; goodwill; intangible assets; and investment in associated companies

The Group's largest, second-largest and third-largest customers account for approximately 17%, 12% and 7% of net sales, respectively (2016: 16%, 12% and 6% respectively; 2015: 14%, 11% and 5% respectively). All segments had sales to these customers in 2017, 2016 and 2015. No other customer accounted for 5% or more of net sales in any year.

The highest amounts of trade receivables outstanding were for these same three customers and amounted to 14%, 9% and 5%, respectively, of the trade receivables at December 31, 2017 (2016: 14%, 9% and 6% respectively).

Innovative Medicines net sales by business franchise

	2017 USD millions	2016 USD millions	Change (2016 to 2017) USD %	2015 USD millions	Change (2015 to 2016) USD %
Oncology					
Gleevec/Glivec	1 943	3 323	– 42	4 658	– 29
Tasigna	1 841	1 739	6	1 632	7
Sandostatin	1 612	1 646	– 2	1 630	1
Afinitor/Votubia	1 525	1 516	1	1 607	– 6
Exjade/Jadenu	1 059	956	11	917	4
Tafinlar + Mekinist	873	672	30	453	nm
Promacta/Revolade	867	635	37	402	nm
Votrient	808	729	11	565	nm
Jakavi	777	581	34	410	42
Kisqali	76	0	nm	0	nm
Other	893	993	– 10	1 030	– 4
Total Oncology business unit	**12 274**	**12 790**	**– 4**	**13 304**	– 4
Ophthalmology					
Lucentis	1 888	1 835	3	2 060	– 11
Travoprost Group	589	619	– 5	631	– 2
Systane Group	400	377	6	380	– 1
Topical Olopatadine Group	284	335	– 15	457	– 27
Other	2 207	2 297	– 4	2 395	– 4
Total Ophthalmology	**5 368**	**5 463**	**– 2**	**5 923**	– 8
Immunology and Dermatology					
Cosentyx	2 071	1 128	84	261	nm
Neoral/Sandimmun(e)	488	515	– 5	570	– 10
Zortress/Certican	414	398	4	335	19
Ilaris	402	283	42	236	20
Myfortic	378	383	– 1	441	– 13
Other	288	308	– 6	294	5
Total Immunology and Dermatology	**4 041**	**3 015**	**34**	**2 137**	41
Neuroscience					
Gilenya	3 185	3 109	2	2 776	12
Other	102	124	– 18	141	– 12
Total Neuroscience	**3 287**	**3 233**	**2**	**2 917**	11

	2017 USD millions	2016 USD millions	Change (2016 to 2017) USD %	2015 USD millions	Change (2015 to 2016) USD %
Respiratory					
Ultibro Breezhaler	411	363	13	260	40
Seebri Breezhaler	151	149	1	150	– 1
Onbrez Breezhaler	112	143	– 22	166	– 14
Subtotal COPD[1] portfolio	**674**	**655**	**3**	**576**	14
Xolair[2]	920	835	10	755	11
Other	23	31	– 26	37	– 16
Total Respiratory	**1 617**	**1 521**	**6**	**1 368**	11
Cardio-Metabolic					
Entresto	507	170	198	21	nm
Other	17	14	21	0	nm
Total Cardio-Metabolic	**524**	**184**	**185**	**21**	nm
Established Medicines					
Galvus	1 233	1 193	3	1 140	5
Exforge	960	926	4	1 047	– 12
Diovan/Co-Diovan	957	1 073	– 11	1 284	– 16
Voltaren/Cataflam	465	525	– 11	558	– 6
Exelon/Exelon Patch	381	444	– 14	728	– 39
Ritalin/Focalin	236	282	– 16	365	– 23
Other	1 682	1 913	– 12	2 553	– 25
Total Established Medicines	**5 914**	**6 356**	**– 7**	**7 675**	– 17
Total Pharmaceutical business unit	**20 751**	**19 772**	**5**	**20 041**	– 1
Total division net sales	**33 025**	**32 562**	**1**	**33 345**	– 2

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

nm = not meaningful

The product portfolio of other segments is widely spread in 2017, 2016 and 2015.

4. Associated companies

	Net income statement effect			Other comprehensive income effect			Total comprehensive income effect		
(USD millions)	**2017**	2016	2015	**2017**	2016	2015	**2017**	2016	2015
Roche Holding AG, Switzerland	456	464	343	108	– 39	– 149	564	425	194
GlaxoSmithKline Consumer Healthcare Holdings Ltd., UK	629	234	– 79	– 145	710	– 4	484	944	– 83
Others	23	5	2				23	5	2
Associated companies related to continuing operations	**1 108**	**703**	**266**	**– 37**	**671**	**– 153**	**1 071**	**1 374**	**113**

Novartis has significant investments in Roche Holding AG, Basel (Roche) and in GlaxoSmithKline Consumer Healthcare Holdings Ltd, Brentford, Middlesex, UK as well as certain other smaller investments that are accounted for as associated companies.

	Balance sheet value	
(USD millions)	**December 31, 2017**	December 31, 2016
Roche Holding AG, Switzerland	8 121	7 644
GlaxoSmithKline Consumer Healthcare Holdings Ltd., UK	7 020	6 448
Others	229	212
Total	**15 370**	**14 304**

Roche Holding AG

The Group's holding in Roche voting shares was 33.3% at December 31, 2017, 2016 and 2015. This investment represents approximately 6.3% of Roche's total outstanding voting and non-voting equity instruments at December 31, 2017, 2016 and 2015.

Since full-year 2017 financial data for Roche is not available when Novartis produces its consolidated financial results, a survey of analyst estimates is used to estimate the Group's share of Roche's net income. Any differences between these estimates and actual results will be adjusted in the Group's 2018 consolidated financial statements when available.

The following tables show summarized financial information for Roche, including current values of fair value adjustments made at the time of the acquisition of the shares, for the year ended December 31, 2016 and for the six months ended June 30, 2017 (since full-year 2017 data is not yet available):

(CHF billions)	Current assets	Non-current assets	Current liabilities	Non-current liabilities
December 31, 2016	28.7	61.4	22.6	27.8
June 30, 2017	26.7	56.9	20.6	26.0

(CHF billions)	Revenue	Net income	Other comprehensive income	Total comprehensive income
December 31, 2016	50.6	7.5	0.7	8.2
June 30, 2017	26.3	4.4	0.2	4.6

A purchase price allocation was performed on the basis of publicly available information at the time of acquisition of the investment. The December 31, 2017 balance sheet value allocation is as follows:

(USD millions)	**December 31, 2017**
Novartis share of Roche's estimated net assets	2 412
Novartis share of re-appraised intangible assets	673
Implicit Novartis goodwill	2 915
Current value of share in net identifiable assets and goodwill	**6 000**
Accumulated equity accounting adjustments and translation effects less dividends received	2 121
Balance sheet value	**8 121**

The identified intangible assets principally relate to the value of currently marketed products and are amortized on a straight-line basis over their estimated average useful life of 20 years.

In 2017, dividends received from Roche in relation to the distribution of its 2016 net income amounted to USD 438 million (2016: USD 433 million in relation to the distribution of its 2015 net income).

The consolidated income statement effects from applying Novartis accounting principles for this investment in 2017, 2016 and 2015 are as follows:

(USD millions)	**2017**	2016	2015
Novartis share of Roche's estimated current-year consolidated net income	669	678	650
Prior-year adjustment	– 67	– 68	– 157
Amortization of fair value adjustments relating to intangible assets, net of taxes of USD 42 million (2016: USD 42 million; 2015: USD 41 million)	– 146	– 146	– 150
Net income effect	**456**	**464**	**343**

The publicly quoted market value of the Novartis interest in Roche (SIX symbol: RO) at December 31, 2017, was USD 13.4 billion (2016: USD 12.4 billion).

GlaxoSmithKline Consumer Healthcare Holdings Ltd.

On March 2, 2015, Novartis closed its transactions with GlaxoSmithKline plc, Great Britain (GSK) announced in April 2014. As part of these transactions, Novartis and GSK agreed to create a combined consumer healthcare business through a combination between Novartis OTC and GSK Consumer Healthcare. On March 2, 2015, a new entity GlaxoSmithKline Consumer Healthcare Holdings Ltd (GSK Consumer Healthcare) was formed via the contribution of businesses from both Novartis and GSK.

At December 31, 2017, 2016 and 2015, Novartis has a 36.5% interest in GSK Consumer Healthcare and four of eleven seats on the GSK Consumer Healthcare board of directors. Furthermore, Novartis has customary minority rights and also exit rights at a pre-defined, market-based pricing mechanism.

The December 31, 2017 balance sheet value allocation is as follows:

(USD millions)	December 31, 2017
Novartis share of GSK Consumer Healthcare's estimated net assets	1 505
Novartis share of re-appraised intangible assets	3 852
Implicit Novartis goodwill	1 763
Current value of share in net identifiable assets and goodwill	**7 120**
Accumulated equity accounting adjustments and translation effects less dividends received	– 100
Balance sheet value	**7 020**

The identified intangible assets principally relate to the value of the indefinite life GSK Consumer Healthcare intangible assets. The identified intangible assets with a definite life are amortized on a straight-line basis over their estimated average useful life of 20 years.

At acquisition date, Novartis has valued the contribution of 63.5% of its OTC Division in exchange for 36.5% of the GSK Consumer Healthcare business at fair value. The retained interest in the OTC Division business contributed was accounted for at net book value at the time of contribution.

The following tables show summarized financial information for GSK Consumer Healthcare, including current values of fair value adjustments made at the time of acquisition, for the year ended December 31, 2016, and for the nine months ended September 30, 2017 (interim unaudited), since full-year 2017 data is not yet available:

(GBP billions)	Current assets	Non-current assets	Current liabilities	Non-current liabilities
December 31, 2016	4.0	21.1	3.1	2.1
September 30, 2017	3.3	20.6	2.6	2.0

(GBP billions)	Revenue	Net income	Other comprehensive income	Total comprehensive income
December 31, 2016	6.5	0.6	1.6	2.2
September 30, 2017	5.3	0.6	– 0.4	0.2

Since full-year 2017 financial data for GSK Consumer Healthcare is not available when Novartis produces its consolidated financial results, a projection of the latest internal management reporting is used to estimate the Group's share of GSK Consumer Healthcare's net result for the year. Any differences between this estimate and actual results will be adjusted in the Group's 2018 consolidated financial statements when available.

In 2017, dividends received from GSK Consumer Healthcare amounted to USD 544 million (2016: USD 463 million).

The consolidated income statement effects from applying Novartis accounting principles for this investment in 2017, 2016 and 2015 are as follows:

(USD millions)	**2017**	2016	2015
Novartis share of GSK Consumer Healthcare's estimated current-year consolidated net income	589	268	– 17
Prior-year adjustment	47	– 22	
Amortization of fair value adjustments relating to intangible assets and inventory, net of taxes of USD 1 million (2016: USD 2 million; 2015: USD 18 million)	– 7	– 12	– 62
Net income effect	**629**	**234**	**– 79**

5. Interest expense and other financial income and expense

Interest expense

(USD millions)	2017	2016	2015
Interest expense	– 758	– 709	– 669
(Expense)/ income arising from discounting long-term liabilities	– 19	2	14
Total interest expense	**– 777**	**– 707**	**– 655**

Other financial income and expense

(USD millions)	2017	2016	2015
Interest income	110	43	33
Dividend income	1	1	1
Net capital losses on available-for-sale securities	– 1	– 1	– 8
Income on forward contracts and options			1
Impairment of commodities and available-for-sale securities, net	12	7	– 132
Other financial expense	– 25	– 20	– 23
Monetary loss from hyperinflation accounting			– 72
Currency result, net	– 58	– 477	– 254
Total other financial income and expense	**39**	**– 447**	**– 454**

6. Taxes

Income before taxes

(USD millions)	2017	2016	2015
Switzerland	5 289	3 110	5 765
Foreign	3 710	4 707	2 369
Income before taxes from continuing operations	**8 999**	**7 817**	**8 134**
Income before taxes from discontinued operations			12 479
Total income before taxes	**8 999**	**7 817**	**20 613**

Current and deferred income tax expense

(USD millions)	2017	2016	2015
Switzerland	– 462	– 709	– 317
Foreign	– 1 594	– 1 418	– 1 333
Current income tax expense from continuing operations	**– 2 056**	**– 2 127**	**– 1 650**
Switzerland	– 298	765	– 68
Foreign	1 058	243	612
Deferred tax income from continuing operations	**760**	**1 008**	**544**
Income tax expense from continuing operations	**– 1 296**	**– 1 119**	**– 1 106**
Income tax expense from discontinued operations			– 1 713
Total income tax expense	**– 1 296**	**– 1 119**	**– 2 819**

Analysis of tax rate

The main elements contributing to the difference between the Group's overall applicable tax rate (which can change each year since it is calculated as the weighted average tax rate based on pre-tax income of each subsidiary) and the effective tax rate are:

(As a percentage)	2017	2016	2015
Applicable tax rate	14.5	13.2	12.4
Effect of disallowed expenditures	3.4	3.5	3.5
Effect of utilization of tax losses brought forward from prior periods	– 0.1	– 0.2	– 0.2
Effect of income taxed at reduced rates	– 0.2	– 0.2	– 0.3
Effect of tax credits and allowances	– 2.2	– 2.8	– 2.7
Effect of release of contingent consideration liability	– 1.2	0.0	0.0
Effect of tax rate change on current and deferred tax assets and liabilities [1]	0.7	0.2	– 0.5
Effect of write-off of deferred tax assets	0.0	0.5	0.0
Effect of write down and reversal of write-down of investments in subsidiaries	– 1.1	– 1.0	– 0.9
Effect of tax benefits expiring in 2017	– 0.8	– 0.5	– 0.4
Effect of non-deductible losses in Venezuela	0.0	1.3	1.2
Effect of prior year items	1.2	0.2	1.0
Effect of other items [2]	0.2	0.1	0.5
Effective tax rate for continuing operations	**14.4**	**14.3**	**13.6**
Effective tax rate for discontinued operations			13.7
Effective tax rate	**14.4**	**14.3**	**13.7**

[1] Included in 2017 is a 0.7% impact related to the revaluation of the deferred tax assets and liabilities and a portion of current tax payables. This revaluation resulted from the US tax reform legislation enacted on December 22, 2017, refer to Note 11 for additional disclosures.

[2] Other items in 2016 (+0.1%) include one-time impacts for the deferred tax effects on the net assets of certain subsidiaries resulting from the change in their tax status (-6.2%), the changes in uncertain tax positions (+5.1%) and other items (+1.2%).

Novartis has a substantial business presence in many countries and is therefore subject to different income and expense items that are non-taxable (permanent differences) or taxed at different rates in those tax jurisdictions. This results in a difference between our applicable tax rate and effective tax rate, as shown in the table above.

The utilization of tax-loss carry-forwards lowered the tax charge by USD 7 million in 2017, and by USD 18 million and USD 15 million in 2016 and 2015, respectively.

7. Earnings per share

	2017	2016	2015
Net income attributable to shareholders of Novartis AG (USD millions)			
– Continuing operations	7 703	6 712	7 025
– Discontinued operations			10 758
– Total	**7 703**	**6 712**	**17 783**
Number of shares (in millions)			
Weighted average number of shares outstanding used in basic earnings per share	2 346	2 378	2 403
Adjustment for vesting of restricted shares, restricted share units and dilutive shares from options	25	22	35
Weighted average number of shares in diluted earnings per share	**2 371**	**2 400**	**2 438**
Basic earnings per share (USD)			
– Continuing operations	3.28	2.82	2.92
– Discontinued operations			4.48
– Total	**3.28**	**2.82**	**7.40**
Diluted earnings per share (USD)			
– Continuing operations	3.25	2.80	2.88
– Discontinued operations			4.41
– Total	**3.25**	**2.80**	**7.29**

Basic earnings per share (EPS) is calculated by dividing net income attributable to shareholders of Novartis AG by the weighted average number of shares outstanding in a reporting period. This calculation excludes the average number of issued shares purchased by the Group and held as treasury shares.

For diluted EPS, the weighted average number of shares outstanding is adjusted to assume the vesting of all restricted shares, restricted share units, and the conversion of all potentially dilutive shares arising from options on Novartis shares that have been issued.

No options were excluded from the calculation of diluted EPS in 2017, 2016, or 2015, as all options were dilutive in all years.

8. Changes in consolidated statements of comprehensive income

The consolidated statements of comprehensive income include the Group's net income for the year as well as all other valuation adjustments recorded in the Group's consolidated balance sheet but which under IFRS are not recorded in the consolidated income statement. These include fair value adjustments to financial instruments, actuarial gains or losses on defined benefit pension and other post-employment plans and currency translation effects, net of tax.

The following table summarizes these value adjustments and currency translation effects attributable to Novartis shareholders:

(USD millions)	Fair value adjustments on marketable securities	Fair value adjustments on deferred cash flow hedges	Actuarial gains/(losses) from defined benefit plans	Net investment hedge	Cumulative currency translation effects	Total value adjustments
Value adjustments at January 1, 2015	**433**	**– 38**	**– 5 366**		**2 406**	**– 2 565**
Fair value adjustments on financial instruments	28	20				48
Net actuarial losses from defined benefit plans [1]			– 147			– 147
Currency translation effects [2]					– 1 659	– 1 659
Total value adjustments in 2015	**28**	**20**	**– 147**		**– 1 659**	**– 1 758**
Fair value adjustments related to divestments			100			100
Value adjustments at December 31, 2015	**461**	**– 18**	**– 5 413**		**747**	**– 4 223**
Fair value adjustments on financial instruments	– 113	15				– 98
Net actuarial losses from defined benefit plans			– 514			– 514
Currency translation effects					– 2 389	– 2 389
Total value adjustments in 2016	**– 113**	**15**	**– 514**		**– 2 389**	**– 3 001**
Fair value adjustments related to divestments			12			12
Value adjustments at December 31, 2016	**348**	**– 3**	**– 5 915**		**– 1 642**	**– 7 212**
Fair value adjustments on financial instruments	38	12				50
Net investment hedge				– 237		– 237
Net actuarial gains from defined benefit plans			851			851
Currency translation effects					2 208	2 208
Total value adjustments in 2017	**38**	**12**	**851**	**– 237**	**2 208**	**2 872**
Value adjustments at December 31, 2017	**386**	**9**	**– 5 064**	**– 237**	**566**	**– 4 340**

[1] Net actuarial gains of USD 10 million in 2015 were attributable to discontinued operations up to the respective divestment dates
[2] Currency translation losses of USD 29 million in 2015 were attributable to discontinued operations up to the respective divestment dates

8.1) The 2017, 2016 and 2015 changes in the fair value of financial instruments were as follows:

(USD millions)	Fair value adjustments on marketable securities	Fair value adjustments on deferred cash flow hedges	Total
Fair value adjustments at January 1, 2017	**348**	**– 3**	**345**
Changes in fair value:			
– Available-for-sale marketable securities	11		11
– Available-for-sale financial investments	47		47
Realized net gains transferred to the consolidated income statement:			
– Other financial assets sold	– 109		– 109
Amortized net losses on cash flow hedges transferred to the consolidated income statement		13	13
Impaired financial assets transferred to the consolidated income statement	102		102
Deferred tax on above items [1]	– 13	– 1	– 14
Fair value adjustments during the year	**38**	**12**	**50**
Fair value adjustments at December 31, 2017	**386**	**9**	**395**

[1] Included in 2017 is a USD 18 million impact related to the revaluation of deferred tax liabilities on available-for-sale financial investments held in the US that were previously recognized through other comprehensive income. This revaluation resulted from the US tax reform legislation enacted on December 22, 2017, refer to Note 11 for additional disclosures.

(USD millions)	Fair value adjustments on marketable securities	Fair value adjustments on deferred cash flow hedges	Total
Fair value adjustments at January 1, 2016	**461**	**– 18**	**443**
Changes in fair value:			
– Available-for-sale marketable securities	1		1
– Available-for-sale financial investments	– 87		– 87
Realized net gains transferred to the consolidated income statement:			
– Marketable securities sold	– 1		– 1
– Other financial assets sold	– 154		– 154
Amortized net losses on cash flow hedges transferred to the consolidated income statement		16	16
Impaired financial assets transferred to the consolidated income statement	131		131
Deferred tax on above items	– 3	– 1	– 4
Fair value adjustments during the year	**– 113**	**15**	**– 98**
Fair value adjustments at December 31, 2016	**348**	**– 3**	**345**

(USD millions)	Fair value adjustments on marketable securities	Fair value adjustments on deferred cash flow hedges	Total
Fair value adjustments at January 1, 2015	**433**	**– 38**	**395**
Changes in fair value:			
– Available-for-sale marketable securities	– 130		– 130
– Available-for-sale financial investments	80		80
– Associated companies' movements in comprehensive income	– 8		– 8
Realized net gains transferred to the consolidated income statement:			
– Marketable securities sold	– 1		– 1
– Other financial assets sold	– 103		– 103
Amortized net losses on cash flow hedges transferred to the consolidated income statement		21	21
Impaired financial assets transferred to the consolidated income statement	194		194
Deferred tax on above items	– 4	– 1	– 5
Fair value adjustments during the year	**28**	**20**	**48**
Fair value adjustments at December 31, 2015	**461**	**– 18**	**443**

8.2) In 2015, cumulative currency translation losses of USD 10 million were recycled through the income statement as a result of the divestments of subsidiaries. No currency translation losses or gains were recycled through the income statement in 2017 and 2016.

8.3) Remeasurements from defined benefit plans arise as follows:

(USD millions)	**2017**	2016	2015
Defined benefit pension plans before tax	1 367	– 667	– 252
Other post-employment benefit plans before tax	76	12	168
Taxation on above items [1]	– 592	140	– 63
Total after tax	**851**	**– 515**	**– 147**
Attributable to:			
Shareholders of Novartis AG	*851*	*– 514*	*– 147*
Non-controlling interests		*– 1*	

[1] Included in 2017 is a USD -272 million impact related to the revaluation of deferred tax assets on US post-employment benefits that were previously recognized through other comprehensive income. This revaluation resulted from the US tax reform legislation enacted on December 22, 2017, refer to Note 11 for additional disclosures.

9. Property, plant & equipment

The following table summarizes the movements of property, plant and equipment during 2017:

(USD millions)	Land	Buildings	Construction in progress	Machinery & other equipment	Total
Cost					
January 1, 2017	**687**	**13 113**	**2 680**	**14 816**	**31 296**
Reclassifications [1]	5	508	– 1 617	1 104	
Additions	13	104	1 186	425	1 728
Disposals and derecognitions [2]	– 23	– 324	– 71	– 593	– 1 011
Currency translation effects	38	663	190	1 106	1 997
December 31, 2017	**720**	**14 064**	**2 368**	**16 858**	**34 010**
Accumulated depreciation					
January 1, 2017	**– 40**	**– 5 436**	**– 15**	**– 10 164**	**– 15 655**
Depreciation charge	– 3	– 510		– 1 007	– 1 520
Accumulated depreciation on disposals and derecognitions [2]	6	275	34	534	849
Impairment charge		– 25	– 58	– 106	– 189
Reversal of impairment charge			2	30	32
Currency translation effects	– 3	– 287	– 1	– 772	– 1 063
December 31, 2017	**– 40**	**– 5 983**	**– 38**	**– 11 485**	**– 17 546**
Net book value at December 31, 2017	**680**	**8 081**	**2 330**	**5 373**	**16 464**
Net book value of property, plant & equipment under finance lease contracts					**78**
Commitments for purchases of property, plant & equipment					**318**
Capitalized borrowing costs					**9**

[1] Reclassifications between various asset categories due to completion of plant and other equipment under construction.
[2] Derecognition of assets that are no longer used and are not considered to have a significant disposal value or other alternative use.

The following table summarizes the movements of property, plant and equipment during 2016:

(USD millions)	Land	Buildings	Construction in progress	Machinery & other equipment	Total
Cost					
January 1, 2016	**688**	**12 857**	**2 810**	**15 093**	**31 448**
Reclassifications [1]	4	630	– 1 226	592	
Additions	24	176	1 226	409	1 835
Disposals and derecognitions [2]	– 8	– 178	– 19	– 656	– 861
Currency translation effects	– 21	– 372	– 111	– 622	– 1 126
December 31, 2016	**687**	**13 113**	**2 680**	**14 816**	**31 296**
Accumulated depreciation					
January 1, 2016	**– 40**	**– 5 188**	**– 7**	**– 10 231**	**– 15 466**
Depreciation charge	– 3	– 530		– 956	– 1 489
Accumulated depreciation on disposals and derecognitions [2]	5	157	1	630	793
Impairment charge	– 3	– 47	– 11	– 61	– 122
Reversal of impairment charge		6	1	13	20
Currency translation effects	1	166	1	441	609
December 31, 2016	**– 40**	**– 5 436**	**– 15**	**– 10 164**	**– 15 655**
Net book value at December 31, 2016	**647**	**7 677**	**2 665**	**4 652**	**15 641**
Net book value of property, plant & equipment under finance lease contracts					**81**
Commitments for purchases of property, plant & equipment					**223**
Capitalized borrowing costs					**9**

[1] Reclassifications between various asset categories due to completion of plant and other equipment under construction.
[2] Derecognition of assets that are no longer used and are not considered to have a significant disposal value or other alternative use.

10. Goodwill and intangible assets

The following table summarizes the movements of goodwill and intangible assets in 2017:

	Goodwill	Intangible Assets other than Goodwill						
(USD millions)	Total	Acquired research & development	Alcon brand name	Technologies	Currently marketed products	Marketing know-how	Other intangible assets	Total
Cost								
January 1, 2017	**31 381**	**5 150**	**2 980**	**6 548**	**33 007**	**5 960**	**1 492**	**55 137**
Impact of business combinations	94	1 223						1 223
Reclassifications [1]		– 389			175		214	
Additions		697		5	282		162	1 146
Disposals and derecognitions [2]		– 353		– 1	– 328		– 64	– 746
Currency translation effects	704	134		86	969		48	1 237
December 31, 2017	**32 179**	**6 462**	**2 980**	**6 638**	**34 105**	**5 960**	**1 852**	**57 997**
Accumulated amortization								
January 1, 2017	**– 401**	**– 886**		**– 3 637**	**– 16 863**	**– 1 430**	**– 981**	**– 23 797**
Reclassifications [1]		6			– 6			
Amortization charge				– 577	– 2 571	– 238	– 304	– 3 690
Accumulated impairments on disposals and derecognitions [2]		352			317		61	730
Impairment charge		– 615			– 92		– 2	– 709
Currency translation effects	– 28	– 27		– 54	– 416		– 37	– 534
December 31, 2017	**– 429**	**– 1 170**		**– 4 268**	**– 19 631**	**– 1 668**	**– 1 263**	**– 28 000**
Net book value at December 31, 2017	**31 750**	**5 292**	**2 980**	**2 370**	**14 474**	**4 292**	**589**	**29 997**

[1] Reclassifications between various asset categories as a result of product launches of acquired In-Process Research & Development and completion of software development.
[2] Derecognitions of assets that are no longer used or being developed and are not considered to have a significant disposal value or other alternative use.

The following table summarizes the movements of goodwill and intangible assets in 2016:

	Goodwill	Intangible Assets other than Goodwill						
(USD millions)	Total	Acquired research & development	Alcon brand name	Technologies	Currently marketed products	Marketing know-how	Other intangible assets	Total
Cost								
January 1, 2016	**31 585**	**4 119**	**2 980**	**6 563**	**33 385**	**5 960**	**1 341**	**54 348**
Impact of business combinations	56	690			451			1 141
Reclassifications [1]		– 158			6		152	
Additions		599			223		156	978
Disposals and derecognitions [2]		– 23			– 464		– 130	– 617
Currency translation effects	– 260	– 77		– 15	– 594		– 27	– 713
December 31, 2016	**31 381**	**5 150**	**2 980**	**6 548**	**33 007**	**5 960**	**1 492**	**55 137**
Accumulated amortization								
January 1, 2016	**– 411**	**– 650**		**– 3 070**	**– 14 221**	**– 1 192**	**– 998**	**– 20 131**
Reclassifications [1]		225			– 225			
Amortization charge				– 576	– 2 926	– 238	– 121	– 3 861
Accumulated impairments on disposals and derecognitions [2]		22			390		123	535
Impairment charge		– 490			– 96		– 5	– 591
Currency translation effects	10	7		9	215		20	251
December 31, 2016	**– 401**	**– 886**		**– 3 637**	**– 16 863**	**– 1 430**	**– 981**	**– 23 797**
Net book value at December 31, 2016	**30 980**	**4 264**	**2 980**	**2 911**	**16 144**	**4 530**	**511**	**31 340**

[1] Reclassifications between various asset categories as a result of product launches of acquired In-Process Research & Development and completion of software development.
[2] Derecognitions of assets that are no longer used or being developed and are not considered to have a significant disposal value or other alternative use.

The following table summarizes the allocation of the net book values of goodwill and intangible assets by reporting segment at December 31, 2017:

	Goodwill	Intangible Assets other than Goodwill						
(USD millions)	Total	Acquired research & development	Alcon brand name	Technologies	Currently marketed products	Marketing know-how	Other intangible assets	Total
Innovative Medicines	15 237	4 368		9	11 604		353	16 334
Sandoz	8 210	625		539	1 589		30	2 783
Alcon	8 295	291		1 822	1 281	4 292	195	7 881
Corporate	8	8	2 980				11	2 999
Net book value at December 31, 2017	**31 750**	**5 292**	**2 980**	**2 370**	**14 474**	**4 292**	**589**	**29 997**

The following table summarizes the allocation of the net book values of goodwill and intangible assets by reporting segment at December 31, 2016:

	Goodwill	Intangible Assets other than Goodwill						
(USD millions)	Total	Acquired research & development	Alcon brand name	Technologies	Currently marketed products	Marketing know-how	Other intangible assets	Total
Innovative Medicines	15 010	3 512		11	12 821		276	16 620
Sandoz	7 669	613		563	1 904		25	3 105
Alcon	8 293	139		2 337	1 419	4 530	196	8 621
Corporate	8		2 980				14	2 994
Net book value at December 31, 2016	**30 980**	**4 264**	**2 980**	**2 911**	**16 144**	**4 530**	**511**	**31 340**

The Innovative Medicines, Sandoz and Alcon Divisions' cash generating units, to which goodwill are allocated, each comprise a group of smaller cash generating units. The valuation method of the recoverable amount of the cash generating units, to which goodwill is allocated, is based on the fair value less costs of disposal.

The Alcon brand name is a Corporate asset with an indefinite life. The intangible asset is allocated to Corporate as it is used to market the Alcon-branded products of both the Alcon Division and the Ophthalmology business franchise of the Innovative Medicines Division. Net sales of these products together are the grouping of cash generating units, which is used to determine the recoverable amount. The valuation method is based on the fair value less costs of disposal.

The following assumptions are used in the calculations:

(As a percentage)	Innovative Medicines	Sandoz	Alcon	Corporate
Terminal growth rate	1.5	2.0	3.0	2.6
Discount rate (post-tax)	7.0	7.0	7.0	7.0

The Alcon terminal growth rate assumption of 3% is higher than the expected inflation rate of the medical device industry, and more specifically the ophthalmic sub-segment of the industry. The growth rates are expected to exceed this long-term inflation rate, due to the impact of the demographic trend of the aging population to which Alcon's products are prescribed is growing faster than the general population.

The discount rates for all divisions consider the Group's weighted average cost of capital, adjusted to approximate the weighted average cost of capital of a comparable market participant.

The fair value less costs of disposal, for all groupings of cash generating units containing goodwill or indefinite life intangible assets, is reviewed for the impact of reasonably possible changes in key assumptions. In particular, we considered an increase in the discount rate, a decrease in the terminal growth rate and certain negative impacts on the forecasted cash flows. These reasonably possible changes in key assumptions did not indicate an impairment.

Note 1, Significant accounting policies – Impairment of goodwill and intangible assets, provides additional disclosures on how the Group performs goodwill and intangible asset impairment testing.

The following table shows the intangible asset impairment charges for 2017 and 2016:

(USD millions)	**2017**	2016
Innovative Medicines	– 591	– 522
Sandoz	– 61	– 65
Alcon	– 57	– 4
Total	**– 709**	**– 591**

11. Deferred tax assets and liabilities

(USD millions)	Property, plant & equipment	Intangible assets	Pensions and other benefit obligations of associates	Inventories	Tax loss carry-forwards	Other assets, provisions and accruals	Total
Gross deferred tax assets at January 1, 2017	**224**	**1 331**	**1 839**	**4 160**	**146**	**2 597**	**10 297**
Gross deferred tax liabilities at January 1, 2017	**– 629**	**– 4 019**	**– 358**	**– 511**		**– 1 403**	**– 6 920**
Net deferred tax balance at January 1, 2017	**– 405**	**– 2 688**	**1 481**	**3 649**	**146**	**1 194**	**3 377**
At January 1, 2017	**– 405**	**– 2 688**	**1 481**	**3 649**	**146**	**1 194**	**3 377**
Credited/(charged) to income	– 30	1 279	– 90	– 304	– 49	– 46	760
Charged to equity						– 101	– 101
Charged to other comprehensive income			– 592			– 69	– 661
Impact of business combinations		– 322			5		– 317
Other movements	– 41	33	37	– 14	– 14	2	3
Net deferred tax balance at December 31, 2017	**– 476**	**– 1 698**	**836**	**3 331**	**88**	**980**	**3 061**
Gross deferred tax assets at December 31, 2017	137	1 287	1 090	3 786	97	1 983	8 380
Gross deferred tax liabilities at December 31, 2017	– 613	– 2 985	– 254	– 455	– 9	– 1 003	– 5 319
Net deferred tax balance at December 31, 2017	**– 476**	**– 1 698**	**836**	**3 331**	**88**	**980**	**3 061**
After offsetting the following amount of deferred tax assets and liabilities within the same tax jurisdiction the balance amounts to:							151
Deferred tax assets at December 31, 2017							8 229
Deferred tax liabilities at December 31, 2017							– 5 168
Net deferred tax balance at December 31, 2017							**3 061**
Gross deferred tax assets at January 1, 2016	**216**	**611**	**1 730**	**3 821**	**62**	**2 866**	**9 306**
Gross deferred tax liabilities at January 1, 2016	**– 639**	**– 3 962**	**– 401**	**– 565**	**– 5**	**– 1 132**	**– 6 704**
Net deferred tax balance at January 1, 2016	**– 423**	**– 3 351**	**1 329**	**3 256**	**57**	**1 734**	**2 602**
At January 1, 2016	**– 423**	**– 3 351**	**1 329**	**3 256**	**57**	**1 734**	**2 602**
Credited/(charged) to income	– 13	1 057	53	373	55	– 517	1 008
Charged to equity						– 44	– 44
Credited/(charged) to other comprehensive income			140			– 2	138
Impact of business combinations	4	– 400			23	37	– 336
Other movements	27	6	– 41	20	11	– 14	9
Net deferred tax balance at December 31, 2016	**– 405**	**– 2 688**	**1 481**	**3 649**	**146**	**1 194**	**3 377**
Gross deferred tax assets at December 31, 2016	224	1 331	1 839	4 160	146	2 597	10 297
Gross deferred tax liabilities at December 31, 2016	– 629	– 4 019	– 358	– 511		– 1 403	– 6 920
Net deferred tax balance at December 31, 2016	**– 405**	**– 2 688**	**1 481**	**3 649**	**146**	**1 194**	**3 377**
After offsetting the following amount of deferred tax assets and liabilities within the same tax jurisdiction the balance amounts to:							263
Deferred tax assets at December 31, 2016							10 034
Deferred tax liabilities at December 31, 2016							– 6 657
Net deferred tax balance at December 31, 2016							**3 377**

The following table presents deferred tax assets and deferred tax liabilities, which are expected to have an impact on current taxes payable after more than twelve months:

(USD billions)	**2017**	2016
Expected to have an impact on current tax payable after more than 12 months		
– Deferred tax assets	3.5	4.8
– Deferred tax liabilities	4.4	5.9

For unremitted earnings retained by consolidated entities for reinvestment, no provision is made for income taxes that would be payable upon the distribution of these earnings. If these earnings were remitted, an income tax charge could result based on the tax statutes currently in effect.

(USD billions)	**2017**	2016
Unremitted earnings that have been retained by consolidated entities for reinvestment	66	63

Temporary differences on which no deferred tax has been provided as they are permanent in nature related to:

(USD billions)	**2017**	2016
Investments in subsidiaries	3	2
Goodwill from acquisitions	– 29	– 28

The gross value of tax-loss carry-forwards that have, or have not, been capitalized as deferred tax assets, with their expiry dates is as follows:

(USD millions)	Not capitalized	Capitalized	**2017 total**
One year	37	3	40
Two years	64	4	68
Three years	87	5	92
Four years	26	25	51
Five years	67	16	83
More than five years	654	1 671	2 325
Total	**935**	**1 724**	**2 659**

(USD millions)	Not capitalized	Capitalized	2016 total
One year	21	12	33
Two years	30	5	35
Three years	50	5	55
Four years	75	3	78
Five years	73	25	98
More than five years	405	1 913	2 318
Total	**654**	**1 963**	**2 617**

(USD millions)	**2017**	2016	2015
Tax losses carried forward that expired	1	19	13

Deferred tax assets related to taxable losses of relevant Group entities are recognized to the extent it is considered probable that future taxable profits will be available against which such losses can be utilized in the foreseeable future.

On December 22, 2017, the US enacted tax reform legislation (Tax Cuts and Jobs Act), which among other provisions, reduced the US corporate tax rate from 35% to 21%, effective January 1, 2018. This required a revaluation of the deferred tax assets and liabilities and a portion of current tax payables to the newly enacted tax rates at the date of enactment.

The following table shows the impact on the revaluation of deferred assets and liabilities and current income tax liabilities:

(USD millions)	Income statement	Equity	**Total**
Deferred tax asset and liability revaluation			
Items previously recognized in consolidated income statement	– 24		– 24
Items previously recognized in other comprehensive income [1]		– 254	– 254
Items previously recognized in retained earnings [2]		– 71	– 71
Total revaluation of deferred tax assets and liabilities	– 24	– 325	– 349
Total revaluation of current tax payables	– 37		– 37
Total revaluation of deferred tax assets and liabilities and current income tax liabilities	**– 61**	**– 325**	**– 386**

[1] Related to post-employment benefits and available for sale financial investments.
[2] Related to equity based compensation plans.

The enacted US tax reform legislation includes a provision that requires the US parent company's foreign subsidiaries' unremitted earnings to be subject to an immediate toll tax on the qualifying amount of unremitted earnings (the deemed repatriated earnings). Previously, these earnings were taxable upon distribution to the US parent company. The toll tax amount owed is payable, without interest, in installments over an eight year period through 2024. Certain of the Group's US subsidiaries are the parent company of non-US domiciled companies, and as a result, USD 70 million of deferred tax liabilities related to these entities' unremitted earnings, the majority of which were recognized in the prior year, were reclassified to current income tax liabilities.

12. Financial and other non-current assets

Financial assets

(USD millions)	2017	2016
Available-for-sale long-term financial investments	1 275	1 096
Long-term receivables from customers	197	231
Minimum lease payments from finance lease agreements	122	147
Contingent consideration receivables [1]	394	586
Long-term loans, advances and security deposits	255	136
Total financial assets	**2 243**	**2 196**

[1] Note 28 provides additional disclosures related to contingent considerations.

Other non-current assets

(USD millions)	2017	2016
Deferred compensation plans	484	451
Prepaid post-employment benefit plans	133	47
Other non-current assets	201	200
Total other non-current assets	**818**	**698**

Minimum finance lease payments

The following table shows the receivables of the gross investments in finance leases and the net present value of the minimum lease payments, as well as unearned finance income, related to surgical equipment lease arrangements. The finance income is recorded in "Other income".

	2017					2016				
(USD millions)	Total future payments	Unearned finance income	Present value	Provision	Net book value	Total future payments	Unearned finance income	Present value	Provision	Net book value
Not later than one year [1]	83	– 7	76	– 3	73	91	– 5	86	– 2	84
Between one and five years	180	– 14	166	– 59	107	182	– 16	166	– 37	129
Later than five years	31	– 2	29	– 14	15	63	– 4	59	– 41	18
Total	**294**	**– 23**	**271**	**– 76**	**195**	**336**	**– 25**	**311**	**– 80**	**231**

[1] The current portion of the minimum lease payments is recorded in trade receivables or other current assets (to the extent not yet invoiced).

13. Inventories

(USD millions)	2017	2016
Raw material, consumables	841	705
Work in progress	2 957	2 700
Finished products	3 069	2 850
Total inventories	**6 867**	**6 255**

The following table shows the amount of inventory recognized as an expense in "Cost of goods sold" in the consolidated income statements:

(USD billions)	2017	2016	2015
Cost of goods sold	– 10.3	– 10.3	– 10.5

The following table shows the recognized amount of inventory provisions and reversals of inventory provisions:

(USD millions)	2017	2016	2015
Inventory provisions	– 470	– 283	– 356
Reversals of inventory provisions	189	67	148

The reversals mainly result from the release of products initially requiring additional quality control inspections and from the reassessment of inventory values manufactured prior to regulatory approval but for which approval was subsequently received.

14. Trade receivables

(USD millions)	2017	2016
Total gross trade receivables	8 790	8 364
Provisions for doubtful trade receivables	– 190	– 162
Total trade receivables, net	**8 600**	**8 202**

The following table summarizes the movement in the provision for doubtful trade receivables:

(USD millions)	2017	2016	2015
January 1	**– 162**	**– 142**	**– 156**
Impact of divestments	12		
Provisions for doubtful trade receivables charged to the consolidated income statement	– 119	– 76	– 68
Utilization provisions for doubtful trade receivables	12	17	39
Reversal of provisions for doubtful trade receivables	76	37	32
Currency translation effects	– 9	2	11
December 31	**– 190**	**– 162**	**– 142**

The following sets forth the trade receivables that are not overdue as specified in the payment terms and conditions established with Novartis customers as well as an analysis of overdue amounts and related provisions for doubtful trade receivables:

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

Trade receivable balances include sales to drug wholesalers, retailers, private health systems, government agencies, managed care providers, pharmacy benefit managers and government-supported healthcare systems. Novartis continues to monitor sovereign debt issues and economic conditions, particularly in Greece, Italy, Portugal, Spain, Brazil, Russia, Saudi Arabia and Turkey, and evaluates trade receivables in these countries for potential collection risks. The majority of the outstanding trade receivables from these closely monitored countries are due directly from local governments or from government-funded entities except for Russia, Brazil and Turkey, which are due from private entities. Deteriorating credit and economic conditions as well as other factors in these closely monitored countries have resulted in, and may continue to result in an increase in the average length of time that it takes to collect these trade receivables and may require Novartis to re-evaluate the collectability of these trade receivables in future periods.

The following table shows the gross trade receivables balance from these closely monitored countries at December 31, 2017 and 2016, the amounts that are past due for more than one year and the related provisions that have been recorded:

(USD millions)	2017	2016
Total balance of gross trade receivables from closely monitored countries	1 733	1 717
Past due for more than one year	124	82
Provisions	95	63

At December 31, 2017 amounts past due for more than one year are not significant in any of these countries on a standalone basis.

Total trade receivables include amounts denominated in the following major currencies:

(USD millions)	2017	2016
US dollar (USD)	3 451	3 432
Euro (EUR)	1 533	1 366
Japanese yen (JPY)	600	567
Chinese yuan (CNY)	312	264
Russian ruble (RUB)	268	347
Brazilian real (BRL)	237	222
British pound (GBP)	208	160
Australian dollar (AUD)	165	147
Swiss franc (CHF)	127	135
Canadian dollar (CAD)	73	97
Other currencies	1 626	1 465
Total trade receivables, net	**8 600**	**8 202**

15. Marketable securities, commodities, time deposits, derivative financial instruments and cash and cash equivalents

Marketable securities, commodities, time deposits and derivative financial instruments

(USD millions)	2017	2016
Debt securities	328	306
Fund investments	34	31
Total available-for-sale marketable securities	**362**	**337**
Commodities	106	94
Time deposits with original maturity more than 90 days	125	108
Derivative financial instruments	31	230
Accrued interest on debt securities and time deposits	1	1
Total marketable securities, commodities, time deposits and derivative financial instruments	**625**	**770**

The following table provides a breakdown of debt securities by currency:

(USD millions)	2017	2016
US dollar (USD)	303	284
Euro (EUR)	14	12
Japanese yen (JPY)	11	10
Total debt securities	**328**	**306**

Cash and cash equivalents

(USD millions)	2017	2016
Current accounts	2 970	1 912
Time deposits and short-term investments with original maturity less than 90 days	5 890	5 095
Total cash and cash equivalents	**8 860**	**7 007**

16. Other current assets

(USD millions)	2017	2016
VAT receivable	717	521
Withholding tax recoverable	93	282
Prepaid expenses		
– Third parties	753	692
– Associated companies	3	5
Receivables from associated companies	8	7
Contingent consideration receivable [1]	450	
Other receivables and current assets	1 030	1 034
Total other current assets	**3 054**	**2 541**

[1] Note 28 provides additional disclosures related to contingent consideration.

17. Equity

The following table shows the movement in the share capital:

(USD millions)	Jan 1, 2015	Movement in year	Dec 31, 2015	Movement in year	Dec 31, 2016	Movement in year	**Dec 31, 2017**
Share capital	1 001	– 10	991	– 19	972	– 3	969
Treasury shares	– 103	2	– 101	25	– 76	– 24	– 100
Outstanding share capital	**898**	**– 8**	**890**	**6**	**896**	**– 27**	**869**

The following table shows the movement in the shares:

Number of outstanding shares (in millions)	Note	**2017** Total Novartis shares	**2017** Total treasury shares	**2017** Total outstanding shares	2016 Total Novartis shares	2016 Total treasury shares	2016 Total outstanding shares	2015 Total Novartis shares	2015 Total treasury shares	2015 Total outstanding shares
Balance at beginning of year		**2 627.1**	**– 253.0**	**2 374.1**	**2 677.0**	**– 303.1**	**2 373.9**	**2 706.2**	**– 307.6**	**2 398.6**
Shares canceled for capital reduction [1]		– 10.3	10.3		– 49.9	49.9		– 29.2	29.2	
Shares acquired to be held in Group Treasury [2]									– 9.6	– 9.6
Shares acquired to be canceled [3]			– 66.2	– 66.2		– 10.3	– 10.3		– 49.9	– 49.9
Other share purchases [4]			– 3.8	– 3.8		– 2.6	– 2.6		– 4.1	– 4.1
Exercise of options and employee transactions [5]	17.6		4.6	4.6		4.1	4.1		27.0	27.0
Equity-based compensation [5]			8.8	8.8		9.0	9.0		11.9	11.9
Total movements		**– 10.3**	**– 46.3**	**– 56.6**	**– 49.9**	**50.1**	**0.2**	**– 29.2**	**4.5**	**– 24.7**
Balance at end of year		**2 616.8**	**– 299.3**	**2 317.5**	**2 627.1**	**– 253.0**	**2 374.1**	**2 677.0**	**– 303.1**	**2 373.9**

[1] Novartis reduced its share capital by cancelling shares which were repurchased on the SIX Swiss Exchange second trading line during previous years.
[2] Shares repurchased on the SIX Swiss Exchange first trading line
[3] For 2017 and 2016, shares repurchased on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback authority approved at the 2016 Annual General Meeting (AGM). For 2015, shares repurchased on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback authority approved at the 2008 Annual General Meeting (AGM).
[4] Shares acquired from employees, which were previously granted to them under the respective programs
[5] Shares delivered as a result of options being exercised and physical share deliveries related to equity-based participation plans

17.1) The amount available for distribution as a dividend to shareholders is based on the available distributable retained earnings of Novartis AG determined in accordance with the legal provisions of the Swiss Code of Obligations.

	2017	2016	2015
Dividend per share (in CHF)	2.75	2.70	2.60
Total dividend payment (in USD billion)	6.5	6.5	6.6

17.2) The following table summarizes the treasury shares movements:

	Note	2017 Number of outstanding shares (in millions)	2017 Equity impact USDm	2016 Number of outstanding shares (in millions)	2016 Equity impact USDm	2015 Number of outstanding shares (in millions)	2015 Equity impact USDm
Shares acquired to be held in Group Treasury [1]						– 9.6	– 897
Shares acquired to be canceled [2]		– 66.2	– 5 270	– 10.3	– 784	– 49.9	– 4 805
Other share purchases [3]		– 3.8	– 304	– 2.6	– 208	– 4.1	– 417
Purchase of treasury shares		– 70.0	– 5 574	– 12.9	– 992	– 63.6	– 6 119
Exercise of options and employee transactions [4]	17.6	4.6	255	4.1	214	27.0	1 592
Equity-based compensation [5, 6]		8.8	612	9.0	664	11.9	815
Total		**– 56.6**	**– 4 707**	**0.2**	**– 114**	**– 24.7**	**– 3 712**

[1] Shares repurchased on the SIX Swiss Exchange first trading line

[2] For 2017 and 2016, shares repurchased on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback authority approved at the 2016 Annual General Meeting (AGM). For 2015, shares repurchased on the SIX Swiss Exchange second trading line under the CHF 10 billion share buyback authority approved at the 2008 Annual General Meeting (AGM).

[3] Shares acquired from employees, which were previously granted to them under the respective programs

[4] Shares delivered as a result of options being exercised related to equity-based participation plans and the delivery of treasury shares. The average share price of the shares delivered was significantly below market price reflecting the strike price of the options exercised.

[5] Equity-settled share-based compensation is expensed in the consolidated income statement in accordance with the vesting period of the share-based compensation plans. The value for the shares and options granted is credited to consolidated equity over the respective vesting period. In addition, tax benefits arising from tax deductible amounts exceeding the expense recognized in the income statement are credited to equity.

[6] Included in 2017 is a USD 71 million impact related to the revaluation of deferred tax assets on equity based compensation that were previously recognized through retained earnings. This revaluation resulted from the US tax reform legislation enacted on December 22, 2017, refer to Note 11 for additional disclosures.

17.3) Changes in non-controlling interests represent the impact on the non-controlling interest of transactions with minority shareholders such as change in ownership percentage, dividend payments, and other equity transactions.

17.4) In 2017, Novartis entered into an irrevocable, non-discretionary arrangement with a bank to repurchase Novartis shares on the second trading line under its up-to USD 5 billion share buyback, as well as to mitigate dilution from equity-based participation plans. The commitment under this arrangement is the expected purchases by the bank under such trading plan over a rolling 90-day period. As of December 31, 2017, this trading plan commitment was fully executed and expired, and as a consequence, there is no contingent liability related to this plan recognized.

In 2014, Novartis entered into a similar irrevocable, non-discretionary arrangement with a bank to repurchase Novartis shares. The commitment under this arrangement reflected the expected purchases by the bank under such trading plan over a rolling 90-day period. In 2015, this trading plan was fully executed and expired, resulting in a decrease of USD 658 million in the repurchase obligation. As a consequence, there is no contingent liability related to this plan as of December 31, 2015 and December 31, 2016.

17.5) The impact of change in ownership of consolidated entities represents the excess of the amount paid to non-controlling interest over their carrying value and equity allocation to non-controlling interest due to change in ownership percentage.

17.6) At December 31, 2017, the market maker held 12 million written call options, originally issued as part of the share-based compensation for associates that have not yet been exercised. The weighted average exercise price of these options is USD 62.17 and they have contractual lives of 10 years, with remaining lives up to six years.

18. Non-current financial debt

(USD millions)	2017	2016
Straight bonds	22 957	17 285
Liabilities to banks and other financial institutions [1]	539	708
Finance lease obligations	87	82
Total, including current portion of non-current financial debt	**23 583**	**18 075**
Less current portion of non-current financial debt	– 359	– 178
Total non-current financial debts	**23 224**	**17 897**

[1] Average interest rate 0.3% (2016: 0.4%)

Financial debts, including current financial debts, contain only general default covenants. The Group is in compliance with these covenants.

The percentage of fixed-rate financial debt to total financial debt was 82% at December 31, 2017, and 76% at December 31, 2016.

The average interest rate on total financial debt in 2017 was 2.6% (2016: 2.8%).

The following table provides a breakdown of straight bonds:

Coupon	Currency	Nominal amount	Issuance year	Maturity year	Issuer	Issue price	2017 (USD millions)	2016 (USD millions)
5.125%	USD	3 000	2009	2019	Novartis Securities Investment Ltd., Hamilton, Bermuda	99.822%	2 997	2 995
4.400%	USD	1 000	2010	2020	Novartis Capital Corporation, New York, United States	99.237%	997	996
2.400%	USD	1 500	2012	2022	Novartis Capital Corporation, New York, United States	99.225%	1 491	1 490
3.700%	USD	500	2012	2042	Novartis Capital Corporation, New York, United States	98.325%	489	489
3.400%	USD	2 150	2014	2024	Novartis Capital Corporation, New York, United States	99.287%	2 134	2 132
4.400%	USD	1 850	2014	2044	Novartis Capital Corporation, New York, United States	99.196%	1 824	1 823
0.750%	EUR	600	2014	2021	Novartis Finance S.A., Luxembourg, Luxembourg	99.134%	713	625
1.625%	EUR	600	2014	2026	Novartis Finance S.A., Luxembourg, Luxembourg	99.697%	714	627
0.250%	CHF	500	2015	2025	Novartis AG, Basel, Switzerland	100.640%	513	491
0.625%	CHF	550	2015	2029	Novartis AG, Basel, Switzerland	100.502%	564	539
1.050%	CHF	325	2015	2035	Novartis AG, Basel, Switzerland	100.479%	333	318
3.000%	USD	1 750	2015	2025	Novartis Capital Corporation, New York, United States	99.010%	1 730	1 728
4.000%	USD	1 250	2015	2045	Novartis Capital Corporation, New York, United States	98.029%	1 218	1 217
0.125%	EUR	1 250	2016	2023	Novartis Finance S.A., Luxembourg, Luxembourg	99.127%	1 480	1 299
0.625%	EUR	500	2016	2028	Novartis Finance S.A., Luxembourg, Luxembourg	98.480%	588	516
1.800%	USD	1 000	2017	2020	Novartis Capital Corporation, New York, United States	99.609%	996	
2.400%	USD	1 000	2017	2022	Novartis Capital Corporation, New York, United States	99.449%	993	
3.100%	USD	1 000	2017	2027	Novartis Capital Corporation, New York, United States	99.109%	988	
0.000%	EUR	1 250	2017	2021	Novartis Finance S.A., Luxembourg, Luxembourg	99.133%	1 480	
1.125%	EUR	600	2017	2027	Novartis Finance S.A., Luxembourg, Luxembourg	99.874%	715	
Total straight bonds							**22 957**	**17 285**

The following tables provide a breakdown of total non-current financial debt, including current portion by maturity and currency:

Breakdown by maturity:

(USD millions)	2017	2016
2017		178
2018	359	345
2019	3 173	3 168
2020	1 997	1 000
2021	2 194	628
2022	2 485	2 442
After 2022	13 375	10 314
Total	**23 583**	**18 075**

Breakdown by currency:

(USD millions)	2017	2016
US dollar (USD)	15 945	12 952
Euro (EUR)	5 695	3 092
Japanese yen (JPY)	533	683
Swiss franc (CHF)	1 410	1 348
Total	**23 583**	**18 075**

The following table shows the comparison of balance sheet and fair value of total non-current financial debt, including current portion:

(USD millions)	2017 Balance sheet	2017 Fair values	2016 Balance sheet	2016 Fair values
Straight bonds	22 957	23 835	17 285	17 943
Others	626	626	790	790
Total	**23 583**	**24 461**	**18 075**	**18 733**

The fair values of straight bonds are determined by quoted market prices. Other financial debts are recorded at notional amounts which are a reasonable approximation of the fair values.

The following table shows the pledged assets:

(USD millions)	2017	2016
Total net book value of property, plant & equipment pledged as collateral for non-current financial debts	84	94

19. Provisions and other non-current liabilities

(USD millions)	2017	2016
Accrued liability for employee benefits:		
Defined benefit pension plans [1]	3 157	4 490
Other long-term employee benefits and deferred compensation	625	545
Other post-employment benefits [1]	953	1 005
Environmental remediation provisions	706	708
Provisions for product liabilities, governmental investigations and other legal matters	230	264
Contingent consideration [2]	809	840
Other non-current liabilities	577	618
Total provisions and other non-current liabilities	**7 057**	**8 470**

[1] Note 24 provides additional disclosures related to post-employment benefits.
[2] Note 28 provides additional disclosures related to contingent consideration.

Novartis believes that its total provisions are adequate based upon currently available information. However, given the inherent difficulties in estimating liabilities in this area, Novartis may incur additional costs beyond the amounts provided. Management believes that such additional amounts, if any, would not be material to the Group's financial condition but could be material to the results of operations or cash flows in a given period.

Environmental remediation provisions

The following table shows the movements in the environmental liability provisions:

(USD millions)	2017	2016	2015
January 1	**773**	**871**	**923**
Cash payments	– 46	– 75	– 52
Releases	– 153		– 5
Additions	154	1	6
Currency translation effects	33	– 24	– 1
December 31	**761**	**773**	**871**
Less current provision	– 55	– 65	– 80
Non-current environmental remediation provisions at December 31	**706**	**708**	**791**

The material components of the environmental remediation provisions consist of costs to sufficiently clean and refurbish contaminated sites to the extent necessary, and to treat, and where necessary, continue surveillance at sites where the environmental remediation exposure is less significant.

A substantial portion of the environmental remediation provisions relate to the remediation of Basel regional landfills in the adjacent border areas in Switzerland, Germany and France. The provisions are re-assessed on a yearly basis and are adjusted as necessary.

In the United States, Novartis has been named under federal legislation (the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended) as a potentially responsible party (PRP) in respect of certain sites. Novartis actively participates in, or monitors, the clean-up activities at the sites in which it is a PRP. The provision takes into consideration the number of other PRPs at each site as well as the identity and financial position of such parties in light of the joint and several nature of the liability.

The expected timing of the related cash outflows as of December 31, 2017, is currently projected as follows:

(USD millions)	Expected cash outflows
Due within two years	164
Due later than two years, but within five years	241
Due later than five years, but within ten years	315
Due after ten years	41
Total environmental remediation liability provisions	**761**

Provisions for product liabilities, governmental investigations and other legal matters

Novartis has established provisions for certain product liabilities, governmental investigations and other legal matters where a potential cash outflow is probable and Novartis can make a reliable estimate of the amount of the outflow. These provisions represent the Group's current best estimate of the total financial effect for the matters described below and for other less significant matters. Potential cash outflows reflected in a provision might be fully or partially off-set by insurance in certain circumstances.

Novartis has not established provisions for potential damage awards for certain additional legal claims against its subsidiaries if Novartis currently believes that a payment is either not probable or cannot be reliably estimated. In total, these not-provisioned-for matters include more than 1 000 individual product liability cases and certain other legal matters. Plaintiffs' alleged claims in these matters, which Novartis does not believe to be entirely remote but which do not fulfill the conditions for the establishment of provisions, currently aggregate to, according to Novartis' current best belief, approximately USD 1.5 billion. In addition, in some of these matters there are claims for punitive or multiple (treble) damages, civil penalties and disgorgement of profits that in Novartis' view are either wholly or partially unspecified or wholly or partially unquantifiable at present; the Group believes that information about these amounts claimed by plaintiffs generally is not meaningful for purposes of determining a reliable estimate of a loss that is probable or more than remote.

A number of other legal matters are in such early stages or the issues presented are such that the Group has not made any provisions since it cannot currently estimate either a potential outcome or the amount of any potential losses. For these reasons, among others, the Group generally is unable to make a reliable estimate of possible loss with respect to such cases. It is therefore not practicable to provide information about the potential financial impact of those cases.

There might also be cases for which the Group was able to make a reliable estimate of the possible loss or the range of possible loss, but the Group believes that publication of such information on a case-by-case basis would seriously prejudice the Group's position in ongoing legal proceedings or in any related settlement discussions. Accordingly, in such cases, information has been disclosed with respect to the nature of the contingency, but no disclosure is provided as to an estimate of the possible loss or range of possible loss.

Note 27 contains additional information on contingencies.

Summary of significant legal proceedings

The following is a summary of significant legal proceedings to which Novartis or its subsidiaries are a party or were a party and that concluded in 2017.

Investigations and related litigations

SOUTHERN DISTRICT OF NEW YORK (S.D.N.Y.) MARKETING PRACTICES INVESTIGATION AND LITIGATION

In 2013, the US government filed a civil complaint in intervention to an individual *qui tam* action against Novartis Pharmaceuticals Corporation (NPC) in the United States District Court (USDC) for the S.D.N.Y. The complaint, as subsequently amended, asserts federal False Claims Act (FCA) and common law claims with respect to speaker programs and other promotional activities for certain NPC cardiovascular medications (*Lotrel, Starlix* and *Valturna*) allegedly serving as mechanisms to provide kickbacks to healthcare professionals (HCPs). It seeks damages, which according to the complaint are "substantial", including treble damages and maximum civil penalties per claim, as well as disgorgement of Novartis profits from the alleged unlawful conduct. Also in 2013, New York State filed a civil complaint in intervention asserting similar claims. Neither government complaint in intervention adopted the individual relator's claims with respect to off-label promotion of *Valturna*, which were subsequently dismissed with prejudice by the court. The individual relator continues to litigate the kickback claims on behalf of other states and municipalities. NPC vigor-

ously contests the S.D.N.Y., New York State and individual claims, both as to alleged liability and amount of damages and penalties.

S.D.N.Y. / WESTERN DISTRICT OF NEW YORK HEALTHCARE FRAUD INVESTIGATION

In 2011, Alcon Laboratories, Inc. (ALI) received a subpoena from the United States Department of Health & Human Services relating to an investigation into allegations of healthcare fraud. The subpoena requests the production of documents relating to marketing practices, including the remuneration of healthcare providers, in connection with certain ALI products (*Vigamox*, *Nevanac*, *Omnipred*, *Econopred*; surgical equipment). ALI is cooperating with this investigation.

S.D.N.Y. *GILENYA* MARKETING PRACTICES INVESTIGATION

In 2013, NPC received a civil investigative demand from the United States Attorney's Office (USAO) for the S.D.N.Y. requesting the production of documents and information relating to marketing practices for *Gilenya*, including the remuneration of healthcare providers in connection therewith. In 2017, S.D.N.Y. and New York State declined to intervene in claims raised by an individual relator, which continue to be vigorously contested.

GOVERNMENT GENERIC PRICING ANTITRUST INVESTIGATIONS, ANTITRUST CLASS ACTIONS

In 2016 and 2017, Sandoz Inc. received subpoenas and interrogatories from the Antitrust Division of the US Department of Justice (DoJ) and from the Attorney General of the State of Connecticut requesting documents related to the marketing and pricing of generic pharmaceutical products sold by Sandoz Inc. and its subsidiaries, including Fougera Pharmaceuticals, Inc. (Fougera), and related communications with competitors. Sandoz Inc. is cooperating with these investigations, which it believes to be part of a broader inquiry into industry practice.

Since the third quarter of 2016, Sandoz Inc. and Fougera have been sued alongside other generic pharmaceutical companies in more than 20 consolidated complaints by proposed classes of direct and indirect purchasers, and Attorneys General for 45 states, the District of Columbia and Puerto Rico have sought leave to file a complaint, alleging that defendants, including Sandoz, engaged in anti-competitive conduct with regard to the sales of various generic drugs and asserting violations of federal and state antitrust laws as well as consumer protection laws. Lek Pharmaceuticals d.d., Novartis AG and Novartis International AG were dismissed from the proceedings. The cases have been consolidated for pretrial purposes in the USDC for the Eastern District of Pennsylvania (E.D. Pa.) and the claims are being vigorously contested.

DISTRICT OF MASSACHUSETTS (D. MASS.) CHARITABLE FOUNDATION INVESTIGATION

In 2016 and 2017, NPC received subpoenas from the USAO for the D. Mass. requesting documents related to NPC's support of 501(c)(3) organizations that provide co-payment assistance to Medicare patients who are prescribed Novartis medicines, including the respective accounting and tax treatment, as well as related to pricing strategies for *Gleevec*, *Tasigna*, *Zometa*, and *Gilenya*. The requests are focused on potential violations of federal health care offenses, including the Anti-Kickback Statute, and FCA. NPC is cooperating with this investigation, which it believes to be part of a broader inquiry into industry practices.

ASIA/RUSSIA INVESTIGATION

In 2017, Novartis Group companies, as well as present and former senior executives of Alcon, received document requests and subpoenas from the DoJ and the US Securities and Exchange Commission (SEC) requesting information concerning Alcon's business practices in Asia and Russia and related accounting treatment, both before and after Alcon became part of the Novartis Group. Novartis is cooperating with this investigation.

LUCENTIS/AVASTIN® MATTERS

In connection with an investigation into whether Novartis Farma S.p.A., Novartis AG, F. Hoffmann-La Roche AG, Genentech Inc. and Roche S.p.A. colluded to artificially preserve the market positions of Avastin® and *Lucentis*, in 2014 the Italian Competition Authority imposed a fine equivalent to USD 125 million on Novartis AG and Novartis Farma S.p.A. Novartis paid the fine, subject to the right to later claim recoupment, and is appealing before the Consiglio di Stato. In 2014 and 2015, the Italian Ministry of Health and the Lombardia region sent letters with payment requests for a total equivalent of approximately USD 1.5 billion in damages from Novartis and Roche entities based on the above allegations. In 2014, the French Competition Authority opened an investigation against Novartis Groupe France with respect to the French market for anti-vascular endothelial growth factor (VEGF) products indicated for the treatment of wet age-related macular degeneration (AMD). Novartis continues to vigorously contest all claims in Italy and France. Also, Novartis is challenging policies and regulations allowing off-label/unlicensed use and reimbursement for economic reasons in various countries, including in Italy and the UK.

JAPAN INVESTIGATION

In 2015, a trial started against a former Novartis Pharma K.K. (NPKK) employee, and also NPKK under the dual liability concept in Japanese law, over allegations brought by the Tokyo District Public Prosecutor Office in two counts for alleged manipulation of data in sub-analysis publications of the Kyoto Heart Study regarding valsartan. The charges against NPKK are subject to a maximum total fine of JPY 4 million. In 2017, the Tokyo District Court issued a not-guilty ruling for both the former NPKK employee and NPKK. An appeal by the Tokyo District Public Prosecutor Office remains pending.

SOUTH KOREA INVESTIGATION

In 2016, the Seoul Western District Prosecutor initiated a criminal investigation into, among other things, allegations that Novartis Korea utilized medical journals to provide inappropriate economic benefits to HCPs. A criminal trial is ongoing concerning allegations that Novartis Korea utilized medical journals to provide inappropriate economic benefits to HCPs. In addition, other authorities in South Korea, including the Korea Fair Trade Commis-

sion, the Ministry of Food and Drug Safety and the Ministry of Health and Welfare conducted investigations into Novartis Korea. Those investigations have led to total fines of approximately USD 53 million as well as sales and reimbursement suspensions on Novartis Korea products in 2017.

GREECE INVESTIGATION

Novartis is investigating allegations of potentially inappropriate economic benefits in Greece to HCPs and others. Novartis Group companies in Greece are providing information to the Greek authorities related to these allegations. Novartis is also responding to a subpoena and document requests from the SEC and DoJ that it received in 2016 and 2017 in connection with such allegations and is cooperating with their investigation.

Antitrust class actions

CONTACT LENSES

Since the first quarter of 2015, more than 50 putative class action complaints have been filed in several courts across the US naming contact-lens manufacturers, including ALI, and alleging violations of federal antitrust law as well as state antitrust, consumer protection and unfair competition laws of various states in connection with the sale of contact lenses. The cases have been consolidated in the Middle District of Florida by the Judicial Panel on Multidistrict Litigation and the claims are being vigorously contested.

GLEEVEC

In 2015 and 2016, Novartis Group companies were sued in putative antitrust class actions in D. Mass. alleging delayed generic entry of *Gleevec* and seeking damages on behalf of direct and indirect purchasers of *Gleevec*. The motion to dismiss those actions was granted and plaintiffs have appealed. A similar class action was filed in 2018 in E.D. Pa. on behalf of direct purchasers of *Gleevec*. The claims are being vigorously contested.

ENOXAPARIN

In 2015, Sandoz and Momenta Pharmaceuticals were sued in a putative antitrust class action in federal court in Tennessee alleging that Momenta and Sandoz engaged in anticompetitive and unfair business conduct with regard to sales of enoxaparin, and the same allegations were made by Amphastar in a lawsuit filed in federal court in California and subsequently moved to federal court in Mass. (Sandoz, Momenta Pharmaceuticals and Amphastar are currently engaged in patent litigation concerning enoxaparin). The claims are being vigorously contested.

Other matters

AVERAGE WHOLESALE PRICE (AWP) LITIGATION

Lawsuits have been brought, the latest in February 2016, by various US state governmental entities and private parties against various pharmaceutical companies, including certain Sandoz entities and NPC, alleging that they fraudulently overstated the AWP that is or has been used by payors, including state Medicaid agencies, to calculate reimbursements to healthcare providers. NPC remains a defendant in an action brought by the state of Illinois and in a putative class action brought by private payors in New Jersey, and Sandoz remains a defendant in an individual action in Pennsylvania. The putative class action in Pennsylvania was dismissed in 2017. The claims are being vigorously contested.

RECLAST/ACLASTA PRODUCT LIABILITY LITIGATION

NPC is a defendant in more than 20 US product liability actions involving *Reclast* and alleging atypical femur fracture injuries, most of which are in New Jersey state or federal court and in California state court coordinated with claims against other bisphosphonate manufacturers. The Canadian putative class action brought against numerous bisphosphonate manufacturers, including NPC, Novartis Pharmaceuticals Canada Inc. and Novartis International AG, in Quebec was discontinued in 2017. The claims are being vigorously contested.

TAXOTERE® (DOCETAXEL) PRODUCT LIABILITY LITIGATION

Sandoz is a defendant in more than 1 000 US product liability actions involving Taxotere® (docetaxel), an oncology product, many of which have been transferred to Multidistrict Litigation in the Eastern District of Louisiana. The complaints allege that Sanofi, as innovator, and several 505(b)(2) NDA holders (including Sandoz) failed to warn of the risk of permanent alopecia/hair loss. The claims are being vigorously contested.

AMIODARONE PRODUCT LIABILITY LITIGATION

Sandoz entities are named in more than 10 individual and multi-plaintiff US product liability cases involving amiodarone, a cardiac drug indicated to treat life-threatening arrhythmias that have not responded to other treatment. The complaints allege failure to warn, off-label promotion and failure to include medication guides to pharmacies. All claims are being vigorously contested.

ORIEL LITIGATION

In 2013, Shareholder Representative Services LLC filed a complaint in New York State Court against Sandoz Inc., two affiliates and two former officers of Sandoz AG asserting various common law and statutory contract, fraud and negligent misrepresentation claims arising out of Sandoz Inc.'s purchase of Oriel Therapeutics, Inc. In March 2015, the court dismissed all parties and claims but for a breach of contract claim against Sandoz Inc. Sandoz Inc. continues to vigorously contest the claim.

EYE DROP PRODUCTS CONSUMER CLASS ACTIONS

Two putative consumer fraud class actions remain ongoing against Alcon and Sandoz in New Jersey and at the US Court of Appeals for the First Circuit after having been initially dismissed at the trial court level. They claim that Alcon's and Sandoz's eye drop products for glaucoma were unfairly designed so that the drop dosage is more than necessary and exceeds the capacity of the eye, leading to wastage and higher costs to patient consumers. The claims are being vigorously contested.

IP Matters

MIVS® PLATFORM PATENT INFRINGEMENT LITIGATION

Johns Hopkins University filed a patent infringement lawsuit against Alcon alleging that the use of certain Alcon surgical products, principally by third parties, infringes a patent directed to certain methods of ocular surgery, and a trial is scheduled for February 2018. The claims are being vigorously contested.

Concluded legal matters

NEW YORK STATE PRICING POLICY INVESTIGATION

In 2014, ALI received a civil subpoena from the New York State attorney general relating to an investigation into a unilateral pricing policy program. Novartis considers this matter concluded.

***LUCENTIS*/AVASTIN® MATTER IN FRANCE**

Novartis' appeals against a temporary recommendation of use and reimbursement of off-label Avastin® for neovascular AMD by hospital ophthalmologists, in force since September 2015, as well as against the decree on which the recommendation is based, were rejected by the Supreme Court in 2016 and 2017.

SOLODYN® ANTITRUST CLASS ACTIONS

Since the third quarter of 2013, seventeen putative class action complaints and three other complaints had been filed against manufacturers of the brand drug Solodyn® and its generic equivalent, including Sandoz Inc. The cases had been consolidated and transferred for pretrial purposes to the federal district court in Mass. The plaintiffs purported to represent direct and indirect purchasers of Solodyn® branded products and asserted violations of federal and state antitrust laws, including allegations in connection with separate settlements by Medicis with each of the other defendants, including Sandoz Inc., of patent litigation relating to Solodyn®. In 2017, all cases were resolved through settlement, the payment of which was not material to Novartis.

Summary of product liability, governmental investigations and other legal matters provision movements

(USD millions)	2017	2016	2015
January 1	**395**	**1 194**	**849**
Cash payments	– 69	– 811	– 256
Releases of provisions	– 70	– 239	– 223
Additions to provisions	93	243	832
Currency translation effects	2	8	– 8
December 31	**351**	**395**	**1 194**
Less current portion	– 121	– 131	– 743
Non-current product liabilities, governmental investigations and other legal matters provisions at December 31	**230**	**264**	**451**

Novartis believes that its total provisions for investigations, product liability, arbitration and other legal matters are adequate based upon currently available information. However, given the inherent difficulties in estimating liabilities, there can be no assurance that additional liabilities and costs will not be incurred beyond the amounts provided.

20. Current financial debt and derivative financial instruments

(USD millions)	2017	2016
Interest-bearing accounts of associates payable on demand [1]	1 822	1 601
Bank and other financial debt [2]	692	836
Commercial paper	2 328	3 174
Current portion of non-current financial debt	359	178
Fair value of derivative financial instruments	107	116
Total current financial debt and derivative financial instruments	**5 308**	**5 905**

[1] Weighted average interest rate 0.5% (2016: 0.5%)
[2] Weighted average interest rate 7.0% (2016: 6.7%)

The consolidated balance sheet amounts of current financial debt, other than the current portion of non-current financial debt, approximate the estimated fair value due to the short-term nature of these instruments.

Details on commercial papers are provided in Note 28 – Liquidity risk.

21. Provisions and other current liabilities

(USD millions)	2017	2016
Taxes other than income taxes	660	547
Restructuring provisions	153	222
Accrued expenses for goods and services received but not invoiced	977	880
Accruals for royalties	586	550
Provisions for deductions from revenue	4 672	4 183
Accruals for compensation and benefits including social security	2 327	1 993
Environmental remediation liabilities	55	65
Deferred income	305	287
Provisions for product liabilities, governmental investigations and other legal matters [1]	121	131
Accrued share-based payments	261	199
Contingent considerations [2]	44	49
Other payables	1 042	722
Total provisions and other current liabilities	**11 203**	**9 828**

[1] Note 19 provides additional disclosures related to legal provisions.
[2] Note 28 provides additional disclosures related to contingent considerations.

Provisions are based upon management's best estimate and adjusted for actual experience. Such adjustments to the historic estimates have not been material.

Provisions for deductions from revenue

The following table shows the movement of the provisions for deductions from revenue:

(USD millions)	2017	2016	2015
January 1	**4 183**	**3 790**	**3 533**
Impact of business combinations			3
Additions	17 997	16 622	15 603
Payments/utilizations	– 17 452	– 16 189	– 15 218
Changes in offset against gross trade receivables	– 252	10	50
Currency translation effects	196	– 50	– 181
December 31	**4 672**	**4 183**	**3 790**

Restructuring provisions movements

(USD millions)	2017	2016	2015
January 1	**222**	**260**	**333**
Additions	194	343	399
Cash payments	– 200	– 260	– 435
Releases	– 64	– 66	– 36
Transfers	– 7	– 76	
Currency translation effects	8	21	– 1
December 31	**153**	**222**	**260**

In 2017, additions to provisions of USD 194 million were mainly related to the following reorganizations:

- The Innovative Medicines Division's Pharmaceuticals business unit adjusted a regional promotional model which led to a restructuring of the sales force. It also streamlined the above country operating model to facilitate an even higher external competition oriented focus. Furthermore, the development organization streamlined its activities to create efficiencies.
- The Alcon Division continued initiatives to realign its operations to focus on the Surgical and Vision Care business after the Ophthalmic Pharmaceutical business transfer to the Innovative Medicines Division.
- The Sandoz Division launched initiatives to focus resources to gain efficiencies.
- Group-wide initiatives to streamline Novartis Technical Operations in the Innovative Medicines and Sandoz Divisions were launched.

In 2016, additions to provisions of USD 343 million were mainly related to the following reorganizations:

- The Innovative Medicines Division's Pharmaceuticals business unit realigned its operations to improve its operating agility, to focus resources on key growth drivers. Furthermore, research realigned and focused its operations resulting in redundancies from the consolidation of certain research teams and the outsourcing of certain activities to qualified third party vendors.
- The Alcon Division launched several initiatives to improve its efficiencies resulting in redundancies, as it realigned its operations to focus on its Surgical and Vision Care business franchises after the transfer of its Ophthalmic Pharmaceuticals business to Innovative Medicines division.
- The Sandoz Division launched an initiative to reallocate resources to priority, high growth and higher profitability countries.
- Various group-wide initiatives to simplify organizational structure, including the consolidation of manufacturing sites and support services.

In 2015, additions to provisions of USD 399 million were mainly related to the following reorganizations:

- The Innovative Medicines Division implemented a restructuring program targeted at efficiency gains in the business franchises, other than in Oncology. It also initiated initiatives related to the integration of the oncology business acquired from GSK.
- The Alcon Division extended its initiative started in the prior year to realize productivity opportunities.
- Various group-wide initiatives to simplify the organizational structure, mainly related to the manufacturing footprint and support services.

22. Details to the consolidated cash flow statements

22.1) Adjustments for non-cash items from continuing operations

(USD millions)	**2017**	2016	2015
Taxes	1 296	1 119	1 106
Depreciation, amortization and impairments on:			
Property, plant & equipment	1 677	1 591	1 550
Intangible assets	4 399	4 452	3 921
Financial assets [1]	256	132	104
Income from associated companies	– 1 108	– 703	– 266
Gains on disposal and other adjustments on property, plant & equipment, intangible, financial and other non-current assets, net	– 1 043	– 935	– 869
Equity-settled compensation expense	683	671	773
Change in provisions and other non-current liabilities	160	956	1 642
Net financial expense	738	1 154	1 109
Total	**7 058**	**8 437**	**9 070**

[1] Including unrealized fair value gains

In 2015, the Group acquired property, plant and equipment of USD 85 million through finance lease contracts.

22.2) Cash flows from changes in working capital and other operating items included in operating cash flow from continuing operations

(USD millions)	**2017**	2016	2015
(Increase) in inventories	– 247	– 235	– 482
(Increase) in trade receivables	– 204	– 229	– 513
Increase/(Decrease) in trade payables	58	– 587	378
Change in other net current assets and other operating cash flow items	637	974	– 246
Total	**244**	**– 77**	**– 863**

22.3) Cash flows arising from acquisitions and divestments of businesses

The following is a summary of the cash flow impact of acquisitions and divestments. The most significant transactions are described in Note 2.

(USD millions)	**2017 Acquisitions**	**2017 Divestments**	2016 Acquisitions	2016 Divestments	2015 Acquisitions	2015 Divestments
Property, plant & equipment		25				1 000
Currently marketed products		1	– 451		– 12 970	646
(Acquired)/divested research & development	– 1 223		– 690		– 730	13
Technologies						113
Other intangible assets		3			– 15	86
Financial and other assets including deferred tax assets	– 8		– 39		– 555	40
Inventories			– 4			893
Trade receivables and other current assets		34	– 1		– 3	529
Cash and cash equivalents	– 20		– 1		– 25	311
Current and non-current financial debts						– 601
Trade payables and other liabilities including deferred tax liabilities	326	– 15	372		212	– 841
Net identifiable assets (acquired) or divested	**– 925**	**48**	**– 814**		**– 14 086**	**2 189**
Currency translation effects						98
Acquired/(divested) liquidity	20		1		25	– 479
Fair value of previously held equity interests			64			
Subtotal	**– 905**	**48**	**– 749**		**– 14 061**	**1 808**
Refinancing of intercompany financial debt, net						578
Goodwill	– 94		– 56		– 2 438	1 042
Divestment gain						7 401
Taxes paid and other portfolio transformation related cash flows		– 140		– 748		– 1 337
Receivables and payables contingent consideration, net [1]	206		84		– 8	– 519
Other payments and deferred consideration, net	– 36	– 3	– 44			
Deferred portion of sales price [2]						– 49
Net cash flows	**– 829**	**– 95**	**– 765**	**– 748**	**– 16 507**	**8 924**
Of which:						
Net cash flows used in/from discontinued operations		– 140		– 748		8 924
Net cash flows used in/from continuing operations	– 829	45	– 765		– 16 507	

[1] The contingent consideration of the 2016 Transcend Medical, Inc. acquisition amounted to USD 92 million. Of this amount, USD 60 million has been paid in 2016.
[2] Divestments include USD 49 million proceeds for the divestment of the Animal Health business received in 2014.

Notes 2 and 23 provide further information regarding acquisitions and divestments of businesses. All acquisitions were for cash.

22.4) Cash flows from discontinued operations

(USD millions)	**2017**	2016	2015
Cash flows used in operating activities			**– 188**
Purchase of property, plant & equipment			– 41
Proceeds from sales of property, plant & equipment			1
Purchase of financial and other non-current assets, net			– 2
Divestments of businesses [1]	– 140	– 748	8 924
Cash flows used in/from investing activities	**– 140**	**– 748**	**8 882**
Total net cash flows used in/from discontinued operations	**– 140**	**– 748**	**8 694**

[1] 2017 includes payments related to the 2015 portfolio transformation transaction. 2016 includes mainly payments for capital gains taxes and other payments related to the 2015 portfolio transformation transaction. 2015 includes proceeds of USD 10 925 million reduced by USD 2 001 million, for payments of capital gains taxes, transaction-related costs and purchase price adjustments, related to the 2015 portfolio transformation transaction. See Note 2 for a description of the 2015 porfolio transformation transaction.

22.5) Reconciliation of liabilities arising from financing activities

(USD millions)	Non-current financial debts	Current financial debts and derivative financial instruments	Total
January 1, 2017	**17 897**	**5 905**	**23 802**
Increase in non-current financial debts	4 933		4 933
Repayment of non-current financial debts	– 1	– 187	– 188
Change in current financial debts		– 755	– 755
Changes in fair values and other changes	– 6	– 140	– 146
Amortization of bonds discount	16		16
Currency translation effects	744	126	870
Current portion of non-current financial debt	– 359	359	
December 31, 2017	**23 224**	**5 308**	**28 532**

23. Acquisitions of businesses

Fair value of assets and liabilities arising from acquisitions

(USD millions)	**2017**	2016	2015
Currently marketed products		451	12 970
Acquired research & development	1 223	690	730
Other intangible assets			15
Deferred tax assets	8	39	555
Inventories		4	
Trade receivables and other current assets		1	3
Cash and cash equivalents	20	1	25
Payables and other liabilities including deferred tax liabilities	– 326	– 372	– 212
Net identifiable assets acquired	**925**	**814**	**14 086**
Acquired liquidity	– 20	– 1	– 25
Goodwill	94	56	2 438
Net assets recognized as a result of business combinations	**999**	**869**	**16 499**

Note 2 details significant acquisition of businesses, which were Ziarco and Encore in 2017, were Transcend and Reprixys in 2016, and were the GSK Oncology products, Spinifex and Admune in 2015. The goodwill arising out of these acquisitions is attributable to buyer-specific synergies, the assembled workforce and the accounting for deferred tax liabilities on the acquired assets. No goodwill from 2017 is tax-deductible. Goodwill of USD 18 million from 2016 and of USD 2.4 billion from 2015 is tax deductible.

24. Post-employment benefits for associates

Defined benefit plans

In addition to the legally required social security schemes, the Group has numerous independent pension and other post-employment benefit plans. In most cases, these plans are externally funded in entities that are legally separate from the Group. For certain Group companies, however, no independent plan assets exist for the pension and other post-employment benefit obligations of associates. In these cases the related unfunded liability is included in the balance sheet. The defined benefit obligations (DBOs) of all major pension and other post-employment benefit plans are reappraised annually by independent actuaries. Plan assets are recognized at fair value. The major plans are based in Switzerland, the United States, the United Kingdom, Germany and Japan, which represent 94% of the Group's total DBO for pension plans. Details of the plans in the two most significant countries of Switzerland and the United States are provided below.

Swiss-based pension plans represent the most significant portion of the Group's total DBO and plan assets. For the active insured members born on or after January 1, 1956, or having joined the plans after December 31, 2010, the benefits are partially linked to the contributions paid into the plan. Certain features of Swiss pension plans required by law preclude the plans being categorized as defined contribution plans. These factors include a minimum interest guarantee on retirement savings accounts, a pre-determined factor for converting the accumulated savings account balance into a pension and embedded death and disability benefits.

All benefits granted under Swiss-based pension plans are vested, and Swiss legislation prescribes that the employer has to contribute a fixed percentage of an associate's pay to an external pension fund. Additional employer contributions may be required whenever the plan's statutory funding ratio falls below a certain level. The associate also contributes to the plan. The pension plans are run by separate legal entities, each governed by a Board of Trustees, that, for the principal plans, consists of representatives nominated by Novartis and the active insured associates. The Boards of Trustees are responsible for the plan design and asset investment strategy.

In September 2017, the pension regulations in Switzerland were amended, which resulted in a change in accounting from defined benefit to defined contribution for a component of the Swiss pension plans. This change resulted in a reduction to the defined benefit pension plans liability and in a corresponding net pre-tax gain of USD 225 million (CHF 216 million).

The United States pension plans represent the second largest component of the Group's total DBO and plan assets. The principal plans (Qualified Plans) are funded, whereas plans providing additional benefits for executives (Restoration Plans) are unfunded. Employer contributions are required for Qualified Plans whenever the statutory funding ratio falls below a certain level. Furthermore, associates in the United States are covered under other post-employment benefit plans and post-retirement medical plans.

The following tables are a summary of the funded and unfunded defined benefit obligation for pension and other post-employment benefit plans of associates at December 31, 2017 and 2016:

	Pension plans		Other post-employment benefit plans	
(USD millions)	**2017**	2016	**2017**	2016
Benefit obligation at January 1	**23 614**	**23 402**	**1 158**	**1 132**
Current service cost	422	437	34	35
Interest cost	330	390	44	48
Past service costs and settlements	– 1 226	– 73	– 10	
Administrative expenses	27	29		
Remeasurement losses arising from changes in financial assumptions	11	1 299	32	46
Remeasurement (gains) arising from changes in demographic assumptions	– 26	– 7	– 9	– 26
Experience-related remeasurement losses/(gains)	47	117	– 87	– 33
Currency translation effects	1 138	– 896	5	7
Benefit payments	– 1 300	– 1 250	– 51	– 51
Contributions of associates	207	207		
Effect of acquisitions, divestments or transfers	– 34	– 41	– 1	
Benefit obligation at December 31	**23 210**	**23 614**	**1 115**	**1 158**
Fair value of plan assets at January 1	**19 225**	**19 536**	**153**	**172**
Interest income	236	293	5	6
Return on plan assets excluding interest income	1 429	742	12	– 1
Currency translation effects	909	– 757		
Novartis Group contributions	579	542	43	27
Contributions of associates	207	207		
Settlements	– 995	– 77		
Benefit payments	– 1 300	– 1 250	– 51	– 51
Effect of acquisitions, divestments or transfers	– 15	– 11		
Fair value of plan assets at December 31	**20 275**	**19 225**	**162**	**153**
Funded status	**– 2 935**	**– 4 389**	**– 953**	**– 1 005**
Limitation on recognition of fund surplus at January 1	**– 54**	**– 50**		
Change in limitation on recognition of fund surplus (incl. exchange rate differences)	– 30			
Interest income on limitation of fund surplus	– 5	– 4		
Limitation on recognition of fund surplus at December 31	**– 89**	**– 54**		
Net liability in the balance sheet at December 31	**– 3 024**	**– 4 443**	**– 953**	**– 1 005**

The reconciliation of the net liability from January 1 to December 31 is as follows:

	Pension plans		Other post-employment benefit plans	
(USD millions)	**2017**	2016	**2017**	2016
Net liability at January 1	**– 4 443**	**– 3 916**	**– 1 005**	**– 960**
Current service cost	– 422	– 437	– 34	– 35
Net interest expense	– 99	– 101	– 39	– 42
Administrative expenses	– 27	– 29		
Past service costs and settlements	231	– 4	10	
Remeasurements	1 397	– 667	76	12
Currency translation effects	– 229	139	– 5	– 7
Novartis Group contributions	579	542	43	27
Effect of acquisitions, divestments or transfers	19	30	1	
Change in limitation on recognition of fund surplus	– 30			
Net liability at December 31	**– 3 024**	**– 4 443**	**– 953**	**– 1 005**

Amounts recognized in the consolidated balance sheet				
Prepaid benefit cost	133	47		
Accrued benefit liability	– 3 157	– 4 490	– 953	– 1 005

The following table shows a breakdown of the DBO for pension plans by geography and type of member, and the breakdown of plan assets into the geographical locations in which they are held:

	2017				2016			
(USD millions)	Switzerland	United States	Rest of the world	Total	Switzerland	United States	Rest of the world	Total
Benefit obligation at December 31	**14 606**	**3 788**	**4 816**	**23 210**	**15 436**	**3 783**	**4 395**	**23 614**
Thereof unfunded		*728*	*499*	*1 227*		*739*	*497*	*1 236*
By type of member								
Active	5 627	796	1 646	8 069	6 426	891	1 460	8 777
Deferred pensioners		1 258	1 646	2 904		831	1 515	2 346
Pensioners	8 979	1 734	1 524	12 237	9 010	2 061	1 420	12 491
Fair value of plan assets at December 31	**14 445**	**2 400**	**3 430**	**20 275**	**13 958**	**2 282**	**2 985**	**19 225**
Funded status	**– 161**	**– 1 388**	**– 1 386**	**– 2 935**	**– 1 478**	**– 1 501**	**– 1 410**	**– 4 389**

The following table shows the principal weighted average actuarial assumptions used for calculating defined benefit plans and other post-employment benefits of associates:

	Pension plans			Other post-employment benefit plans		
	2017	2016	2015	**2017**	2016	2015
Weighted average assumptions used to determine benefit obligations at December 31						
Discount rate	1.5%	1.4%	1.8%	3.7%	4.2%	4.4%
Expected rate of pension increase	0.5%	0.4%	0.4%			
Expected rate of salary increase	2.8%	2.2%	2.9%			
Interest on savings account	0.6%	0.5%	0.8%			
Current average life expectancy for a 65-year-old male in years	22	22	21	21	21	21
Current average life expectancy for a 65-year-old female in years	24	24	24	23	23	23

Changes in the aforementioned actuarial assumptions can result in significant volatility in the accounting for the Group's pension plans in the consolidated financial statements. This can result in substantial changes in the Group's other comprehensive income, long-term liabilities and prepaid pension assets.

The DBO is significantly impacted by assumptions regarding the rate that is used to discount the actuarially determined post-employment benefit liability. This rate is based on yields of high-quality corporate bonds in the country of the plan. Decreasing corporate bond yields decrease the discount rate, so that the DBO increases and the funded status decreases.

In Switzerland, an increase in the DBO due to lower discount rates is slightly offset by lower future benefits expected to be paid on the associate's savings account where the assumption on interest accrued changes in line with the discount rate.

The impact of decreasing interest rates on a plan's assets is more difficult to predict. A significant part of the plan assets is invested in bonds. Bond values usually rise when interest rates decrease and may therefore partially compensate for the decrease in the funded status. Furthermore, pension assets also include significant holdings of equity instruments. Share prices tend to rise when interest rates decrease and therefore often counteract the negative impact of the rising defined benefit obligation on the funded status (although the correlation of interest rates with equities is not as strong as with bonds, especially in the short term).

The expected rate for pension increases significantly affects the DBO of most plans in Switzerland, Germany and the United Kingdom. Such pension increases also decrease the funded status, although there is no strong correlation between the value of the plan assets and pension/inflation increases.

Assumptions regarding life expectancy significantly impact the DBO. An increase in longevity increases the DBO. There is no offsetting impact from the plan assets, as no longevity bonds or swaps are held by the pension funds. Generational mortality tables are used where this data is available.

The following table shows the sensitivity of the defined benefit pension obligation to the principal actuarial assumptions for the major plans in Switzerland, the United States, the United Kingdom, Germany and Japan on an aggregated basis:

(USD millions)	Change in 2017 year-end defined benefit pension obligation
25 basis point increase in discount rate	– 753
25 basis point decrease in discount rate	803
1 year increase in life expectancy	840
25 basis point increase in rate of pension increase	533
25 basis point decrease in rate of pension increase	– 138
25 basis point increase of interest on savings account	56
25 basis point decrease of interest on savings account	– 54
25 basis point increase in rate of salary increase	49
25 basis point decrease in rate of salary increase	– 50

The healthcare cost trend rate assumptions used for other post-employment benefits are as follows:

	2017	2016	2015
Healthcare cost trend rate assumed for next year	6.5%	7.0%	7.5%
Rate to which the cost trend rate is assumed to decline	4.5%	5.0%	5.0%
Year that the rate reaches the ultimate trend rate	2025	2022	2022

The following table shows the weighted average plan asset allocation of funded defined benefit pension plans at December 31, 2017 and 2016:

	Pension plans			
(as a percentage)	Long-term target minimum	Long-term target maximum	**2017**	2016
Equity securities	15	40	31	31
Debt securities	20	60	35	35
Real estate	5	20	15	15
Alternative investments	0	20	15	15
Cash and other investments	0	15	4	4
Total			**100**	**100**

Cash and most of the equity and debt securities have a quoted market price in an active market. Real estate and alternative investments, which include hedge fund and private equity investments, usually do not have a quoted market price.

The strategic allocation of assets of the different pension plans is determined with the objective of achieving an investment return that, together with the contributions paid by the Group and its associates, is sufficient to maintain reasonable control over the various funding risks of the plans. Based upon the market and economic environments, actual asset allocations may temporarily be permitted to deviate from policy targets. The asset allocation currently includes investments in shares of Novartis AG as per the below table:

	December 31, 2017	December 31, 2016
Investment in shares of Novartis AG		
Number of shares (in millions)	11.0	11.0
Market Value (in USD billions)	0.9	0.8

The weighted average duration of the defined benefit obligation is 14.6 years (2016: 14.5 years).

The Group's ordinary contribution to the various pension plans is based on the rules of each plan. Additional contributions are made whenever this is required by statute or law (i.e., usually when statutory funding levels fall below pre-determined thresholds). The only significant plans that are foreseen to require additional funding are those in the United Kingdom.

The expected future cash flows in respect of pension and other post-employment benefit plans at December 31, 2017, were as follows:

(USD millions)	Pension plans	Other post-employment benefit plans
Novartis Group contributions		
2018 (estimated)	395	62
Expected future benefit payments		
2018	1 226	63
2019	1 166	65
2020	1 163	67
2021	1 147	68
2022	1 133	69
2023–2027	5 534	344

Defined contribution plans

In many subsidiaries, associates are covered by defined contribution plans. Contributions charged to the 2017 consolidated income statement for the defined contribution plans were:

(USD millions)	**2017**	2016	2015
Contributions for defined contribution plans continuing operations	406	338	359
Contributions for defined contribution plans discontinued operations			1

25. Equity-based participation plans for associates

The expense related to all equity-based participation plans and the liabilities arising from equity-based payment transactions were as follows:

(USD millions)	2017	2016	2015
Expense related to equity-based participation plans	924	846	968
of which continuing operations	924	846	903
of which discontinued operations			65
Liabilities arising from equity-based payment transactions	261	199	209

Equity-based participation plans can be separated into the following plans:

Annual Incentive

The Annual Incentive of the Novartis Group CEO and the other Executive Committee members is paid 50% in cash in February or March of the year following the performance period, and 50% in Novartis Restricted Shares (RSs) or Restricted Share Units (RSUs) that are granted in January of the year following the performance period, deferred and restricted for three years. In 2016, this was extended to Novartis Top Leaders (NTLs). The Annual Incentive payout for the NTLs is 70% in cash and 30% in Novartis RSs or RSUs. Each RS is entitled to voting rights and payment of dividends during the vesting period. Each RSU is equivalent to one Novartis share and is converted into one share at the vesting date. RSUs do not carry any dividend, dividend equivalent or voting rights. The executives in certain countries may elect to also receive their cash incentive partially or fully in shares or share units that will not be subject to vesting conditions.

Share savings plans

A number of associates in certain countries as well as certain key executives worldwide are encouraged to invest their Annual Incentive, and in the United Kingdom also their salary, in a share savings plan. Under the share savings plan, participants may elect to receive their Annual Incentive fully or partially in Novartis shares in lieu of cash. As a reward for their participation in the share savings plan, at no additional cost to the participant, Novartis matches their investments in shares after a holding period of three or five years.

Novartis operates three share savings plans, and associates may only participate in one of the share savings plans in any given year:

- In Switzerland, Employee Share Ownership Plan (ESOP) participants may choose to receive their Annual Incentive (i) 100% in shares, (ii) 50% in shares and 50% in cash or (iii) 100% in cash. After expiration of a three-year holding period for Novartis shares invested under the ESOP, participants will receive one matching share for every two invested shares. Associates eligible for the equity plan "Select" are not eligible to receive ESOP matching shares starting with the 2017 performance period onwards.
- In the United Kingdom, associates can invest up to 10% of their monthly salary in shares (up to a maximum of GBP 150) and may also be invited to invest their net Annual Incentive in shares. Two invested shares are matched with one share with a holding period of three years. Starting with the 2017 performance period onwards, United Kingdom associates can only invest a maximum of 50% of their Annual Incentive in shares and this option is no longer offered to associates who are eligible for the equity plan "Select".
- The Leveraged Share Savings Plan (LSSP) was available to key executives for performance periods prior to 2016. At the participant's election, the Annual Incentive was awarded partly or entirely in shares. The elected number of shares is subject to a holding period of five years. At the end of the holding period, Novartis will match the invested shares at a ratio of 1-to-1 (i.e. one share awarded for each invested share). In the United States both the LSSP award and the corresponding match are cash settled.

Following the introduction of the new compensation programs in 2014, the Novartis Group CEO and the other Executive Committee members are no longer eligible to participate in the share savings plans. From the 2016 performance period onwards, the NTLs are also no longer eligible to participate in the share savings plans.

Novartis equity plan "Select"

The equity plan "Select" is a global equity incentive plan under which eligible associates may annually be awarded a grant subject to a three year vesting period. No awards are granted for performance ratings below a certain threshold. Executive Committee members are not eligible for participation in the equity plan "Select" effective from the performance period 2014, and the NTLs are not eligible to participate effective from the performance period 2016.

The equity plan "Select" currently allows participants in Switzerland to choose the form of their equity compensation in RSs or RSUs. In all other jurisdictions, RSUs are typically granted. Until 2013, participants could also choose to receive part or the entire grant in the form of tradable share options.

Tradable share options expire on their tenth anniversary from the grant date. Each tradable share option entitles the holder to purchase after vesting (and before the tenth anniversary from the grant date) one Novartis share at a stated exercise price that equals the closing market price of the underlying share at the grant date.

Options under Novartis equity plan "Select" outside North America

The following table shows the activity associated with the share options during the period. The weighted average prices in the table below are translated from Swiss francs into USD at historical rates.

	2017		2016	
	Options (millions)	Weighted average exercise price (USD)	Options (millions)	Weighted average exercise price (USD)
Options outstanding at January 1	**9.5**	**59.4**	**11.7**	**59.9**
Sold or exercised	– 2.1	59.2	– 2.2	61.8
Forfeited or expired				
Outstanding at December 31	**7.4**	**59.5**	**9.5**	**59.4**
Exercisable at December 31	**7.4**	**59.5**	**9.5**	**59.4**

All share options were granted at an exercise price that was equal to the closing market price of the Group's shares at the grant date. The weighted average share price at the dates of sale or exercise was USD 80.1.

The following table summarizes information about share options outstanding at December 31, 2017:

	Options outstanding		
Range of exercise prices (USD)	Number outstanding (millions)	Average remaining contractual life (years)	Weighted average exercise price (USD)
45–49	0.7	1.0	46.7
50–54	1.1	2.0	54.6
55–59	2.7	3.3	57.6
65–70	2.9	5.0	66.1
Total	**7.4**	**3.6**	**59.5**

Options under Novartis equity plan "Select" for North America

The following table shows the activity associated with the American Depositary Receipts (ADR) options during the period:

	2017		2016	
	ADR options (millions)	Weighted average exercise price (USD)	ADR options (millions)	Weighted average exercise price (USD)
Options outstanding at January 1	**25.9**	**59.9**	**31.9**	**60.2**
Sold or exercised	– 5.6	59.9	– 6.0	61.7
Forfeited or expired				
Outstanding at December 31	**20.3**	**59.9**	**25.9**	**59.9**
Exercisable at December 31	**20.3**	**59.9**	**25.9**	**59.9**

All ADR options were granted at an exercise price that was equal to the closing market price of the ADRs at the grant date. The weighted average ADR price at the dates of sale or exercise was USD 79.9.

The following table summarizes information about ADR options outstanding at December 31, 2017:

	ADR options outstanding		
Range of exercise prices (USD)	Number outstanding (millions)	Average remaining contractual life (years)	Weighted average exercise price (USD)
45–49	1.8	1.0	46.4
50–54	2.1	2.0	53.7
55–59	8.0	3.5	58.0
65–69	8.4	5.0	66.1
Total	**20.3**	**3.7**	**59.9**

Long-Term Performance Plan

The Long-Term Performance Plan (LTPP) is an equity plan for the Novartis Group CEO, the other Executive Committee members and the NTLs. For the 2017 grant, the target incentive is 200% of base compensation for the Novartis Group CEO and ranges from 150% to 170% for other Executive Committee members. For the NTLs, the target incentive range is from 20% to 160% of base compensation.

The awards of the LTPP are based on three-year performance objectives focused on financial and innovation measures. The financial measure is Novartis Cash Value Added (NCVA). The weighting of this measure is 75%. The NCVA target is approved by the Board of Directors.

The innovation measure is based on a holistic approach under which divisional innovation targets are set at the beginning of the cycle, comprised of up to ten target milestones that represent the most important research and development project milestones for each division. The weighting of this measure is 25%. At the end of the performance period, the Research & Development Committee assists the Board of Directors and the Compensation Committee in evaluating performance against the innovation targets at the end of the cycle.

Under the LTPP, participants are granted a target number of Performance Share Units (PSUs) at the beginning of every performance period, which are converted into unrestricted Novartis shares after the performance period. Payout is between 0% and 200% of target. PSUs granted under the LTPP do not carry voting rights, but do carry dividend equivalents that are paid in shares at the end of the performance period.

Long-Term Relative Performance Plan

The Long-Term Relative Performance Plan (LTRPP) is an equity plan for the Novartis Group CEO, other ECN members and NTLs. For the 2017 grant, the target incentive is 125% of base compensation for the Novartis Group CEO and ranges from 60% to 80% for other Executive Committee members. For the NTLs, the target incentive range is from 10% to 40% of base compensation. The LTRPP is based on the ranking of Novartis' Total Shareholder Return (TSR) relative to a global healthcare peer group of 12 companies until 2016, and 15 companies from 2017, over rolling three-year performance periods. TSR in USD is calculated as price change of the Novartis share plus the dividend plus the re-investment return of the dividend amount, all translated to USD at the respective exchange rate, over the three-year performance period. The calcu-

lation is based on Bloomberg standard published TSR data, which is publicly available. The position in the peer group determines the payout range based on a payout matrix. Under the LTRPP, participants are also granted a target number of PSUs at the beginning of every performance period, which are converted into unrestricted Novartis shares after the performance period. Payout is between 0% and 200% of target. PSUs under the LTRPP do not carry voting rights, but do carry dividend equivalents that are paid in shares at the end of the performance period.

Other share awards

Selected associates, excluding the Executive Committee members, may exceptionally receive Special Share Awards of RSs or RSUs. These Special Share Awards provide an opportunity to reward outstanding achievements or exceptional performance, and aim to retain key contributors. They are based on a formal internal selection process, through which the individual performance of each candidate is thoroughly assessed at several management levels. Special Share Awards have a minimum three-year vesting period. In exceptional circumstances, Special Share Awards may be awarded to attract special expertise and new talents into the organization. These grants are consistent with market practice and Novartis' philosophy to attract, retain and motivate best-in-class talents around the world.

Worldwide, associates at different levels in the organization were awarded RSs and RSUs in 2017.

In addition, in 2017, Board members received unrestricted shares as part of their regular compensation.

Summary of non-vested share movements

The table below provides a summary of non-vested share movements (RSs, RSUs and PSUs) for all plans:

	2017			2016		
	Number of shares in millions	Weighted average fair value at grant date in USD	Fair value at grant date in USD millions	Number of shares in millions	Weighted average fair value at grant date in USD	Fair value at grant date in USD millions
Non-vested shares at January 1	**21.0**	**89.5**	**1 880**	**20.1**	**87.1**	**1 751**
Granted						
– Annual incentive	1.3	69.3	90	0.1	73.8	7
– Share savings plans	4.5	69.4	312	4.4	78.1	344
– Select North America	4.5	64.1	288	4.8	72.4	348
– Select outside North America	2.0	65.3	131	1.6	74.4	119
– Long-Term Performance Plan	1.4	71.5	100	1.2	79.2	95
– Long-Term Relative Performance Plan	0.4	47.7	19	0.3	58.5	18
– Other share awards	1.3	67.8	88	0.7	65.8	46
Vested	– 10.7	78.2	– 837	– 10.4	68.8	– 716
Forfeited	– 1.8	80.7	– 145	– 1.8	73.1	– 132
Non-vested shares at December 31	**23.9**	**80.6**	**1 926**	**21.0**	**89.5**	**1 880**

Alcon, Inc., equity plans granted to associates prior to the merger

At the completion of the merger of Alcon, Inc. into Novartis on April 8, 2011, all awards outstanding under the Alcon equity plans were converted into awards based upon Novartis shares with a conversion factor of 3.0727 as defined in the Merger Agreement. The plans are fully vested.

Share options entitle the recipient to purchase Novartis shares at the closing market price of the former Alcon, Inc., share on the day of grant divided by the conversion factor.

Share-settled appreciation rights (SSAR) entitle the participant to receive, in the form of Novartis shares, the difference between the values of the former Alcon, Inc., share at the date of grant, converted into Novartis shares using the conversion factor, and the Novartis share price at the date of exercise.

Both options and SSAR expire on their tenth anniversary. The last grant was made in 2009.

The following table shows the activity associated with the converted Novartis share options and SSARs during 2017 and 2016:

	Number of options (millions)	Weighted average exercise price (USD)	Number of SSARs (millions)	Weighted average exercise price (USD)
Outstanding at January 1, 2016	**0.2**	**36.8**	**1.8**	**36.6**
Exercised	– 0.1	37.6	– 0.4	38.9
Outstanding at December 31, 2016	**0.1**	**36.0**	**1.4**	**35.9**
Exercisable at December 31, 2016	**0.1**	**36.0**	**1.4**	**35.9**
Outstanding at January 1, 2017	**0.1**	**36.0**	**1.4**	**35.9**
Exercised			– 0.6	39.8
Outstanding at December 31, 2017	**0.1**	**33.7**	**0.8**	**33.0**
Exercisable at December 31, 2017	**0.1**	**33.7**	**0.8**	**33.0**

26. Transactions with related parties

Genentech/Roche

Novartis has two agreements with Genentech, Inc., United States, a subsidiary of Roche Holding AG which is indirectly included in the consolidated financial statements using equity accounting since Novartis holds 33.3% of the outstanding voting shares of Roche.

LUCENTIS

Novartis has licensed the exclusive rights to develop and market *Lucentis* outside the United States for indications related to diseases of the eye. As part of this agreement, Novartis paid Genentech/Roche an initial milestone and shared the cost for the subsequent development by making additional milestone payments upon the achievement of certain clinical development points and product approval. Novartis also pays royalties on the net sales of *Lucentis* products outside the United States. In 2017, *Lucentis* sales of USD 1.9 billion (2016: USD 1.8 billion, 2015: USD 2.1 billion) were recognized by Novartis.

XOLAIR

In February 2004, Novartis Pharma AG, Genentech, Inc., and Tanox, Inc., finalized a three-party collaboration to govern the development and commercialization of certain anti-IgE antibodies including *Xolair* and TNX-901. Under this agreement, all three parties co-developed *Xolair*. On August 2, 2007, Genentech, Inc. completed the acquisition of Tanox, Inc. and has taken over its rights and obligations. Novartis and Genentech/Roche are co-promoting *Xolair* in the United States where Genentech/Roche records all sales. Novartis records sales outside of the United States.

Novartis markets *Xolair* and records all sales and related costs outside the United States as well as co-promotion costs in the US. Genentech/Roche and Novartis share the resulting profits from sales in the United States, Europe and other countries, according to agreed profit-sharing percentages. In 2017, Novartis recognized total sales of *Xolair* of USD 920 million (2016: USD 835 million, 2015: USD 755 million) including sales to them for the United States market.

The net expense for royalties, cost sharing and profit sharing arising out of the *Lucentis* and *Xolair* agreements with Genentech/Roche totaled USD 33 million in 2017 (2016: USD 217 million, 2015: USD 309 million).

Furthermore, Novartis has several patent license, supply and distribution agreements with Roche.

Executive Officers and Non-Executive Directors Compensation

During 2017, there were 11 Executive Committee members ("Executive Officers"), including those who stepped down during the year (14 members in 2016 and 11 members in 2015 also including those who stepped down).

The total compensation for members of the Executive Committee and the 13 Non-Executive Directors (13 in 2016, 12 in 2015 including those who stepped down during the year) using the Group's accounting policies for equity-based compensation and pension benefits was as follows:

	Executive Officers			Non-Executive Directors			Total		
(USD millions)	**2017**	2016	2015	**2017**	2016	2015	**2017**	2016	2015
Cash and other compensation	18.4	20.8	17.1	4.0	4.0	4.7	22.4	24.8	21.8
Post-employment benefits	2.0	2.2	1.9				2.0	2.2	1.9
Equity-based compensation	49.9	46.2	52.9	4.8	4.6	4.4	54.7	50.8	57.3
Total	**70.3**	**69.2**	**71.9**	**8.8**	**8.6**	**9.1**	**79.1**	**77.8**	**81.0**

During 2017, there was an increase in the IFRS compensation expense for Executive Officers, mainly due to the pro-rata accelerated vesting of equity-based compensation, required by IFRS, for an ECN member who stepped down on December 31, 2017. This was partially offset by the reduction in the number of Executive Officers compared to 2016. The increase in the IFRS compensation expense for Non-Executive Directors was due to one additional Non-Executive Director appointed at the 2017 Annual General Meeting.

During 2016, there was a decrease in the IFRS compensation expense for Executive Officers compared to 2015. This was mainly due to lower equity-based compensation expense attributable to lower performance factors, which was partially offset by higher benefits other than equity-based compensation resulting from the increase in the number of Executive Officers.

The Annual Incentive award, which is fully included in equity-based compensation even when paid out in cash, is granted in January in the year following the reporting period.

The disclosures on Board and Executive compensation required by the Swiss Code of Obligations and in accordance with the Swiss Ordinance against Excessive Compensation in Stock Exchange Listed Companies are shown in the Compensation Report.

Transactions with former members of the Board of Directors

During 2017, 2016 and 2015, the following payments (or waivers of claims) were made to former Board members or to "persons closely" linked to them:

	Currency	2017	2016	2015
Prof. Dr. Brody	CHF	0	25 000	100 000
Prof. Dr. Zinkernagel	CHF	0	50 000	200 000
Dr. Krauer	CHF	60 000	60 000	60 000
Dr. Vasella	CHF	26 279	0	0
	USD	0	250 000	250 000

Prof. Dr. William R. Brody and Prof. Dr. Rolf M. Zinkernagel, who stepped down from the Board of Directors at the 2014 AGM, received in 2016 and 2015, delegated Board membership fees for their work on the Boards of the Novartis Institute for Tropical Diseases (Prof. Dr. Zinkernagel) and the Genomics Institute of the Novartis Research Foundation (Prof. Dr. Brody and Prof. Dr. Zinkernagel). No payments were made in 2017, as their respective mandates ended in 2016.

Dr. Alex Krauer, Honorary Chairman, is entitled to an amount of CHF 60 000 for annual periods from one AGM to the next. This amount was fixed in 1998 upon his departure from the Board in 1999, and has not been revised since that date.

In 2017, Dr. Daniel Vasella, Honorary Chairman, was paid CHF 26 279 for reimbursable costs under his agreement with the company. In 2016, Dr. Daniel Vasella received the contractual minimum compensation under an agreement which became effective on November 1, 2013 and ended in 2016. Under this agreement, Dr. Vasella was compensated at a rate of USD 25 000 per day, with an annual guaranteed minimum fee of USD 250 000. This amount was in line with compensation practices at other large companies when retired Chairmen or CEOs were retained in consulting agreements after leaving the board of directors.

In 2014, Dr. Vasella exercised an option to acquire, at a future date, real estate in Risch, Zug, Switzerland. The real estate transaction closed in 2015 and Dr. Vasella acquired the Group assets from a consolidated entity for an arm's length transaction price determined on the basis of two independent external assessments.

Transactions with an Executive Officer prior to the start of employment

As announced on September 24, 2015, Dr. James E. Bradner succeeded Dr. Mark Fishman as President of the Novartis Institutes for BioMedical Research (NIBR) and member of the Executive Committee of Novartis with effect from March 1, 2016. In 2015, a Novartis subsidiary acquired Dr. Bradner's 10 million shares (7% interest) in a non-material entity for USD 10 million. The arm's length transaction price was determined based on the most recent round of financing of this entity.

The above disclosures related to Dr. Vasella and Dr. Bradner are made on a voluntary basis.

27. Commitments and contingencies

Leasing commitments

The Group has entered into various fixed-term operational leases, mainly for cars and real estate. As of December 31, 2017, the Group's commitments with respect to these leases, including estimated payment dates, were as follows:

(USD millions)	2017
2018	309
2019	224
2020	161
2021	131
2022	123
Thereafter	2 221
Total	**3 169**
Expense of current year	**337**

Research & Development and other intangible asset purchase commitments

The Group has entered into long-term research and development agreements with various institutions which provide for potential milestone payments by Novartis that may be capitalized. As of December 31, 2017 the Group's commitments to make payments under those agreements and other agreements to purchase intangible assets, and their estimated timing, were as follows:

(USD millions)	Research & Development commitments	Other intangible asset purchase commitments	Total
2018	780	130	910
2019	671		671
2020	864		864
2021	801		801
2022	353		353
Thereafter	837		837
Total	**4 306**	**130**	**4 436**

Other commitments

The Group has entered into various purchase commitments for services and materials as well as for equipment in the ordinary course of business. These commitments are generally entered into at current market prices and reflect normal business operations.

Contingencies

Group companies have to observe the laws, government orders and regulations of the country in which they operate.

A number of Novartis companies are, and will likely continue to be, subject to various legal proceedings and investigations that arise from time to time, including proceedings regarding product liability, sales and marketing practices, commercial disputes, employment, and wrongful discharge, antitrust, securities, health and safety, environmental, tax, international trade, privacy, and intellectual property matters. As a result, the Group may become subject to substantial liabilities that may not be covered by insurance and that could affect our business, financial position and reputation. While Novartis does not believe that any of these legal proceedings will have a material adverse effect on its financial position, litigation is inherently unpredictable and large judgments sometimes occur. As a consequence, Novartis may in the future incur judgments or enter into settlements of claims that could have a material adverse effect on its results of operations or cash flow.

Governments and regulatory authorities around the world have been stepping up their compliance and law enforcement activities in recent years in key areas, including marketing practices, pricing, corruption, trade restrictions, embargo legislation, insider trading, antitrust, cyber security and data privacy. Further, when one government or regulatory authority undertakes an investigation, it is not uncommon for other governments or regulators to undertake investigations regarding the same or similar matters. Responding to such investigations is costly and requires an increasing amount of management's time and attention. In addition, such investigations may affect our reputation, create a risk of potential exclusion from government reimbursement programs in the United States and other countries, and may lead to (or arise from) litigation. These factors have contributed to decisions by Novartis and other companies in the healthcare industry, when deemed in their interest, to enter into settlement agreements with governmental authorities around the world prior to any formal decision by the authorities or a court. Those government settlements have involved and may continue to involve, in current government investigations and proceedings, large cash payments, sometimes in the hundreds of millions of dollars or more, including the potential repayment of amounts allegedly obtained improperly and other penalties, including treble damages. In addition, settlements of government healthcare fraud cases often require companies to enter into corporate integrity agreements, which are intended to regulate company behavior for a period of years. Our affiliate Novartis Pharmaceuticals Corporation is a party to such an agreement, which will expire in 2020. Also, matters underlying governmental investigations and settlements may be the subject of separate private litigation.

While provisions have been made for probable losses, which management deems to be reasonable or appropriate, there are uncertainties connected with these estimates.

Note 19 contains additional information on these matters.

A number of Group companies are involved in legal proceedings concerning intellectual property rights. The inherent unpredictability of such proceedings means that there can be no assurances as to their ultimate outcome. A negative result in any such proceeding could potentially adversely affect the ability of certain Novartis companies to sell their products, or require the payment of substantial damages or royalties.

In the opinion of management, however, the outcome of these actions will not materially affect the Group's financial position but could be material to the results of operations or cash flow in a given period.

The Group's potential environmental remediation liability is assessed based on a risk assessment and investigation of the various sites identified by the Group as at risk for environmental remediation exposure. The Group's future remediation expenses are affected by a number of uncertainties. These uncertainties include, but are not limited to, the method and extent of remediation, the percentage of material attributable to the Group at the remediation sites relative to that attributable to other parties, and the financial capabilities of the other potentially responsible parties.

Note 19 contains additional information on environmental liabilities.

28. Financial instruments – additional disclosures

(USD millions)	Note	2017[1]	2016[1]
Cash and cash equivalents	15	**8 860**	**7 007**
Financial assets – measured at fair value through other comprehensive income			
Available-for-sale marketable securities			
Debt securities	15	328	306
Fund investments	15	34	31
Total available-for-sale marketable securities		**362**	**337**
Available-for-sale long-term financial investments			
Equity securities	12	1 109	989
Fund investments	12	166	107
Total available-for-sale long-term financial investments		**1 275**	**1 096**
Total financial assets – measured at fair value through other comprehensive income		**1 637**	**1 433**
Financial assets – measured at amortized costs			
Trade receivables, income tax receivables, and other current assets (excluding contingent consideration receivables and pre-payments)	14/16	10 650	10 202
Accrued interest on debt securities and time deposits	15	1	1
Time deposits with original maturity more than 90 days	15	125	108
Long-term loans and receivables from customers and finance lease, advances, security deposits	12	574	514
Total financial assets – measured at amortized costs		**11 350**	**10 825**
Financial assets – measured at fair value through the consolidated income statement			
Associated companies at fair value through profit and loss		216	188
Derivative financial instruments	15	31	230
Contingent consideration receivables	12/16	844	586
Total financial assets – measured at fair value through the consolidated income statement		**1 091**	**1 004**
Total financial assets		**22 938**	**20 269**
Financial liabilities – measured at amortized costs			
Current financial debt			
Interest-bearing accounts of associates payable on demand	20	1 822	1 601
Bank and other financial debt	20	692	836
Commercial paper	20	2 328	3 174
Current portion of non-current debt	20	359	178
Total current financial debt		**5 201**	**5 789**
Non-current financial debt			
Straight bonds	18	22 957	17 285
Liabilities to banks and other financial institutions	18	539	708
Finance lease obligations	18	87	82
Current portion of non-current debt	18	– 359	– 178
Total non-current financial debt		**23 224**	**17 897**
Trade payables		**5 169**	**4 873**
Total financial liabilities – measured at amortized costs		**33 594**	**28 559**
Financial liabilities – measured at fair value through the consolidated income statement			
Contingent consideration (see Note 19/21) and other financial liabilities		924	1 018
Derivative financial instruments	20	107	116
Total financial liabilities – measured at fair value through the consolidated income statement		**1 031**	**1 134**
Total financial liabilities		**34 625**	**29 693**

[1] Except for straight bonds (see Note 18), the carrying amount is a reasonable approximation of fair value.

Derivative financial instruments

The following tables show the contract or underlying principal amounts and fair values of derivative financial instruments analyzed by type of contract at December 31, 2017 and 2016. Contract or underlying principal amounts indicate the gross volume of business outstanding at the consolidated balance sheet date and do not represent amounts at risk. The fair values are determined by reference to market prices or standard pricing models that use observable market inputs at December 31, 2017 and 2016.

	Contract or underlying principal amount		Positive fair values		Negative fair values	
(USD millions)	**2017**	2016	**2017**	2016	**2017**	2016
Currency-related instruments						
Forward foreign exchange rate contracts	8 410	8 220	31	230	– 107	– 116
Total derivative financial instruments included in marketable securities and in current financial debts	**8 410**	**8 220**	**31**	**230**	**– 107**	**– 116**

The following table shows by currency contract or underlying principal amount the derivative financial instruments at December 31, 2017 and 2016:

			2017	
(USD millions)	EUR	USD	Other	Total
Currency-related instruments				
Forward foreign exchange rate contracts	2 768	4 361	1 281	8 410
Total derivative financial instruments	**2 768**	**4 361**	**1 281**	**8 410**

			2016		
(USD millions)	EUR	USD	JPY	Other	Total
Currency-related instruments					
Forward foreign exchange rate contracts	3 623	3 427	43	1 127	8 220
Total derivative financial instruments	**3 623**	**3 427**	**43**	**1 127**	**8 220**

Derivative financial instruments effective for hedge accounting purposes

At the end of 2017 and 2016, there were no open hedging instruments for anticipated transactions.

Fair value by hierarchy

As required by IFRS, financial assets and liabilities recorded at fair value in the consolidated financial statements are categorized based upon the level of judgment associated with the inputs used to measure their fair value. There are three hierarchical levels, based on an increasing amount of subjectivity associated with the inputs to derive fair valuation for these assets and liabilities, which are as follows:

The assets carried at Level 1 fair value are equity and debt securities listed in active markets.

The assets generally included in Level 2 fair value hierarchy are foreign exchange and interest rate derivatives and certain debt securities. Foreign exchange and interest rate derivatives are valued using corroborated market data. The liabilities generally included in this fair value hierarchy consist of foreign exchange and interest rate derivatives.

Level 3 inputs are unobservable for the asset or liability. The assets generally included in Level 3 fair value hierarchy are various investments in hedge funds and unquoted equity security investments. Contingent consideration carried at fair value is included in this category.

	2017				
(USD millions)	Level 1	Level 2	Level 3	Valued at amortized cost	Total
Financial assets					
Debt securities	303	25			328
Fund investments	34				34
Total available-for-sale marketable securities	**337**	**25**			**362**
Time deposits with original maturity more than 90 days				125	125
Derivative financial instruments		31			31
Accrued interest on debt securities				1	1
Total marketable securities, time deposits and derivative financial instruments	**337**	**56**		**126**	**519**
Available-for-sale financial investments	672		437		1 109
Fund investments			166		166
Contingent consideration receivables			394		394
Long-term loans and receivables from customers and finance lease, advances, security deposits				574	574
Financial investments and long-term loans	**672**		**997**	**574**	**2 243**
Associated companies at fair value through profit and loss	**28**		**188**		**216**
Contingent consideration receivables short-term			**450**		**450**
Financial liabilities					
Contingent consideration payables			– 852		– 852
Other financial liabilities			– 72		– 72
Derivative financial instruments		– 107			– 107
Total financial liabilities at fair value		**– 107**	**– 924**		**– 1 031**

	2016				
(USD millions)	Level 1	Level 2	Level 3	Valued at amortized cost	Total
Financial assets					
Debt securities	284	22			306
Fund investments	31				31
Total available-for-sale marketable securities	**315**	**22**			**337**
Time deposits with original maturity more than 90 days				108	108
Derivative financial instruments		230			230
Accrued interest on debt securities				1	1
Total marketable securities, time deposits and derivative financial instruments	**315**	**252**		**109**	**676**
Available-for-sale financial investments	513		476		989
Fund investments			107		107
Contingent consideration receivables			586		586
Long-term loans and receivables from customers and finance lease, advances, security deposits				514	514
Financial investments and long-term loans	**513**		**1 169**	**514**	**2 196**
Associated companies at fair value through profit and loss			**188**		**188**
Financial liabilities					
Contingent consideration payables			– 889		– 889
Other financial liabilities			– 129		– 129
Derivative financial instruments		– 116			– 116
Total financial liabilities at fair value		**– 116**	**– 1 018**		**– 1 134**

The analysis above includes all financial instruments including those measured at amortized cost or at cost.

The change in carrying values associated with Level 3 financial instruments using significant unobservable inputs during the year ended December 31 are set forth below:

	2017					
(USD millions)	Associated companies at fair value through profit and loss	Fund investments	Available-for-sale financial investments	Contingent consideration receivables	Contingent consideration payables	Other financial liabilities
January 1	**188**	**107**	**476**	**586**	**– 889**	**– 129**
Fair value gains and other adjustments, including from divestments recognized in the consolidated income statement	45		32	278	362	
Fair value losses (including impairments and amortizations) and other adjustments recognized in the consolidated income statement	– 34		– 45		– 193	– 37
Fair value adjustments recognized in the consolidated statement of comprehensive income		45	– 40			
Purchases	37	28	113		– 238	
Cash receipts and payments				– 20	106	94
Disposals	– 19	– 18	– 52			
Reclassification	– 29	4	– 47			
December 31	**188**	**166**	**437**	**844**	**– 852**	**– 72**
Total of fair value gains and losses recognized in the consolidated income statement for assets and liabilities held at December 31, 2017	11	0	– 13	278	169	– 37

	2016					
(USD millions)	Associated companies at fair value through profit and loss	Fund investments	Available-for-sale financial investments	Contingent consideration receivables	Contingent consideration payables	Other financial liabilities
January 1	**181**	**94**	**473**	**550**	**– 790**	**– 315**
Fair value gains and other adjustments, including from divestments recognized in the consolidated income statement	26		1	51		3
Fair value losses (including impairments and amortizations) and other adjustments recognized in the consolidated income statement	– 28	– 1	– 24		– 156	
Fair value adjustments recognized in the consolidated statement of comprehensive income		14	– 8			
Purchases	41	5	122		– 172	
Cash receipts and payments				– 15	229	183
Disposals	– 3	– 5	– 18			
Reclassification	– 29		– 70			
December 31	**188**	**107**	**476**	**586**	**– 889**	**– 129**
Total of fair value gains and losses recognized in the consolidated income statement for assets and liabilities held at December 31, 2016	– 2	– 1	– 23	51	– 156	3

During 2017, there were several individually non-significant transfers of available-for-sale financial investments from Level 3 to Level 1 for USD 73 million (2016: USD 75 million) mainly due to Initial Public Offerings of the invested companies.

Realized gains and losses associated with Level 3 available-for-sale marketable securities are recorded in the consolidated income statement under “Other financial income and expense” and realized gains and losses associated with Level 3 available-for-sale financial investments are recorded in the consolidated income statement under “Other income” or “Other expense”, respectively.

If the pricing parameters for the Level 3 input were to change for associated companies at fair value through profit and loss, equity securities, fund investments and available-for-sale financial investments by 10% positively or negatively, this would change the amounts recorded in the 2017 consolidated statement of comprehensive income by USD 79 million.

For the determination of the fair value of a contingent consideration various unobservable inputs are used. A change in these inputs might result in a significantly higher or lower fair value measurement. The inputs used are, among others, the probability of success, sales forecast and assumptions regarding the discount rate, timing and different scenarios of triggering events. The inputs are interrelated. The significance and usage of these inputs to each contingent consideration may vary due to differences in the timing and triggering events for payments or in the nature of the asset related to the contingent consideration.

If the most significant parameters for the Level 3 input were to change by 10% positively or negatively, or where the probability of success (POS) is the most significant input parameter 10% were added or deducted from the applied probability of success, for contingent consideration payables, other financial liabilities and contingent consideration receivables, this would change the amounts recorded in the 2017 consolidated income statement by USD 333 million and USD 322 million, respectively.

Nature and extent of risks arising from financial instruments

Market risk

Novartis is exposed to market risk, primarily related to foreign currency exchange rates, interest rates and the market value of the investments of liquid funds. The Group actively monitors and seeks to reduce, where it deems it appropriate to do so, fluctuations in these exposures. It is the Group's policy and practice to enter into a variety of derivative financial instruments to manage the volatility of these exposures and to enhance the yield on the investment of liquid funds. It does not enter into any financial transactions containing a risk that cannot be quantified at the time the transaction is concluded. In addition, it does not sell short assets it does not have, or does not know it will have, in the future. The Group only sells existing assets or enters into transactions and future transactions (in the case of anticipatory hedges) that it confidently expects it will have in the future, based on past experience. In the case of liquid funds, the Group writes call options on assets it has, or writes put options on positions it wants to acquire and has the liquidity to acquire. The Group expects that any loss in value for these instruments generally would be offset by increases in the value of the underlying transactions.

Foreign currency exchange rate risk

The Group uses the US dollar as its reporting currency. As a result, the Group is exposed to foreign currency exchange movements, primarily in European, Japanese and emerging market currencies. Fluctuations in the exchange rates between the US dollar and other currencies can have a significant effect on both the Group's results of operations, including reported sales and earnings, as well as on the reported value of our assets, liabilities and cash flows. This, in turn, may significantly affect the comparability of period-to-period results of operations.

Because our expenditures in Swiss francs are significantly higher than our revenues in Swiss francs, volatility in the value of the Swiss franc can have a significant impact on the reported value of our earnings, assets and liabilities, and the timing and extent of such volatility can be difficult to predict. In addition, there is a risk that certain countries could take other steps that could significantly impact the value of their currencies.

The Group is exposed to a potential adverse devaluation risk on its intercompany funding and total investment in certain subsidiaries operating in countries with exchange controls. The most significant foreign exchange losses (USD 0.3 billion) occurred in Venezuela in 2016. The net outstanding intercompany payable balance of Venezuela subsidiaries was not significant at December 31, 2017 and at December 31, 2016, due to reserves against the intercompany balances.

The Group manages its global currency exposure by engaging in hedging transactions where management deems appropriate. Novartis may enter into various contracts that reflect the changes in the value of foreign currency exchange rates to preserve the value of assets, commitments and anticipated transactions. Novartis also uses forward contracts and foreign currency option contracts to hedge.

Net investments in subsidiaries in foreign countries are long-term investments. Their fair value changes through movements of foreign currency exchange rates. The Group has designated a certain portion of its long-term euro-denominated straight bonds as hedges of the translation risk arising on certain of these net investments in foreign operations with euro functional currency. As of December 31, 2017, long-term financial debt with a carrying amount of EUR 1.8 billion (USD 2.2 billion) has been designated as a hedge instrument. During 2017, USD 237 million of unrealized loss was recognized in other comprehensive income and accumulated in currency translation effects in relation with this net investment hedge. The hedge remained effective since inception, and no amount was recognized in the consolidated income statement in 2017. During 2016 and 2015, the Group did not apply net investment hedge accounting.

Commodity price risk

The Group has only a very limited exposure to price risk related to anticipated purchases of certain commodities used as raw materials by the Group's businesses. A change in those prices may alter the gross margin of a specific business, but generally by not more than 10% of the margin and thus below the Group's risk management tolerance levels. Accordingly, the Group does not enter into significant commodity futures, forward and option contracts to manage fluctuations in prices of anticipated purchases.

Interest rate risk
The Group addresses its net exposure to interest rate risk mainly through the ratio of its fixed-rate financial debt to variable rate financial debt contained in its total financial debt portfolio. To manage this mix, Novartis may enter into interest rate swap agreements, in which it exchanges periodic payments based on a notional amount and agreed-upon fixed and variable interest rates.

Equity risk
The Group may purchase equities as investments of its liquid funds. As a policy, it limits its holdings in an unrelated company to less than 5% of its liquid funds. Potential investments are thoroughly analyzed. Call options are written on equities that the Group owns, and put options are written on equities that the Group wants to buy and for which cash is available.

Credit risk
Credit risks arise from the possibility that customers may not be able to settle their obligations as agreed. To manage this risk, the Group periodically assesses country and customer credit risk, assigns individual credit limits, and takes actions to mitigate credit risk where appropriate.

The Group's largest customer accounted for approximately 17% of net sales, and the second-largest and third-largest customers accounted for 12% and 7% of net sales, respectively (2016: 16%, 12% and 6%, respectively; 2015: 14%, 11% and 5%, respectively). No other customer accounted for 5% or more of net sales in either year.

The highest amounts of trade receivables outstanding were for these same three customers and amounted to 14%, 9% and 5%, respectively, of the Group's trade receivables at December 31, 2017 (2016: 14%, 9% and 6%, respectively). There is no other significant concentration of customer credit risk.

Counterparty risk
Counterparty risk encompasses issuer risk on marketable securities and money market instruments, credit risk on cash, time deposits and derivatives, as well as settlement risk for different instruments. Issuer risk is reduced by only buying securities that are at least A-rated. Counterparty credit risk and settlement risk are reduced by a policy of entering into transactions with counterparties (banks or financial institutions) that feature a strong credit rating. Exposure to these risks is closely monitored and kept within predetermined parameters. The limits are regularly assessed and determined based upon credit analysis, including financial statement and capital adequacy ratio reviews. In addition, reverse repurchasing agreements are contracted and Novartis has entered into credit support agreements with various banks for derivative transactions.

The Group's cash and cash equivalents are held with major regulated financial institutions, the three largest ones hold approximately 20.2%, 15.0% and 12.7%, respectively (2016: 16.5%, 6.9% and 6.7%, respectively).

The Group does not expect any losses from non-performance by these counterparties and does not have any significant grouping of exposures to financial sector or country risk.

Liquidity risk
Liquidity risk is defined as the risk that the Group could not be able to settle or meet its obligations on time or at a reasonable price. Group Treasury is responsible for liquidity, funding and settlement management. In addition, liquidity and funding risks, and related processes and policies, are overseen by management. Novartis manages its liquidity risk on a consolidated basis according to business needs, tax, capital or regulatory considerations, if applicable, through numerous sources of financing in order to maintain flexibility. Management monitors the Group's net debt or liquidity position through rolling forecasts on the basis of expected cash flows.

Novartis has two United States commercial paper programs under which it can issue up to USD 9.0 billion in the aggregate of unsecured commercial paper notes. Novartis also has a Japanese commercial paper program under which it can issue up to JPY 150 billion (approximately USD 1.3 billion) of unsecured commercial paper notes. Commercial paper notes totaling USD 2.3 billion under these three programs were outstanding as per December 31, 2017 (2016: USD 3.2 billion). Novartis further has a committed credit facility of USD 6.0 billion, entered into on September 23, 2015. This credit facility is provided by a syndicate of banks and is intended to be used as a backstop for the United States commercial paper programs. It matures in September 2020 and was undrawn as per December 31, 2017 and December 31, 2016.

The following table sets forth how management monitors net debt or liquidity based on details of the remaining contractual maturities of current financial assets and liabilities excluding trade receivables and payables as well as contingent considerations at December 31, 2017 and December 31, 2016:

	2017					
(USD millions)	Due within one month	Due later than one month but less than three months	Due later than three months but less than one year	Due later than one year but less than five years	Due after five years	Total
Current assets						
Marketable securities and time deposits	71	72	105	181	58	487
Commodities					106	106
Derivative financial instruments and accrued interest	7	19	6			32
Cash and cash equivalents	4 260	4 600				8 860
Total current financial assets	**4 338**	**4 691**	**111**	**181**	**164**	**9 485**
Non-current liabilities						
Financial debt				– 9 849	– 13 375	– 23 224
Financial debt – undiscounted				*– 9 893*	*– 13 519*	*– 23 412*
Total non-current financial debt				**– 9 849**	**– 13 375**	**– 23 224**
Current liabilities						
Financial debt	– 4 576	– 169	– 456			– 5 201
Financial debt – undiscounted	*– 4 576*	*– 169*	*– 456*			*– 5 201*
Derivative financial instruments	– 31	– 48	– 28			– 107
Total current financial debt	**– 4 607**	**– 217**	**– 484**			**– 5 308**
Net debt	**– 269**	**4 474**	**– 373**	**– 9 668**	**– 13 211**	**– 19 047**

	2016					
(USD millions)	Due within one month	Due later than one month but less than three months	Due later than three months but less than one year	Due later than one year but less than five years	Due after five years	Total
Current assets						
Marketable securities and time deposits	32	126	110	124	53	445
Commodities					94	94
Derivative financial instruments and accrued interest	38	102	91			231
Cash and cash equivalents	5 907	1 100				7 007
Total current financial assets	**5 977**	**1 328**	**201**	**124**	**147**	**7 777**
Non-current liabilities						
Financial debt				– 5 141	– 12 756	– 17 897
Financial debt – undiscounted				*– 5 155*	*– 12 901*	*– 18 056*
Total non-current financial debt				**– 5 141**	**– 12 756**	**– 17 897**
Current liabilities						
Financial debt	– 5 099	– 250	– 440			– 5 789
Financial debt – undiscounted	*– 5 099*	*– 250*	*– 440*			*– 5 789*
Derivative financial instruments	– 15	– 72	– 29			– 116
Total current financial debt	**– 5 114**	**– 322**	**– 469**			**– 5 905**
Net debt	**863**	**1 006**	**– 268**	**– 5 017**	**– 12 609**	**– 16 025**

The consolidated balance sheet amounts of financial liabilities included in the above analysis are not materially different to the contractual amounts due on maturity. The positive and negative fair values on derivative financial instruments represent the net contractual amounts to be exchanged at maturity.

The Group's contractual undiscounted potential cash flows from derivative financial instruments to be settled on a gross basis are as follows:

	2017			
(USD millions)	Due within one month	Due later than one month but less than three months	Due later than three months but less than one year	Total
Derivative financial instruments and accrued interest on derivative financial instruments				
Potential outflows in various currencies – from financial derivative liabilities	– 953	– 972	– 2 824	– 4 749
Potential inflows in various currencies – from financial derivative assets	928	948	2 778	4 654

	2016			
(USD millions)	Due within one month	Due later than one month but less than three months	Due later than three months but less than one year	Total
Derivative financial instruments and accrued interest on derivative financial instruments				
Potential outflows in various currencies – from financial derivative liabilities	– 1 087	– 1 246	– 2 027	– 4 360
Potential inflows in various currencies – from financial derivative assets	1 109	1 287	2 051	4 447

Other contractual liabilities that are not part of management's monitoring of the net debt or liquidity consist of the following items:

	2017				
(USD millions)	Due later than one month but less than three months	Due later than three months but less than one year	Due later than one year but less than five years	Due after five years	Total
Contractual interest on non-current liabilities	– 113	– 507	– 1 765	– 3 859	– 6 244
Trade payables	– 5 169				– 5 169

	2016				
(USD millions)	Due later than one month but less than three months	Due later than three months but less than one year	Due later than one year but less than five years	Due after five years	Total
Contractual interest on non-current liabilities	– 104	– 433	– 1 694	– 4 015	– 6 246
Trade payables	– 4 873				– 4 873

Capital risk management

Novartis strives to maintain a strong credit rating. In managing its capital, Novartis focuses on maintaining a strong balance sheet. Moody's rated the Group as Aa3 for long-term maturities and as P-1 for short-term maturities and Standard & Poor's had a rating of AA- for long-term maturities and A-1+ for short-term maturities. Fitch had a long-term rating of AA and a short-term rating of F1+.

The debt/equity ratio increased to 0.38:1 at December 31, 2017, compared to 0.32:1 at the beginning of the year.

Value at risk

The Group uses a value at risk (VAR) computation to estimate the potential ten-day loss in the fair value of its financial instruments.

A ten-day period is used because of an assumption that not all positions could be undone in one day given the size of the positions. The VAR computation includes all financial assets and financial liabilities as set forth in the table on page 243, except trade receivables, income tax receivables and other current assets, contingent considerations, finance lease obligations, long-term loans and receivables from customers and finance lease, advances and security deposits and trade payables.

The VAR estimates are made assuming normal market conditions, using a 95% confidence interval. The Group uses a "Delta Normal" model to determine the observed interrelationships between movements in interest rates, stock markets and various currencies. These inter-relationships are determined by observing interest rate, stock market movements and forward foreign currency rate movements over a sixty-day period for the calculation of VAR amounts.

The estimated potential ten-day loss in the fair value of the Group's foreign currency positions (including foreign exchange translation risk), the estimated potential ten-day loss of its equity holdings, and the estimated potential ten-day loss in fair value of its interest rate sensitive instruments (primarily financial debt and investments of liquid funds under normal market conditions) as calculated in the VAR model are the following:

(USD millions)	**2017**	2016
All financial instruments	498	541
Analyzed by components:		
Instruments sensitive to foreign currency exchange rates	184	222
Instruments sensitive to equity market movements	27	26
Instruments sensitive to interest rates	242	328

The average, high, and low VAR amounts are as follows:

	2017		
(USD millions)	Average	High	Low
All financial instruments	521	560	466
Analyzed by components:			
Instruments sensitive to foreign currency exchange rates	277	352	184
Instruments sensitive to equity market movements	28	35	21
Instruments sensitive to interest rates	282	338	219

	2016		
(USD millions)	Average	High	Low
All financial instruments	402	541	316
Analyzed by components:			
Instruments sensitive to foreign currency exchange rates	203	245	147
Instruments sensitive to equity market movements	50	99	26
Instruments sensitive to interest rates	308	407	234

The VAR computation is a risk analysis tool designed to statistically estimate the potential ten-day loss from adverse movements in foreign currency exchange rates, equity prices and interest rates under normal market conditions. The computation does not purport to represent actual losses in fair value on earnings to be incurred by the Group, nor does it consider the effect of favorable changes in market rates. The Group cannot predict actual future movements in such market rates and it does not claim that these VAR results are indicative of future movements in such market rates or are representative of any actual impact that future changes in market rates may have on the Group's future results of operations or financial position.

In addition to these VAR analyses, the Group uses stress testing techniques that aim to reflect a worst case scenario on the marketable securities that are monitored by Group Treasury. For these calculations, the Group uses the six-month period with the worst performance observed over the past twenty years in each category. For 2017 and 2016, the worst case loss scenario was calculated as follows:

(USD millions)	**2017**	2016
All financial instruments	7	6
Analyzed by components:		
Instruments sensitive to foreign currency exchange rates		
Instruments sensitive to equity market movements		
Instruments sensitive to interest rates	7	6

In the Group's risk analysis, Novartis considered this worst case scenario acceptable as it could reduce income, but would not endanger the solvency or investment grade credit rating of the Group.

29. Discontinued operations

Discontinued operations consolidated income statement segmentation

	2015			
(USD millions)	Vaccines	Consumer Health[1]	Corporate (including eliminations)	Total discontinued operations
Net sales to third parties of discontinued operations	**145**	**456**		**601**
Sales to continuing segments	18	1		19
Net sales of discontinued operations	**163**	**457**		**620**
Other revenues	18	5		23
Cost of goods sold	– 192	– 184		– 376
Gross profit of discontinued operations	**– 11**	**278**		**267**
Marketing & Sales	– 57	– 187		– 244
Research & Development	– 151	– 30		– 181
General & Administration	– 26	– 32		– 58
Other income	2 870	10 558	– 8	13 420
Other expense	– 57	– 14	– 656	– 727
Operating income of discontinued operations	**2 568**	**10 573**	**– 664**	**12 477**
Income from associated companies	2			2
Income before taxes of discontinued operations				**12 479**
Taxes				– 1 713
Net income of discontinued operations				**10 766**

[1] Consumer Health is the aggregation of the former OTC and Animal Health divisions.

The following are included in net income from discontinued operations:

(USD millions)	2015
Impairment charges on property, plant & equipment, net	83
Additions to restructuring provisions	– 1
Equity-based compensation of Novartis equity plans	– 65

30. Events subsequent to the December 31, 2017 consolidated balance sheet date

Significant transaction closed in January 2018
For significant transaction entered into in 2017 and closed in 2018, see Note 2.

Dividend proposal for 2017 and approval of the Group's 2017 consolidated financial statements
On January 23, 2018, the Novartis AG Board of Directors proposed the acceptance of the 2017 consolidated financial statements of the Novartis Group for approval by the Annual General Meeting on March 2, 2018. Furthermore, also on January 23, 2018, the Board proposed a dividend of CHF 2.80 per share to be approved at the Annual General Meeting on March 2, 2018. If approved, total dividend payments would amount to approximately USD 6.7 billion (2016: USD 6.5 billion) using the CHF/USD December 31, 2017 exchange rate.

31. Principal Group subsidiaries and associated companies

The following table lists the principal subsidiaries controlled by Novartis and associated companies in which Novartis is deemed to have significant influence. It includes all subsidiaries and associated companies with Total assets or Net sales to third parties in excess of USD 25 million. The equity interest percentage shown in the table also represents the share in voting rights in those entities, except where explicitly noted.

As at December 31, 2017		Share capital [1]	Equity interest
Algeria			
Société par actions SANDOZ, Algiers	DZD	650.0 m	100%
Argentina			
Novartis Argentina S.A., Buenos Aires	ARS	906.1 m	100%
Alcon Laboratorios S.A., Buenos Aires	ARS	83.9 m	100%
Australia			
Novartis Australia Pty Ltd, North Ryde, NSW	AUD	2	100%
Novartis Pharmaceuticals Australia Pty Ltd, North Ryde, NSW	AUD	3.8 m	100%
Sandoz Pty Ltd, North Ryde, NSW	AUD	11.6 m	100%
Alcon Laboratories (Australia) Pty Ltd, Frenchs Forest, NSW	AUD	2.6 m	100%
Austria			
Novartis Austria GmbH, Vienna	EUR	1.0 m	100%
Novartis Pharma GmbH, Vienna	EUR	1.1 m	100%
Sandoz GmbH, Kundl	EUR	32.7 m	100%
EBEWE Pharma Ges.m.b.H Nfg. KG, Unterach am Attersee	EUR	1.0 m	100%
Bangladesh			
Novartis (Bangladesh) Limited, Gazipur	BDT	162.5 m	60%
Belgium			
N.V. Novartis Pharma S.A., Vilvoorde	EUR	7.1 m	100%
N.V. Sandoz S.A., Vilvoorde	EUR	19.2 m	100%
S.A. Alcon-Couvreur N.V., Puurs	EUR	110.6 m	100%
N.V. Alcon S.A., Vilvoorde	EUR	141 856	100%
Bermuda			
Novartis Investment Ltd., Hamilton	USD	12 000	100%
Novartis Securities Investment Ltd., Hamilton	CHF	30 000	100%
Novartis Finance Services Ltd., Hamilton	CHF	20 000	100%
Novartis B2 Ltd., Hamilton	USD	12 000	100%
Novartis B3 Ltd., Hamilton	USD	106 400	100%
Triangle International Reinsurance Limited, Hamilton	CHF	1.0 m	100%
Trinity River Insurance Co Ltd., Hamilton	USD	370 000	100%
Brazil			
Novartis Biociências S.A., São Paulo	BRL	265.0 m	100%
Sandoz do Brasil Indústria Farmacêutica Ltda., Cambé, PR	BRL	190.0 m	100%
Canada			
Novartis Pharmaceuticals Canada Inc., Dorval, Quebec	CAD	13.0 m	100%
Sandoz Canada Inc., Boucherville, Quebec	CAD	80.8 m	100%
Alcon Canada Inc., Mississauga, Ontario	CAD	2 500	100%
CIBA Vision Canada Inc., Mississauga, Ontario	CAD	82 886	100%
Chile			
Novartis Chile S.A., Santiago de Chile	CLP	2.0 bn	100%
Alcon Laboratorios Chile Ltd., Santiago de Chile	CLP	2.0 bn	100%
China			
Beijing Novartis Pharma Co., Ltd., Beijing	USD	30.0 m	100%
Novartis Pharmaceuticals (HK) Limited, Hong Kong	HKD	200	100%
China Novartis Institutes for BioMedical Research Co., Ltd., Shanghai	USD	320.0 m	100%
Suzhou Novartis Pharma Technology Co., Ltd., Changshu	USD	103.4 m	100%
Shanghai Novartis Trading Ltd., Shanghai	USD	3.2 m	100%
Sandoz (China) Pharmaceutical Co., Ltd., Zhongshan	USD	36.5 m	100%
Alcon Hong Kong Limited, Hong Kong	HKD	77 000	100%
Alcon (China) Ophthalmic Product Co., Ltd., Beijing	USD	60.0 m	100%
Colombia			
Novartis de Colombia S.A., Santafé de Bogotá	COP	7.9 bn	100%
Laboratorios Alcon de Colombia S.A., Santafé de Bogotá	COP	20.9 m	100%
Croatia			
Sandoz d.o.o. farmaceutska industrija, Zagreb	HRK	25.6 m	100%
Czech Republic			
Novartis s.r.o., Prague	CZK	51.5 m	100%
Sandoz s.r.o., Prague	CZK	44.7 m	100%
Alcon Pharmaceuticals (Czech Republic) s.r.o., Prague	CZK	31.0 m	100%
Denmark			
Novartis Healthcare A/S, Copenhagen	DKK	14.0 m	100%
Sandoz A/S, Copenhagen	DKK	12.0 m	100%
Alcon Nordic A/S, Copenhagen	DKK	0.5 m	100%
Ecuador			
Novartis Ecuador S.A., Quito	USD	4.0 m	100%
Egypt			
Novartis Pharma S.A.E., Cairo	EGP	193.8 m	99.77%
Sandoz Egypt Pharma S.A.E., New Cairo City	EGP	250 000	100%
Finland			
Novartis Finland Oy, Espoo	EUR	459 000	100%

As at December 31, 2017		Share capital [1]	Equity interest
France			
Novartis Groupe France S.A., Rueil-Malmaison	EUR	103.0 m	100%
Novartis Pharma S.A.S., Rueil-Malmaison	EUR	43.4 m	100%
Sandoz S.A.S., Levallois-Perret	EUR	5.4 m	100%
Laboratoires Alcon S.A.S., Rueil-Malmaison	EUR	12.9 m	100%
Germany			
Novartis Deutschland GmbH, Wehr	EUR	155.5 m	100%
Novartis Business Services GmbH, Wehr	EUR	25 000	100%
Novartis Pharma GmbH, Nuremberg	EUR	25.6 m	100%
Novartis Pharma Produktions GmbH, Wehr	EUR	2.0 m	100%
Sandoz International GmbH, Holzkirchen	EUR	100 000	100%
1 A Pharma GmbH, Oberhaching	EUR	26 000	100%
HEXAL AG, Holzkirchen	EUR	93.7 m	100%
Salutas Pharma GmbH, Barleben	EUR	42.1 m	100%
Aeropharm GmbH, Rudolstadt	EUR	26 000	100%
Alcon Pharma GmbH, Freiburg im Breisgau	EUR	512 000	100%
CIBA Vision GmbH, Grosswallstadt	EUR	15.4 m	100%
WaveLight GmbH, Erlangen	EUR	6.6 m	100%
Gibraltar			
Novista Insurance Limited, Gibraltar City	CHF	130.0 m	100%
Greece			
Novartis (Hellas) S.A.C.I., Metamorphosis/Athens	EUR	23.4 m	100%
Alcon Laboratories Hellas-Commercial and Industrial S.A., Maroussi, Athens	EUR	5.7 m	100%
Hungary			
Novartis Hungary Healthcare Limited Liability Company, Budapest	HUF	545.6 m	100%
Sandoz Hungary Limited Liability Company, Budapest	HUF	883.0 m	100%
India			
Novartis India Limited, Mumbai	INR	140.7 m	73.4%
Novartis Healthcare Private Limited, Mumbai	INR	60.0 m	100%
Sandoz Private Limited, Mumbai	INR	32.0 m	100%
Alcon Laboratories (India) Private Limited, Bangalore	INR	1.1 bn	100%
Indonesia			
PT. Novartis Indonesia, Jakarta	IDR	7.7 bn	100%
PT. CIBA Vision Batam, Batam	IDR	11.9 bn	100%
Ireland			
Novartis Ireland Limited, Dublin	EUR	25 000	100%
Novartis Ringaskiddy Limited, Ringaskiddy, County Cork	EUR	2.0 m	100%
Alcon Laboratories Ireland Limited, Cork City	EUR	541 251	100%
Israel			
Novartis Israel Ltd., Petach Tikva	ILS	1 000	100%
Optonol Ltd., Neve-Ilan	ILS	752 545	100%
Italy			
Novartis Farma S.p.A., Origgio	EUR	18.2 m	100%
Sandoz S.p.A., Origgio	EUR	1.7 m	100%
Sandoz Industrial Products S.p.A., Rovereto	EUR	2.6 m	100%
Alcon Italia S.p.A., Milan	EUR	3.7 m	100%
Japan			
Novartis Holding Japan K.K., Tokyo	JPY	10.0 m	100%
Novartis Pharma K.K., Tokyo	JPY	6.0 bn	100%
Ciba-Geigy Japan Limited, Tokyo	JPY	8.5 m	100%
Sandoz K.K., Tokyo	JPY	100.0 m	100%
Alcon Japan Ltd., Tokyo	JPY	500.0 m	100%
Luxembourg			
Novartis Investments S.à r.l., Luxembourg-Ville	USD	100.0 m	100%
Novartis Finance S.A., Luxembourg-Ville	USD	100 000	100%
Malaysia			
Novartis Corporation (Malaysia) Sdn. Bhd., Kuala Lumpur	MYR	3.3 m	100%
Alcon Laboratories (Malaysia) Sdn. Bhd., Petaling Jaya	MYR	1.0 m	100%
CIBA Vision Johor Sdn. Bhd., Kuala Lumpur	MYR	10.0 m	100%
Mexico			
Novartis Farmacéutica, S.A. de C.V., Mexico City	MXN	205.0 m	100%
Sandoz, S.A. de C.V., Mexico City	MXN	468.2 m	100%
Alcon Laboratorios, S.A. de C.V., Mexico City	MXN	5.9 m	100%
Morocco			
Novartis Pharma Maroc SA, Casablanca	MAD	80.0 m	100%
Netherlands			
Novartis Netherlands B.V., Arnhem	EUR	1.4 m	100%
Novartis Pharma B.V., Arnhem	EUR	4.5 m	100%
Sandoz B.V., Almere	EUR	907 560	100%
Alcon Nederland B.V., Arnhem	EUR	18 151	100%
New Zealand			
Novartis New Zealand Ltd, Auckland	NZD	820 000	100%

As at December 31, 2017		Share capital [1]	Equity interest
Norway			
Novartis Norge AS, Oslo	NOK	1.5 m	100%
Pakistan			
Novartis Pharma (Pakistan) Limited, Karachi	PKR	3.9 bn	99.99%
Panama			
Novartis Pharma (Logistics), Inc., Panama City	USD	10 000	100%
Alcon Centroamerica S.A., Panama City	PAB	1 000	100%
Philippines			
Novartis Healthcare Philippines, Inc., Manila	PHP	298.8 m	100%
Sandoz Philippines Corporation, Manila	PHP	30.0 m	100%
Poland			
Novartis Poland Sp. z o.o., Warszawa	PLN	44.2 m	100%
Sandoz Polska Sp. z o.o., Warszawa	PLN	25.6 m	100%
Lek S.A., Strykow	PLN	11.4 m	100%
Alcon Polska Sp. z o.o., Warszawa	PLN	750 000	100%
Portugal			
Novartis Portugal SGPS Lda., Porto Salvo	EUR	500 000	100%
Novartis Farma – Produtos Farmacêuticos S.A., Porto Salvo	EUR	2.4 m	100%
Sandoz Farmacêutica Lda., Porto Salvo	EUR	499 900	100%
Alcon Portugal-Produtos e Equipamentos Oftalmológicos Lda., Porto Salvo	EUR	4.5 m	100%
Romania			
Novartis Pharma Services Romania S.R.L., Bucharest	RON	3.0 m	100%
Sandoz S.R.L., Targu-Mures	RON	105.2 m	100%
Alcon Romania S.R.L., Bucharest	RON	10.8 m	100%
Russian Federation			
Novartis Pharma LLC, Moscow	RUB	20.0 m	100%
Novartis Neva LLC, St. Petersburg	RUB	1.3 bn	100%
ZAO Sandoz, Moscow	RUB	57.4 m	100%
Alcon Farmacevtika LLC, Moscow	RUB	44.1 m	100%
Saudi Arabia			
Saudi Pharmaceutical Distribution Co. Ltd., Riyadh	SAR	26.8 m	75%
Singapore			
Novartis (Singapore) Pte Ltd., Singapore	SGD	100 000	100%
Novartis Singapore Pharmaceutical Manufacturing Pte Ltd, Singapore	SGD	45.0 m	100%
Novartis Asia Pacific Pharmaceuticals Pte Ltd, Singapore	SGD	39.0 m	100%
Novartis Institute for Tropical Diseases Pte Ltd, Singapore	SGD	2 004	100%
Alcon Pte Ltd, Singapore	SGD	164 000	100%
Alcon Singapore Manufacturing Pte Ltd, Singapore	SGD	101 000	100%
CIBA Vision Asian Manufacturing and Logistics Pte Ltd., Singapore	SGD	1.0 m	100%
Slovakia			
Novartis Slovakia s.r.o., Bratislava	EUR	2.0 m	100%
Slovenia			
Lek Pharmaceuticals d.d., Ljubjana	EUR	48.4 m	100%
Sandoz Pharmaceuticals d.d., Ljubjana	EUR	1.5 m	100%
South Africa			
Novartis South Africa (Pty) Ltd, Midrand	ZAR	86.3 m	100%
Sandoz South Africa (Pty) Ltd, Kempton Park	ZAR	3.0 m	100%
Alcon Laboratories (South Africa) (Pty) Ltd., Midrand	ZAR	201 820	100%
South Korea			
Novartis Korea Ltd., Seoul	KRW	24.5 bn	98.55%
Sandoz Korea Ltd., Seoul	KRW	17.8 bn	100%
Alcon Korea Ltd., Seoul	KRW	33.8 bn	100%
Spain			
Novartis Farmacéutica S.A., Barcelona	EUR	63.0 m	100%
Sandoz Farmacéutica S.A., Madrid	EUR	270 450	100%
Sandoz Industrial Products S.A., Les Franqueses del Vallés / Barcelona	EUR	9.3 m	100%
Alcon Cusi S.A., Barcelona	EUR	11.6 m	100%
Abadia Retuerta S.A., Sardón de Duero/Valladolid	EUR	6.0 m	100%
Sweden			
Novartis Sverige AB, Täby / Stockholm	SEK	5.0 m	100%
Switzerland			
Novartis International AG, Basel	CHF	10.0 m	100%
Novartis Holding AG, Basel	CHF	100.2 m	100%
Novartis International Pharmaceutical Investment AG, Basel	CHF	100 000	100%
Novartis Bioventures AG, Basel	CHF	100 000	100%
Novartis Forschungsstiftung, Basel	--	--	100%
Novartis Stiftung für Kaderausbildung, Basel	--	--	100%
Novartis Mitarbeiterbeteiligungsstiftung, Basel	--	--	100%
Novartis Stiftung für Mensch und Umwelt, Basel	--	--	100%
Stiftung der Novartis AG für Erziehung, Ausbildung und Bildung, Basel	--	--	100%
Novartis Pharma AG, Basel	CHF	350.0 m	100%
Novartis International Pharmaceutical AG, Basel	CHF	100 000	100%
Novartis Pharma Services AG, Basel	CHF	20.0 m	100%
Novartis Pharma Schweizerhalle AG, Muttenz	CHF	18.9 m	100%
Novartis Pharma Stein AG, Stein	CHF	251 000	100%
Novartis Pharma Schweiz AG, Risch	CHF	5.0 m	100%
Sandoz AG, Basel	CHF	5.0 m	100%
Sandoz Pharmaceuticals AG, Risch	CHF	100 000	100%
Alcon Switzerland SA, Risch	CHF	100 000	100%
Alcon Pharmaceuticals Ltd., Fribourg	CHF	200 000	100%
Roche Holding AG, Basel	CHF	160.0 m	33/6 [2]

As at December 31, 2017		Share capital [1]	Equity interest
Taiwan			
Novartis (Taiwan) Co., Ltd., Taipei	TWD	170.0 m	100%
Thailand			
Novartis (Thailand) Limited, Bangkok	THB	302.0 m	100%
Alcon Laboratories (Thailand) Limited, Bangkok	THB	228.1 m	100%
Turkey			
Novartis Saglik, Gida ve Tarim Ürünleri Sanayi ve Ticaret A.S., Istanbul	TRY	98.0 m	100%
Farmanova Saglik Hizmetleri Ltd. Sti., Istanbul	TRY	6.7 m	100%
Sandoz Ilaç Sanayi ve Ticaret A.S., Istanbul	TRY	165.2 m	99.99%
Sandoz Syntek Ilaç Hammaddeleri Sanayi ve Ticaret A.S., Istanbul	TRY	46.0 m	100%
Sandoz Grup Saglik Ürünleri Ilaçlari Sanayi ve Ticaret A.S., Gebze – Kocaeli	TRY	50.0 m	100%
Alcon Laboratuvarlari Ticaret A.S., Istanbul	TRY	25.2 m	100%
United Arab Emirates			
Novartis Middle East FZE, Dubai	AED	7.0 m	100%
United Kingdom			
Novartis UK Limited, Frimley/Camberley	GBP	25.5 m	100%
Novartis Pharmaceuticals UK Limited, Frimley/Camberley	GBP	5.4 m	100%
Novartis Grimsby Limited, Frimley/Camberley	GBP	250.0 m	100%
Ziarco Group Limited, Frimley/Camberley	GBP	3 904	100%
Sandoz Limited, Frimley/Camberley	GBP	2.0 m	100%
Alcon Eye Care UK Limited, Frimley/Camberley	GBP	550 000	100%
Glaxosmithkline Consumer Healthcare Holdings Limited, Brentford, Middlesex	GBP	100 000	36.5%
United States of America			
Novartis Corporation, East Hanover, NJ	USD	72.2 m	100%
Novartis Finance Corporation, New York, NY	USD	1 000	100%
Novartis Capital Corporation, New York, NY	USD	1	100%
Novartis Services, Inc., East Hanover, NJ	USD	1	100%
Novartis US Foundation, New York, NY	--	--	100%
Novartis Pharmaceuticals Corporation, East Hanover, NJ	USD	5.2 m	100%
Novartis Institutes for BioMedical Research, Inc., Cambridge, MA	USD	1	100%
Corthera, Inc., San Mateo, CA	USD	1	100%
CoStim Pharmaceuticals Inc., Cambridge, MA	USD	1	100%
Encore Vision, Inc., New York, NY	USD	1	100%
Navigate BioPharma Services, Inc., Wilmington, NC	USD	100	100%
Reprixys Pharmaceuticals Corporation, Oklahoma City, OK	USD	1	100%
Spinifex Pharmaceuticals, Inc., Wilmington, NC	USD	1	100%
Novartis Institute for Functional Genomics, Inc., San Diego, CA	USD	1 000	100%
Sandoz Inc., Princeton, NJ	USD	25 000	100%
Fougera Pharmaceuticals Inc., Melville, NY	USD	1	100%
Eon Labs, Inc., Princeton, NJ	USD	1	100%
Alcon Laboratories, Inc., Fort Worth, TX	USD	1 000	100%
Alcon Refractivehorizons, LLC, Fort Worth, TX	USD	10	100%
Alcon Research, Ltd., Fort Worth, TX	USD	12.5	100%
Alcon Lensx, Inc., Aliso Viejo, CA	USD	1	100%
Alcon Laboratories Holding Corporation, Fort Worth, TX	USD	10	100%
Novartis Vaccines and Diagnostics, Inc., Cambridge, MA	USD	3	100%
ClarVista Medical, Inc., Aliso Viejo, CA	USD	1	100%
Transcend Medical, Inc., Menlo Park, CA	USD	1	100%
Venezuela			
Novartis de Venezuela, S.A., Caracas	VEF	1.4 m	100%
Alcon Pharmaceutical, C.A., Caracas	VEF	5.5 m	100%

In addition, the Group is represented by subsidiaries and associated companies in the following countries: Bosnia/Herzegovina, Bulgaria, Dominican Republic, Guatemala, Kenya, Latvia, the Former Yugoslav Republic of Macedonia, Nigeria, Peru, Puerto Rico, Ukraine and Uruguay

[1] Share capital may not reflect the taxable share capital and does not include any paid-in surplus

[2] Approximately 33% of voting shares; approximately 6% of total net income and equity attributable to Novartis

m = million; bn = billion

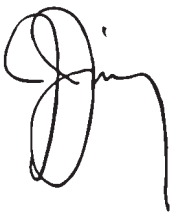
Report of Novartis management on internal control over financial reporting

The Board of Directors and management of the Group are responsible for establishing and maintaining adequate internal control over financial reporting. The Novartis Group's internal control system was designed to provide reasonable assurance to the Novartis Group's management and Board of Directors regarding the reliability of financial reporting and the preparation and fair presentation of its published consolidated financial statements.

All internal control systems, no matter how well designed, have inherent limitations. Therefore, even those systems determined to be effective may not prevent or detect misstatements and can provide only reasonable assurance with respect to financial statement preparation and presentation. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions or that the degree of compliance with the policies or procedures may deteriorate.

Novartis Group management assessed the effectiveness of the Group's internal control over financial reporting as of December 31, 2017. In making this assessment, it used the criteria established in *Internal Control – Integrated Framework(2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on its assessment, management has concluded that, as of December 31, 2017, the Novartis Group's internal control over financial reporting was effective based on those criteria.

PricewaterhouseCoopers AG, Switzerland, an independent registered public accounting firm, has issued an opinion on the existence and effectiveness of the Group's internal control over financial reporting which is included in this financial report on the pages 256 and 261 respectively.



Joseph Jimenez
Chief Executive Officer

Harry Kirsch
Chief Financial Officer

Basel, January 23, 2018

Report of the statutory auditor on the consolidated financial statements of Novartis AG

To the general meeting of Novartis AG, Basel

Opinion

We have audited the consolidated financial statements of Novartis AG and its subsidiaries (the "Group"), which comprise the consolidated income statements, consolidated statements of comprehensive income, consolidated balance sheets, consolidated statements of changes in equity, and consolidated cash flow statements, and notes to the consolidated financial statements (pages 186 to 254), including a summary of significant accounting policies, for the year ended December 31, 2017.

In our opinion, the consolidated financial statements give a true and fair view of the consolidated financial position of the Group as at December 31, 2017 and its consolidated financial performance and its consolidated cash flows for the year then ended in accordance with International Financial Reporting Standards (IFRS), as issued by the International Accounting Standards Board, and comply with Swiss law.

Basis for opinion

We conducted our audit in accordance with Swiss law, International Standards on Auditing (ISAs) and Swiss Auditing Standards. Our responsibilities under those provisions and standards are further described in the "Auditor's responsibilities for the audit of the consolidated financial statements" section of our report.

We are independent of the Group in accordance with the provisions of Swiss law and the requirements of the Swiss audit profession, as well as the IESBA Code of Ethics for Professional Accountants, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Our audit approach

Overview

- Overall Group materiality: USD 400 million which represents slightly less than 5% of income before taxes from continuing operations.
- We conducted full scope audit work at the Group's three operating divisions and at 14 reporting entities, including reporting entities of the Corporate Division, in seven countries.
- In addition, full scope audit work on account balances was performed on 21 reporting entities in 14 countries.
- Our audit scope addressed 69% of the Group's net sales and 86% of Group's total assets.

As key audit matters, the following areas of focus have been identified:

- Carrying value of Alcon goodwill
- Carrying value of intangible assets other than goodwill
- Governmental investigations and litigation
- Rebates, discounts, and sales returns

Audit scope

We designed our audit by determining materiality and assessing the risks of material misstatement in the consolidated financial statements. In particular, we considered areas where subjective judgments were made, such as significant accounting estimates that involved making assumptions and consideration of future events that are inherently uncertain. As in all of our audits, we also addressed the risk of management override of internal controls, including among other matters consideration of whether there was evidence of bias that represented a risk of material misstatement due to fraud.

How we tailored the audit scope

We tailored the scope of our audit in order to perform sufficient work to enable us to provide an opinion on the financial statements as a whole, taking into account the structure of the Group, the accounting processes and controls, and the industry in which the Group operates.

The Group financial statements are a consolidation of over 300 reporting entities. We identified 14 reporting entities that, in our view, required an audit of their complete financial information due to their size or risk characteristics. We worked very closely with and received full scope reporting from the divisional audit teams for Innovative Medicines, Alcon and Sandoz, each being a global business with headquarters based in Switzerland, the United States of America and Germany, respectively. We also received full scope reporting from reporting entity audit teams for the full scope audit work performed on account balances, carried out at 21 reporting entities, to obtain appropriate coverage of material balances. None of the reporting entities excluded from our Group audit scope individually contributed more than 5% to net sales or total assets. Audit procedures were also performed by the Group audit team over the Group's Corporate segment, certain group functions (including accounting for associated companies, taxation, treasury, certain employee benefits, government investigations and litigation) and Group consolidation.

In order to exercise the appropriate direction and supervision over the work of the divisional and reporting entity audit teams, the Group audit team made several site visits, reviewed audit working papers, participated in meetings between the divisional and reporting entity audit teams and attended selected meetings between divisional management and divisional audit teams. In addition, we hosted a planning workshop in May 2017 for audit partners and managers responsible for divisional and reporting entities.

Materiality
The scope of our audit was influenced by our application of materiality. Our audit opinion aims to provide reasonable assurance that the consolidated financial statements are free from material misstatement. Misstatements may arise due to fraud or error. They are considered material, if individually or in aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the consolidated financial statements.

Based on our professional judgment, we determined certain quantitative thresholds for materiality, including the overall group materiality for the consolidated financial statements as a whole as set out below. These, together with qualitative considerations, helped us to determine the scope of our audit and the nature, timing and extent of our audit procedures and to evaluate the effect of misstatements, if any, both individually and in aggregate, on the consolidated financial statements as a whole.

Overall group materiality
USD 400 million.

How we determined it
Slightly less than 5% of income before taxes from continuing operations.

Rationale for the materiality benchmark applied
We chose income before taxes as the measure because, in our view, it is the measure against which the performance of the Group is most commonly assessed and is a generally accepted benchmark.

We agreed with the Audit and Compliance Committee that we would report to them misstatements identified during our audit above USD 20 million as well as any misstatements below that amount which, in our view, warranted reporting for qualitative reasons.

Key Audit Matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the consolidated financial statements of the current period. These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

Key audit matter	How our audit addressed the key audit matter
Carrying value of Alcon goodwill The Group has goodwill of USD 31.8 billion at December 31, 2017, of which USD 8.3 billion relates to Alcon. The assessment of the carrying value of the goodwill balances is dependent on the estimation of future cash flows. In particular, those assessments and judgments made to support the carrying value of the goodwill allocated to the Alcon Division were critical, given the performance of the business in prior years, which lead the group to initiate a turnaround plan, followed by the on-going strategic review. Refer to Note 1 Significant accounting policies (pages 191 to 198) and Note 10 Goodwill and intangible assets (pages 214 to 215).	We assessed and tested the design and operating effectiveness of the Group's controls over the assessment of the carrying value of Alcon goodwill and concluded that these operate effectively. We tested, with the support of our valuation specialists, the carrying value of the goodwill allocated to Alcon as at December 31, 2017 focusing on the reasonableness of the cash flows growth rate after the forecast period assumption of 3%, given that this rate is above both the growth rate achieved by Alcon recently and the rate of inflation in key markets at the end of 2017. We also challenged management to substantiate its key assumptions in the cash flow projections during the forecast period and its intention and ability to execute their strategic initiatives and evaluated the reasonableness of the discount rate applied to those future cash flows. We assessed management's sensitivity analysis around key estimates to quantify the downside changes in assumptions that could result in an impairment and the disclosures included in Note 10 Goodwill and intangible assets (pages 214 to 215) of the annual report. As a result of our procedures, as discussed with the Audit and Compliance Committee, we determined that the conclusions reached by management with regard to the carrying value of Alcon goodwill were reasonable and supportable.

Key audit matter	How our audit addressed the key audit matter
Carrying value of intangible assets other than goodwill The Group has intangible assets other than goodwill totaling USD 30.0 billion at December 31, 2017, comprising research and development acquired, currently marketed products, marketing know-how, technologies, the Alcon brand name and other intangible assets. The Group recognized specific impairments of intangible assets other than goodwill of USD 709 million during the year. The assessment of the carrying values of intangible assets is dependent on future cash flows and if these are below initial expectations there is a risk that the assets will be impaired. The reviews of carrying values performed by the Group contain a number of significant judgments and estimates such as scientific success, revenue growth, the success of new product launches, profit margins and discount rates. The carrying value assessments of the following intangible asset includes the most significant risk and highest level of judgment: • The Alcon brand name is an indefinite life corporate asset and not subject to amortization. • Certain currently marketed products which have performed below management's expectation or were, in our view, at a greater risk of impairment. • Products in development, as the assessment of their carrying value is challenging due to management being required to make judgments both as to the probability of scientific success and regulatory approval of the developments across indications, as well as the probability of commercial success of the subsequent product launches. Refer to Note 1 Significant accounting policies (pages 191 to 198) and Note 10 Goodwill and intangible assets (pages 214 to 215).	We assessed and tested the design and operating effectiveness of the Group's controls over the assessment of the carrying value of intangible asset other than goodwill and concluded that these operate effectively, specifically in respect to the identification of impairment triggering events. We obtained certain carrying value calculations and assessed the key assumptions. For the Alcon brand name and the currently marketed products these assumptions specifically included pricing, market size and share and competition assumptions. We assessed the indefinite life designation of the Alcon brand name asset considering the performance of the business in prior years, by challenging management on their ability to execute their strategic initiatives. For selected currently marketed products and products in development, with the support of our valuation specialists, we considered third party sources to challenge expected future revenues due to actions by competitors or due to changes in relevant markets. Furthermore, for products in development we also considered key scientific developments. We performed our own sensitivity analysis around these key estimates to ascertain the extent of change in those assumptions that either individually or collectively would be required for the intangible assets tested to be impaired. As a result of our procedures we did not propose any adjustments to the amount of impairment recognized in 2017. For intangible assets other than goodwill where management determined that no impairment was required, we found that the assessments made by management were based upon reasonable assumptions, consistently applied.

Key audit matter	How our audit addressed the key audit matter
Governmental investigations and litigation The pharmaceutical industry is heavily regulated which increases inherent litigation risk. The Group is subject to various government investigations, of which the most significant are disclosed in Note 19 Provisions and other non-current liabilities. We specifically assessed the investigations and related litigation in the US given their significance and the inherent uncertainty of outcomes. Refer to Note 1 Significant accounting policies (pages 191 to 198) and Note 19 Provisions and other non-current liabilities (pages 224 to 228).	We assessed and tested the design and operating effectiveness of the Group's controls over the completeness, assessment for recognition, measurement and disclosures of provisions for governmental investigations and other legal matters and concluded that these operate effectively. We evaluated management's judgments in connection with the investigations and related litigation in the US, read the respective court filings and minutes of Board of Directors and management meetings and inquired with management, internal and external legal counsel. We concluded that the judgments made by management were in accordance with the accounting policies described in Note 1.

Key audit matter	How our audit addressed the key audit matter
Rebates, discounts and sales returns The Group distributes its products in many cases through wholesale distributors, and in many cases the ultimate net selling prices are determined based on the contractual arrangements that the Group has with the ultimate patient's insurer or other payment program. The initial revenue recognition, which is usually upon shipment to the distributor, requires an estimate of the net selling price taking into consideration rebates and discounts as well as sales returns. The estimate depends on contract terms and regulation, as well as forecasts of sales volumes by sales channel. Additionally, the dispensing of the product to the patient and the final determination of the selling price may be several months later. We focused our testing on the valuation and accuracy of the accruals for both rebates and discounts together with sales returns recognized at the year end because, specifically for US Medicaid and Medicare or similar programs, the estimation processes involve large volumes of data, require significant judgment and can contain risks of management bias. The provision reported as of December 31, 2017 for revenue deductions related to rebates, discounts, allowances and sales returns amounted to USD 4.7 billion. Refer to Note 21 Provisions and other current liabilities (pages 229 and 230).	We performed procedures to assess the design and operating effectiveness of the controls related to the recording of rebates, discounts and sales returns and the estimation of related period end reserves. We obtained management's calculations for the respective estimates and performed one or more of the following procedures on each of them: developed an independent expectation of the reserve and/or tested management's estimation process to assess the reasonableness of the recorded reserve balances, performed retrospective reviews and assessed subsequent events. We also performed testing of credits issued and payments made throughout the year, reviewed related contracts and independently confirmed sales terms with significant customers, and inventory levels with the largest wholesalers. We did not identify any material differences between our expectations and the accruals and we found the judgments made by management to be reasonable.

Other information in the annual report

The Board of Directors is responsible for the other information in the annual report. The other information comprises all information included in the annual report, but does not include the consolidated financial statements, the stand-alone financial statements and our auditor's reports thereon.

Our opinion on the consolidated financial statements does not cover the other information in the annual report and we do not express any form of assurance conclusion thereon.

In connection with our audit of the consolidated financial statements, our responsibility is to read the other information in the annual report and, in doing so, consider whether the other information is materially inconsistent with the consolidated financial statements or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of the Board of Directors for the consolidated financial statements

The Board of Directors is responsible for the preparation of the consolidated financial statements that give a true and fair view in accordance with IFRS and the provisions of Swiss law, and for such internal control as the Board of Directors determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, the Board of Directors is responsible for assessing the Group's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Board of Directors either intends to liquidate the Group or to cease operations, or has no realistic alternative but to do so.

Auditor's responsibilities for the audit of the consolidated financial statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Swiss law, ISAs and Swiss Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

As part of an audit in accordance with Swiss law, ISAs and Swiss Auditing Standards, we exercise professional judgment and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made.
- Conclude on the appropriateness of the Board of Directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the Group audit. We remain solely responsible for our audit opinion.

We communicate with the Board of Directors mostly through the Audit and Compliance Committee regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide the Board of Directors with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

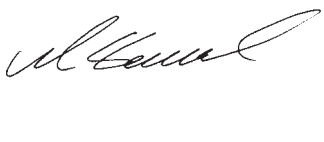
From the matters communicated with the Board of Directors, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

Report on other legal and regulatory requirements

In accordance with article 728a paragraph 1 item 3 CO and Swiss Auditing Standard 890, we confirm that an internal control system exists which has been designed for the preparation of consolidated financial statements according to the instructions of the Board of Directors.

We recommend that the consolidated financial statements submitted to you be approved.

PricewaterhouseCoopers AG



Martin Kennard
Audit expert
Auditor in charge

Stephen Johnson
Global relationship partner

Basel, January 23, 2018

The report set out on pages 256 to 260 is included in accordance with the requirements of Swiss Law and does not form part of the Novartis AG Annual Report pursuant to section 13 or 15(d) of the securities exchange act of 1934 as filed with the US Securities and Exchange Commission (SEC) on Form 20-F. The report of the Independent Registered Public Accounting Firm as included in the Form 20-F is reprinted for information purposes on page 261.

Report of Independent Registered Public Accounting Firm

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

Opinions on the Financial Statements and Internal Control over Financial Reporting

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

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and December 31, 2016, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2017 in conformity with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control – Integrated Framework (2013) issued by the COSO.

Basis for Opinions

The Novartis' Board of Directors and management of the Group are responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the "Report of Novartis Management on Internal Control Over Financial Reporting" in item 15(b) of this Form 20-F. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

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

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with IFRS. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with IFRS, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

PricewaterhouseCoopers AG

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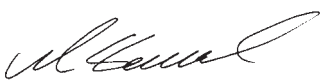

Martin Kennard
Audit expert
Auditor in charge

Stephen Johnson
Global relationship partner

Basel, January 23, 2018

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

The report of the Independent Registered Public Accounting Firm set out above is reprinted for information purposes only and is a copy of the report included in the Novartis AG Annual Report pursuant to section 13 or 15(d) of the securities exchange act of 1934 as filed with the US Securities and Exchange Commission (SEC), on Form 20-F. The report does not form part of the reporting to the general meeting as required by Swiss Law.

Financial statements of Novartis AG

Income statements

(For the years ended December 31, 2017 and 2016)

(CHF millions)	Note	2017	2016
Income from investment in Group subsidiaries		7 633	7 291
License income		1 588	1 445
Gain from disposal of intangibles assets		274	495
Other income		5	11
Total income		9 500	9 242
Amortization of goodwill and other intangible assets	3	– 1 141	– 1 140
Administrative expenses		– 23	– 26
Other expenses		– 2	– 4
Total expenses		– 1 166	– 1 170
Operating income		**8 334**	**8 072**
Financial income	4	449	440
Financial expenses	4	– 180	– 194
Income before taxes		**8 603**	**8 318**
Direct taxes		– 176	– 177
Net income of the year		**8 427**	**8 141**

The accompanying Notes form an integral part of these financial statements.

Balance sheets

(At December 31, 2017 and 2016)

(CHF millions)	Note	2017	2016
Assets			
Current assets			
Cash and cash equivalents		60	3
Receivables			
Group subsidiaries		1 897	4 163
Third parties		6	24
Total current assets		**1 963**	**4 190**
Non-current assets			
Financial assets			
Group subsidiaries		14 965	14 978
Investments	5		
Group subsidiaries		12 398	12 630
Third parties		0	0
Goodwill and other intangible assets	3	14 366	15 507
Total non-current assets		**41 729**	**43 115**
Total assets		**43 692**	**47 305**
Liabilities and equity			
Current liabilities			
Other current liabilities			
Group subsidiaries		36	48
Third parties		84	8
Accrued expenses		186	185
Deferred income		16	19
Total current liabilities		**322**	**260**
Non-current liabilities			
Interest-bearing non-current liabilities			
Bonds	6	1 378	1 378
Non-current provisions		488	502
Total non-current liabilities		**1 866**	**1 880**
Equity			
Share capital	7	**1 308**	**1 314**
Legal capital reserves – capital contribution reserve		**198**	**198**
General reserve		320	320
Reserve for treasury shares held by subsidiaries	8	3 005	3 417
Total legal retained earnings		**3 325**	**3 737**
Free reserves	9	30 178	30 527
Retained earnings		3 281	2 040
Net income of the year		8 427	8 141
Retained earnings available for distribution at the end of the year		11 708	10 181
Total unappropriated earnings		**41 886**	**40 708**
Treasury shares held by Novartis AG	8	**– 5 213**	**– 792**
Total equity		**41 504**	**45 165**
Total liabilities and equity		**43 692**	**47 305**

The accompanying Notes form an integral part of these financial statements.

Notes to the financial statements of Novartis AG

1. Introduction

The financial statements of Novartis AG, with its registered office in Basel, comply with the requirements of the Swiss accounting legislation of the Swiss Code of Obligations (SCO).

Novartis AG is presenting consolidated financial statements according to IFRS. As a result, these financial statements and notes do not include additional disclosures, cash flow statements or a management report.

2. Accounting policies

Financial income and expenses

Current assets and current liabilities denominated in foreign currencies are converted at year-end exchange rates. Realized exchange gains and losses, and all unrealized exchange losses arising from these as well as those from business transactions are recorded net as financial income or financial expenses.

Derivative financial instruments

Derivative financial instruments are used for hedging purposes. These instruments are valued at fair value. When different accounting policies apply for the hedged item and the derivative financial instrument, hedge accounting is applied through measuring the hedged item together with the derivative financial instrument.

Financial assets

Financial assets are valued at acquisition cost less adjustments for foreign currency losses and any other impairment of value.

Investments

Investments are initially recognized at cost. Investments in Novartis Group subsidiaries are assessed annually and in case of an impairment adjusted to their recoverable amount within their category.

Goodwill and other intangible assets

Goodwill and other intangible assets are capitalized and amortized over a period of between five and 20 years. Goodwill and other intangible assets are reviewed for impairment on a yearly basis. If necessary, an impairment loss is recognized.

Bonds

Bonds are valued at nominal value. Any bond premium is accrued over the duration of the bond so that at maturity the balance sheet amount will equal the amount that is due to be paid.

Provisions

Provisions are made to cover general business risks of the Group.

3. Goodwill and other intangible asset movements

(CHF millions)	2017	2016
Goodwill		
Gross cost [1]	**22 350**	**22 350**
Accumulated amortization		
January 1	**– 6 843**	**– 5 703**
Amortization charges	– 1 141	– 1 140
December 31	**– 7 984**	**– 6 843**
Net book value at December 31	**14 366**	**15 507**
Other intangible assets		
Cost [1]	11	11
Accumulated amortization [1]	– 11	– 11
Net book value at December 31		
Goodwill and other intangible assets		
Net book value at December 31	**14 366**	**15 507**

[1] There was no change during 2017 and 2016.

4. Financial income and expenses

	2017		2016	
(CHF millions)	Income	Expenses	Income	Expenses
Interest	449	– 111	440	– 134
Foreign exchange		– 68		– 58
Others		– 1		– 2
Total	**449**	**– 180**	**440**	**– 194**

5. Investments

The principal direct and indirect subsidiaries and other holdings of Novartis AG are shown in Note 31 to the Group's consolidated financial statements.

6. Bonds

Straight bonds

Coupon	Currency	Nominal amount	Issuance year	Maturity year	Issuer	Issue price	2017 (CHF millions)	2016 (CHF millions)
0.250%	CHF	500	2015	2025	Novartis AG, Basel, Switzerland	100.640%	501	502
0.625%	CHF	550	2015	2029	Novartis AG, Basel, Switzerland	100.502%	551	551
1.050%	CHF	325	2015	2035	Novartis AG, Basel, Switzerland	100.479%	326	325
Total straight bonds							**1 378**	**1 378**

Breakdowns by maturity

(CHF millions)	2017	2016
After 2022	1 378	1 378
Total	**1 378**	**1 378**

Comparison of balance sheet and fair value

(CHF millions)	2017 Balance sheet	2017 Fair values	2016 Balance sheet	2016 Fair values
Straight bonds	1 378	1 408	1 378	1 407
Total	**1 378**	**1 408**	**1 378**	**1 407**

7. Share capital

	2017		2016	
	Number of shares	Share capital CHF millions	Number of shares	Share capital CHF millions
January 1	**2 627 114 820**	**1 313.6**	**2 676 993 000**	**1 338.5**
Number of shares canceled/capital reduced during the period	– 10 270 000	– 5.2	– 49 878 180	– 24.9
December 31	**2 616 844 820**	**1 308.4**	**2 627 114 820**	**1 313.6**

The Novartis AG share capital consists of registered shares with a nominal value of CHF 0.50 each.

The total share capital decreased from CHF 1 313.6 million at December 31, 2016, to CHF 1 308.4 million at December 31, 2017, due to a share capital reduction as a result of the cancellation of 10.3 million repurchased shares with a nominal value of CHF 5.2 million. The cancellation was approved at the Annual General Meeting of February 28, 2017, and became effective on May 9, 2017. During 2016, the total share capital decreased from CHF 1 338.5 million at December 31, 2015, to CHF 1 313.6 million at December 31, 2016, due to a share capital reduction as a result of the cancellation of 49.9 million repurchased shares with a nominal value of CHF 24.9 million. The cancellation was approved at the Annual General Meeting of February 23, 2016, and became effective on April 28, 2016.

8. Reserve for treasury shares

	2017		2016	
	Number of shares	Reserve for treasury shares held by subsidiaries CHF millions	Number of shares	Reserve for treasury shares held by subsidiaries CHF millions
Treasury shares held by subsidiaries [1]				
January 1	**56 847 803**	**3 417**	**65 176 383**	**4 009**
Number of shares purchased/sold; reserves transferred	– 6 341 428	– 412	– 8 328 580	– 592
December 31	**50 506 375**	**3 005**	**56 847 803**	**3 417**

[1] Excluding foundations

	2017		2016	
	Number of shares	Reserve for treasury shares held by Novartis AG CHF millions	Number of shares	Reserve for treasury shares held by Novartis AG CHF millions
Treasury shares held by Novartis AG				
January 1	**61 577 458**	**792**	**101 185 638**	**4 676**
Number of shares purchased/canceled; reserves transferred	55 950 000	4 421	– 39 608 180	– 3 884
December 31	**117 527 458**	**5 213**	**61 577 458**	**792**

	2017		2016	
	Number of shares	Total reserve for treasury shares CHF millions	Number of shares	Total reserve for treasury shares CHF millions
Total treasury shares [1]				
January 1	**118 425 261**	**4 209**	**166 362 021**	**8 685**
Total number of shares purchased/sold or canceled; reserves transferred	49 608 572	4 009	– 47 936 760	– 4 476
December 31	**168 033 833**	**8 218**	**118 425 261**	**4 209**

[1] Excluding foundations

Novartis AG has met the legal requirements for legal reserves under Articles 659 et. seq. and 663b.10 SCO for the treasury shares.

Treasury share purchases during 2017 totaled 70.6 million (2016: 12.9 million), with an average purchase price of CHF 78 (2016: CHF 75). Treasury share sales totaled 1.8 million (2016: 4.1 million), with an average sale price of CHF 61 (2016: CHF 56), and share-based compensation transactions totaled 9.0 million shares (2016: 8.8 million shares).

The number of treasury shares held by the company and its subsidiaries meet the definitions and requirements of Article 659b SCO. At December 31, 2017, treasury shares held by Novartis AG and its subsidiaries totaled 168 033 833. As per the dividend payment date, Novartis AG and its subsidiaries are expected to hold 156 515 091 shares. These shares are non-dividend-bearing shares. It should be noted that within the Novartis Group's IFRS consolidated financial statements, some Novartis entities are included in the consolidation scope – mainly foundations, which do not qualify as subsidiaries in the sense of Article 659b SCO.

9. Free reserves

(CHF millions)	2017	2016
January 1	**30 527**	**34 560**
Reduction due to cancellation of treasury shares (CHF 767 million / CHF 4 651 million of repurchased shares less their nominal value of CHF 5 million / CHF 25 million)	– 761	– 4 626
Transfer from reserve for treasury shares	412	593
December 31	**30 178**	**30 527**

10. Contingent liabilities

(CHF millions)	Dec 31, 2017	Dec 31, 2016
Guarantees in favor of subsidiaries to cover capital and interest of bonds, credit facilities and commercial paper programs – total maximum amount CHF 43 195 million (2016: CHF 39 369 million)	23 512	19 708
Other guarantees in favor of subsidiaries, associated companies and others – total maximum amount CHF 4 010 million (2016: CHF 4 155 million)	1 592	2 253
Total contingent liabilities	**25 104**	**21 961**

Novartis AG is part of the Swiss Novartis value added tax (VAT) group and is therefore jointly liable for existing and future VAT claims from the Swiss Federal Tax Administration.

11. Registration, voting restrictions and major shareholders

The company's Articles of Incorporation state that no person or entity shall be registered with the right to vote for more than 2% of the share capital as set forth in the Commercial Register. In particular cases, the Board of Directors may allow exemptions from the limitation for registration in the share register.

According to the share register, shareholders owning 2% or more of the Company's capital at December 31 and being entitled to voting rights on all of their shares, excluding treasury shares held by Novartis AG and its subsidiaries are as follows:

	% Holding of share capital Dec 31, 2017	% Holding of share capital Dec 31, 2016
Novartis Foundation for Employee Participation, Basel	2.5	2.6
Emasan AG, Basel	3.4	3.4
UBS Fund Management (Switzerland) AG, Basel	2.0	2.1

Furthermore, there are the following other significant shareholders:

	2017	2016
Shareholders registered as nominees:		
Chase Nominees Ltd., London	7.8%	8.5%
Nortrust Nominees Ltd., London	3.8%	3.9%
Bank of New York Mellon, New York	4.3%	4.4%
through Bank of New York Mellon, Everett	*2.0%*	*1.8%*
through Bank of New York Mellon, SA/NV, Brussels	*2.3%*	*2.6%*
Shareholder acting as American Depositary Share (ADS) depositary:		
JPMorgan Chase Bank, N.A., New York	12.3%	12.0%

The following shareholder is disclosed through a notification filed with Novartis AG, but not registered as of December 31, 2017 in the Novartis Share Register:

- Norges Bank (Central Bank of Norway), Oslo, holds 2.1% (2016: 2.0%).

The following shareholder is disclosed through a notification filed with Novartis AG and the SIX Swiss Exchange, but registered with less than 2% of the share capital as of December 31, 2017 in the Novartis Share Register:

- BlackRock, Inc., New York, holds between 3% and 5%.

12. Equity instrument disclosures for the Board of Directors and Executive Committee members

Share ownership requirements for Board members

The Chairman is required to own a minimum of 30 000 Novartis shares, and other members of the Board of Directors are required to own at least 4 000 Novartis shares within three years after joining the Board of Directors, to ensure their interests are aligned with 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, 2017, 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

As at December 31, 2017, no member of the Board of Directors, either individually or together with "persons closely linked"[1] to them, owned 1% or more of the outstanding shares (or ADRs) of Novartis. As at the same date, no member of the Board of Directors held any share options to purchase Novartis shares.

The total number of vested Novartis shares and ADRs owned by members of the Board of Directors and "persons closely linked"[1] to them as at December 31, 2017 is shown in the table below.

Shares and ADRs owned by Board members[1]

	Number of shares [1,2]	
	At December 31, 2017	At December 31, 2016
Joerg Reinhardt	518 310	497 762
Enrico Vanni	20 101	17 853
Nancy Andrews	4 042	2 308
Dimitri Azar	13 094	11 217
Ton Buechner (from February 24, 2016)	4 428	1 398
Srikant Datar	37 239	34 998
Elizabeth Doherty (from February 24, 2016)	2 761	839
Ann Fudge	15 457	17 530
Pierre Landolt [3]	61 029	58 061
Frans van Houten (from February 28, 2017)	978	NA
Andreas von Planta	130 634	127 740
Charles L. Sawyers	7 763	6 029
William T. Winters	12 397	9 257
Total	**828 233**	**784 992**

NA – Not applicable.

[1] Includes holdings of "persons closely linked" to Board members (see definition in this Note 12)

[2] Each share provides entitlement to one vote.

[3] According to Pierre Landolt, the Sandoz Family Foundation is the economic beneficiary of the shares

Share ownership requirements for Executive Committee members

Executive Committee members are required to own at least a minimum multiple of their annual base salary in Novartis shares or Restricted Share Units (RSUs) within five years of hire or promotion, as set out in the table below.

In the event of a substantial rise or drop in the share price, the Board of Directors may, at its discretion, amend that time period accordingly.

Function	Ownership level
CEO	5 x base compensation
Other Executive Committee members	3 x base compensation

The determination of equity amounts against the share ownership requirements is defined to include vested and unvested Novartis shares or ADRs, as well as RSUs acquired under the company's compensation plans. However, unvested matching shares granted under the Leveraged Share Savings Plan (LSSP), the Employee Share Ownership Plan (ESOP), and any unvested Performance Share Units (PSUs) are excluded. The determination also includes other shares as well as vested options of Novartis shares or ADRs that are owned directly or indirectly by "persons closely linked"[1] to an Executive Committee member. The Compensation Committee reviews compliance with the share ownership guideline on an annual basis.

As at December 31, 2017, all members who have served at least five years on the Executive Committee have met or exceeded their personal Novartis share ownership requirements.

Shares, ADRs, equity rights and share options owned by Executive Committee members

As at December 31, 2017, no member of the Executive Committee, either individually or together with "persons closely linked"[1] to them, owned 1% or more of the outstanding shares (or ADRs) of Novartis. As at the same date, no member of the Executive Committee held any share options to purchase Novartis shares, with the exception of André Wyss who held 373 000.

The following table shows the total number of shares, ADRs, and other equity rights owned by Executive Committee members and "persons closely linked"[1] to them as at December 31, 2017.

[1] "Persons closely linked" are (i) their spouse, (ii) their children below age 18, (iii) any legal entities that they own or otherwise control, and (iv) any legal or natural person who is acting as their fiduciary.

Shares, ADRs and other equity rights owned by Executive Committee members[1]

	Vested shares and ADRs	Unvested shares and other equity rights[2]	**Total at December 31, 2017**	Vested shares and ADRs	Unvested shares and other equity rights[2]	**Total at December 31, 2016**
Joseph Jimenez (CEO)	287 699	288 378	576 077	347 278	273 930	621 208
Steven Baert	10 955	55 125	66 080	11 111	50 827	61 938
F. Michael Ball	0	109 222	109 222	0	49 081	49 081
James Bradner	0	47 364	47 364	0	14 479	14 479
Felix R. Ehrat	189 940	123 255	313 195	137 290	122 196	259 486
Richard Francis	35 117	57 758	92 875	22 424	49 550	71 974
Paul Hudson	6 616	36 193	42 809	0	24 027	24 027
Harry Kirsch	64 769	95 378	160 147	47 437	108 686	156 123
Vasant Narasimhan	16 279	85 726	102 005	7 271	79 703	86 974
Bruno Strigini	27 871	78 774	106 645	4 310	92 383	96 693
André Wyss	51 183	63 240	114 423	61 475	92 875	154 350
Total	**690 429**	**1 040 413**	**1 730 842**	638 596	957 737	1 596 333

NA – Not applicable.

[1] Includes holdings of "persons closely linked" to Executive Committee members (see definition in this Note 12)

[2] Includes restricted shares, RSUs and target number of PSUs. Matching shares under the ESOP and LSSP, and target number of PSUs are disclosed pro-rata to December 31, unless the award qualified for full vesting under the relevant plan rules. Awards under all other incentive plans are disclosed in full.

Appropriation of available earnings of Novartis AG as per balance sheet and declaration of dividend

(CHF)	2017	2016
Available unappropriated earnings		
Balance brought forward	3 281 006 904	2 039 915 695
Net income of the year	8 427 115 178	8 140 581 612
Total available earnings at the disposal of the Annual General Meeting	**11 708 122 082**	**10 180 497 307**
Appropriation proposed by the Board of Directors		
Payment of a gross dividend (before taxes and duties) of CHF 2.80 (2016: CHF 2.75) on 2 460 329 729 (2016: 2 518 535 601) dividend-bearing shares[1] with a nominal value of CHF 0.50 each	– 6 888 923 241	– 6 925 972 903
Total available earnings after appopriation	**4 819 198 841**	**3 254 524 404**
Dividend waived for additional treasury shares held by the Company		26 482 500
Balance to be carried forward	**4 819 198 841**	**3 281 006 904**

[1] No dividend will be declared on treasury shares held by Novartis AG, and certain other treasury shares held by other Group companies.

Assuming that this proposal by the Board of Directors is approved by the Annual General Meeting of shareholders, payment of the dividend will be made as from March 8, 2018. The last trading day with entitlement to receive the dividend is March 5, 2018. As from March 6, 2018 the shares will be traded ex-dividend.

Report of the statutory auditor on the financial statements of Novartis AG

To the General Meeting of Novartis AG, Basel

Opinion

As statutory auditor, we have audited the financial statements of Novartis AG, which comprise the balance sheet as at December 31, 2017, income statement and notes to the financial statements (pages 262 to 270) for the year then ended, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements as at December 31, 2017 comply with Swiss law and the company's articles of incorporation.

Basis for opinion

We conducted our audit in accordance with Swiss law and Swiss Auditing Standards. Our responsibilities under those provisions and standards are further described in the "Auditor's responsibilities for the audit of the financial statements" section of our report.

We are independent of the entity in accordance with the provisions of Swiss law and the requirements of the Swiss audit profession and we have fulfilled our other ethical responsibilities in accordance with these requirements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Our audit approach

Audit scope

We designed our audit by determining materiality and assessing the risks of material misstatement in the financial statements. In particular, we considered areas where subjective judgments were made, such as significant accounting estimates that involved making assumptions and consideration of future events that are inherently uncertain. As in all of our audits, we also addressed the risk of management override of internal controls, including among other matters, consideration of whether there was evidence of bias that represented a risk of material misstatement due to fraud.

Materiality

The scope of our audit was influenced by our application of materiality. Our audit opinion aims to provide reasonable assurance that the financial statements are free from material misstatement. Misstatements may arise due to fraud or error. They are considered material if, individually or in aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

Based on our professional judgment, we determined certain quantitative thresholds for materiality, including the overall materiality for the financial statements as a whole as set out below. These, together with qualitative considerations, helped us to determine the scope of our audit and the nature, timing and extent of our audit procedures and to evaluate the effect of misstatements, both individually and in aggregate, on the financial statements as a whole.

- Overall materiality: CHF 400 million.
- How we determined it: Slightly less than 5% of income before taxes.
- Rationale for the materiality benchmark applied: We chose income before taxes as the measure because, in our view, it is the measure against which the performance of the entity is most commonly assessed and is a generally accepted benchmark.

We agreed with the Audit and Compliance Committee that we would report to them misstatements identified during our audit above CHF 20 million as well as any misstatements below that amount which, in our view, warranted reporting for qualitative reasons.

Key Audit Matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the financial statements of the current period. We have determined that there are no key audit matters to communicate in our report.

Responsibilities of the Board of Directors for the financial statements

The Board of Directors is responsible for the preparation of the financial statements in accordance with the provisions of Swiss law and the company's articles of incorporation, and for such internal control as the Board of Directors determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Board of Directors is responsible for assessing the entity's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Board of Directors either intends to liquidate the entity or to cease operations, or has no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Swiss law and Swiss Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Swiss law and Swiss Auditing Standards, we exercise professional judgment and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made.
- Conclude on the appropriateness of the Board of Directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the entity to cease to continue as a going concern.

We communicate with the Board of Directors, mostly through the Audit and Compliance Committee regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide the Board of Directors with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with the Board of Directors, we determine those matters that were of most significance in the audit of the financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

Report on other legal and regulatory requirements

In accordance with article 728a paragraph 1 item 3 CO and Swiss Auditing Standard 890, we confirm that an internal control system exists which has been designed for the preparation of financial statements according to the instructions of the Board of Directors.

We further confirm that the proposed appropriation of available earnings complies with Swiss law and the company's articles of incorporation. We recommend that the financial statements submitted to you be approved.

PricewaterhouseCoopers AG

pwc

Martin Kennard
Audit expert
Auditor in charge

Stephen Johnson
Global relationship partner

Basel, January 23, 2018

Other information

Each year, Novartis commissions a photographer to portray a unique, personal and artistic perspective of healthcare around the world. Depicting the diversity of patients, medical professionals, researchers and caregivers, the photographs demonstrate the complex realities of global healthcare. We are grateful to Andrea Bruce and to those who shared their experiences for the Annual Report 2017.

Andrea Bruce

Andrea Bruce is a documentary photographer who brings attention to people living in the aftermath of war. She concentrates on the social issues that are sometimes ignored and often ignited in war's wake.

Ms. Bruce started working in Iraq in 2003, following the intricacies and obstacles of the conflict experienced by Iraqis and the US military. For more than 10 years, she has chronicled the world's most troubled areas, focusing on Iraq and Afghanistan. Currently she is a member and co-owner of the photo agency NOOR.

For eight years, she worked as a staff photographer for The Washington Post and later as part of the VII Network (2010-2011). At The Post, she originated and authored a weekly column called "Unseen Iraq." She also worked at The Concord Monitor and The St. Petersburg Times after graduating from the University of North Carolina at Chapel Hill in the US in 1995.

Her awards include top honors from the White House News Photographers Association (WHNPA), where she has been named Photographer of the Year four times; several awards from the International Pictures of the Year contest; and the prestigious John Faber Award from the Overseas Press Club in New York. She received the WHNPA grant in 2010 for her work in Ingushetia, and she was a 2011 recipient of the Alicia Patterson Foundation Fellowship. In 2012, she was the recipient of the first Chris Hondros Fund Award for the "commitment, willingness and sacrifice shown in her work." The World Press Photo awarded her 2nd prize in the category "Daily Life," singles, for the image "Soldier's Funeral" in 2014.

In 2016, Ms. Bruce finished Harvard University's Nieman Fellowship for journalists. She is currently based in Washington, D.C.

Photo At the age of 89, Katina Karoutsou is not considered particularly old on the Greek island of Ikaria, where around a third of all residents live into their 90s. Researchers believe this is due to constant physical activity, a mostly vegetarian diet, avoidance of smoking, and high levels of family and social integration.

Key dates for 2018

Anticipated reporting dates

Annual General Meeting
March 2, 2018

First quarter 2018 results
April 19, 2018

Meet Novartis Management investor event in Basel
May 15-16, 2018

Second quarter and first half 2018 results
July 18, 2018

Third quarter and first nine months 2018 results
October 18, 2018

Contact information

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Further detail

www.novartis.com
www.novartis.com/annualreport2017
www.novartis.com/order2017annualreport

Forward-looking statements

These materials contain forward-looking statements that can be identified by terminology such as such as "potential," "expected," "will," "planned," "pipeline," "outlook," or similar expressions, 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 of the strategic review being undertaken to maximize shareholder value of the Alcon Division; or regarding the potential financial or other impact of the significant acquisitions and reorganizations of recent years; or regarding the potential impact of the share buyback plan; or regarding potential future sales or earnings of the Novartis Group or any of its divisions or potential shareholder returns; or by discussions of strategy, plans, expectations or intentions. You should not place undue reliance on these statements. Such forward looking statements are based on our current beliefs and expectations regarding future events, and are subject to significant known and unknown risks and uncertainties. Should one or more of these risks or uncertainties materialize, or should underlying assumptions prove incorrect, actual results may vary materially from those set forth in the forward looking statements. There can be no guarantee that any new products will be approved for sale in any market, or that any new indications will be approved for any existing products in any market, or that any approvals which are obtained will be obtained at any particular time, or that any such products will achieve any particular revenue levels. Nor can there be any guarantee that the strategic review being undertaken to maximize shareholder value of the Alcon Division will reach any particular results, or at any particular time, or that the result of the strategic review will in fact maximize shareholder value. Neither can there be any guarantee that Novartis will be able to realize any of the potential strategic benefits, synergies or opportunities as a result of the significant acquisitions and reorganizations of recent years. Neither can there be any guarantee that shareholders will achieve any particular level of shareholder returns. Nor can there be any guarantee that the Group, or any of its divisions, will be commercially successful in the future, or achieve any particular credit rating or financial results. In particular, our expectations could be affected by, among other things: global trends toward health care cost containment, including government, payor and general public pricing and reimbursement pressures and requirements for increased pricing transparency; regulatory actions or delays or government regulation generally; the potential that the strategic benefits, synergies or opportunities expected from the significant acquisitions and reorganizations of recent years may not be realized or may take longer to realize than expected; the inherent uncertainties involved in predicting shareholder returns; the uncertainties inherent in the research and development of new healthcare products, including clinical trial results and additional analysis of existing clinical data; our ability to obtain or maintain proprietary intellectual property protection, including the ultimate extent of the impact on Novartis of the loss of patent protection and exclusivity on key products which commenced in prior years and will continue this year; safety, quality or manufacturing issues; uncertainties regarding actual or potential legal proceedings, including, among others, actual or potential product liability litigation, litigation and investigations regarding sales and marketing practices, intellectual property disputes and government investigations generally; uncertainties involved in the development or adoption of potentially transformational technologies and business models; general political and economic conditions, including uncertainties regarding the effects of ongoing instability in various parts of the world; uncertainties regarding future global exchange rates; uncertainties regarding future demand for our products; and uncertainties regarding potential significant breaches of data security or data privacy, or disruptions of our information technology systems; and other risks and factors referred to in Novartis AG's current Form 20-F on file with the US Securities and Exchange Commission. Novartis is providing the information in these materials as of this date and does not undertake any obligation to update any foward-looking statements as a result of new information, future events or otherwise.

The business policy of Novartis takes into account the OECD's Guidelines for Multinational Enterprises, with their recommendations on the disclosure of information.

Our Annual Report is published in English; a German translation is also available.

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Photo on the right

Adiarra Traore undergoes a health check at the Bougoula-Hameau clinic in Mali, West Africa, as part of a clinical trial to assess an experimental medicine for malaria called KAF156 being developed by Novartis and several partner organizations.

Photo back cover

In the West African state of Mali, Dr. Bakary Fofana and his colleagues check on progress in a clinical trial of a promising new treatment for malaria known as KAF156. The compound is being developed by Novartis and a number of partner organizations in response to early indications that malaria parasites in some parts of the world are becoming resistant to established medicines.


NOVARTIS