NOVARTIS

Corporate Responsibility Report

2017

Contents

Cover photo 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.

2017 highlights

46 m
Patients reached through access programs

15 m
People reached through health education programs

115 000
Employees trained on the Code of Conduct

USD 22 m
Invested in research for neglected tropical diseases

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.

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 longstanding 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.

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 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.

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 multi-

drug-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.

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 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.

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.

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.

To provide feedback to this CR Report, go to
→ the **feedback survey**

About Novartis

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

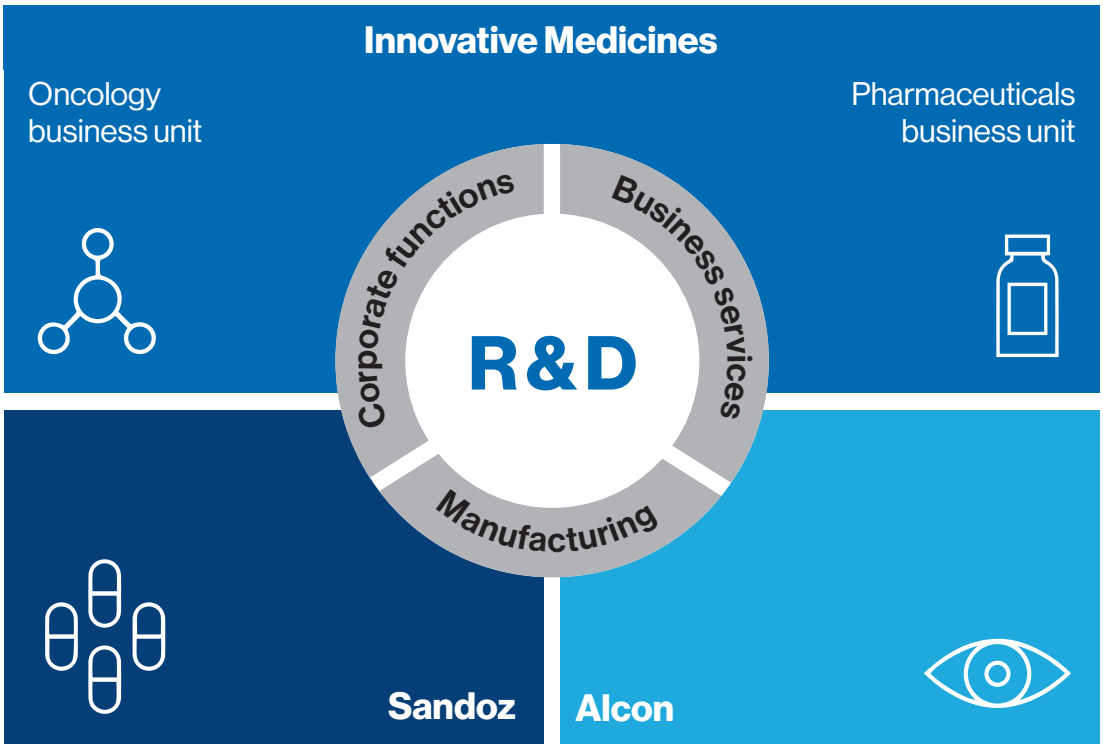
Our global service and manufacturing organizations help us benefit from our global scale and support our efforts to improve efficiency.

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.



Joerg Reinhardt

Message from the Chairman

Novartis made substantial progress in 2017. We introduced important new products, including three breakthrough cancer therapies. Strong growth of recently launched products helped counter the effects of generic competition for products that have lost patent protection. We accelerated collaboration in research and development, which we believe will enhance our ability to produce innovative new medicines. At the same time, we are taking steps to make our medicines available to more people who need them, regardless of where they live.

Novartis was among the first companies to introduce innovative social business models aimed at creating shared value between enterprises and local communities

We believe these steps will position Novartis well to meet the challenges of today's healthcare environment, which is marked by aging populations, growing demand for care, and persistent cost challenges. With the appointment of Vasant Narasimhan as Chief Executive Officer starting February 1, Novartis is well positioned to begin a new phase of growth. 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 over the past eight years and has been instrumental in driving the substantial progress made over the past decade in our access-to-medicine efforts.

Novartis was among the first companies to introduce innovative social business models aimed at creating shared value between enterprises and local communities. Launched in 2007, Arogya Parivar – our Healthy Family program in India – now reaches across 11 Indian states, covering some 14 000 villages and small towns that are home to more than 32 million people. The program, which has since been replicated in Kenya and Vietnam, provides millions of patients with health education and a targeted portfolio of medications that includes low-cost medicines from Novartis and Sandoz for locally prevalent diseases. All three programs have broken even – a critical step if they are to continue to expand access to healthcare over the long term.

The success of Healthy Family has since led to the development and launch of Novartis Access, which aims to address the increase in chronic diseases in lower-income countries through a portfolio of 15 medicines. Since launching the program in 2015, we have delivered more than 800 000 treatments to Kenya, Ethiopia, Lebanon and Cameroon. The hurdles are bigger than we had imagined, and the program uptake is not as swift as anticipated. But we remain true to our commitment and in pursuit of our ultimate goal to introduce Novartis Access in 30 low- and lower-middle-income countries over the coming years and to make it commercially sustainable in the long term. We are on a learning journey with this program, and I hope others in the industry will also learn from our experiences and try out innovative approaches.

As a science-based pharmaceutical company, we focus on research and development. We have started Phase II trials in Africa for our novel malaria compound KAF156, and we also plan to begin testing in patients in Asia in early 2018. While it is still the early days in the development of this drug, we expect the compound to play a crucial part in keeping malaria under control, especially if resistance to current therapies increases further. Meanwhile, we expect further progress from our research

at the Novartis Institute for Tropical Diseases, which we transferred to Emeryville, California, in the US last year to benefit from closer collaboration with our infectious diseases team and the local biotech community.

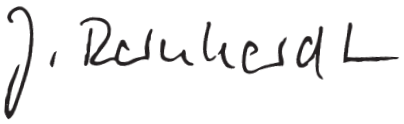
While it is still the early days in the development of this drug, we expect KAF156 to play a crucial part in keeping malaria under control, especially if resistance to current therapies increases further

The work of the Novartis Foundation is also gaining traction. Besides its long-running program to eliminate leprosy through novel strategies to interrupt transmission, the foundation has made further advances in establishing a new collaborative model between healthcare and technology providers, as well as other stakeholders, to help manage and prevent hypertension in urban areas in poorer countries. Its Better Hearts Better Cities initiative has made early progress in cities such as Ulaanbaatar in Mongolia and Dakar in Senegal, and could serve as a model for other cities in the future.

While we are pursuing new approaches, we also remain committed to our long-term programs such as the Novartis Malaria Initiative and our multidrug therapy donation for the treatment of leprosy.

As an original signatory to the United Nations (UN) Global Compact and as supporters of the UN Sustainable Development Goals, we share the view that stable and reliable healthcare systems are vital for economic and social progress. We aim to cultivate a strong dialogue with our stakeholders to better understand how we can continue to improve our contribution to society, and we seek more opportunities for engagement.

Solving the world's many healthcare challenges will require the collaboration of many organizations, and Novartis remains a willing partner in these efforts.



Joerg Reinhardt
Chairman of the Board of Directors

Patrice Matchaba and Joseph Jimenez

Three questions to the CEO and the Global Head of CR

In an interview, Novartis CEO Joseph Jimenez and Global Head of Corporate Responsibility Patrice Matchaba share their perspectives on the importance of reaching many more people with our innovative medicines, and how this will be increasingly driven by a sustainable, business-centric approach that is at the very core of the way the company will operate in the future.

Corporate responsibility (CR) means different things to different people. What does it mean to you?

Patrice: I would like to share a personal story. A couple of years ago, my mother had a myocardial infarction and was subsequently diagnosed with heart failure at the age of 83. She stayed in the intensive care unit in Zimbabwe for 30 days. Coincidentally, I was working at Novartis on a drug that benefits people with heart failure. I asked for the drug, and I took it back to the hospital. The next day she walked out of the intensive care unit, and we took her home a few days later. And the question is, is it good enough that it is a chance phenomenon that patients get access to innovative drugs? Does every woman in a village need to have a son who works in the pharmaceutical industry to gain access to life-saving therapy? As a leading healthcare company, we have the moral responsibility to address these issues and not leave them up to chance.

And how we do this is just as important. We need to be open and act with integrity. And we need to work together. No one particular industry, no one particular company has the solution. We need to be open to inputs from patients, from communities at the village level, from governments, from all stakeholders.

Joe: Corporate responsibility is more than donations and philanthropy. It is about creating sustainable shared value with society. Ten years ago, C. K. Prahalad, a management consultant, challenged our Executive Committee to do more to reach the large numbers of people living at the base of the pyramid in developing countries – those earning less than USD 2 per day. This challenge resonated with our management team and led to the development of our Healthy Family programs. Today, these programs have delivered basic health education to more than 40 million people in India, Kenya and Vietnam, while more than 3 million patients have received diagnoses and treatments at health camps.

Let's take another example. Peninah is a 67-year-old rice farmer in Kenya, who consulted a doctor at the suggestion of her children after experiencing a fast heart rate and headache. She discovered she had hypertension. She was one of the first patients in the country to take Novartis Access medicines, offered to governments of lower-income countries for USD 1 per month, which helped her return to work. Peninah also became more engaged in her own health and in the community, at one point even chairing a local women's group on healthcare topics, from basic sanitation to chronic diseases. This is true societal impact.

As a global leader in healthcare, we have not just a responsibility but also a great opportunity to help bring positive change to areas of the world that need it.

What is different about how Novartis approaches CR?

Joe: Our approach to corporate responsibility is different because it is deeply rooted in our heritage and linked with our mission of discovering new ways to improve and extend people's lives. Take the example of leprosy, a disease we have been fighting for more than 30 years. Since the 1980s, when Novartis first made available the multidrug therapy that can interrupt leprosy transmission, the global burden of the disease has been reduced by 99%. We didn't stop there. We remain committed to going the last mile in an effort to ultimately eliminate the disease.

Another defining feature of corporate responsibility at Novartis is how we have evolved from the traditional

philanthropic model to a "social business" approach that addresses the realities of global health challenges. There are several elements that make our social business efforts unique: Our programs span critical disease areas, offering medicines for a range of indications; they aim to have scale and become profitable over time so they are sustainable; and they employ local people and organizations as implementation partners to help alleviate the burden of disease.

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Patrice: Finding sustainable ways to reach more patients around the world with our innovation is part of our company mission. Our teams assess what it would take for patients across the whole income pyramid to get sustainable access to healthcare. We are convinced that if we find the right partners and are courageous enough to find the right innovative models, we can find sustainable new ways to deliver medicines and improved health services to as many people as possible.

A lot of progress has been made under Joe's leadership and with Juergen Brokatzky-Geiger as Head of Corporate Responsibility. I would like to thank them both for their efforts in ingraining corporate responsibility in the highest levels of our company.

At Novartis, we believe we can marry our commercial interests with the world's need for better access to healthcare through sustainable, scalable businesses. Shareholders and even customers and governments recognize that corporate philanthropy and nonprofit efforts are likely not sustainable in the long term.

For more than 10 years, we have been pioneering innovative social business models, and our access strategy – which cuts across income segments – is recognized as a best practice in the industry. At the heart of our approach is the recognition that we can't do it alone, and we need to pool resources from all partners. We are also willing to try and fail. We aim to apply our learnings to be able to maximize our impact and reach. And we are willing to openly share these learnings across our industry.

We also believe in robust measurement and evaluation for our programs, as well as in valuing the overall impact of our business activities on society.

What does Novartis do well and where does it need to improve?

Patrice: What we do well is find new medicines. What we need to do better is innovate around the business models that would enable us to provide these medicines to all populations in a sustainable manner.

Our ambition is to make access to medicines an integral part of how we do business at Novartis. To achieve this, we need a fundamental shift in the way we research, develop and deliver all our new products globally; we need to be thinking about access provisions systematically and earlier in the process.

In addition, we need to focus more on putting an ecosystem together beyond the pill. We are capable of this, and we have done it before. For example, with the Novartis Malaria Initiative, we collaborate with the World Health Organization, nongovernmental organizations and governments to bring malaria treatments to endemic countries, and then with local partners to provide bed nets and DDT spraying.

And we need to continue building trust with all our stakeholders and customers, as well as the societies we all live in and call home. We need to continue a lot of the great work already underway: strengthening our culture of integrity, minimizing the environmental impact of our activities, and being open and transparent about how we operate.

Joe: Novartis excels in innovation. I am proud that we've built an industry-leading pipeline across many therapeutic areas. We've launched important therapies that are changing the practice of medicine. And our work touches the lives of nearly a billion patients each year. We have a strong commitment to corporate responsibility throughout all our functions at Novartis – and our efforts are being recognized. Last year we were named to Fortune's "Change the World" list, and we moved up three ranks to No. 4 in the Dow Jones Sustainability Index World.

However, as innovation accelerates, we can expect that healthcare budgets will be further strained. Novartis has been leading the industry's shift toward outcomes-based pricing, and we are piloting new commercial models using real-world evidence to help illustrate the value that our products bring to patients and payers. As an industry and as a company, we need to make sure we play our part in helping healthcare systems become more sustainable.

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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, and I know that he will continue our strong commitment to corporate responsibility. I would like to thank our associates for their passion and dedication to helping deliver our breakthrough therapies to people in every corner of the world. And I want to thank our partners and collaborators as well as those who have actively engaged with us over the years to help maximize our impact on patients and society at large.

Corporate responsibility at Novartis

At Novartis, 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 biggest healthcare challenges. 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. Our vision is to be a trusted leader in changing the practice of medicine.

Our corporate responsibility (CR) strategy fundamentally supports this company mission and vision, with a focus on expanding access to healthcare and doing business responsibly.

Novartis and the UN Sustainable Development Goals

We have long experience in supporting the United Nations in achieving its development goals, starting with the Millennium Development Goals and more recently with the Sustainable Development Goals (SDGs). As a leading healthcare company, ensuring good health and well-being (goal 3) is at the core of our business and is aligned with our mission to improve and extend people's lives. Through our business operations and ongoing activities, we make essential contributions to goal 8 (good jobs and economic growth), goal 9 (innovation and infrastructure), and goal 13 (climate action). We harness the power of partnerships (goal 17) to discover and develop breakthrough treatments and deliver them to as many people as possible.

A mapping of our activities against the SDGs can be found in the GRI Content Index on page 49 of this report.

Governance of our corporate responsibility activities

Our governance model for corporate responsibility remains unchanged, with CR being ingrained in the highest levels of our company. The Governance, Nomination and Corporate Responsibilities Committee (GNCRC) of the Board of Directors oversees the company's strategy and governance on CR topics that may affect the company's business and reputation. The Global Head of Corporate Responsibility updates the GNCRC regularly on CR strategy and performance.

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 2017 Novartis 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.

We appointed a new Global Head of Corporate Responsibility in late 2017. This role continues to report to the CEO, and works to incorporate CR activities into the business across the company in collaboration with relevant functions and all divisions.

Key committees are together responsible for driving our CR efforts across the company. Our broader efforts are guided by a team of senior leaders comprising the Corporate Responsibility Board, which meets three times per year. Led by the Global Head of Corporate Responsibility, the CR Board has a focused mandate to advance strategy and programs in our two focus areas: expanding access to healthcare and doing business responsibly. It coordinates companywide activities through representation from all relevant functions and

Novartis corporate responsibility strategy

divisions, and is responsible for making recommendations to the ECN on strategy, targets, policies, materiality and stakeholder engagement. The CR Board is also tasked with facilitating information-sharing between other CR-related governance bodies.

Specific areas of key importance have their own governing committees. The Access to Medicine Committee, chaired by the CEO, governs the topic of access to Novartis medicines and treatments, while the Health, Safety and Environment (HSE) Steering Committee is responsible for providing overall guidance within its functional portfolio.

We take our responsibility for environmental impacts seriously, and we will continue to do what we can to reduce or mitigate our environmental impacts:

- We apply a precautionary approach in all operations to minimize environmental impacts (emissions to air and water, waste to landfill, and efficient use of water and energy resources).
- We manage risks proactively by implementing appropriate preventive and contingency measures.

This risk management process is designed to identify potential hazards and take action to reduce the risk of an event – the likelihood of occurrence and severity of consequences – to an acceptable minimum level. Risk portfolios are elaborated on the sites, consolidated at divisional and corporate levels, and reviewed by senior management:

- We identify and manage HSE risks through site analyses and audits conducted by corporate HSE and Business Continuity (BC), and the HSE and BC organizations of the divisions and business units.

In general, we take a precautionary approach to the innovation and development of new products and technologies. We follow a step-by-step approach, engage in scientific peer reviews, and consider the benefits and risks of innovation in a scientific and transparent manner.

For more information about managing risk and ensuring continuity, see
→ our **website**

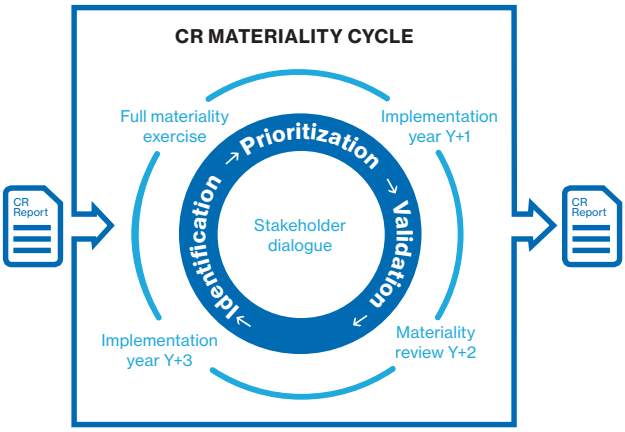
For our environmental data and our health and safety data, see
→ our **Environmental Data Supplement**
→ our **Health & Safety Data Supplement**

We also have an Anti-Counterfeiting Steering Committee to guide the strategic direction of our anti-counterfeiting approach worldwide, and a Third-Party Risk Management Committee to drive an integrated approach to responsible management of our supply chain.

The commitment from senior management and our Board of Directors helps us make the strategic decisions necessary to successfully integrate CR into our business. The engagement and dedication of all our associates are essential to bring CR initiatives to life.

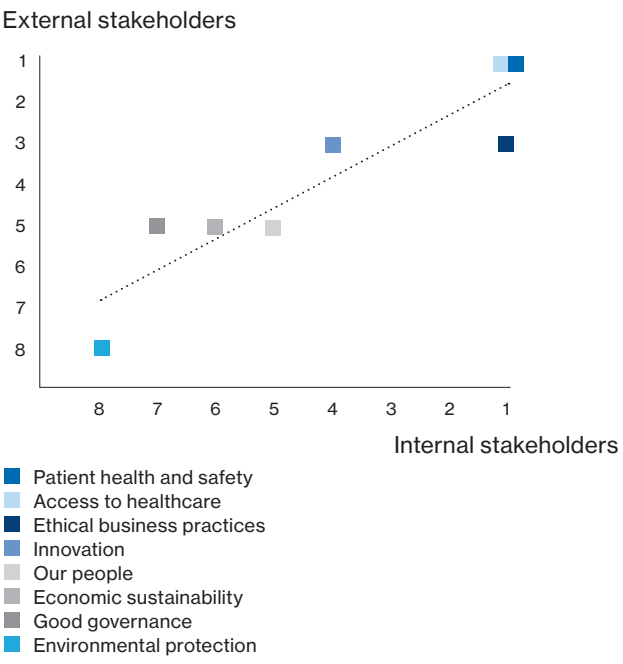
Setting priorities – 2017 materiality assessment

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



We asked stakeholders to rank issue clusters and rate individual CR topics based on their view of the topic's impact on our business. By using a ranking method, stakeholders were required to differentiate between clusters, assigning each cluster a unique position in the ranking.

CR ISSUE CLUSTER RANKING[1]



[1] Difference in perception between internal and external stakeholders based on the answers they provided to the following questions asked during the 2017 Novartis CR materiality survey: *"Please rank the issue clusters based on their impact on Novartis overall"* and *"Please rank the issue clusters based on their impact on the global business of Novartis"*

CR materiality analysis

In 2017, we conducted a new CR materiality analysis, prioritizing four issue clusters as our CR material clusters: access to healthcare, innovation, patient health and safety, and ethical business practices. Clusters receiving a lower rank are regarded as important but not CR material. All clusters and topics, together with their full definitions, can be found in the appendix on page 56.

This enabled us to clearly identify four issue clusters with the most impact, and we prioritized these as our CR material clusters: access to healthcare, innovation, patient health and safety, and ethical business practices. Clusters receiving a lower rank are regarded as important but not CR material. To ensure that our stakeholders are kept informed about our progress and challenges in the areas they identified as having most impact, these CR material clusters will frame our CR reporting and disclosure efforts, including the structure of this report. Within each CR material cluster, all topics are covered irrespective of impact, with topics of greater impact covered in more depth. Remaining topics that scored high in terms of impact but in clusters that received a lower ranking (e.g., people, environment) are either covered in our 2017 Annual Report or on our website. Cross-references to the relevant sections can be found in the GRI Content Index (see page 49 of this report).

The 2017 analysis included extensive desk research, online surveys with internal and external stakeholders, and meetings and phone interviews with internal and external topic experts. Approximately 200 external stakeholders – representing nongovernmental organizations (NGOs), academia, other companies (both pharmaceutical and non-pharmaceutical), investors and more – participated in the survey. Within Novartis, we received survey responses from nearly 1 400 senior employees representing R&D and commercial functions, finance and manufacturing. These surveys were supplemented with 60 follow-up interviews with selected individuals, in which stakeholders further explained their responses.

The first results of the materiality analysis were shared with the CR Board and relevant functions. While our CR strategy of expanding access to healthcare and doing business responsibly remains the same, we plan to use the analysis to shape our vision and inform and prioritize our actions. Additionally, we plan to use it to track issues of concern and to establish meaningful metrics against which to measure our CR performance.

As part of the ongoing granular analysis, we plan to develop our CR strategy going forward to focus more on individual topics; this shift will be reflected in our 2018 reporting where relevant. Full details of the materiality assessment can be found in the CR Materiality Assessment 2017: Results Report, available on our website in the first quarter of 2018.

CR MATERIAL TOPIC BOUNDARIES

As a company, the impacts we have and the value we create extend well beyond our own operations. Using the CR materiality assessment, we have analyzed all topics within the four CR material clusters (access to healthcare, innovation, patient health and safety, and ethical business practices) in the context of our value chain. The resulting diagram displays the boundaries of our impacts (indicated in blue), and helps us better leverage opportunities and manage risks.

	Novartis simplified value chain[1]		
Topic	**Supply chain**	**R&D, operations, distribution**	**Patients**
Access to healthcare			
Availability of medicines		■	■
Pricing		■	■
Intellectual property		■	■
Healthcare system strengthening	■	■	■
Patient assistance programs		■	■
Innovation			
R&D for unmet medical needs		■	■
R&D for neglected diseases		■	■
Drug resistance	■	■	■
Business model innovation	■	■	■
Innovative technologies	■	■	■
Patient health and safety			
Pharmacovigilance, safety profile and quality of drugs	■	■	■
Health education and prevention		■	■
Counterfeit medicines	■	■	■
Ethical business practices			
Ethical and compliant behavior	■	■	■
Responsible supply chain management	■	■	■
Respect for human rights	■	■	■
Responsible use of new technologies	■	■	■
Animal testing	■	■	■

[1] See Novartis full value chain on page 38

Stakeholder engagement

Consistent engagement with our increasingly complex range of stakeholders – who have diverse, sometimes conflicting, expectations on key CR issues – is one of our priorities. Throughout the year, our CR team, the Novartis Foundation and Novartis Social Business pursue formal and informal interactions with various stakeholders, including patients and caregivers, associates, healthcare providers, policymakers, NGOs, shareholders and other financial market participants, local communities, and partners from the pharmaceutical and other industries.

In 2017, our primary stakeholder engagement effort was our CR materiality analysis, which is detailed on page 12. In addition, we engaged with our stakeholders in a variety of ways.

In September, we held an investor call focused on creating value through responsible business. This call highlighted our corporate responsibility, integrity and compliance, and research and development efforts. Speakers included our Chief Ethics and Compliance Officer and Head of Litigation, and our Global Head of Drug Development and Chief Medical Officer. In addition, we participated in several sustainability-focused investor events throughout the year and hosted individual calls with certain investors.

In November, we hosted a dialogue on ways to improve access to healthcare in lower-income countries. More than 200 stakeholders from a cross-section of organizations attended this event at our Basel headquarters, including NGOs, patient groups, think tanks, private foundations and other pharmaceutical companies.

We participated in a number of cross-industry events on access to medicines, including three events hosted by the Access to Medicine Foundation to discuss various topics such as antimicrobial resistance and access to cancer care. We also worked with the foundation and peers to share case studies and best practices. In November, we conducted a focus group and face-to-face interviews with approximately 20 stakeholders to gauge their views on our Access Principles.

Improving transparency

Our vision is to be a trusted leader in changing the practice of medicine. A big part of gaining this trust is transparency – being open and clearly disclosing what we do, how we work, where we are successful, and where we face challenges.

For many years, transparent reporting has been a central part of our CR commitment, and we continue to make progress in this area. 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 professionals, organizations and patient groups, as well as clinical trial results. For example, in Europe, Novartis has a single, consistent transparency standard for disclosing transfers of value to healthcare professionals and organizations that goes beyond the requirements defined by the European Federation of Pharmaceutical Industries and Associations Disclosure Code.

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. Novartis is keeping pace with the developments and is committed to meeting new transparency requirements.

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.

More disclosures are available on
→ the **transparency section** of our **website**

Financial, environmental and social impact valuation

It is increasingly recognized that companies need new reporting mechanisms to better measure and communicate the value they create for their stakeholders beyond financial value. As businesses around the globe respond to calls to demonstrate their contribution to inclusive long-term value creation for all of society, the Coalition for Inclusive Capitalism is bringing together CEOs from more than 20 global companies, including Novartis, who together represent more than USD 20 trillion of assets under management. Through a project called the Embankment Project for Inclusive Capitalism, they will work on a proof of concept to encourage and measure long-term value creation.

In the meantime, over the past two years, Novartis has developed, tested and applied a methodology for valuing the financial, environmental and social (FES) impact its business activities have on society. The results are intended to reflect our social value beyond financial performance, taking into account benefits and costs to society in monetary terms. Our impact valuation is still evolving, with gaps in methodologies and data. However, we believe it is important to share our experiences to date, and we invite external partners and stakeholders to engage with us and advance this field of study.

Our FES impact valuation was initially co-developed with KPMG and builds on its True Value approach. We used our CR materiality assessment as the basis for identifying indicators to be included in the FES impact valuation. Methodologies were then developed to measure and value these indicators for our own operations and supply chain.

Our economic and environmental impact valuation methodologies are more developed than social impact valuation methodologies. For our social impact valuation, we cover key human capital impact elements of our own operations, the social impact of our products, and healthcare system strengthening initiatives. The human capital impact includes employee development, occupational safety and living wage.

Methodology

As a measure of wealth creation, we measured the gross domestic product (GDP) contribution of our operations, based on the Novartis income statement. GDP contributions and employment impacts from our supply chain were calculated based on a macroeconomic approach using the World Input-Output Database.

Environmental impacts were valued using shadow prices, mainly based on the damage costs published in the Shadow Prices Handbook of CE Delft. Our environmental impacts were calculated based on internal data, while our supply chain impacts were calculated based on the global input-output database from the Global Trade Analysis Project.

Novartis financial, environmental and social impact

Indicator	Results [1]	Remarks
Financial		
GDP contribution	USD 65 bn	Own operations USD 50 bn, supply chain USD 15 bn
Employment	260 000	In addition to own operations
Economic inefficiencies		Not valued in 2016
Total taxes		Not valued in 2016
Environmental		
Climate, energy and air pollution	- USD 913 m	Greenhouse gas emissions USD 460 m (own operations and supply chain)
Water and waste	- USD 250 m	Water USD 244 m (own operations and supply chain)
Other environmental impacts		Example: land use and biodiversity not valued in 2016
Social		
Employee development	USD 404 m	Own operations
Occupational safety	- USD 6 m	Own operations
Other human capital impacts		Example: employee well-being, voluntary turnover, human rights, and living wages not valued in 2016
Healthcare system strengthening initiatives	173% to 241%	Initiatives in South Africa
Products	USD 632 000	Novartis Access (2016 Kenya)

[1] All figures refer to 2016.

The social impacts of employee development were calculated for employees who voluntarily left Novartis, based on discounted incremental contributions to future earnings. The same methodology was applied to training and education of third-party healthcare professionals. The social impact of occupational safety was calculated based on the work done by Safe Work Australia. Quality-adjusted life-year (QALY) estimates were used to measure the social impact of living wages. One QALY equates to one year in perfect health.

How we perform

Overall, according to our analysis, the company's activities in 2016 generated a contribution of USD 65 billion to the global economy, and created an estimated 260 000 jobs beyond those held by our own employees. Our activities generated a negative environmental impact valued at USD 1.2 billion. In 2017, wages paid by Novartis created more than USD 1 billion of social value, while identified cases below living wage resulted in USD 1.4 million of negative social value.

Each year, Novartis voluntarily sets a minimum living wage around the world so that associates and their families can cover the costs of their basic living needs. At major operations where local minimum wage requirements (which tend to focus on poverty levels for individuals) exist, the Novartis living wage can be higher than the legal minimum standard. Country managers are tasked with ensuring that all associates, regardless of gender, are paid at least the confirmed living wage. They report any incidents of noncompliance to the global Human Resources (HR) function. In addition, in 2017, we conducted a living wage survey that covered 76 countries with 50 or more associates. Based on the results, our local HR teams have already adjusted or will adjust wages as relevant.

The key element of social impact valuation – and the most challenging one – is assessing the social impact of our products. A number of simplifying assumptions were needed to determine the health impacts expressed in QALYs and to calculate the resulting socio-economic value in a scientifically sound and scalable methodology. The social impact valuation for the Novartis Access portfolio was performed with the help of WifOR, an independent economic research institute. Focusing on Kenya in 2016, we found a positive impact equivalent to USD 632 000, resulting from, for example, participation in the workforce. Another example is Novartis South Africa, which has been particularly active in healthcare system strengthening by training healthcare professionals. In 2016, these 20 initiatives delivered an aggregated average social return on investment (SROI) of between 173% and 241%.

We are committed to expanding and adapting this methodology as more evidence and data become available. In particular, we hope to soon be able to measure the social impact of more parts of our product portfolio, as well as the social impact of living wages in our supply chain.

Indirect impacts in Switzerland

In Switzerland, where we are headquartered, Novartis offers jobs not only directly but also indirectly as a buyer of goods and services from suppliers, including many small- and medium-sized enterprises. In 2017, the company placed orders worth about CHF 2.3 billion with companies in the 26 Swiss cantons. Novartis indirectly secured more than 58 000 jobs in Switzerland through the procurement of products and services. Major areas of procurement include laboratory equipment, information technology products and services, raw materials, building costs, fixtures and fittings, and chemical products.

For further information about the local activities of Novartis in Switzerland, see
→ the **Novartis Swiss Passport**

To provide feedback to this CR Report, go to
→ the **feedback survey**

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.

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.

Access to healthcare

"The moment you think about a new drug, you need to start thinking about how to take it to the rest of the world. Of course there are limitations, but these should not be based on where the patient lives."

Pat Garcia-Gonzalez, CEO, The Max Foundation

2017 highlights

- Novartis Access Principles were approved; at their core is a commitment to integrate patient access strategies into all of our new medicine launches
- Novartis Access signed agreements in three countries, bringing the total to six, and delivered more than 685 000 treatments to patients in lower-income countries
- Novartis signed agreements with key partners to improve the management of cancer in sub-Saharan Africa
- The *Glivec* International Patient Assistance Program transitioned to CMLPath to Care™
- Sandoz received approval for two biosimilars in the EU
- The Novartis Foundation launched the Better Hearts Better Cities initiative, and its telemedicine program continued rolling out across Ghana

Key challenges

- Procurement processes that do not support a portfolio approach, outdated national essential medicines lists, and skepticism toward private companies present barriers to the uptake of Novartis Access in the public sector
- Rising generic competition in the treatment of malaria drives a decline in our patient reach with *Coartem*
- Most healthcare systems in lower-income countries are geared toward acute care and are ill-equipped to address the needs of chronic patients
- A lack of basic healthcare infrastructure, equipment, clinics and hospitals, efficient distribution networks, medical staff and trained healthcare providers all present challenges for access to healthcare
- The stigma associated with certain diseases, such as cancer, prevents patients from promptly seeking a diagnosis

Why it is important

While significant progress has been made in tackling some of the world's greatest healthcare challenges, billions of people still lack adequate access to healthcare. This challenge will only grow – especially in developing countries – as aging populations, rapid urbanization and poor lifestyles contribute to a massive increase in non-communicable diseases (NCDs), in addition to the ongoing burden of infectious diseases.

Already today, 31 million people die each year from NCDs in low- and middle-income countries, representing nearly 75% of deaths from NCDs globally. Moreover, many of these NCD-related deaths occur before the age of 60, which causes immense social and economic loss. Faced with managing both NCDs and infectious diseases, these countries now have a double disease burden.

Affordability and availability of medicines is just one aspect of the access problem in developing countries. Solving the access challenge will require improvements to other elements that make healthcare systems function, such as the capacity to detect, diagnose and treat patients, and develop efficient distribution channels.

How we approach it

We are continuing to work to expand access to healthcare through a variety of approaches that provide tailored and scalable solutions: social business initiatives, equitable commercial models, zero-profit models, patient assistance programs and drug donations. Our generics division, Sandoz, also helps make high-quality generic medicines and biosimilars available to more people.

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 across 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.

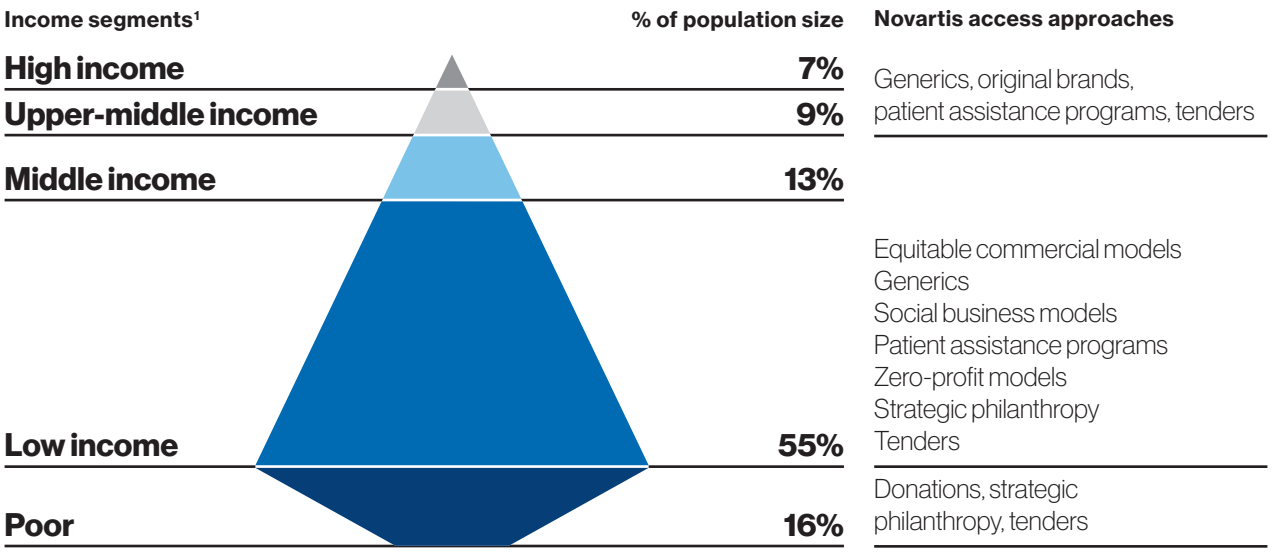
At their core is a commitment to integrate patient access strategies into all of our new medicine launches. These strategies will be based on three key principles: systematically assessing our research and development portfolio against the unmet needs of underserved populations, further improving the affordability of our medicines, and systematically assessing our efforts to strengthen local healthcare systems. In 2018, the CEO and ECN members will have an access objective as part of their individual objectives.

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 strategies across products and countries. For details on how we manage our access efforts, see the governance section (pages 10 and 11).

We continue to engage in strategic donations to address access gaps for neglected diseases and people at the bottom of the pyramid. Please see the table on page 45 for data on our philanthropic donations.

We believe in the power of partnerships to help effectively address barriers to access to healthcare. Early in 2017, 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. Working together across the industry, healthcare systems and sectors, we believe we can increase our impact and truly answer the call to partnership outlined in UN Sustainable Development Goal 17.

Novartis access strategy



[1] PEW Research Center with data from World Bank PovcalNet (data 2011)

Availability of medicines

Our key programs continue to make inroads in driving accessibility of our medicines. Because chronic illnesses require early detection and long-term, ongoing treatment, we need new ways to ensure access to affordable medicines for NCDs in countries where people often have limited resources. At the same time, additional efforts are needed to secure the gains and further accelerate progress toward the treatment and elimination of infectious diseases. Novartis has a long history of activity in this area, with a focus on neglected tropical diseases such as malaria and leprosy. Ensuring good health and well-being (Sustainable Development Goal 3) is at the core of our business, and we are committed to playing a role in helping end the epidemic of infectious diseases such as malaria and reducing premature mortality from NCDs.

Novartis Access offers a portfolio of medicines to address cardiovascular diseases, diabetes, respiratory illnesses and breast cancer. Launched in 2015, the portfolio is available to governments, NGOs and other public sector healthcare providers in lower-income countries at a price of USD 1 per treatment, per month. In addition to providing affordable treatments, Novartis Access works with partners on the ground to improve prevention and diagnostic capability (see page 22). The program is integrated into Novartis Social Business, a unit that also includes the Novartis Malaria Initiative and the Novartis Healthy Family programs.

In 2017, we signed agreements with three countries to launch Novartis Access, bringing the total to six: Kenya, Ethiopia, Rwanda, Uganda, Pakistan and Cameroon. During 2017, we were able to deliver more than 685 000 treatments, each providing a one-month supply of medicine, to patients in Kenya, Ethiopia, Lebanon and Cameroon. Since the launch of Novartis Access in 2015, more than 800 000 treatments have been delivered to these countries. Preparing the ground for future country rollouts, 502 product submissions have been filed with health authorities for marketing authorization in 24 countries, with 221 approvals to date.

While the number of patients reached has increased from approximately 8 000 in 2016 to more than 386 000 in 2017, and we can be proud of our achievements, the rollout of Novartis Access has not been as swift as anticipated. Moving from single product sourcing to portfolio procurement continues to be the biggest hurdle for countries. Further, as purchasing decisions are decentralized in many countries, this causes delays in the program rollout. Another important learning is that we need to expand into the private sector at a faster pace. The decision to distribute Novartis Access medicines through public channels was made early on to help ensure our treatments reach target populations at affordable prices. However, results from a baseline study conducted in Kenya by Boston University underline certain flaws in this logic. While more than 50% of chronic diseases are diagnosed in the public sector, more than 40% of patients actually buy their medicines in the private, for-profit sector.

Against this background, we will pilot a new approach in the private sector in the coming months, targeting patients in a vast slum area around Nairobi, Kenya, who lack private health insurance or coverage. We will partner with the Abraaj Group, a private equity group investing in programs with social impact. On a larger scale, as of January 2018, we 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 across all income levels. In parallel, we will continue rolling out Novartis Access in 30 countries as per our original strategic plan, and we are already in advanced discussions with three Asian and seven African countries.

Despite changes in the marketplace over the years and the growing presence of generics, the Novartis Malaria Initiative remains one of the industry's largest access-to-medicine programs. Since 2001, it has provided – without profit – more than 850 million treatments for adults and children in over 60 malaria-endemic coun-

Availability of medicines performance indicators

	Patients reached (thousands)		
	2017	2016	2015
Social business models			
Novartis Access	**386.5**[1]	8.4	3.3
Zero-profit model			
Malaria/*Coartem*	**43 675.0**[2]	49 757.9	64 097.7

[1] 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.

[2] Increased availability of generic options on the market

tries, contributing to a significant reduction in the death toll from malaria. In 2017, our patient reach continued to decline (from almost 50 million in 2016 to 44 million in 2017), largely due to the increasing availability of other artemisinin-based combination therapies from generic manufacturers, which have also been pre-qualified by the World Health Organization and are therefore eligible for international donor-funded procurement. Our commitment to malaria is long term, and we will continue with our *Coartem* deliveries.

Novartis Healthy Family programs reached nearly 580 000 patients in India, Kenya and Vietnam in 2017, a reduction from previous years due to the closing of the Keluarga Sehat program in Indonesia. For further information on Healthy Family programs, see pages 22 and 33.

For more details on our progress, see
→ **Novartis Access two-year report**
→ **Novartis Healthy Family 10-year report**

Pricing

While there have been tremendous advances in medical science, some people cannot afford the medicines they need. This is not just an issue in the developing world, where lower incomes and purchasing power mean even some of the cheapest medicines cannot be afforded; it is also an issue in the developed world, where many people have limited incomes and/or no access to health insurance.

We aim to provide access to innovative medicines for patients with unmet needs and across all geographic areas, including emerging markets. We actively partner with governments, NGOs and other stakeholders in the public sector to understand the local healthcare landscape and develop access solutions that meet local priorities and patient needs. We complement our efforts to increase affordability with initiatives aimed at improving diagnosis, supporting patients and building capabilities. Novartis has developed a structured and integrated patient access approach to address key barriers to access in emerging markets. This includes taking into account affordability, which is a major challenge for both healthcare systems and patients.

In the 2016 Access to Medicine Index, Novartis was noted for considerable expansion in our provision of equitable pricing strategies. In total, 49% of our products for diseases in scope had pricing strategies that target priority countries for the index. To further embed access in our business strategy, Novartis has approved at Board level the Novartis Access Principles, to be implemented in 2018. A key tenet of these principles is to improve the affordability of our products, taking into account local socio-economic conditions while maintaining the sustainability of our business. A pricing/affordability indicator based upon the principles will therefore be developed and reported in 2018.

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 and lower-income countries. Novartis has launched more than 35 local brands as of November 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 access expansion 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.

Generic medicines can also expand access by offering affordable treatments with the same safety and efficacy as the originator product after its patent expires. Novartis is the only major healthcare company with leadership positions in both patented and generic pharmaceuticals. Our Sandoz Division is the second-largest producer of generics, with a portfolio of approximately 1 000 products.

Sandoz and its affiliate 1 A Pharma often compete in tenders, where the lowest-priced product with the best delivery conditions usually wins the contract. Sandoz and 1 A Pharma have successfully tendered bids in numerous African countries.

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. In 2017, we gained approval in the EU for two new biosimilar products, rituximab and etanercept, and we launched them in several European markets.

"A health system is like a chair with four legs. One is infrastructure, one is health workers, one is medicines and medical supply, and the last is health information systems. The base of the chair is how you finance the system. Access to medicine is a critical element of any health system; otherwise, the chair would fall down with the patient who is sitting on it. Pharmaceutical companies must play their part, so that people are able to access the medicines they need at affordable prices."

Dr. Mohga Kamal-Yanni, senior health and HIV policy advisor, Oxfam GB

Intellectual property

The intellectual property (IP) system is essential to our mission of improving and extending people's lives. In our research-intensive field, the IP system provides a proven, practical means to attract the massive investments needed to conduct and sustainably finance the complex activities – from research and development through to distribution – that lead to life-saving and life-enhancing medicines and cures.

We recognize, however, that in the world's least developed countries (LDCs), as defined by the United Nations, and in low-income countries (LICs), as defined by the World Bank, disadvantages stemming from the development stage of these countries can create unique challenges that may interfere with the ordinary mechanics and typical benefits of a market-based patent system. For these reasons, like the majority of other healthcare companies that operate in the developing world, Novartis has long had policies of either not filing or not enforcing patents in LDCs. In 2017, the ECN approved changes to expand our policies to extend to LICs as well as LDCs, and we have broadened our commitment to include both non-filing and non-enforcement of patents (i.e., for any patents that may already exist) in this expanded group of countries. In addition, we have broadened our existing voluntary licensing policy – which involves a commitment to grant non-exclusive licenses to qualified third parties to supply our patented products exclusively to LDCs – to now also include all LICs.

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 the areas of oncology, hepatitis C, cardiovascular disease, HIV, diabetes and respiratory disease, as well as any other products on the World Health Organization's Essential Medicines List. The database for these therapy areas is targeted to be online by mid-2018. In a second phase, Pat-INFORMED will expand to all therapeutic areas and explore the inclusion of complex therapeutics. In addition to a searchable database, Pat-INFORMED includes a platform for facilitating communication between procurement agencies and patent owners to make it easier for the former to seek more detailed public patent information about a particular medicine.

Novartis is also a founding member of the WIPO-World Economic Forum Inventor Assistance Program (IAP), a first-of-its-kind pro bono program aimed at providing free IP-related legal services to under-resourced inventors in developing countries to help these inventors navigate the patent system. After pilot launches in Colombia, Morocco and the Philippines in 2015 and 2016, Novartis supported and helped launch the program in South Africa and Ecuador in November 2017.

Healthcare system strengthening

A medicine is only as good as the system that delivers it. More needs to be done to strengthen healthcare services and build capacity on the ground to help developing countries create fully functional healthcare systems. More healthcare workers are needed who can prevent, diagnose and treat diseases, as even the most effective treatments have limited impact without skilled healthcare personnel. Importantly, healthcare systems also need strong regulatory systems to support pharmacovigilance, good manufacturing and clinical practices, which are vital to helping lower-income countries improve healthcare capabilities and patient outcomes.

Novartis works to expand healthcare capabilities by combining its scientific expertise with on-the-ground experience. Our local country organizations work to define and implement specific strategies tailored to local needs. No one company can solve these issues alone, so we partner with governments, NGOs, private companies (also across industry sectors) and other stakeholders to create sustainable solutions.

The Novartis Foundation is taking on the challenge at a city level 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 brings together multi-sector partners – including food suppliers, health authorities, employers and city planners – to contribute expertise and resources for local solutions that can improve cardiovascular health in cities. Information and communication technology, or digital technology, is also an integral part of Better Hearts Better Cities. Intel Corporation is serving as the digital advisor for this initiative.

Better Hearts Better Cities has already launched in Ulaanbaatar in Mongolia and in Dakar in Senegal, and it is planned to launch in São Paulo, Brazil, in 2018. In the pilot district of Dakar (Dakar Ouest), efforts are underway to strengthen hypertension prevention and care, to improve health literacy via education programs, to set up a registry for disease observation, and to collaborate with key employers on workplace programs for NCDs. These interventions are planned to be rolled out across the remaining city districts in 2018 and beyond.

Cancer is also on the rise in sub-Saharan Africa. Approximately 650 000 people in Africa develop cancer annually, leading to about 510 000 cancer deaths that occur each year due to limited treatment options. More than one-third of the cancer deaths in Africa are from cancers that are easily preventable and/or treatable if detected early. While the availability of cancer treatments is important, it is far from sufficient to improve cancer care in developing countries, which suffer from systemic issues such as a lack of basic healthcare infrastructure, equipment, clinics and hospitals, efficient distribution networks, medical staff and trained healthcare providers. Moreover, because the availability of cancer drugs is limited, procurement agencies themselves are unfamiliar with the treatments. There is also a stigma associated with cancer because it is considered fatal, so being tested when symptoms appear can be a difficult step for a patient to take.

In this context, Novartis Access, the American Society for Clinical Pathology (ASCP) and the American Cancer Society (ACS) joined forces in November 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. Through this initiative, partners are being connected to national health priorities, strengthening the entire continuum of care for cancer patients – from training for better diagnosis and care, to improved access to treatment, through to advocacy for national cancer treatment guidelines.

Each partner brings unique expertise in cancer diagnosis and treatment. ASCP will build healthcare capacity for immunohistochemistry analysis in two hospital laboratories in Ethiopia and Tanzania. ACS will support the training of healthcare professionals in Ethiopia, Tanzania and Uganda to ensure quality processes in the transportation of biopsy samples and in the administration of chemotherapy. Novartis will provide funding to support the technical work. This initiative is planned to serve as a pilot for the future rollout of similar activities in other countries.

Novartis Access has also continued to expand capacity-building activities to raise awareness about, screen for and diagnose hypertension and diabetes; train healthcare workers; and work on supply chain integrity and distribution.

To address the challenges of bringing healthcare to people living in India's rural and remote areas, Novartis launched Arogya Parivar ("healthy family" in Hindi) in 2007. This social business model uses a market-based approach for healthcare provision. The program is organized into cells, currently 239. Each cell covers 35-40 square kilometers and includes 60 to 75 villages and small towns with around 200 000 inhabitants. 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. Arogya Parivar broke even in less than three years and has been sustainable ever since, meeting both its commercial and social targets. It is expected to reach 44 million people through health education meetings and health camps over the next five years.

In addition to India, Healthy Family is now present in Vietnam and Kenya. In 2017, nearly 580 000 people attended health camps.

Novartis shares the view of the global health community that there is a pressing need to formalize the role of community health workers (CHWs) as an essential component of building stronger healthcare systems in developing countries. Last Mile Health, which success-

Healthcare system strengthening and patient education and prevention performance indicators

	People reached (thousands) [1]		
	2017	2016	2015
Healthy Family (in India, Kenya and Vietnam) [2]	**7 689.9**	7 717.8	7 602.4
Novartis Foundation	**7 080.6**[3]	8 908.6	4 456.0
Novartis research capacity-building programs	**0.6**	1.0	1.0

[1] Via training and service delivery and through health awareness activities
[2] Numbers have been restated for Healthy Family given the Keluarga Sehat program in Indonesia ended in January 2017.
[3] 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

fully 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.

In addition, 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.

For more details on our progress, see
→ **Novartis Healthy Family 10-year report**

Patient assistance programs

Even in countries that have sufficient incomes and insurance schemes to help pay for healthcare, there are still individuals who are unable to afford care for various reasons. They include people in places such as the US, where even having prescription drug coverage does not guarantee that someone can afford the medicine they need, when they need it. We have therefore set up patient assistance programs around the world for patients who cannot afford their medicines due to a lack of adequate insurance coverage. We use a standard model for all our global and locally run patient-oriented programs, with a documented framework in place to ensure quality and compliance. In 2017, our patient assistance programs worldwide helped more than 138 000 people access medicines they could not afford due to financial hardship, lack of insurance, or inadequate reimbursement.

In the US, for 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 for the vast majority of our branded and biosimilar products. This includes our cancer portfolio. As of January 2018, all our branded products without generic alternatives and our biosimilar products are available under these programs, subject to any limits imposed by a patient's individual health plan and where allowed by law.

In addition, 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 2017, the Novartis Patient Assistance Foundation Inc. provided nearly USD 1.5 billion in free medicines to more than 55 000 patients in the US.

We also provide programs for patients in lower-income countries. One of our key programs, Novartis Oncology Access (NOA), is designed to address access to our medicines for cancer and blood disorders in countries with very limited healthcare reimbursement systems or challenging healthcare environments. The NOA programs include the Novartis medicines *Glivec*, *Tasigna* and *Exjade*. In 2017, these programs reached almost 83 000 patients worldwide.

The *Glivec* International Patient Assistance Program (GIPAP) was a direct-to-patient access program that helped frame NOA programs. Since launching in 2002, GIPAP has assisted approximately 75 000 patients in nearly 80 countries. It was introduced after Novartis recognized the importance of ensuring patients in lower-income countries have access to breakthrough cancer therapy. Given the changes in the healthcare environment from when the program was launched, Novartis and The Max Foundation recognized the need to evolve the GIPAP strategy to help ensure sustainable access for patients. In 2017, we announced that GIPAP will be transitioned to CMLPath to Care™, a new, independent, patient-centered program that is a collaboration between Novartis and The Max Foundation. The Max Foundation will assume responsibility from Novartis for delivering treatment to patients, including supply chain management. Novartis will provide funding and drug donation support. China Charity Federation continues to be our partner for these patient assistance programs in China.

Patient assistance programs performance indicators

	Patients reached (thousands)		
	2017	2016	2015
Novartis Patient Assistance Foundation Inc. (US)	**55.5**	51.2	42.6
Oncology/hematology LMIC patient assistance	**82.9**	83.3	80.6

How we perform

In our industry, main indirect impacts are linked with increasing access to healthcare. Novartis products reached more than 925 million patients in 2017, and of these patients, approximately 46 million were reached through access-to-healthcare programs. Diseases cause governments to spend more on healthcare and also have wider economic and social costs. Our medicines and medical devices help reduce these costs, but quantifying these indirect savings is difficult. However, innovative medicines and treatments can reduce healthcare costs because fewer surgical procedures are required, hospital stays are shorter, and the associated costs of nursing care are also reduced.

We realized years ago that the traditional model of providing access to medicines in the developing world – generally via donations and philanthropy – was not a sustainable one. We have therefore focused our efforts on innovative business models, strengthening healthcare systems and equitable pricing, while still maintaining our long-term programs to deliver essential medicines for infectious diseases such as malaria and leprosy.

We worked throughout 2017 to expand and grow all of our programs. Overall, the figures show a mixed result. Novartis Access added three new countries and reached more than 386 000 patients. Sandoz reached 525 million patients with generic medicines.

Being a pioneer comes with challenges, as you are threatening the established mindset and models. While we can be proud that Novartis Access has delivered more than 800 000 monthly treatments in four countries since launch, and that we have submitted 502 products in 24 countries in just two years, the rollout of the program has not been as swift as anticipated. But we keep going, learning and adapting as needed, because we believe this will help make all of our programs stronger moving forward.

Beyond the sheer numbers, however, it is clear that we are making real progress. This has been recognized, for example, by the Access to Medicines Index, which in 2016 ranked us third. More importantly, we topped the industry in access-to-medicine management and capacity building, and our integrated access strategy addressing all income segments stood out as a best practice.

This progress can also be seen in our programs: Novartis Access has grown; Healthy Family and the Novartis Malaria Initiative continue to provide critical services; we have launched new and exciting programs such as Better Hearts Better Cities that take a holistic view of improving cardiovascular health; and our equitable pricing efforts have taken root. We plan to continue and grow these efforts in 2018. We have taken concrete steps to embed access to healthcare in the very core of our day-to-day business, with the implementation of our Access Principles throughout the organization.

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.

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.

Innovation

"Companies will need to meet a number of great challenges over the coming years, but they should stay focused on their core expertise. For pharmaceutical companies, this is access and innovation. Beyond product innovation, companies have to devise new profitable business models to reach patients across the global income pyramid."

Jeffrey Sturchio, president and CEO, Rabin Martin

2017 highlights

- Delivered 16 major approvals as well as six FDA breakthrough therapy designations and 16 major regulatory submissions; nine projects entered our development pipeline
- Launched a patient trial in Africa for KAF156, a novel compound against multidrug-resistant malaria
- 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
- Reported progress in research of a novel antibiotic candidate, LYS228, for multidrug-resistant infections caused by the Enterobacteriaceae family of Gram-negative pathogens

Key challenges

- Aging populations and growing healthcare spending put increasing pressure on healthcare systems
- Anticipating future health needs, particularly for aging populations
- Developing new antibiotics remains a challenging scientific endeavor
- Rising parasite resistance to current antimalarial therapies threatens progress achieved to date
- Expanding quickly into the private sector with Novartis Access to drive sales volume and subsequently make the program sustainable

Why it is important

Demographic trends are changing healthcare. The world's population is growing, with an estimated 8.5 billion people expected to inhabit the planet by 2030. At the same time, the population is rapidly aging. According to projections by the United Nations, about 1.4 billion people worldwide are expected to be 60 years or older by 2030, and this is expected to be one of the factors that will fuel a rise in chronic illness. If the growth trends continue, global healthcare spending 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.

We believe innovation that produces breakthrough medicines, devices and solutions will be critical to overcome this challenge as demographic trends increase pressure on healthcare systems to produce the best results at the lowest overall cost.

How we approach it

Innovation is a cornerstone of the Novartis strategy and a foundation of our future. Research and development (R&D) as well as a strong pipeline of potential medicines are critical for our future business and long-term success. We invested USD 9.0 billion on R&D for new drugs and medical devices in 2017, or 18.3% of net sales.

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. In 2017, 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. The digital technology sector is increasingly a source of innovation for pharmaceutical research. We are working to harness advances made by software and hardware engineers to make drug discovery more efficient and effective, as well as to improve clinical research. For more details on our approach to drug discovery, see page 43 of our 2017 Annual Report.

NIBR works in concert with our Global Drug Development (GDD) group to bring innovative treatments to patients around the world. 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, GDD 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 planned in the US and EU between 2017 and 2020. For more details on our approach to development, see page 46 of our 2017 Annual Report. For full details on our innovation achievements in 2017, see pages 25-27 of our 2017 Annual Report.

We are taking several steps to ensure our potential new treatments can deliver significant health improvements for patients. We assess all our projects on multiple criteria such as feasibility, the potential to change medical practice, and alignment with current capabilities. Our pipeline covers a broad range of disease areas, including chronic, infectious and neglected diseases. As part of our long-term development strategy, we are working to anticipate future health needs, particularly for aging populations. And one of the three pillars of our new Access Principles (see page 18) is to ensure our R&D efforts address high-burden diseases with unmet medical needs and to adapt relevant products to the needs of underserved populations. The growing prevalence of antimicrobial resistance is recognized as one of the major threats to global public health today, and we have ongoing activities to counter the threat of emerging drug resistance.

Beyond traditional research and development, we are using innovative approaches to reach more patients with our medicines, while leveraging innovative technologies to help solve a variety of healthcare challenges – from developing breakthrough treatments to making sure that basic medicines are available where they are needed most. 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.

R&D for unmet medical needs

We systematically review our product portfolio to identify and prioritize opportunities for adaptive product development or additional product registrations in countries with a high disease burden. In addition, our drug development teams evaluate the special needs of low- and lower-middle-income countries as part of their development plans.

This builds on our past work in adaptive development – the modification of an existing medicine to further improve therapeutic efficacy, safety and access, and to generate a positive health outcome in non-conventional settings. Most often, this is done with a specific focus on poor and vulnerable patient groups, such as children and the elderly.

In 2017, we carried out systematic reviews across our existing early- and late-stage development programs in Innovative Medicines, and we now have more than 20 initial ideas for adapting marketed products that address both communicable and noncommunicable diseases. These ideas are currently undergoing in-depth technical assessments.

One example of our efforts in this area is our drug clofazimine, indicated for many years in combination with dapsone and rifampicin to treat leprosy. It has recently been recommended by the World Health Organization for use in the treatment of multidrug-resistant tuberculosis (MDR-TB). To align with this recommendation and ensure access for populations living in low- and lower-middle income countries, Novartis is working with regulators worldwide to seek registration for the MDR-TB indication. MDR-TB remains a public health crisis, and ending the TB epidemic by 2030 is among the health targets of the Sustainable Development Goals.

R&D for neglected diseases

The Novartis Institute for Tropical Diseases (NITD) is our research group dedicated to finding new medicines to treat neglected diseases. NITD is a small-molecule drug discovery research institute within NIBR that works in collaboration with a number of academic and nonprofit partners, including the Wellcome Trust, the Bill & Melinda Gates Foundation, Medicines for Malaria Venture, and the Swiss Tropical Public Health Institute. Originally founded in 2002 in Singapore, NITD moved its operations to Emeryville, California, in the US in 2017. There, it is co-located with our infectious diseases research team to increase the synergies around research collaboration.

NITD teams are engaged in research efforts that range from target discovery and screening development to compound optimization and preparation for clinical testing. NITD research currently focuses on parasitic diseases such as malaria, cryptosporidiosis and three major kinetoplastid diseases: human African trypanosomiasis (sleeping sickness), Chagas disease and leishmaniasis.

One of the significant achievements of our NITD scientists in 2017 was the discovery and early validation of a drug candidate for treating cryptosporidiosis. Diarrheal diseases, such as cryptosporidiosis, can cause dehydration, malnutrition, stunting and cognitive defects, and they contribute to more than half a million deaths annually. Cryptosporidium is the second most common cause of diarrhea-related mortality in children under 2 years old. The parasite can cause weeks of watery diarrhea and sets up a vicious cycle of malnutrition and increased susceptibility to infection. Currently, there is no vaccine and the only available treatment is poorly efficacious in malnourished children.

In collaboration with the University of Georgia and Washington State University in the US, NITD researchers used transgenic parasites and novel disease models – as well as knowledge from our malaria research programs – in the drug discovery process. Together, these efforts helped identify and validate a potent and specific Cryptosporidium PI(4)K inhibitor, KDU731. KDU731 has been shown to specifically inhibit Cryptosporidium in preclinical models and is currently undergoing safety studies prior to the initiation of clinical trials. The findings were published in the journal Nature.

Investment in neglected tropical diseases was USD 22 million in 2017, down from 2016. This reduction is partially due to the relocation of NITD's operations from Singapore to Emeryville in the US. A fraction of associates from Singapore moved to Emeryville, and recruitment of full-time equivalent employees at the new location is proceeding rapidly. Key projects met expected milestones during the transition, and the priorities, mission and areas of focus of NITD are unchanged. NITD continues to explore opportunities to maximize its impact, and its scientific strategy is informed by the evolution of science as well as unmet medical needs.

Drug resistance

Antimicrobial resistance (AMR) has recently topped agendas at key global health and economic summits, such as the G7 and G20 summits, the UN General Assembly, the World Health Assembly and the World Economic Forum. Antimicrobials are one of the cornerstones of global healthcare for treating a wide range of infectious diseases and for preventing infection during everyday medical procedures, but their effectiveness is being threatened by multidrug-resistant bacteria. The growing prevalence of AMR is recognized today as one of the major threats to global public health. If uncontrolled, it is estimated that AMR could lead to an additional 10 million deaths per year by 2050 – more than the current total number of deaths from all infectious diseases worldwide.

We have invested in the discovery of new antibiotics, and infectious disease researchers in Emeryville lead these efforts at Novartis. In 2017, we reported progress in researching a novel antibiotic candidate, LYS228, for multidrug-resistant infections caused by the Enterobacteriaceae. This family of pathogens is listed as a "critical" threat to public health by the World Health Organization and as an "urgent" threat by the US Centers for Disease Control and Prevention.

Next-generation antimalarials are also urgently needed to tackle rising parasite resistance to current therapies. One important and promising compound 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. Additionally, we are investigating another compound with a novel mechanism of action against malaria called KAE609 (cipargamin). For more information about our malaria research and development programs, see page 56 of our 2017 Annual Report.

In January 2016, Novartis signed the Davos Declaration on Combating AMR, together with more than 100 other international companies and key industry bodies from 21 countries. In September 2016, Novartis was one of 13 leading pharmaceutical companies that committed to the Industry Roadmap for Progress on Combating AMR, which outlines more concrete measures to implement the Davos Declaration. Through this roadmap, the signatories have pledged to reduce the environmental impact from the manufacturing of antibiotics.

Addressing AMR historically has been embedded in our overall approach to Pharmaceuticals in the Environment (PiE). The AMR Roadmap includes commitments to establish and implement a common framework for managing antibiotic discharges by 2018, to develop a practical mechanism to demonstrate that our supply chain meets the standards in the framework, and to establish science-driven, risk-based targets for antibiotic discharges by 2020. In 2015, Novartis set a 2020 target to limit the release of drug substance effluents from its manufacturing sites to 10 times less than the predicted no effect concentration (PNEC) in receiving surface waters. This is intended to ensure that the contribution from manufacturing effluents into the environment is negligible. Progress on this target is monitored closely.

Additionally, in 2017 Novartis 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 AMR Roadmap.

An Antibiotic Manufacturing Framework has been drafted by the AMR Alliance Manufacturing Working Group (consisting of the 13 AMR Roadmap signatories). It provides a methodology for responsible antibiotic manufacturing, including managing antibiotic discharge, while the evolving science to derive a consistent methodology for establishing AMR-relevant emissions limits continues.

Beginning in 2018, Novartis will apply the following criteria of the Antibiotic Manufacturing Framework at our own antibiotic manufacturing operations to ensure these operations meet common minimum expectations, such as:

- Complying with local laws, environmental permits, company standards, and codes of conduct
- Exercising appropriate duty of care for all discharges and waste streams containing antibiotics
- Ensuring water and solid waste management programs are in place to prevent untreated discharge of manufacturing waste containing antibiotics
- Completing appropriate training in line with industry best practices
- Ensuring these environmental programs are evaluated periodically for efficacy
- Conducting facility reviews and following up with an action plan to address any findings

Through our Third-Party Risk Management program, we are also considering supplier performance on AMR as part of our supplier selection process. As a member of the Pharmaceutical Supply Chain Initiative, we use a platform for collaboratively assessing the environmental management performance of our suppliers.

Business model innovation

Beyond research and development, we are using innovative approaches to reach more patients with our medicines. Novartis Social Business was created a year ago to capitalize on the individual strengths of several of our industry-leading access-to-healthcare programs, each of which aims to increase the health and well-being of patients in lower-income countries. 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 pages 22 and 33 of this report.

Another flagship program within Novartis Social Business is Novartis Access, launched in 2015. Novartis Access builds on our Healthy Family programs as an evolution in our social business approach. The program offers a portfolio of 15 medicines against chronic diseases together with capacity-building activities to strengthen the ability of healthcare systems to 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, NGOs and other public sector healthcare providers in these lower-income countries.

When Novartis Access launched, the decision was made to first focus on the public sector before expanding into the private sector. However, challenges and learnings from two years on the ground have led to the decision to speed up the implementation of Novartis Access in the private sector to enable faster product uptake. Results from a program analysis conducted by Boston University corroborate this. The results showed

that while more than 50% of chronic diseases are diagnosed in the public sector, more than 40% of patients buy their medicines in the private, for-profit sector. This further substantiates the theory that Novartis Access needs to expand beyond distribution of its medicines through public and faith-based facilities.

Starting in January 2018, Novartis Social Business will be present in the public and private market in seven countries (Cambodia, Laos, Malawi, Nepal, Rwanda, Tanzania and Uganda) 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 requirements across all income levels. Depending on the outcomes and based on our experience on the ground, we will consider expanding this approach to more countries in the future.

Innovative technologies

We use innovative technologies to help solve a variety of challenges – from developing breakthrough treatments to making sure that basic medicines are available where they are needed most. For example, we are exploring using machine learning to replace certain lab experiments with computer simulations, and generating DNA-encoded libraries to rapidly expand our collection of small molecules that serves as a starting point for potential new medicines. We are also investing in a variety of emerging technologies that could help make the drug development process smarter, faster and cheaper, including advanced analytical tools aimed at improving the efficiency and effectiveness of our trials. To learn more about how we are harnessing advances in technology within R&D, see pages 44 and 46 in the 2017 Annual Report.

Technology can be an enabler in overcoming barriers to access, especially for patients in remote areas. The Novartis Foundation telemedicine program in Ghana uses mobile technology to centralize expertise and coach health workers in rural communities to strengthen healthcare capacity, avoiding unnecessary referrals and reducing costs for patients. Ghana Health Service and the Ministry of Health are now rolling out the initiative, and the entire country is expected to soon be covered by telemedicine services.

Managing stock-outs can be another major access challenge in many developing countries, especially for health centers in rural areas. To improve the management of drug inventories in these areas, SMS for Life was launched in 2009. SMS for Life helps eliminate stock-outs of essential medicines through simple, affordable and widely available technologies, including mobile phones, smartphones and tablet computers, the internet and electronic mapping. It enables health facilities that dispense essential medicines to report their stock levels to the district medical officers who are responsible for treatment availability. Building on the success of SMS for Life, a new and enhanced version – SMS for Life 2.0 – was launched in December 2016 in Kaduna State, Nigeria's third most populous region, in partnership with the Kaduna State Ministry of Health and Vodacom.

Using smartphones and tablet computers, local healthcare workers can track stock levels of essential antimalarials; vaccines; and HIV, tuberculosis and leprosy treatments, and send notifications to district medical officers when stock levels are low. Tablet computers also allow for disease monitoring by supporting data collection of basic disease parameters in line with a country's needs. The program enables healthcare workers to monitor surveillance parameters of malaria; maternal and infant deaths; and seven other diseases, including measles, yellow fever and cholera. Additionally, SMS for Life 2.0 enables training of healthcare workers in local facilities using on-demand eLearning modules. These resources can also be used to increase public awareness on key health topics.

In addition to the launch in Nigeria, Novartis and our nonprofit partner Right to Care signed a memorandum of understanding in 2016 with the Zambian Ministry of Health, with the goal of deploying SMS for Life 2.0 in more than 500 health facilities in the northern provinces of the country. The program, which will include stock reporting, disease surveillance and eLearning, was developed in cooperation with Vodacom and was launched at the end of 2017.

SMS for Life 2.0 is also under discussion in other sub-Saharan African countries. Further, the system could be extended to treatments against noncommunicable diseases such as diabetes and high blood pressure. The first rollout of an adapted version of the SMS for Life digital platform will launch in Pakistan in 2018 to help track patient access and adherence to treatment.

How we perform

Innovation remains at the very heart of everything we do at Novartis, and we invested a total of USD 9.0 billion in R&D in 2017. We made progress in priority disease areas with high unmet medical needs, and we achieved several key milestones in our pipeline. A total of nine projects entered our development pipeline, and we delivered 16 major approvals as well as six FDA breakthrough therapy designations and 16 major regulatory submissions. We also made steps in advancing our pipeline for infectious and neglected tropical diseases, where we invested USD 22 million.

Innovative business models continue to play a key role in our efforts to bring our medicines to more patients – and they also continue to evolve as we learn from our experiences on the ground and adapt to changing circumstances in markets where we operate. We are using these experiences to guide our activities, as we believe they will teach us important lessons about how to best operate in parts of the world that are currently underserved, while helping us grow our business in lower-income countries.

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.

Patient health and safety

"Companies need to incorporate patient evidence at all stages of the medicine R&D cycle as well as decisions on access and availability – with the meaningful involvement of patients and their patient organizations. Only a collaborative and holistic approach can bring about sustainable solutions."

Nicola Bedlington, secretary general, European Patient Forum

2017 highlights

- Introduced a companywide patient engagement strategy to systematically embed patient engagement in the way we work
- Created a new organization to oversee global suppliers in clinical development
- Began providing easy-to-understand summaries for patients in Phase IIb and III studies
- More than 99% of regulatory inspections had no major findings
- Reached out to more than 1 300 patient organizations to ensure we understand patient perspectives
- The Novartis Foundation and partners launched Healthy Schools for Healthy Communities in South Africa
- Healthy Family celebrated 10 years in India and is planned to expand over the coming years
- Nine illegal pharmaceutical manufacturing facilities and assembly lines were dismantled, and more than 7 300 illegal online pharmacies were shut down as a result of our actions to combat counterfeit medicines

Key challenges

- Developing effective strategies to interrupt the transmission of leprosy and ultimately eliminate the disease
- Our Healthy Family program in Indonesia discontinued due to challenges in successfully adapting the program to local realities
- Developing novel distribution channels to improve access to our high-quality antimalarial for people relying on the private sector

Why it is important

The safety of patients is one of the foundations of healthcare delivery, yet a number of adverse events occur each year. According to the World Health Organization, in a study across low- and middle-income countries, the rate of adverse events was around 8%, of which 83% could have been prevented and 30% led to death. Moreover, approximately two-thirds of all adverse events in healthcare happen in low- and middle-income countries.[1]

Counterfeit and falsified medical products also pose a global public health risk. They often cause treatment failure, disability or even death, and can lead to the emergence of resistant forms of infectious agents. Due to high demand and low production cost, falsifying medical products is a highly profitable business. In the US, the Center for Medicine in the Public Interest puts the worldwide sales of counterfeit medicines at around USD 75 billion. This number is expected to rise by 90% in the next five years.

At the same time, educating patients to become more knowledgeable is one way to help ensure that health treatments have the desired effects. This can only be done if people are given the background and understanding needed to make the right decisions – something that is especially necessary in lower-income environments, where awareness about many diseases (especially chronic diseases such as hypertension, diabetes and cancer) is low.

How we approach it

The health and safety of patients is at the very core of our mission. We cannot hope to find new ways to improve and extend people's lives if we cannot assure the people who use these medicines that they are both effective and safe.

Throughout the lifecycle of our medicines, we work to ensure the best balance of benefit and risk by having a variety of systems and processes in place for a continuous and systematic review of the data collected for all products in our portfolio, including those on the market and those that are still in development. These processes are designed to help us maximize the safety and therapeutic benefits for patients.

We focus our patient health and safety activities in three key areas: pharmacovigilance, safety profile and quality of drugs; health education and prevention; and combatting counterfeit medicines.

We also work with patients to ensure they have a voice in how our products are developed. 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 development and commercialization process for our medicines. 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.

Novartis continues to maintain close interactions with national health authorities in a number of countries such as China to improve pharmacovigilance processes, with the ultimate goal of providing patients with a better risk-benefit assessment.

Pharmacovigilance, safety profile and quality of drugs

Our safety efforts begin at the earliest stages of research, right at the conception of a potential drug target through the proof of concept and eventually into clinical trials. Clinical studies are an essential part of the development and registration of new innovative medicines, biosimilars and generics. These studies are possible only because subjects consent to participate and test new medicines. The ethical principles that protect the safety and well-being of the clinical study subjects are outlined in the Declaration of Helsinki.

Information on clinical studies and their results serves patients and their healthcare providers directly, as well as the public at large. Such information can help interested individuals make informed decisions about their potential participation in a clinical study. For clinical study registration and results reporting, there are a number of national requirements that vary between countries and are continuously evolving. In May 2005, Novartis became one of the first pharmaceutical companies to publish clinical trial results for innovative medicines, regardless of outcome, on a publicly accessible website: www.novartisclinicaltrials.com. This site includes the results from all phases of interventional trials for innovative products within one year after each trial is completed.

While disclosing trial results is vital, the summaries can be too technical or scientific for the general public and patient populations to make use of. In 2016, we therefore began providing non-technical summaries to patients participating in Phase I/IIa interventional general medicine clinical trials. In 2017, we began providing non-technical summaries to trial investigators to share with their patients for Phase IIb and III studies for our interventional innovative medicine trials initiated within the year. These will be published on www.novartisclinicaltrials.com alongside the technical summaries.

Together with preclinical safety data, the adverse events collected in clinical trials and spontaneously reported for marketed products provide critical information for characterizing the safety profile of a drug. This safety data is closely scrutinized by regulators when assessing whether the benefits of a drug are expected to outweigh the potential risks, which is a prerequisite for gaining marketing approval and keeping the medicine on

[1] WHO report: Patient Safety: Making Health Care Safer, May 2017, page 2, online at http://apps.who.int/iris/bitstream/10665/255507/1/WHO-HIS-SDS-2017.11-eng.pdf

the market. Post-marketing pharmacovigilance activities play an important role in our ability to gain a deeper understanding of the safety profile of a specific product once it is approved for marketing and becomes available to a wider number of patients in normal clinical practice.

For example, each year the Novartis Chief Medical Office and Patient Safety Organization (CMO & PS) must oversee the submission of more than a million individual case safety reports (ICSRs) to health authorities worldwide – reaching more than 1 500 000 in 2017. Compliance in reporting ICSRs to health authorities remained at a very high level across divisions and even increased marginally in the Innovative Medicines and Alcon Divisions in 2017. These ICSRs record any adverse events experienced by patients using our medications and are an important source of pharmacovigilance data. Taken together, they form the basis for periodic safety update reports (PSURs), which provide an update on the global safety profile of a medicine and conclude with a risk-benefit balance. PSURs are also submitted to health authorities, who confirm the positive risk-benefit balance of our medicinal products and verify that they remain safe to be on the market. The CMO & PS has excelled in this area, with consistent rates of above 99% in 2017 for on-time regulatory submissions.

The Novartis safety risk management process begins early in the development of new products. Safety management teams (SMTs) develop safety monitoring and risk management plans for each product when it enters development. These plans are regularly updated as new safety information for a product becomes available.

Significant safety- and product-related risks are escalated to the Portfolio Stewardship Board (PSB). The PSB is a standing, cross-functional senior executive board that is chaired by the Head of CMO & PS and that reports to senior management in Global Drug Development. Its decisions and recommendations are made independently of project teams and business franchises, with the intent to put patient safety first.

Many of our clinical trials employ third-party/external service providers (ESPs) that deliver various support services. We recognize the need to ensure all ESPs meet the standards to which we hold ourselves accountable. In 2017, we therefore created a new organization within Global Drug Development called the External Development Organization, which functions as a central hub for global supplier oversight.

Our reputation as a healthcare provider is founded on the quality of our products. It is our obligation and commitment to deliver reliable and safe medicines on time, every time – and our Quality organization safeguards our ability to do this. The team's scope is broad: It must ensure the quality of our products over their entire lifecycle, from the early stages of product inception, through clinical development, manufacturing and supply, all the way to market exit or withdrawal. The team also helps support and control activities for the design, conduct, safety management, monitoring, reporting and documentation of clinical trials.

We can measure the success of our Group quality activities through a number of indicators. Health authority inspections of our manufacturing facilities are one way to determine if we are on track. Regulatory inspections with no major findings remained high at 99.1% in 2017, and all were deemed good or acceptable, except for a Russian Ministry of Industry and Trade inspection at Alcon's plant in Puurs, Belgium, which requires further action before being closed out.

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. We consistently engage in education and awareness activities in disease areas across our portfolio. Partnerships (Sustainable Development Goal 17) across the public and private sectors are key to the way we work.

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

Pharmacovigilance, safety profile and quality of drugs performance indicators

	2017[1]	2016	2015
Health authority regulatory reporting (ICSRs)[2] per division (%)	**Innovative Medicines: 99.2** **Sandoz: 98.8** **Alcon: 97.4**	Innovative Medicines: 98.7 Sandoz: 98.7 Alcon: 94.9	Innovative Medicines: 97.7 Sandoz: 97.5 Alcon: 96.5
Regulatory inspections without major findings (%)	**99.1**	98.1	98.4

[1] Compliance by division can only be reported from January to November 2017 due to a change in European regulation as of November 22, 2017, resulting in a change in our reporting configuration.

[2] ICSRs: individual case safety reports

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.

The Novartis Healthy Family programs are also continuing to evolve. Launched 10 years ago in India under the name Arogya Parivar, Healthy Family is an essential public health tool. Arogya Parivar offers effective, low-cost medications against infectious and chronic diseases that are prevalent in rural India. 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. Over the years, however, we have learned that we cannot simply replicate a model, given the differences in healthcare infrastructures and systems, stakeholders, regulatory environments and local competition. For example, the program we launched in Indonesia never took off – partly because we only had one product to offer, and also because our operations on the ground were lacking – and it was discontinued in 2017.

Overall, since 2010, more than 40 million people in rural areas have attended health education sessions held by our Healthy Family programs, and more than 3 million patients have received diagnoses and treatments at health camps. Novartis plans to expand Healthy Family to more countries and disease areas in the coming years, while exploring partnerships with other companies and organizations that have complementary expertise and products.

In a 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 1000 co-workers in biweekly sessions, supporting the nurse and physician who provide healthcare services at the factory.

In an effort to further strengthen its coffee supply chain in Kenya, Nestlé is partnering with Familia Nawiri to bring health information 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.

We are also exploring a collaboration with agribusiness Syngenta; the Kenya Tea Development Agency, one of the largest tea management companies in Kenya; and Living Goods, an NGO that supports health entrepreneurs who teach families how to improve their health and wealth. In particular, we are planning on running health camps in tea-growing areas and other agricultural estates to offer screening, diagnosis and treatments to farmers. We aim to leverage Living Goods' large network of "Avon-like" health entrepreneurs who go door-to-door to incorporate Familia Nawiri activities in two specific counties.

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.

Counterfeit medicines

We believe counterfeit medicines, including both innovative medicines and generics, pose a significant threat to public health. This is especially true since patients 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. We investigate and use various technologies to serialize, track and verify products. 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). It is therefore one technology that helps decrease the number of falsified products that enter the legitimate supply chain. We have also implemented a verification features system that enables a fully automated, fast and secure verification of our innovative medicines products, and we monitor our trademarks globally as another mechanism to detect falsified and counterfeit products.

We investigate all reported cases of falsified and counterfeit Novartis products, regardless of where they are made available, including the internet and local markets. All Novartis associates can access a standardized electronic reporting tool for suspected counterfeit and falsified products. 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, dozens of illegal trading and distribution operations were shut down, falsified and counterfeit medical products found on site were seized, and criminals were prosecuted. More than 7 300 illegal online pharmacies, many of which were large clusters operated by criminal organizations, were also shut down. To raise awareness about the dangers of pharmaceutical crime and the necessity of joint collaboration from all stakeholders, Novartis also actively engaged in training of almost 1 000 law enforcement and health authority officials in more than 20 countries.

Our anti-counterfeiting program is governed by a Security Steering Group that comprises three ECN members, including the Group General Counsel; an Anti-Counterfeiting Steering Committee, also sponsored by a member of the ECN; and an Anti-Counterfeiting Working Group composed of representatives from 11 core functions within Novartis. An Anti-Counterfeiting Guideline has been in effect since November 2016, and a position paper on counterfeit and falsified medical products has been publicly available since July 2017.

Counterfeit and falsified products are especially prevalent for malaria medicines in Africa. It is estimated that up to half of malaria patients there buy antimalarial medicines from the private sector, at local market stalls and drug stores. This carries with it the increased risk of purchasing sub-standard or counterfeit medicines because they are cheaper and available. In addition to conducting several market surveys in African countries in 2017, and initiating and supporting subsequent enforcement operations, we are exploring novel distribution channels to improve access to our high-quality antimalarial for people relying on the private sector.

How we perform

Patient health and safety has always been a top priority at Novartis. In 2017, we took further steps to incorporate the patient perspective more deeply into how we run our business. From a safety perspective, our more centralized Group Quality, medical and patient safety organizations help ensure that patients can be confident in the safety, efficacy and quality of our medicines.

While thorough quality and safety systems are necessary to protect the well-being of patients taking our medicines, we must also continuously work with patients and groups representing them to capture their perspectives and ensure that our medicines, clinical trials and other activities are helping patients overcome health challenges.

Our soon-to-be-published Commitment to Patients and Caregivers is planned to be the foundation for all our patient-related activities, and we intend to incorporate patient perspectives into our research, development and commercial activities to an even greater extent. The process to include the patient perspective in clinical trials has been defined, and several projects have been documenting the benefits. For 2018, this means that we will increase our efforts to seek out and use insights from the patient community to inform our decision-making processes, including expanding access to our medicines and improving access to and participation in clinical trials.

At the same time, our anti-counterfeiting efforts continue to make progress, both internally (through our multipronged approach to better monitor our medicines) and externally (through our work to better track down medicines that are fake).

Our health education programs are also growing and, perhaps more importantly, evolving. We are exploring the possibility of expanding our Healthy Family programs into new countries and therapy areas. We are also looking at additional partnerships with other companies and organizations that have complementary expertise and products. The Novartis Foundation takes a strategic approach, working hand-in-hand and on the ground with partners on projects addressing local health needs. The foundation acts as a catalyst, with the ultimate goal of helping evolve every project into scalable and sustainable healthcare solutions and policies that can improve health outcomes long after our involvement ends.

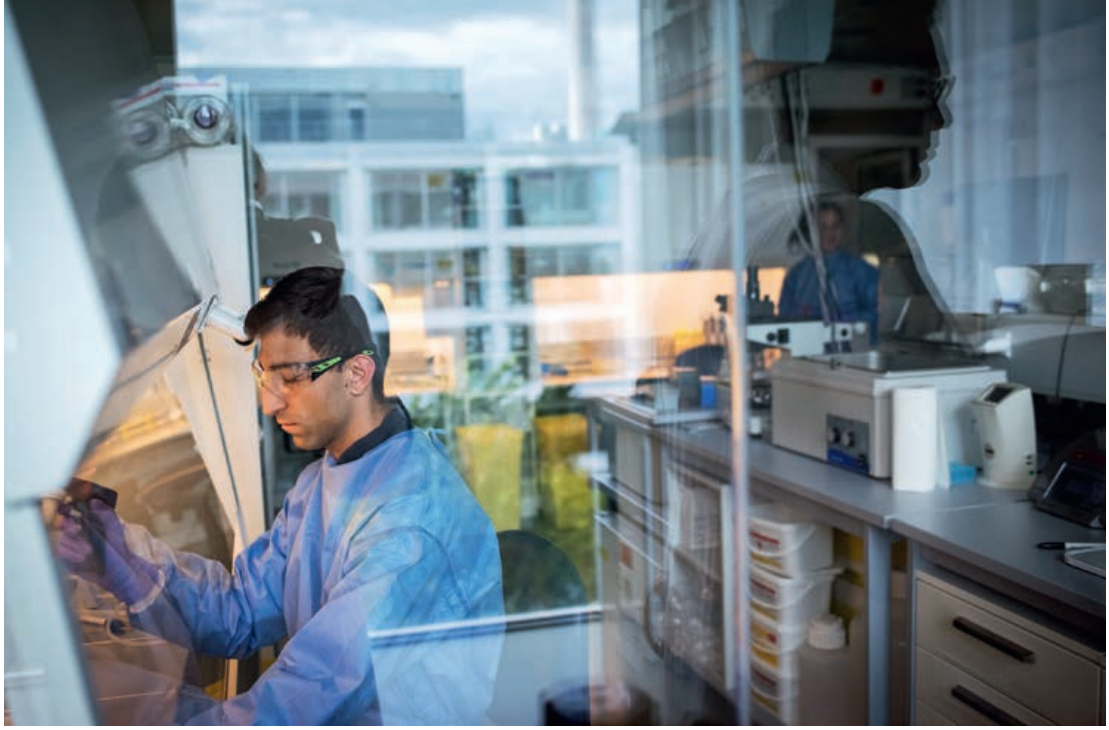


Photo Graduate intern Felix Peix uses CRISPR genome editing technology at Novartis in Basel, Switzerland. CRISPR edits the genes of targeted cells, assisting in drug discovery and offering the potential to treat disease by deleting, repairing or replacing specific genes.

Ethical business practices

"It all comes down to people. If leaders have the right balance between ethical business and economic sustainability, the rest will follow. Leading by example and creating the right work environment is critical, including the right incentives and the right tools."

Brigitta Keller, head of treasury and trade solutions, Switzerland, Citi

2017 highlights

- Developed a new harmonized, companywide Professional Practices Policy
- Further strengthened our anti-bribery due diligence
- Increased country compliance and monitoring visits by approximately 40% from 2016
- Trained almost 115 000 employees on our Code of Conduct
- Expanded the breadth and depth of our Third-Party Risk Management program
- Conducted a corporate human rights impact assessment and piloted our first local human rights conformance review in Egypt
- Published a Modern Slavery Act statement on our website

Key challenges

- Isolated cases of noncompliant behavior may overshadow otherwise improved performance
- The complexity of our multinational organization presents a challenge in swiftly and fully embedding a common understanding around a culture of compliance
- The shift from a rules-based to a more principles-based compliance approach requires a change in mindset that needs time, training and communication
- One end-to-end process to effectively manage third-party risks is complex to operationalize

Why it is important

Expectations are changing – not only for Novartis and the pharmaceutical industry but across all industries. It is no longer good enough to do what is required by law; we need to do what is right, in all our dealings with all our various stakeholders. We expect this to be even more important in tomorrow's world, where society's expectations will continue to evolve and where change will happen at a faster pace than ever.

Operating ethically not only is the right thing to do but also is fundamental to our success as a business. Poor governance and poor ethical business practices can lead to fines, public scrutiny and distrust – overshadowing good performance, destroying reputation, and undermining the morale and engagement of employees. To achieve our goal of being a trusted leader in changing the practice of medicine, we must act in ways that build and maintain the trust of patients, healthcare professionals, governments and society.

How we approach it

We believe that ethical conduct results from a culture of integrity. Ours is built around a Code of Conduct that is a fundamental part of the terms of employment for all associates at Novartis Group companies. The code contains our principles and expectations for ethical business conduct. It guides the behavior of our employees and third parties acting on our behalf, helping them make the right decisions in difficult situations.

But ethical business practices go beyond compliant behavior. We must also respect and help protect human rights at all times, and help ensure that all of our third-party suppliers uphold the same set of standards.

As a company that is actively engaged in research and development, we also believe that certain activities that are essential to our success – including the use of new technologies and the use of animals in research – must be conducted in a transparent and ethical way.

Ethical and compliant behavior

We are strongly committed to ethical behavior founded on the principle of putting the patient first in everything we do. Our interactions with healthcare professionals are intended to reinforce this principle to help ensure that the right drugs are prescribed to the right patients at the right time. We also have an obligation through our interactions with healthcare professionals to advance scientific understanding of diseases and available treatments.

Our approach to integrity starts with a commitment from our most senior leaders. Our integrated global Integrity & Compliance (I&C) function is headed by the Chief Ethics and Compliance Officer, who reports directly to the CEO and who also serves as the Head of Litigation, reporting in that capacity to the Group General Counsel.

The Board of Directors oversees the effectiveness of the Novartis compliance program, while the ECN oversees its operationalization and monitors its effectiveness. Global divisional compliance heads, meanwhile, lead the implementation of division-wide I&C strategies and compliance programs. They are supported by regional and local compliance officers who drive our compliance programs locally and help our employees act with integrity.

We continue to provide confidential channels through which employees and third parties can flag misconduct to the Business Practices Office (BPO), an independent team that reports to the Group General Counsel. These reporting channels include email, telephone, web-based and in-person options. The web-based and telephone channels are operated via a third-party vendor. Employees are protected against retaliation for reporting misconduct, as stated in the Novartis Code of Conduct. The BPO process has been in place since 2005 and is available in 115 countries and 41 languages. In 2017, the BPO investigated 2 031 cases related to misconduct covering 2 574 allegations; 1 147 allegations were substantiated and resulted in 521 dismissals or resignations.

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 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. As of January 2018, we have also introduced annual caps for promotional speaker engagements by healthcare professionals. We are 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 [EFPIA] Disclosure Code). In Europe, Novartis has established a single, con-

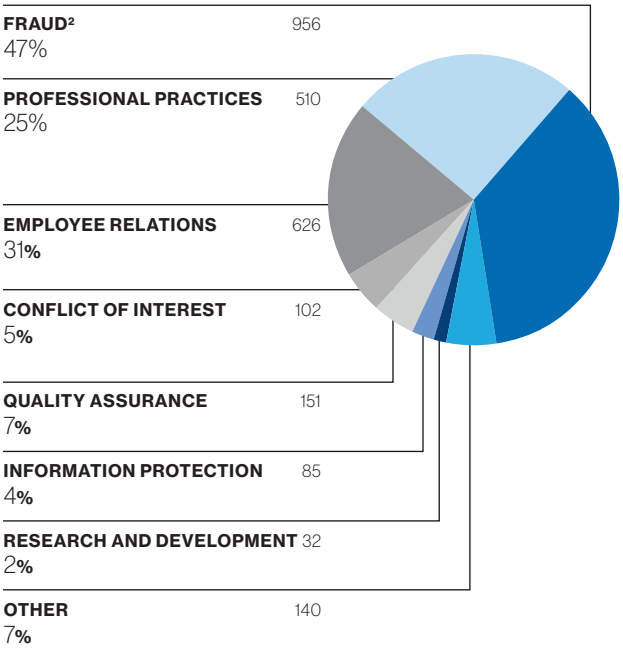
sistent transparency standard for disclosing transfers of value that even goes beyond the EFPIA Disclosure Code's requirements. For example, Novartis has extended this disclosure to include all European Novartis entities whether or not they are in scope of the EFPIA code (e.g., in Luxembourg and Iceland). We also include all product segments, including over-the-counter pharmaceuticals, food supplements and medical devices, though the EFPIA only requires disclosure for prescription pharmaceuticals.

We are making further progress in moving from a compliance function that is perceived as an enforcer of rules to one that is viewed as a problem-solver and a strategic partner to the business to enable sound decision-making. We are also working to simplify the policy framework, which previously included complex and disparate rules-based policies. As part of these efforts, we have realigned our existing division-specific policies to create a new principles-based, Group-wide Professional Practices Policy (P3), effective March 1, 2018 (except at Alcon, where the effective date will be determined at a later stage). P3 will guide our interactions with healthcare professionals and patients. By focusing on the patient and applying more principles-based thinking, our employees will be better equipped to make sound ethical decisions, even in challenging situations.

In 2017, we further strengthened our anti-bribery compliance program by updating our Anti-Bribery Third-Party Guideline, and we trained more than 70 000 Novartis employees (97% of all relevant employees) on the updated policy. This builds on our work that has been underway since the launch of the Anti-Bribery Policy in 2012. New internal Novartis managers and employees in customer-facing roles receive copies of the Anti-Bribery Policy as part of their contracts, and the policy is available in 19 different languages for all Novartis employees. Furthermore, anti-bribery is covered in the new-hire course for internal employees and external contractors. By December 31, 2017, 16 614 employees had been invited to undertake this training, and 14 976 (90% of the new hires invited) had completed it. Additionally, 5 839 contractors had been invited to undertake this training, and 3 972 (68% of the new contractors invited) had completed it. We also

Misconduct cases[1] per category

In 2017, the Business Practices Office investigated 2 031 cases[1] related to misconduct covering 2 574 allegations; 1 147 allegations were substantiated and resulted in 521 dismissals or resignations.



[1] One case can fall under several categories, so the total is greater than 100% and category figures total more than the stated number of cases. Investigation reports are received on an ongoing basis, which potentially leads to a reassessment of the allegation category and related figures.
[2] Fraud mainly related to minor fraud (travel and expenses in small amounts, false reporting of visits to HCPs, etc.).

Ethical and compliant behavior performance indicators

	2017	2016	2015
Novartis associates trained and certified on the Code of Conduct[1]	**114 913**	110 774	110 638
Misconduct cases reported/allegations substantiated[2]	**2 031 / 1 147**	1804/1313	1301/1013
BPO allegations per category (%)[3]			
Fraud	**47**	46	48
Professional practices	**25**	32	29
Employee relations	**31**	25	24
Conflict of interest	**5**	6	7
Information protection	**4**	3	5
Quality assurance	**7**	6	7
Research and development	**2**	2	1
Other	**7**	7	4
Dismissals and resignations related to misconduct[4]	**521**	401	577

[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] One case can fall under several categories, so the total is greater than 100% and category figures total more than the stated number of cases. Investigation reports are received on an ongoing basis, which potentially leads to a reassessment of the allegation category and related figures.
[4] 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.

look at anti-bribery risks in close collaboration with our internal audit function. In 2017, our internal auditors performed audits on 31 units where anti-bribery was in scope to provide independent assurance that our risk management, governance and internal control processes are working effectively.

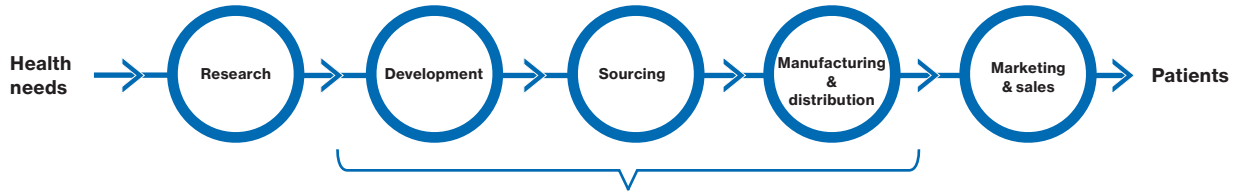
We have strengthened our ability to proactively identify and strategically mitigate risks within the I&C function and on an enterprise level. Last year we launched the Emerging Risk Forum to enhance collaboration across risk and control functions, which include I&C, Finance, Internal Audit, Legal, Quality Assurance and Enterprise Risk Management. The forum aims to promote discussion about top and emerging risks, and to encourage the sharing of best practices across assurance functions. During 2017, the I&C function completed 230 country and monitoring visits – an approximate increase of 40% compared to 2016. We share best practices and lessons from visits with the rest of the organization. In 2017, we established a compliance operations dashboard that provides centralized aggregated data from control functions and helps to better identify trends.

All Novartis Group company associates are required to complete annual integrity and compliance training. In 2017, almost 115 000 employees completed the Code of Conduct course. We offer other awareness and training programs in a variety of formats, and we provide extensive communications materials to support awareness programs at the local level. We also include ethics training in our Corporate Leadership Learning programs.

Responsible supply chain management

Novartis engages with an extensive network of third parties worldwide, and their contributions are crucial to our success. With such a global reach, it is essential that we ensure our goods and services are sourced ethically, based on a robust and documented process.

Our value chain



The RP risk indicator tool

The RP risk indicator tool uses the category risk, country risk and contract value in combination to indicate a potential risk around the five areas of elevated ethical risk in the supply chain: labor rights, HSE general, HSE specific, animal welfare and anti-bribery.

THE RP RISK INDICATOR TOOL

	Labor rights	HSE general	HSE specific	Animal welfare	Anti-bribery
Policy or guidelines	Novartis Supplier Code	Novartis Supplier Code	HSE guideline 1 HSE guidance note 7.2 HSE guideline 8	Novartis Animal Welfare Policy	Novartis Anti-Bribery Policy and Third-Party Guideline
Applies to	All third-party suppliers	All third-party suppliers	Contract manufacturers, waste contractors, chemical producers, facilities or construction contractors working on our own sites	Third-party suppliers handling animals	Third-party suppliers acting on behalf of Novartis
Risk indication trigger	Category risk Country risk Contract value	Category risk Country risk Contract value	Category only (independent of country or contract value)	Category only (independent of country or contract value)	Category only (independent of country or contract value)
Assessment and due diligence	Depending on the risk type, policies and/or guidelines and related standards set forth the due diligence process for suppliers using a variety of tools, including desktop reviews, supplier questionnaires, assessment visits and audits.				
Collaboration/ engagement	Focuses on implementing improvement plans (developed after audits or other assessments) and other targeted initiatives to help suppliers improve their standards and ethical business practices				
Case review	If noncompliance is found through assessment and due diligence, the matter is escalated to a case review.				

To ensure we maintain an ethical supply chain, we support the Pharmaceutical Industry Principles for Responsible Supply Chain Management, and our standards are based on the United Nations Global Compact (UNGC) and other applicable international standards or accepted good practices, such as those of the International Labor Organization. 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. We also rolled out a new e-training module for contractors based on the Novartis Code of Conduct, which references human rights. By December 31, 2017, 5 839 contractors had been invited to undertake this training, and 3 972 (68% of those invited) had completed it.

Our Global Policy of Procurement of Goods and Services from Third-Party Suppliers describes our expectations when committing company resources to suppliers. It defines a competitive environment as one in which our suppliers and/or potential suppliers can compete independently, fairly and transparently for the goods or services we wish to acquire on the basis of price, quality, service and other criteria. The policy is supplemented with a global procurement standard operating procedure that is applicable for all divisions, countries and sites, including the processes for competitive bidding and supplier selection. In our significant locations of operation (based on sales), an average of 90% of spend is on local suppliers.

Modern slavery and human trafficking are serious crimes and violate the fundamental dignity of the human being. In 2017, we published our first UK Modern Slavery Act statement, which details the processes we have in place to help identify and eliminate modern slavery and human trafficking. The statement also outlines our aspirations and objectives, and can be found on our website. An updated statement will be available in January 2018.

2017 RP FINDINGS

We focus our attention on risk and responsibility. Expectations are addressed in the early stages of the supplier selection process. Our Responsible Procurement (RP) practice is designed to provide a clear view of where potential issues exist or standards may be compromised, with speed and accuracy. It quickly filters out more than 90% of suppliers that present little or no ethical risk, enabling us to concentrate our efforts on the small number of suppliers where significant risks exist or where we can influence change. Most importantly, it is designed to give us this insight before we buy; we call it "buying with our eyes open." Ongoing monitoring of these standards is also managed through the RP practice.

Our responsibility goes beyond monitoring suppliers' ability to comply with standards, to promoting real changes that benefit workers and the environment in the countries from which we source. If an issue surfaces, we address it by engaging with the supplier. For example, if a supplier is identified as having a potential environmental or labor rights risk (e.g., water waste, freedom of association and bargaining, or forced or compulsory labor), the topic is discussed and an improvement plan is created with the supplier. In 2017, the labor rights risk assessment process as part of the RP program showed no incidents of child labor or young workers among our assessed suppliers. Our RP program also focuses on applying our expertise to help suppliers find lasting solutions to complex issues, such as bribery, ultimately aiming to improve standards and reduce their overall negative impacts on society. Anti-bribery criteria and data are reported and analyzed on a country-by-country basis.

In 2017, 459 suppliers were identified as posing an elevated risk, including environmental, labor and human rights. One supplier can pose multiple risks. Of these suppliers, 275 have active follow-up actions, including more information requested, on-site assessments or audits. In 2017, we audited 49 suppliers, representing 18% of those identified as requiring follow-up actions. 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.

Against this background, we launched a new Third-Party Risk Management (TPRM) program in late 2016. The program follows an in-depth review of our supplier management systems and processes, and an assessment of the most significant issues in supplier management to help us gain a holistic view of our key risks, such as labor rights and the environment. The assessment identified improvement opportunities, especially in the areas of governance, collaboration across risk areas, capabilities enhancement and action tracking.

The objective of the TPRM program is to implement an integrated approach to third-party risk management through one end-to-end process underpinned by a single technology solution, delivering quality and efficiency improvements. With this new model, we expect to gain depth and breadth, and move toward a comprehensive supplier risk management framework that includes all

Responsible supply chain management performance indicators

	2017	2016	2015
Suppliers posing an elevated risk under responsible procurement [1]	**459**	441	475
Suppliers with active follow-up [1, 2]	**275**	147	249
Suppliers audited [1]	**49**	76	100

[1] Includes new suppliers and new products, services or sites from existing suppliers. Figures include data on labor rights; health, safety and environment; and animal welfare.
[2] Follow-up includes more information requested, audits or on-site assessments.

key risk areas. We believe this new state-of-the-art model will bring consistency and rigor to how we qualify and manage supplier risks, while being simpler, scalable and more transparent.

In 2017, six cross-functional work streams developed three-year action plans to strengthen the policy, implementation and monitoring aspects of the program to address third-party risks. We plan to begin the program rollout starting in Mexico in 2018. We expect it to be operational globally in 2019, following a phased regional rollout.

Respect for human rights

Human rights are founded on the principle that all human beings are equal and entitled to live with dignity. Since 2001, Novartis has been a signatory to the UN Global Compact, endorsing the 10 universal principles covering human rights, labor, the environment and corruption. We also support the UN Guiding Principles on Business and Human Rights (UNGP) and implement them within Novartis across all parts of our business. Our efforts are aligned with Sustainable Development Goal 8, with respect to providing decent work for all, protecting labor rights, eliminating modern slavery and forced and child labor, and promoting a safe working environment.

For Novartis, implementing the requirements of the UNGP involves assessing our potential and actual impacts on human rights through a corporate human rights impact assessment (HRIA), which we conducted in 2017. This assessment was designed to identify and prioritize key risks of negative impacts on human rights, and to define key opportunities around nine human right priorities. To select these priority themes, we conducted interviews with more than 30 Novartis business leaders and reviewed public documents (annual reports, human rights positions, corporate responsibility reports) as well as internal documents and procedures (policies, supplier audit reports, and external stakeholder requests and our answers to them). The nine themes were defined as follows:

- Forced, compulsory, bonded labor and child labor
- Working conditions
- Ethics in research and development
- Fair business practices
- Privacy
- Product stewardship
- Environmental health
- Access to healthcare
- Economic and social development

Based on the results of the corporate HRIA, we developed a market-level HRIA questionnaire to help local Novartis affiliates assess key risks and opportunities associated with these priorities on a local level. In November, we piloted our first local human rights impact assessment in Egypt. Additional local market pilot assessments are planned for 2018, and we will establish an ongoing process for regular local market reviews.

Specific human rights issues are governed and managed through issue- and function-specific standards at Novartis (e.g., the Novartis Supplier Code). We follow an integrated approach to managing human rights and have processes in place that aim to avoid human rights-related violations.

All new employees must acknowledge the Novartis Code of Conduct and all Group policies. The general obligation of each and every Novartis employee to respect

Supplier spend

	Spend			Supplier[3]	
Country	Total %	Direct spend %[1]	Indirect spend %[2]	Total	%
United States	30.6	24.1	32.9	9 340	11.0
Switzerland	26.3	22.8	27.6	8 125	9.6
Germany	7.2	10.0	6.1	8 970	10.6
Austria	5.3	8.2	4.2	4 729	5.6
Japan	2.3	1.8	2.4	4 994	5.9
France	2.1	1.7	2.3	2 891	3.4
Spain	1.9	2.2	1.8	1 868	2.2
Ireland	1.8	4.2	1.0	1 217	1.4
China	1.6	1.1	1.8	4 393	5.2
Belgium	1.6	3.1	1.1	1 540	1.8
Singapore	1.5	0.6	1.8	1 455	1.7
Italy	1.5	1.2	1.6	1 765	2.1
Canada	1.4	1.7	1.3	1 309	1.5
United Kingdom	1.2	1.3	1.2	1 524	1.8
India	1.0	1.3	0.8	3 233	3.8
Rest of the world	12.7	14.8	11.9	35 127	41.5
Grand total	**100**	**100**	**100**	**84 675**[4]	**100.0**[4]

[1] Purchase of goods and services directly incorporated into a product being manufactured. Example: raw material, subcontracted manufacturing services, packaging

[2] All suppliers necessary to run an organization, such as utilities, IT hardware/software, furniture, capital expenditure, marketing supplies, etc.

[3] Suppliers with whom we have a direct contractual relationship pertaining to the delivery of goods and services

[4] The sum of individual country totals is larger than the grand total because one supplier can serve multiple countries. Suppliers are counted for each country they serve, but they are counted only once for the grand total.

human rights is defined in the Novartis Code of Conduct. Our Corporate Responsibility Guideline was updated in 2017 and provides guidance on governance, roles and responsibilities, and the management of corporate responsibility across Novartis. While we do not have a misconduct category called "human rights," our employee relations misconduct category includes issues pertaining to human rights, such as discrimination, harassment and inappropriate behavior – whereas the information protection misconduct category covers the protection of personal data. In addition, there is a category under "other" where any other issues are reported (further details on misconduct categories are on page 37 of this report).

Though none of our operations are identified as having a significant risk for incidents of forced or compulsory labor, the Novartis Code of Conduct specifies our position on forced or compulsory labor and is included in all Group policies as well as the basic employment terms or contracts of all associates. Novartis protects associates from unfair and unethical working conditions, including bonded, forced and child labor, and any unsafe working conditions. Our internal Human Resources Principles Guideline outlines how the Novartis Human Resources (HR) function supports the company's strategic goals, including a commitment to the fair and respectful treatment of associates, and their development through HR processes, services and tools. We annually monitor the global workforce for any associates below the age of 15, and we take corrective action when necessary. In 2017, monitoring showed no incidents of child labor at Novartis operations.

Clinical trial practices in the developing world are also frequently scrutinized to ensure they respect human rights and are not used to "evade" the regulations or ethical standards that are in place in Europe and the US. Novartis acknowledges that the situation of clinical study participants in developing nations is more complex than in the developed world, but we know that issues with regard to the ethical conduct of clinical trials are not limited to the developing world. We therefore follow one global ethical standard for conducting clinical trials, regardless of geography. All clinical trials – whether in developed or developing countries – are designed, conducted and reported in accordance with the ethical principles embodied in the Declaration of Helsinki, Good Clinical Practice guidelines, and national and international regulatory requirements. We apply the same Good Clinical Practice standards for protocols, informed consent documents and ethical reviews in all countries where we conduct clinical trials.

When recruiting participants, researchers strive to ensure that no discrimination arises based on economic, gender and/or ethnic factors, while respecting cultural sensitivities and the requirements of the relevant study protocol. Special care is taken when recruiting trial participants from vulnerable populations, such as children and the economically deprived. Prior to the start of a study, all appropriate trial documentation must be reviewed and positively assessed by independent and appropriately constituted ethics committees and, where required, relevant health authorities.

Our longstanding commitment to human rights led to our first Human Rights Guideline, which was put in force in 2003. In 2017, we issued an updated version of this guideline, incorporating new commitments such as our support of the UN Guiding Principles on Business and Human Rights, endorsed by the UN's Human Rights Council in 2011.

Responsible use of new technologies

Developments at the intersection of IT and healthcare are happening today and include a wide variety of activities – ranging from genome analysis to the development of new, interactive healthcare tools, such as nanotech robots. Concerns about the disruptive nature of these emerging healthcare solutions run deep and often trigger fear and anxiety. They relate to the application of the technology itself, as well as to privacy issues stemming from the vast amounts of extremely personal data that can be accessed.

Nanotechnology is one of the most widely anticipated technologies of the century. As an enabling technology, it will increasingly impact other technologies as well as products such as innovative diagnostic tools and medicines. Like many other technologies, the benefits and risks of nanotechnology must be evaluated in relation to consumers and patients.

Novartis is currently evaluating potential practical applications of nanotechnology, especially in the area of nanomedicine. In accordance with our general drug development process, both the safety and efficacy of all nanoscale drug delivery systems are and will continue to be rigorously investigated and evaluated through in-depth studies. These investigations will be followed by well-controlled clinical studies. Patient safety, workplace safety and environmental protection will continue to be of paramount importance to Novartis. In general, Novartis prefers the development of biodegradable nanoscale drug delivery systems; these systems are degraded within the human body and/or the environment to safe, well-characterized metabolites.

We are also exploring the use of CRISPR as a therapeutic approach to editing the genome of specific somatic cells. CRISPR, an acronym that stands for clustered regularly interspaced short palindromic repeats, is an approach that enables scientists to precisely edit the genes of targeted cells. In a short period of time, it has proven to be a powerful tool for creating very specific models of disease for use in drug discovery, and it has great potential for use as a therapeutic modality to treat diseases at the genetic level by deleting, repairing or replacing the genes that cause disease.

We are using CRISPR in two ways: as a basic research tool to generate animal models of genetic defects, and as a therapeutic approach whereby cells are taken from a patient's body, modified to fight a disease, and then

transplanted back into the patient. We do not support the use of this or other gene editing tools in ways that might modify the sperm or egg cells (germ cells) of humans, as these changes can be passed on to subsequent generations.

Human embryonic stem cell (hESC) research also offers enormous potential for discovering genes related to disease and potentially for cellular therapeutics, but it also raises ethical concerns because of the destruction of embryos needed to generate such cells. With external advisors, we have seriously considered the ethical concerns surrounding research involving hESCs. The use of hESCs is only permitted at Novartis if they are derived from surplus embryos created by in vitro fertilization (IVF) for reproductive purposes and are no longer intended for implantation, or if the embryos were donated and the mother or parents have given informed consent for the cells to be used for research purposes and do not receive any financial benefit. The same standards are required for imported human embryonic stem cells and for collaborations. Under no conditions is it acceptable for Novartis scientists to engage in research with the goal of cloning a human being.

Data collection and privacy are other important factors related to the use of new technology. Many people today are concerned about the increasing availability and use of their personal data. Novartis takes such concerns seriously and understands the importance of protecting this data and using it in a responsible way that does no harm.

Using new technologies requires us to redefine our patient relationships and develop the right solutions in terms of transparency and governance. We are committed to creating a safe digital environment, irrespective of whether these are apps, websites or other tools. At the end of the day, it is about health data and patients' right to have their data adequately stored, protected from illegitimate access and use, and properly processed.

When we collect data from patients through medical applications, clinical trials, interviews and surveys, we do so with full transparency; patients know they are providing this information and are required to give their consent. And in most countries, the collection, processing and use of personal information is strongly protected by legislation.

We also enforce clear policies on protecting personal information such as genetic data. Our data privacy program includes a global organization and well-defined governance, as well as procedures and training to support local activities and ensure compliance.

Animal testing

Advances in medicine are responsible for saving and improving the lives of millions of people – and animal research has been key to many of the great medical advances that we take for granted today. Animal research is only a very small part of all medical research carried out at Novartis, but it plays an important role in our work to find innovative, safe and life-changing medicines for patients. Many of our scientific breakthroughs in devastating diseases have benefited from animal research.

Currently, governments and regulatory authorities require that medicines be tested in animals before they are tested in humans. At the same time, the Declaration of Helsinki says that it is unethical to give experimental treatments to humans that have not been tested first in laboratory animals. Animal studies are a requirement, as they are often needed to better understand complex disease mechanisms that cannot be fully recreated in a "test tube" (in vitro) or on a computer.

The welfare of animals in our care is of primary concern to us. Good animal welfare not only is an ethical obligation but also is a prerequisite for good science because reducing the stress levels in laboratory animals improves the quality of our scientific results. We have an Animal Welfare Policy and a set of Animal Welfare Standards that define key principles, responsibilities and explicit requirements governing animal research. These principles and requirements frequently exceed the requirements of local regulations and must be followed in all animal studies sponsored by Novartis Group companies worldwide, including those conducted by third parties sponsored by Novartis.

We also strictly adhere to international conventions for animal welfare (such as the EC Directive 2010/63/EU and the NIH Guide for the Care and Use of Laboratory Animals), and health authority regulations and guidelines in all of the countries where we operate.

To ensure the implementation of and adherence to Novartis standards, we have a dedicated Global Animal Welfare Organization, made up of animal welfare experts. This organization conducts regular audits of all Novartis animal facilities and Novartis-contracted third parties using animals. We also seek to transparently report on

Animal testing performance indicators

	2017[1]	2016	2015[2]
Rodents	**415 333 (70.8%)**	408 788 (80%)	NA
Zebrafish	**168 201 (28.7%)**	97 639 (19.1%)	NA
Other species	**3 114 (0.5%)**	4 489 (0.9%)	NA

[1] 2017 data are estimates and will be updated with actual data in the first quarter of 2018.
[2] 2015 data cannot be compared due to change of methodology.

our website the number of animals needed for research and development purposes at Novartis each year. In 2017, we used 586 648 total animals in our research activities, of which 415 333 were rodents, 168 201 were zebrafish, and 3 114 were other species.

Novartis fully supports the use of alternatives to animal research wherever feasible. Scientists at Novartis are urged to search for alternative ways to carry out studies before performing animal research. To help achieve this, Novartis adheres to the principles of the 3Rs. This means, where possible, we are committed to continuously:

- Reducing the number of animals used in studies
- Refining study methods
- Replacing animal studies with new methods

To further encourage implementation of the 3Rs, Novartis gives in-house awards annually to the best proposals for practical implementation of the principles of the 3Rs. This encourages Novartis associates to look for ways to practice the 3Rs globally and to come up with new ideas to reduce the number of animals used in our research and development activities.

How we perform

The world is changing and becoming more demanding, more complex, and less tolerant of missteps. While the topics covered in this section may seem broad and only loosely connected, at the core, each plays a role in our efforts to continue to build a more ethical and compliant organization. Our progress continued in 2017 as we worked to make our structures and processes more flexible and transparent. We established a new, streamlined policy to guide our interactions with patients and healthcare professionals, and we advanced our efforts to improve the behavior of our suppliers and to help ensure that human rights are respected by both Novartis and our suppliers. We believe that these improvements will make a positive impact on our activities in 2018 and beyond.

New technology has the potential to revolutionize medicine – and as with any new medicine, we will evaluate any new technologies in an effort to ensure both their safety and efficacy. The same applies to the use of animals in research, as major progress is being made scientifically to reduce, and perhaps someday eliminate, the need for animal research.

Photo Klaus Artz demonstrates the actibelt® – a high-tech movement monitoring device worn in a belt buckle – at NIBR 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.

About this report

For the fifth consecutive year, Novartis is publishing an annual Corporate Responsibility (CR) Report. This report has been prepared in accordance with the GRI Standards: Core option. The report supplements the CR chapter in the 2017 Novartis Annual Report (see pages 66-76). The previous CR Report was published on January 25, 2017.

As a signatory to the United Nations Global Compact (UNGC), we are fulfilling our commitment through this report to produce a UNGC Communication on Progress – a public disclosure outlining our progress in implementing the 10 principles of the UNGC (see page 58). On page 10, we discuss our contribution to the UN Sustainable Development Goals (SDGs). In addition, both the UNGC principles and the SDGs are clearly mapped versus the GRI indicators on page 49.

This year we have made changes to the structure of the report based on feedback from users and a detailed gap analysis to comply with the GRI Standards. The report is divided into four chapters based on our CR material clusters: access to healthcare, innovation, patient health and safety, and ethical business practices. In each chapter, readers will find more focused and contextual information about the topics contained within each CR material cluster. Our materiality assessment is a key part of our CR strategy and provides much more than a list of priority CR topics to report against. It is part of a regular four-year cycle we have established to help us better understand the issues that matter most to our internal and external stakeholders, the impact these issues have on our current and future business, and the associated risks and opportunities for our company. The methodology and results are detailed on page 11. Further, selected views from external stakeholders on our CR material issues can be found in the relevant sections of this report.

As in previous years, the Governance, Nomination and Corporate Responsibilities Committee of the Board of Directors, which is the highest CR body in Novartis, has reviewed this report.

This report covers all regions and divisions from January 1, 2017, to December 31, 2017. All information reflects the continuing operations of the Novartis Group, including the various changes in the Group's portfolio of activities in prior years. Environmental data is based on nine-month actual data (January to September 2017) plus three-month estimates. This data will be restated with actual figures on our website during the first half of 2018. Where data has been restated from previous reports, it is noted in an appropriate footnote in this report. The scope of the report has changed to take account of the results of our 2017 CR materiality assessment. Additionally, GRI Aspect Boundaries have been replaced by GRI Topic Boundaries to show where we as a company have impact and create value. Using the CR materiality assessment, we have analyzed all topics within the four CR material clusters in the context of our value chain.

This report aims to meet the needs and expectations of CR professional audiences by offering easy access to our performance on key topics raised by our CR materiality analysis. The GRI Content Index on page 49 provides links to content within this report, the 2017 Annual Report, the 20-F report and novartis.com.

PricewaterhouseCoopers AG has provided independent assurance on specific CR data and on our materiality assessment outlined in this report. For more detail, see the Independent Assurance Report on page 60.

Learn more about our CR activities: www.novartis.com/our-company/corporate-responsibility.

See all our CR publications.
Receive the Novartis CR e-newsletter via email.

For feedback and suggestions, contact Jill Gregson, Head, Corporate Responsibility Reporting: jill.gregson@novartis.com or go to

→ the **feedback survey**

UN GLOBAL COMPACT
COMMUNICATION ON PROGRESS

This is our **Communication on Progress** in implementing the principles of the **United Nations Global Compact** and supporting broader UN goals.

We welcome feedback on its contents.

The UNGC has 10 guiding principles. The above icons reflect these relevant sections throughout the report.

SUSTAINABLE DEVELOPMENT GOALS

Ratings and recognition

access to medicine index

MEMBER OF Dow Jones Sustainability Indices In Collaboration with RobecoSAM

FTSE4Good

CDP DRIVING SUSTAINABLE ECONOMIES

Performance indicators 2017

ACCESS TO HEALTHCARE PERFORMANCE INDICATORS

	Patients reached (thousands)			FTEs [1]			People reached (thousands) [2]		
	2017	2016	2015	**2017**	2016	2015	**2017**	2016	2015
Social business models									
Novartis Access	**386.5**[3]	8.4	3.3	**25**	14	10			
Healthy Family (in India, Kenya and Vietnam) [4]	**579.6**[5]	428.7	981.2	**498**	491	519	**7 689.9**	7 717.8	7 621.4

	Patients reached (thousands)			Value USD (millions) [6]		
	2017	2016	2015	**2017**	2016	2015
Patient assistance programs						
Novartis Patient Assistance Foundation Inc. (US)	**55.5**	51.2	42.6	**1 466.4**	1 124.7	707.0
Oncology/hematology LMIC patient assistance	**82.9**	83.3	80.6	**1 571.1**	1 579.1	1 523.5

	Patients reached (thousands)			Value USD (millions) [7]		
	2017	2016	2015	**2017**	2016	2015
Zero-profit model						
Malaria/*Coartem*	**43 675.0**[8]	49 757.9	64 097.7	**58.2**	80.7	111.5

	Patients reached (thousands)			Value USD (millions) [2]		
	2017	2016	2015	**2017**	2016	2015
Donations						
Alcon medical missions [9]	**391.9**	484.0	439.0	**61.2**	73.0	43.0
Leprosy (WHO)	**227.0**	290.0	308.0	**6.5**	4.4	5.6
Fascioliasis/*Egaten* [10]	**281.0**	276.2	13.7	**3.9**	<1	<1
Medicine donations (emergency relief)				**10.9**	1.8	1.1

	Value USD (millions) [11]			FTEs [1]			People reached (thousands) [2]		
	2017	2016	2015	**2017**	2016	2015	**2017**	2016	2015
Healthcare system strengthening									
Novartis Foundation	**15.0**	14.8	12.0	**14**	14	10	**7 080.6**[12]	8 908.6	4 456.0
Novartis research capacity-building programs	**1.9**	3.5	5.5	**4**	6	6	**0.6**	1.0	1.0

[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] Numbers have been restated for Healthy Family given the Keluarga Sehat program in Indonesia ended in January 2017.
[5] Several strategic measures were implemented to improve the quality and impact of the program (capping number and size of health camps, etc).
[6] Wholesale acquisition cost (WAC) plus logistics costs for some programs
[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

PATIENT HEALTH AND SAFETY PERFORMANCE INDICATORS

Pharmacovigilance, safety profile and quality of drugs performance indicators

	2017[1]	2016	2015
Health authority regulatory reporting (ICSRs)[2] per division (%)	**Innovative Medicines: 99.2** **Sandoz: 98.8** **Alcon: 97.4**	Innovative Medicines: 98.7 Sandoz: 98.7 Alcon: 94.9	Innovative Medicines: 97.7 Sandoz: 97.5 Alcon: 96.5
Regulatory inspections without major findings (%)	**99.1**	98.1	98.4

ETHICAL BUSINESS PRACTICES PERFORMANCE INDICATORS

	2017	2016	2015
Novartis associates trained and certified on the Code of Conduct[3]	**114 913**	110 774	110 638
Misconduct cases reported/allegations substantiated[4]	**2 031 / 1 147**	1804/1313	1301/1013
BPO allegations per category (%)[5]			
Fraud	**47**	46	48
Professional practices	**25**	32	29
Employee relations	**31**	25	24
Conflict of interest	**5**	6	7
Information protection	**4**	3	5
Quality assurance	**7**	6	7
Research and development	**2**	2	1
Other	**7**	7	4
Dismissals and resignations related to misconduct[6]	**521**	401	577
Suppliers posing an elevated risk under responsible procurement[7]	**459**	441	475
Suppliers with active follow-up[7,8]	**275**	147	249
Suppliers audited[7]	**49**	76	100

Animal testing indicators

Rodents	**415 333 (70.8%)**	408 788 (80%)	NA
Zebrafish	**168 201 (28.7%)**	97 639 (19.1%)	NA
Other species	**3 114 (0.5%)**	4 489 (0.9%)	NA

[1] Compliance by division can only be reported from January to November 2017 due to a change in European regulation as of November 22, 2017, resulting in a change in our reporting configuration.
[2] ICSRs: individual case safety reports
[3] Active Novartis associates with email addresses, trained via e-learning
[4] 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.
[5] One case can fall under several categories, so the total is greater than 100% and category figures total more than the stated number of cases. Investigation reports are received on an ongoing basis, which potentially leads to a reassessment of the allegation category and related figures.
[6] 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.
[7] Includes new suppliers and new products, services or sites from existing suppliers. Figures include data on labor rights; health, safety and environment; and animal welfare.
[8] Follow-up includes more information requested, audits or on-site assessments.

PEOPLE PERFORMANCE INDICATORS[1,2]

	2017	2016	2015
Full-time equivalent positions / headcount[3]	**121 597 / 126 457**	118 393 / 122 985	118 700 / 122 966
Turnover: % voluntary / % overall	**7.0 / 11.3**	7.4 / 12.2	7.3 / 13.5
Voluntary turnover of high performers (%)	**5.2**	5.8	5.5
Internal hires / external hires (%)	**55 / 45**	47 / 53	44.8 / 55.2
Women in management: % of management[4] / % of Novartis Top Leaders[5] / % of Board of Directors	**41 / 27 / 23**	40/ 25 / 25	39 / 23 / 27
Associate nationalities / associate nationalities in management[4]	**145 / 112**	142 / 109	145 / 109
Annual training hours per employee[6]	**24.5**	26.9	28.5
Associates represented by a trade union/internal work council or covered by a collective bargaining agreement (%)[7]	**39**	41	42
Lost-time injury and illness rate (per 200 000 hours worked)[8]	**0.12**	0.08	0.11
Total recordable case rate (per 200 000 hours worked)[8, 9]	**0.36**	0.31	0.40
Number of employees by employment contract (permanent and temporary), by gender[10]			
Women employed on a permanent contract	**58 154**	56 010	55 275
Women employed on a temporary contract	**3 606**	3 479	3 677
Men employed on a permanent contract	**62 806**	61 064	61 810
Men employed on a temporary contract	**1 884**	1 884	2 000
Number of employees by employment contract (permanent and temporary), by region[10]			
Employees on a permanent contract in Asia Pacific region	**29 546**	27 944	27 794
Employees on a temporary contract in Asia Pacific region	**1 844**	1 807	2 128
Employees on a permanent contract in Europe/Middle East/Africa region	**60 870**	58 554	58 692
Employees on a temporary contract in Europe/Middle East/Africa region	**3 240**	3 146	3 076
Employees on a permanent contract in Latin America region	**5 954**	5 872	6 037
Employees on a temporary contract in Latin America region	**241**	276	314
Employees on a permanent contract in North America region	**24 596**	24 704	24 476
Employees on a temporary contract in North America region	**166**	134	139
Number of employees by employment type (full-time and part-time), by gender[10]			
Women employed on a full-time contract	**54 476**	54 317	53 821
Women employed on a part-time contract	**7 284**	5 376	5 191
Men employed on a full-time contract	**63 609**	62 570	63 232
Men employed on a part-time contract	**1 081**	653	634

[1] 2017 people performance can be found on pages 18 and 28-30 of the 2017 Novartis Annual Report.
[2] Read our 2017 data supplement for more details on Novartis occupational health and safety data.
[3] 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
[4] Management defined by Global Job Level Architecture and Novartis Top Leaders
[5] Novartis Top Leaders comprise the approximately 350 most senior managers at Novartis, including the Executive Committee of Novartis.
[6] 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.
[7] Non-management associates
[8] Data include Novartis associates and third-party personnel managed by Novartis associates.
[9] Includes all work-related injury and illness, whether leading to lost time or not
[10] Less than 0.5% of associates have unknown classification.

ENVIRONMENTAL PERFORMANCE INDICATORS[1]

	2017	2016	2015
Energy use (million gigajoules), on site and purchased	**16.48**	16.39	16.29
Greenhouse gas (GHG) emissions, Scope 1, combustion and process (1 000 tCO_2e)	**390.60**	399.67	396.82
GHG emissions, Scope 1, vehicles (1 000 tCO_2e)	**140.81**	135.57	138.83
GHG emissions, Scope 2, purchased energy (1 000 tCO_2e)	**728.50**	785.13	773.20
GHG emissions, Scope 3, business travel (1 000 tCO_2e)	**243.35**	148.14	217.70
Total GHG emissions, Scope 1 and Scope 2 (1 000 tCO_2e)	**1 259.91**	1 320.36	1 308.85
GHG offsets (1 000 tCO_2)	**61.8**	65.7	68.3
GHG emissions (Scope 1 and Scope 2) per sales (tCO_2e per million USD)	**26.10**	27.22	26.49
GHG emissions (Scope 1 and Scope 2) per associate (tCO_2e)	**10.67**	11.32	11.09
Halogenated volatile organic compounds (VOCs) (t)	**55.87**	43.59	66.40
Non-halogenated VOCs (t)	**503.20**	478.14	512.37
Non-hazardous waste recycled (%)	**78.5**	78.7	75.5
Hazardous waste recycled (%)	**57.9**	52.0	55.1
Non-hazardous waste not recycled (1 000 t)[2]	**17.98**	18.11	20.61
Hazardous waste not recycled (1 000 t)[2]	**49.24**	58.77	55.13
Water use (million m^3)	**75.87**	79.21	79.38
Water discharge (million m^3)	**15.38**	16.06	15.83

[1] 2017 environmental sustainability data published in the Corporate Responsibility 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 environmental sustainability, see www.novartis.com/our-company/corporate-responsibility/doing-business-responsibly/health-safety-environment

[2] Reduction target is based on hazardous and non-hazardous waste intensity per tons produced.

Novartis GRI Content Index

GRI STANDARD	DISCLOSURE NUMBER	DISCLOSURE TITLE	UNGC PRINCIPLE	UN SDG	NOTES	PAGE
101 – FOUNDATION						
102 – GENERAL DISCLOSURES						
Organizational profile						
	102-1	Name of the organization				5
	102-2	Activities, brands, products and services				5
	102-3	Location of headquarters				16
	102-4	Location of operations				AR 2017 p.253
	102-5	Ownership and legal form				AR 2017 p.114
	102-6	Markets served				AR 2017 p.205
	102-7	Scale of the organization				AR 2017 p.8
	102-8	Information on employees and other workers	**6**	8 12		47
	102-9	Supply chain	**3, 4, 5, 6, 8, 10**			38
	102-10	Significant changes to the organization and its supply chain				AR 2017 p.198
	102-11	Precautionary principle or approach	**7**			11
	102-12	External initiatives				55
	102-13	Membership of associations	**1, 8**			55
Strategy						
	102-14	Statement from senior decision-maker				6
Ethics and integrity						
	102-16	Values, principles, standards, and norms of behavior	**1, 2, 3, 4, 5, 6, 8, 10**	16		Novartis website
	102-17	Mechanisms for advice and concerns about ethics	**10**	16		Novartis website
Governance						
	102-18	Governance structure				AR 2017 p.84
	102-19	Delegating authority				10
	102-20	Executive-level responsibility for economic, environmental and social topics				10
	102-21	Consulting stakeholders on economic, environmental and social topics		16		13
	102-22	Composition of the highest governance body and its committees		5 16		AR 2017 p.92
	102-23	Chair of the highest governance body		16		AR 2017 p.97
	102-24	Nominating and selecting the highest governance body		5 16		AR 2017 p.92
	102-25	Conflicts of interest		16		AR 2017 p.99
	102-26	Role of highest governance body in setting purpose, values and strategy				AR 2017 p.95
	102-27	Collective knowledge of highest governance body		4		10
	102-28	Evaluating the highest governance body's performance				AR 2017 p.100
	102-29	Identifying and managing economic, environmental and social impacts		16		AR 2017 p.96
	102-30	Effectiveness of risk management processes				AR 2017 p.96
	102-31	Review of economic, environmental and social topics				AR 2017 p.96
	102-32	Highest governance body's role in sustainability reporting				10
	102-33	Communicating critical concerns				11

GRI STANDARD	DISCLOSURE NUMBER	DISCLOSURE TITLE	UNGC PRINCIPLE	UN SDG	NOTES	PAGE
	102-34	Nature and total number of critical concerns			Number and nature of concerns are not disclosed	AR 2017 p.97
	102-35	Remuneration policies				AR 2017 p.118
	102-36	Process for determining remuneration				AR 2017 p.120
	102-37	Stakeholders' involvement in remuneration		16		AR 2017 p.123
	102-38	Annual total compensation ratio			Information is confidential and not disclosed	
	102-39	Percentage increase in annual total compensation ratio			Information is confidential and not disclosed	
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	102-40	List of stakeholder groups				13
	102-41	Collective bargaining agreements	3	8		47
	102-42	Identifying and selecting stakeholders				13
	102-43	Approach to stakeholder engagement				13
	102-44	Key topics and concerns raised				12
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	102-45	Entities included in the consolidated financial statements				AR 2017 p.253
	102-46	Defining report content and topic boundaries				13
	102-47	List of material topics				12
	102-48	Restatements of information				44
	102-49	Changes in reporting				44
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	102-52	Reporting cycle				44
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	103-1	Explanation of the material topic and its boundary				19
	103-2	The management approach and its components		3		19
	103-3	Evaluation of the management approach				19
	203-2	Significant indirect economic impacts		1 2 8 10 17		14
	N1	Availability of medicines indicators				19
Pricing						20
	103-1	Explanation of the material topic and its boundary				20
	103-2	The management approach and its components		3		20
	103-3	Evaluation of the management approach				20
		Indicator under development				
Intellectual property						21
	103-1	Explanation of the material topic and its boundary				21
	103-2	The management approach and its components		3		21
	103-3	Evaluation of the management approach				21
		Indicator under development				
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	103-1	Explanation of the material topic and its boundary				21
	103-2	The management approach and its components		3		21
	103-3	Evaluation of the management approach				21
	N2	People reached through healthcare system strengthening indicators				22

GRI STANDARD	DISCLOSURE NUMBER	DISCLOSURE TITLE	UNGC PRINCIPLE	UN SDG	NOTES	PAGE
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	103-1	Explanation of the material topic and its boundary				23
	103-2	The management approach and its components		3		23
	103-3	Evaluation of the management approach				23
	N3	Patients reached through patient assistance programs indicators				23
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	103-1	Explanation of the material topic and its boundary				27
	103-2	The management approach and its components		3		27
	103-3	Evaluation of the management approach				27
		Indicator under development				
R&D for neglected diseases						27
	103-1	Explanation of the material topic and its boundary				27
	103-2	The management approach and its components		3		27
	103-3	Evaluation of the management approach				27
	N7	R&D for neglected diseases performance indicator				27
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	103-1	Explanation of the material topic and its boundary				27
	103-2	The management approach and its components	8	3 6 14 15		27
	103-3	Evaluation of the management approach				27
		Indicator under development				
Business model innovation						28
	103-1	Explanation of the material topic and its boundary				28
	103-2	The management approach and its components				28
	103-3	Evaluation of the management approach				28
		Indicator under development				
Innovative technologies						29
	103-1	Explanation of the material topic and its boundary				29
	103-2	The management approach and its components				29
	103-3	Evaluation of the management approach				29
		Indicator under development				
Patient health and safety						30-34
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	103-1	Explanation of the material topic and its boundary				31
	103-2	The management approach and its components		3 16		31
	103-3	Evaluation of the management approach				31
	416-2	Incidents of noncompliance concerning the health and safety indicators impacts of products and services				32
Health education and prevention						32
	103-1	Explanation of the material topic and its boundary				32
	103-2	The management approach and its components		3		32
	103-3	Evaluation of the management approach				32
	N4	Health education and prevention indicators				22
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	103-1	Explanation of the material topic and its boundary				34
	103-2	The management approach and its components		3		34
	103-3	Evaluation of the management approach				34
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	103-1	Explanation of the material topic and its boundary				36
	103-2	The management approach and its components		16		36
	103-3	Evaluation of the management approach				36
	205-1	Operations assessed for risks related to corruption	**10**	16		36
	206-1	Legal actions for anti-competitive behavior, anti-trust and monopoly practices				AR 2017 p.225
	419-1	Noncompliance with laws and regulations in the social and economic area				AR 2017 p.225
Responsible supply chain management						38
	103-1	Explanation of the material topic and its boundary				38
	103-2	The management approach and its components	**2, 6**	5 8 16		38
	103-3	Evaluation of the management approach				38
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	103-1	Explanation of the material topic and its boundary				40
	103-2	The management approach and its components	**1**			40
	103-3	Evaluation of the management approach				40
	412-2	Employee training on human rights policies or procedures				38
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	103-1	Explanation of the material topic and its boundary				41
	103-2	The management approach and its components				41
	103-3	Evaluation of the management approach				41
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Animal testing						42
	103-1	Explanation of the material topic and its boundary				42
	103-2	The management approach and its components				42
	103-3	Evaluation of the management approach				42
	N6	Animal testing performance indicators				42
200 – ECONOMIC						
GRI 201 Economic Performance						
	201-2	Financial implications and other risks and opportunities due to climate change	**7, 8, 9**	13		Environmental data supplement p.7
300 – ENVIRONMENT						
GRI 301 Materials						
	301-1	Materials used by weight or volume	**7, 8**	8 12	Detail not provided on specific material types, sources and percentage of renewable content – see full response for detail	Environmental data supplement p.7
	301-2	Recycled input materials used	**8**	8 12		Environmental data supplement p.7
	301-3	Reclaimed products and their packaging materials	**8**	8 12		Environmental data supplement p.8

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GRI 302 Energy						
	302-1	Energy consumption within the organization	**7, 8, 9**	7 8 12 13		Environmental data supplement p.8
	302-2	Energy consumption outside of the organization	**8**	7 8 12 13		Environmental data supplement p.8
	302-3	Energy intensity	**8**	7 8 12 13		Environmental data supplement p.9
	302-4	Reduction of energy consumption	**7, 8, 9**	7 8 12 13		Environmental data supplement p.9
	302-5	Reductions in energy requirements of products and services	**8, 9**	7 8 12 13		Environmental data supplement p.9
GRI 303 Water						
	303-1	Water withdrawal by source	**7, 8**	6 12		Environmental data supplement p.10
	303-2	Water sources significantly affected by withdrawal of water	**7, 8, 9**	6 12		Environmental data supplement p.10
	303-3	Water recycled and reused	**7, 8, 9**	6 12		Environmental data supplement p.11
GRI 305 Emissions						
	305-1	Direct (Scope 1) GHG emissions	**7, 8**	3 12 13 14 15	Biogenic emissions not reported – see full response for detail	Environmental data supplement p.11
	305-2	Energy indirect (Scope 2) GHG emissions	**7, 8**	3 12 13 14 15		Environmental data supplement p.12
	305-3	Other indirect (Scope 3) GHG emissions	**7, 8**	3 12 13 14 15		Environmental data supplement p.12
	305-4	GHG emissions intensity	**8**	13 14 15		Environmental data supplement p.13
	305-5	Reduction of GHG emissions	**7, 8, 9**	13 14 15		Environmental data supplement p.13
	305-6	Emissions of ozone-depleting substances (ODS)	**7, 8, 9**	3 12	Total inventory provided rather than imports and exports	Environmental data supplement p.14
	305-7	Nitrogen oxides (NO_x), sulfur oxides (SO_x), and other significant air emissions	**7, 8, 9**	3 12 14 15		Environmental data supplement p.14
GRI 306 Effluents and waste						
	306-1	Water discharge by quality and destination	**7, 8, 9**	3 6 12 14		Environmental data supplement p.15
	306-2	Waste by type and disposal method	**7, 8**	3 6 12		Environmental data supplement p.16
	306-3	Significant spills	**8, 9**	6 12 14 15		Environmental data supplement p.17
GRI 307 Environmental Compliance						
	307-1	Non-compliance with environmental laws and regulations	**8**	3 12		Environmental data supplement p.17

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GRI 401 Employment						
	401-1	New employee hires and employee turnover	6	5 8		47
GRI 403 Occupational health and safety						
	403-1	Workers representation in formal joint management-worker health and safety committees		8		Occupational health and safety data supplement p.5
	403-2	Types of injury and rates of injury, occupational diseases, lost days and absenteeism, and number of work-related fatalities		3 8	Data not split by gender; data on non-occupational absenteeism, and on injury rate and occu-pational disease for ontractors not available – see full response for detail	Occupational health and safety data supplement p.5
	403-3	Workers with high incidence or high risk of diseases related to their occupation		3 8		Occupational health and safety data supplement p.9
	403-4	Health and safety topics covered in formal agreements with trade unions		8		Occupational health and safety data supplement p.9
GRI 404 Training and education						
	404-1	Average hours of training per year, per employee	6	4 5 8		47
	404-2	Programs for upgrading employee skills and transition assistance programs				AR 2017 p.28
GRI 405 Diversity and equal opportunity						
	405-1	Diversity of governance bodies and employees	6	5 8		47

To provide feedback to this CR Report, go to
→ the **feedback survey**

Appendix: external initiatives and membership of associations

GRI 102-12: External initiatives

- Novartis signed the Women's Empowerment Principles launched by the UNGC and the UN Development Fund for Women (UNIFEM).
- As a signatory to the UNGC, Novartis supports the Universal Declaration of Human Rights, the ILO's Declaration on Fundamental Principles and Rights at Work, the Rio Declaration on Environment and Development, the UN Convention Against Corruption, the Organization for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises, the OECD Convention on Combating Bribery of Foreign Public Officials, and the UN Guiding Principles on Business and Human Rights.
- Signatory to the International Chamber of Commerce's Business Charter for Sustainable Development
- Signatory to the ILO Tripartite Declaration of Principles Concerning Multinational Enterprises and Social Policy
- Signatory to the CEO Letter on the UN Convention Against Corruption
- Support for the Pharmaceutical Industry Principles for Responsible Supply Chain Management set by the Pharmaceutical Supply Chain Initiative (PSCI)
- Voluntarily agreed to reduce greenhouse gas (GHG) emissions in line with the Paris Agreement and subsequent international target commitments, such as those of the European Union (GHG emissions are reported according to the GHG Protocol)
- Signatory to the UNGC/UNEP/World Business Council for Sustainable Development (WBCSD) initiative Caring for Climate: The Business Leadership Platform, also fulfilling the Business Leadership Criteria on Carbon Pricing
- Classify and dispose of waste according to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
- Member of the Carbon Disclosure Project, Water Disclosure Project and Supply Chain Disclosure Project
- Signatory to WBCSD's Manifesto for Energy Efficiency in Buildings
- Signatory to the Guiding Principles on Access to Healthcare (GPAH), which frame the pharmaceutical industry's approach to expanding access to quality healthcare globally
- Strategic partner of the World Economic Forum

GRI 102-13: Membership of associations

Novartis Group companies are members of various chambers of commerce, sustainability industry associations and pharmaceutical industry associations. We also participate in sector initiatives such as the PSCI to promote high ethical standards in the supply chain, and the Pharmaceutical Security Institute to combat counterfeit medicines. Novartis is a member of:

- The Business for Social Responsibility (BSR), including playing an active role on the BSR Healthcare Working Group, and is a signatory to the BSR GPAH
- The Bill & Melinda Gates Foundation CEO Roundtable on Neglected Tropical Diseases, formed to accelerate progress toward eliminating or controlling 10 neglected tropical diseases by 2020
- Uniting to Combat Neglected Tropical Diseases; Novartis is one of the 20 original endorsers of the London Declaration
- Swiss Alliance against Neglected Tropical Diseases
- The International Integrated Reporting Council
- The Private Sector Delegation Advisory Group and the Global Fund Private Sector Delegation
- The Private Sector Constituency to the Roll Back Malaria Partnership
- Various chambers of commerce and sustainability industry associations, including BSR; SustainAbility; WBCSD; EH&S Inc. Corporate Environmental, Health & Safety Roundtable; ORC (Organization Resource Counselors) Safety and Health Forum; Conference Board (Chief EH&S Council, Business Continuity & Crisis Management Council, and Corporate Responsibility & Sustainability Council); European Biosafety Association; American Biosafety Association; Medichem; and the European Process Safety Center
- Pharmaceutical industry associations: national pharmaceutical industry associations in countries or regions where Novartis operates, notably:
  - Interpharma and Intergenerika in Switzerland
  - Pharmaceutical Research and Manufacturers of America (PhRMA), the Biotechnology Innovation Organization (BIO) and the Generic Pharmaceutical Association (GPhA) in the US
  - European Federation of Pharmaceutical Industries and Associations (EFPIA), EuropaBio, Medicines for Europe (formerly EGA), the European Partnership for Alternative Approaches to Animal Testing (EPAA), European Biopharmaceutical Enterprises (EBE), and Euromcontact in the EU
  - Global associations, including the International Federation of Pharmaceutical Manufacturers & Associations (IFPMA)
- National associations in most markets where Novartis has a legal subsidiary

Appendix: corporate responsibility issue cluster and topic definitions

1. Access to healthcare

1.1. Availability of medicines

Efforts to manage barriers that may prevent, restrict or delay medicine availability for patients in need. Examples may include the registration process requirements, inefficient distribution and supply chain management, etc.

1.2. Pricing

Responsible pricing for innovative and generic medicines that takes into consideration affordable access, positive cost-benefit ratio, and overall healthcare costs. Examples may include pricing models such as tiered pricing, managed entry agreements, outcomes-based pricing and non-exclusive voluntary licensing.

1.3. Healthcare system strengthening

Efforts to improve healthcare infrastructure and deliver healthcare-related services "beyond the pill." Examples may include capacity building, training and education, partnerships involving public and private actors to improve healthcare access in underserved areas, and contribution to reducing healthcare costs for payers, insurance companies and consumers.

1.4. Intellectual property

Responsible patent exclusivity management that balances IP protection with the provision of affordable drugs. Examples may include participation in IP sharing arrangements and avoidance of compulsory licensing.

1.5. Patient assistance programs

Programs that support financially needy patients to either purchase their necessary medication at an affordable price or receive it for free.

2. Economic sustainability

2.1. Recruitment and retention of employees

Human resources management that aligns recruiting efforts with strategy and that provides talent management programs to engage and retain associates with relevant skill sets and ensure continuity through reduced associate turnover.

2.2. Fair contribution to society

Ensuring good relations and appropriate economic contribution in the areas in which the company operates. Examples may include payment of appropriate amount of tax and efforts to support the economy in countries of operation (e.g., local employment, local suppliers, active engagement in local initiatives).

2.3. Financial health and performance

Ensuring the company's continued viability, financial health and performance. Examples may include M&A, divesture activities, risk/crisis management and financial liquidity.

3. Environmental protection

3.1. Sustainable use of resources

Measures to ensure efficient consumption of energy, water and other resources. This includes efforts to responsibly source, recycle and/or reuse natural resources; manage the company's impact on plant and animal life; and preserve biodiversity.

3.2. Pollution, waste and effluents

Reduction and management of emissions, pollution, waste (including use of hazardous chemicals and ozone-depleting substances) and effluents. This includes activities to mitigate climate change and its impacts on human health.

3.3. Pharmaceuticals in the environment

Efforts to minimize the environmental impact of our activities and products over their lifecycle and to ensure proper and legal disposal of waste containing active pharmaceutical ingredients.

4. Ethical business practices

4.1. Ethical and compliant behavior

Processes and systems to ensure Novartis operates in line with high ethical standards, especially in regard to our interactions with healthcare professionals. Examples may include adherence to laws and regulations, anti-bribery, anti-corruption and anti-trust; responsible advocacy, lobbying and political contributions; and responsible incentive structures and compensation.

4.2. Animal testing

Measures to keep animal testing at a minimum and ensure tests are conducted according to the highest animal welfare standards.

4.3. Respect for human rights

Positions, policies and management systems to respect human rights across the business and direct supply chain. Examples may include implementation of responsible clinical trials in developed and developing countries, protection of personal data, and the right to health/healthcare.

4.4. Responsible supply chain management

Processes and systems to ensure a responsible supply chain and that our direct suppliers uphold appropriate standards on financial, social and environmental issues. Examples may include outsourcing, third-party manufacturing, the use of clinical research organizations, supplier audits and transparent reporting practices.

4.5. Responsible use of new technologies

Ensuring appropriate handling of and response to controversial ethical questions related to technological advancements. Examples may include cloning, human genetic engineering (e.g., genome editing through CRISPR), nanotechnology, wearables and life extension.

5. Good governance

5.1. Corporate governance

Ensuring the company management structure balances the interests of its relevant stakeholders, and the company is transparent and discloses critical information to stakeholders. Examples may include rules and regulations to ensure board independence, shareholder rights and engagement, and levels of executive compensation and golden parachutes.

5.2. Transparency

Ensuring appropriate scope and quality of information disclosure and reporting, and engaging in dialogue with our stakeholders. Examples may include disclosing information that is critical to stakeholders such as the risk/safety profiles of products, misconduct cases, support of patient groups and political parties, and trial data.

5.3. Data privacy and security

Systems to ensure that the personally identifiable information of patients, employees, consumers and others is responsibly and securely collected, transferred and stored.

6. Innovation

6.1. R&D for unmet medical needs

Maintaining high investments in creating innovative medicines that address unmet medical needs, with a focus on maximizing patients' outcomes before considering market potential. This includes the research of new compounds but also the modification of existing medicines (i.e., to improve access or efficacy for poor and specifically vulnerable patient groups).

6.2. R&D for neglected diseases

R&D for diseases that disproportionately affect people in low-income settings, for which little or no treatment options are available and where market failure limits research activities. This may include infectious and tropical diseases.

6.3. Business model innovation

Efforts to respond to emerging health needs and trends by changing the existing business model and/or developing new business models. Examples may include responding to the needs of low-income patients and to the growing healthcare burden of noncommunicable diseases (NCDs).

6.4. Innovative technologies

Making the most of advances in IT and digital connectivity to advance R&D for products and outcomes and to revolutionize the delivery of healthcare services. Examples may include using big data analysis or developing personalized healthcare solutions (e.g., products with companion diagnostic tests), and improving health solutions based on data collected by wearables.

6.5. Drug resistance

Contributing to the global response to drug resistance that is caused, for example, by inappropriate use and environmental pollution through antimicrobials.

7. Our people

7.1. Diversity and inclusion

Ensuring equal opportunities and fostering a diverse and inclusive workplace where each associate can contribute and be recognized. This applies in terms of age, ethnicity, gender, nationality, language, sexual orientation, physical ability, and religious and personal beliefs.

7.2. Health and safety

Ensuring the health and safety of associates. This includes efforts to reduce fatalities, injuries and sick leave, and to promote well-being through health programs.

7.3. Fair working conditions

Ensuring fair employment practices, including upholding labor rights to freedom of association and collective bargaining, labor relations and union practices, and fair compensation and benefits. This may also include work-life balance considerations.

8. Patient health and safety

8.1. Health education and prevention

Efforts to promote health literacy, disease prevention awareness, and the effective use of medicines. Examples may include treatment adherence, contributing to solutions to the rising burden of NCDs and chronic illnesses, and substance abuse prevention.

8.2. Counterfeit medicines

Using the company's influence to fight counterfeit drugs around the world.

8.3. Pharmacovigilance, safety profile and quality of drugs

Ensuring healthcare products (patented pharmaceuticals and generics) are manufactured at the highest quality level and that the efficacy and safety features of a medicine outweigh its risks (e.g., side effects), as well as collecting and recording adverse event reports. This includes transparent and timely communication in the case of product safety or quality issues (e.g., prompt product recalls).

Novartis and the United Nations Global Compact

Implementing the 10 principles into strategies and operations

This report forms our United Nations Global Compact (UNGC) Communication on Progress (COP). Based on our 2017 corporate responsibility (CR) materiality assessment, we report against selected Global Reporting Initiative (GRI) indicators that are relevant to each of the 10 UNGC principles. See our GRI Standards Index for details on how the report content maps against the UNGC principles and the UN Sustainable Development Goals (SDGs).

Taking action in support of broader UN goals and issues

1. Core business contribution to UN goals and issues

Corporate responsibility is endorsed and ingrained at the highest level in Novartis. We work to embed our approach to CR across the organization, including through our CR Guideline (reflecting the 10 principles of the UNGC). See our governance structure on pages 10 and 11.

Our Novartis Supplier Code sets out the CR requirements we expect our suppliers to meet. We promote the societal and environmental values of the UNGC to our suppliers and use our influence where possible to encourage their adoption. We launched a new Third-Party Risk Management (TPRM) program, which aims to develop an integrated approach to third-party management. With this new model, we expect to move toward a comprehensive third-party risk management framework that includes all key risk areas.

We have long experience in supporting the United Nations in achieving the SDGs. As a healthcare company, ensuring good health and well-being (goal 3) is at the core of our business and is aligned with our mission to improve and extend people's lives. We pursue a combination of approaches to improve access to our medicines for underserved populations. We also work to improve disease diagnosis and management through disease awareness, training and education programs.

Through our business operations and ongoing activities, we also make essential contributions to goal 8 (good jobs and economic growth), goal 9 (innovation and infrastructure), and goal 13 (climate action). We harness the power of partnerships (goal 17) to discover and develop breakthrough treatments and deliver them to as many people as possible. Our partners include governments and the public sector, nongovernmental organizations (NGOs), local communities and health workers, and research and academic institutes.

The SDGs place a large focus on noncommunicable diseases (NCDs), and Novartis Access – an innovative social business approach to treat chronic diseases in lower-income countries – is a testament to this. Since its launch in 2015, more than 800 000 monthly treatments have been delivered to four countries. The Novartis Foundation is also developing innovative models to help low-income patients in urban areas manage their blood pressure.

2. Strategic social investments and philanthropy

Beyond our core business, for the past 15 years, the Novartis Foundation has also supported projects in developing countries, which have helped make progress on development goals by improving access to healthcare, strengthening human resources for health, and empowering vulnerable groups such as leprosy patients.

Another example of our support to the SDGs is through our forest carbon sink projects. An assessment conducted in 2017 to quantify the social return on investment for our four projects in Argentina, China, Colombia and Mali showed that for every US dollar invested by Novartis in each project, an average of USD 7.8 worth of societal value was created thanks to climate change mitigation, ecosystem services, local employment and smallholders' livelihood.

3. Advocacy and public policy engagement

Novartis contributes to the international CR and sustainability debate. We participate in key UN summits and conferences, and are actively engaged with CR stakeholders within and beyond the UN. We bring experts together from private, public, civil and academic organizations to share ideas and best practices, and catalyze new thinking.

For instance, during the 2017 World Health Assembly (WHA), through the Novartis Foundation and Novartis Social Business, we supported and participated in several sessions on digital health. Through our involvement in Access Accelerated, a global partnership working toward the UN SDG target to reduce premature deaths from NCDs by 2030, Novartis

also engaged in activities, including during the WHA and 2017 UN General Assembly. In November, we hosted a dialogue called "Improving Care for Chronic Patients in Lower-Income Countries: the Patient Journey." The panel presented findings and discussed learnings from the first two years of implementation of Novartis Access.

With regard to our engagement on human rights, we support the UN Guiding Principles on Business and Human Rights, and to this effect, in 2016 we started to reassess our potential and actual impacts on human rights through a corporate human rights impact assessment conducted in 2017. We focused our assessment around nine human rights priorities: (1) forced, compulsory, bonded labor and child labor; (2) working conditions; (3) ethics in research and development; (4) fair business practices; (5) privacy; (6) product stewardship; (7) environmental health; (8) access to healthcare; (9) economic and social development. These priority themes were selected based on interviews with Novartis business leaders and a review of public documents (annual reports, human rights positions, corporate responsibility reports) as well as internal documents and procedures (policies, supplier audit reports, and external stakeholder requests and our answers to them). In addition, we piloted a local human rights impact assessment in Egypt in 2017. We welcome the introduction of the UK Modern Slavery Act and issued a statement in 2017. We plan to issue an updated statement in 2018.

4. Partnerships and collective action

Our ongoing alliances and collaborations with public and private organizations worldwide are vital to advancing access to medicines and healthcare delivery to patients. We work with a range of organizations to improve access to healthcare. Read more about our approach to access to healthcare on page 17.

Engaging with the UNGC

1. Local networks and subsidiary engagements

Novartis supports local UNGC networks. As our company is headquartered in Switzerland, Novartis is a member of the UNGC Network Switzerland (GCNS). Novartis subsidiaries are free to join their local UNGC network (there is no "headquarters-only" policy). Novartis subsidiaries in some countries also publish a UNGC COP report.

2. Global and local working groups

Novartis representatives participate in UNGC meetings and webinars. In 2017, Novartis hosted the General Assembly of the GCNS in conjunction with a one-day public event called "Business and the SDGs: Embark on the Opportunity Journey to 2030," held at our headquarters in Basel. The event gathered representatives from NGOs, academia, the healthcare industry and the financial community, in addition to Novartis associates.

3. Issue-based and sector initiatives

Novartis Group companies are members of various chambers of commerce, sustainability industry associations and pharmaceutical industry associations. We also participate in sector initiatives such as the Pharmaceutical Supply Chain Initiative to promote high ethical standards in the supply chain, the Pharmaceutical Security Institute to combat counterfeit medicines, and the Industry Roadmap for Progress on Combating Antimicrobial Resistance. Further, Novartis signed the BSR Guiding Principles on Access to Healthcare and we are active participants in the BSR Healthcare Working Group, having hosted one of the two in-person meetings at our headquarters in Basel, where industry participants discussed how to make progress on industry-related sustainability topics. Novartis contributed to the UN Development Program foundational report called The Role of the Private Sector in Inclusive Development.

4. Promotion and support of the UNGC

In 2017, Novartis sponsored and hosted an event at the Novartis Institutes for BioMedical Research, called the Biopharma Sustainability Roundtable, which was attended by sustainability professionals from the pharmaceutical industry. At that event, a session focused on how industry participants contribute to the achievement of the SDGs.

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 CR Report.

SCOPE AND SUBJECT MATTER

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

- The "access to healthcare performance indicators" on page 45, the "ethical business practices performance indicators" on page 46, the "people performance indicators" on page 47, and the "environmental performance indicators" on page 48 (CR indicators)
- The materiality determination and stakeholder engagement process of Novartis at the Group level according to the requirements of the GRI Sustainability Reporting Standards (GRI Standards), published by the Global Reporting Initiative (GRI) and disclosed on pages 11-13
- Reporting processes and related controls in relation to data aggregation of CR indicators

The "pharmacovigilance, safety profile and quality of drugs performance indicators," the "animal testing indicators," the "number of employees by employment contract (permanent and temporary), by gender," the "number of employees by employment contract (permanent and temporary), by region," and the "number of employees by employment type (full-time and part-time), by gender" are not subject to this Assurance Report. Consequently, we do not express any conclusion on this data.

CRITERIA

The management reporting processes with respect to the CR reporting and CR indicators were assessed against GRI Standards guidelines and 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:

- **Evaluation of the application of Group guidelines**
  Reviewing the application of the Novartis Group internal CR reporting guidelines
- **Management inquiry**
  Interviewing personnel responsible for internal reporting and data collection
- **Assessment of key figures**
  Performing tests on a sample basis of evidence supporting selected CR data concerning completeness, accuracy, adequacy and consistency
- **Inspection of documentation and analysis of relevant policies and principles**
  Inspecting relevant documentation on a sample basis, including Group CR policies, management reporting structures and documentation
- **Assessment of the processes and data consolidation**
  Reviewing the management reporting processes for CR reporting, and assessing the consolidation process of data at the Group level and their related controls
- **Evaluation of the materiality determination and stakeholder engagement process**
  Inspecting the principles of the Novartis materiality assessment process providing the basis for the adherence to the GRI reporting requirements addressing the soundness of the methodology, the identification process, the determination of the impacted stakeholders as well as the prioritization based on the assessed impact of Novartis

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 in all material respects that:

- The CR indicators outlined in the scope and subject matter section and disclosed in the 2017 CR reporting of the Novartis Group are not stated in accordance with Novartis Group internal policies and procedures
- The materiality determination and stakeholder engagement process of Novartis does not adhere to the principles and guiding factors defined by GRI Standards
- The reporting processes and related controls in relation to data aggregation of CR indicators are not functioning as designed

PricewaterhouseCoopers AG

MARTIN KENNARD **RAPHAEL RUTISHAUSER**

Basel, January 23, 2018

Photo back cover Mingzhu Tao, 68, visits her mother at a nursing home in Shanghai, China. With Chinese society generally becoming more mobile and affluent, relationships between the generations are evolving as city dwellers increasingly rely on institutional care to help them look after elderly relatives.

NOVARTIS