Corporate Responsibility Performance Report

2016

NOVARTIS

Highlights 2016

Novartis is a global healthcare company based in Basel, Switzerland. We provide healthcare solutions that address the evolving needs of patients and societies worldwide. Novartis products are available in about 155 countries, and they reached nearly 1 billion people globally in 2016. About 123 000 people of 142 nationalities work at Novartis around the world.

48.5 bn
Net sales (USD)

9.0 bn
Group R&D spending, amounting to 18.6% of net sales (USD)

200+
Projects in clinical development

No. 3
Novartis rank in Access to Medicine Index, up one position from 2014

120 000
Number of Novartis Access treatments delivered to Kenya, Lebanon and Ethiopia since launch, each providing a one-month supply of medicine

52 m
Patients reached through access programs

120
Ongoing pilots for finding new and improved ways of engaging with healthcare professionals

9 800
Doctors and other participants globally received access to webcasts of industry meetings, part of our efforts to do business differently

10 000
Tons net reduction in CO_2 emissions (Scope 1 and Scope 2)

Cover
Nurse Evelin Alvarado Fuentes drew blood from Maria Magdelena Vasquez Lopez as part of a study of chronic obstructive pulmonary disease in rural Guatemala, where widespread use of wood fires for cooking contributes to respiratory disease.

Joerg Reinhardt

Driving innovation and access

In 2016, Novartis took a series of steps to strengthen its business, boost innovation, and adapt its operational structure to the fast-changing global healthcare system. These efforts are designed to strengthen our ability to develop innovative medical therapies and to reinforce our commitment to expanding access to our medicines and doing business responsibly.

Globally, people are living longer than ever before, in part thanks to public and private action in the fight against widespread infectious diseases, such as malaria and HIV. While we need to maintain concerted efforts toward eliminating communicable diseases, we also need to address the rise in age-related noncommunicable diseases, which is putting further strain on healthcare systems.

The United Nations Sustainable Development Goals offer a sound avenue to address these challenges and reach universal healthcare coverage by 2030. Novartis contributes to these targets by driving medical innovation and access to healthcare.

Together with public healthcare leaders, we are continuing our efforts to help eliminate malaria and leprosy. As part of our long-running leprosy program, we have donated approximately 60 million multidrug treatments since 2000 through the World Health Organization. In 2016, we also achieved the milestone of 800 million treatment courses of *Coartem*, delivered without profit for public sector use since we launched our Malaria Initiative in 2001. And we further advanced our investigational malaria treatment KAF156.

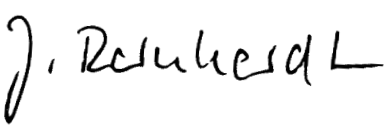
We have also made encouraging progress with the rollout of our Novartis Access portfolio to provide affordable, high-quality medicines to combat chronic diseases in lower-income countries. Although the challenges on the ground are manifold, we will build on the lessons learned in Kenya as we work to expand the portfolio together with our partners in Africa, Asia and Latin America. Banking on the experiences of our social business model Healthy Family, which we started in 2007 in India and have since introduced in Kenya, Indonesia and Vietnam, we are confident that we can continually broaden our patient reach and make Novartis Access sustainable in the long term.

The work of the Novartis Foundation, which aims to pioneer innovative healthcare delivery models in developing countries, is also advancing well. In Vietnam and Ghana, the foundation and its partners have contributed to the creation of local hypertension monitoring and treatment programs, combining existing healthcare infrastructure and digital networks. The ultimate goal is for these programs to be scaled up and to serve as models for treating age-related and chronic diseases in low-income countries.

As we aim to reduce our environmental footprint in the areas of research, production and distribution, we are making continuous progress toward our long-term emission reduction targets, while also improving our material and waste management.

Our innovation and corporate responsibility efforts can only be successful if they are embedded in a culture of high ethical standards. By promoting values such as collaboration, integrity and courage, we are creating a strong behavioral framework, which helps shape the interactions of our associates with patients, healthcare professionals and society at large. We will continue to invest significant efforts in addressing compliance gaps and applying lessons learned throughout the organization. In addition, we have a number of activities underway to improve the way we engage with healthcare professionals, and we are also working on increasing transparency around these interactions.

Through these efforts, we are building the foundation for a sustainable healthcare business that is focused on helping patients, protecting the environment, and gaining the trust of our partners.



Joerg Reinhardt
Chairman of the Board of Directors

Joseph Jimenez

Reimagining corporate responsibility

Last year I traveled to Zambia, where I had the chance to meet a young girl suffering from rheumatic heart disease (RHD). RHD is a complication of untreated streptococcal sore throat, an illness that many parents of young children have encountered at some point. Although completely preventable and treatable, RHD claims the lives of thousands of children each year in the developing world, where poverty is widespread and access to healthcare is challenging. Sadly, and despite our best efforts to help this child, RHD ultimately took her life. Unthinkable tragedies like this are unfortunately a reality for people in poor countries.

I want this company to have an unparalleled impact on humankind and to deliver this impact long into the future

Men, women and children should not be dying from diseases we know how to prevent and treat. As CEO of Novartis, I believe it is our responsibility to use our expertise and skills in a meaningful way to address the needs of these underserved populations.

I want this company to have an unparalleled impact on humankind by creating breakthrough treatments that can help billions of people and transform the practice of medicine itself. I also want us to be able to deliver this impact long into the future, embedding a commitment to sustainability within every aspect of our work.

This is the drive behind our corporate responsibility efforts today, which focus on two key areas: expanding access to healthcare and doing business responsibly. We invest in programs and partners to ensure that our medicines reach as many people as possible around the world. And we invest in our associates and our culture at Novartis to learn, adapt and conduct global business responsibly and sustainably into the future.

These efforts are vital to our success. Healthcare challenges are evolving as populations age and the world faces dramatic increases in chronic diseases. The very nature of business itself is also changing, with society demanding more from companies. We have a unique opportunity to impact millions of people – as an industry, as a company, and as individuals.

That's why we developed Novartis Access, an innovative model for providing treatment for chronic diseases in lower-income countries for only USD 1 per treatment per month. In 2016, we made shipments to Kenya and Ethiopia, and signed a new memorandum of understanding in Rwanda. We also partnered with the International Committee of the Red Cross to treat high blood pressure and diabetes among Syrian refugees in Lebanon, where healthcare systems are stretched thin. In total, we delivered more than 120 000 treatments, each providing a one-month supply of medicine. And we're laying the groundwork to expand into about 30 countries in the years ahead.

Making medicines available at low cost is only part of the equation. Without proper delivery systems – robust supply chains, effective health services, and trained professionals – these gains cannot be sustained. That's why we also invested in strengthening health systems in developing countries where needs are greatest.

In Kenya, for example, we are working to strengthen the pharmaceutical supply chain and train healthcare workers to diagnose and manage chronic conditions. In Zambia, we are conducting research on the true prevalence of RHD; promoting public education and awareness; and expanding access to penicillin, which treats the condition. And the Novartis Foundation is collaborating with local nonprofits and government agencies in

Vietnam and Ghana to create innovative healthcare models that help low-income patients manage their blood pressure.

I am pleased that these efforts are helping patients and gaining recognition from independent groups such as the Access to Medicine Foundation. These investments not only help ease suffering from chronic diseases, but also ensure we are stronger, smarter and better prepared to address this growing epidemic in the future we all want to see.

Doing business responsibly is not a luxury – it is essential to achieving our core business goals. As we embark on 2017, it is clearer than ever that we can only succeed by holding ourselves to the highest standards of business conduct.

I am personally leading this effort to further embed responsible business practices across the organization

We've taken decisive steps to embed a culture of integrity, transparency and accountability throughout our company. We have strengthened our Integrity & Compliance function at the local, regional and global levels. I am personally leading this effort, reinforcing our commitment to further embed responsible business practices across the organization, and urging our leaders to be more accountable for ethical behavior within their teams.

Finally, we pursued the targets outlined in our Vision 2030 on Environmental Sustainability and took steps toward achieving our 2020 target, reducing our net greenhouse gas emissions by 18.7% versus 2010.

I'm proud of the progress we've made in aligning our business goals with our commitment to corporate responsibility and sustainability. This is no small feat, particularly for a company of our size and complexity. But it shows what can be achieved when our 123 000 associates are fully committed to change.

Looking to the future, I am eager to work with our teams to continue embedding corporate responsibility into our business strategy and every facet of our work. And we will continue to actively engage with patients, healthcare providers, governments, investors, employees and other stakeholders to further expand the impact of our corporate responsibility work.

Many of the world's healthcare challenges are difficult to address through the efforts of a single organization. We actively seek like-minded partners – both within our industry and from other sectors – so that we can collectively make a greater impact as we work to achieve the United Nations Sustainable Development Goals and universal healthcare coverage.

I invite you to explore our efforts on the pages ahead and to take the journey with us as we work together to create a better world. Because when it comes to healthcare, we must all do our part to ensure patients have access to the medicines they need. We owe it to patients like the child I met in Zambia.

Joseph Jimenez
CEO

Joseph Jimenez and Juergen Brokatzky-Geiger, Global Head of Corporate Responsibility, visit the Kombewa Clinical Research Centre in Kisumu, Kenya.

About this 2016 report

For the fourth consecutive year, Novartis is publishing an annual Corporate Responsibility (CR) Performance Report. In 2016, we again structured our report in accordance with the Global Reporting Initiative's (GRI) G4 guidelines, with disclosure at "comprehensive" level.

As a signatory to the United Nations Global Compact (UNGC), we are also fulfilling our commitment through this report to producing a UNGC Communication on Progress – a public disclosure outlining our progress in implementing the 10 principles of the UNGC (see page 95). On page 8, 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 pages 36-45.

We have made changes to the structure of this report based on feedback from readers of our 2015 CR Performance Report published in January 2016. This year, our front section provides more focused and contextual information on the issues identified through the CR materiality analysis Novartis conducted in 2013 and updated in 2015. 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 helps us better understand how key CR issues impact our business now and in the future, and informs us about risks and opportunities for our company.

In addition, this year, we reached out to external stakeholders to gauge their views on the key challenges facing our industry on our CR material issues. In parallel, we asked the relevant functional leaders within our organization to express their views on the same topics. These perspectives can be found in the topical 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 our company, has reviewed this report.

This report covers all regions and divisions from January 1, 2016, to December 31, 2016. All information in this corporate responsibility report reflects the continuing operations of the Novartis Group including the various changes in the Group's portfolio of activities that took place during 2015 and prior years. For comparability purposes, all prior-year data has been restated to also only reflect continuing operations. Health, safety and environment (HSE) data is based on nine-month actual data (January to September 2016) plus three-month estimates. This data will be restated with actual figures on our website during the first half of 2017. There have been no significant changes from previous reporting periods in the scope and GRI Aspect Boundaries.

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. You can read more about our materiality assessment and how it maps to G4 aspects and indicators on page 28. The GRI G4 index on pages 36-45 provides links to content within this report and the Annual Report 2016.

PricewaterhouseCoopers AG has provided independent assurance on the key CR data in this report as well as on our materiality exercise. For more detail, see the Independent Assurance Report on page 97 of this report.

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

See our former CR reports, CDP questionnaires and Conflict Minerals Report.
Receive the Novartis CR e-newsletter via email.

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Ratings and recognition

SD **General standard disclosures**

EC **Economic**

EN **Environment**

LA **Social: labor practices and decent work**

HR **Social: human rights**

SO **Social: society**

PR **Social: product responsibility**

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

Corporate responsibility 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 most challenging healthcare issues. We discover and develop breakthrough treatments and find new ways to deliver them to as many people as possible. We also aim to provide a shareholder return that rewards those who invest their money, time and ideas in our company.

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

Our **strategy** is to use science-based innovation to deliver better outcomes for patients in growing areas of healthcare. We maintain strong investment in research and development (R&D) focused on areas of unmet medical need. We seek to develop medicines and products that can produce positive real-world outcomes for patients and healthcare providers. We aim to develop innovative products in growing areas of healthcare where we can make a real difference. At the same time, we are expanding our presence in the emerging markets of Asia, Africa and Latin America, where populations are growing fastest and where demand for access to high-quality medicines and healthcare is also likely to continue to increase.

Novartis corporate responsibility strategy

Our corporate responsibility strategy

We focus our corporate responsibility (CR) work in two areas: expanding access to healthcare and doing business responsibly. This combination of responsible business and making medicines accessible is an important element supporting our company mission, vision and strategy.

To help us find ways to improve access to our treatments for as many people as possible, we offer an array of approaches, including innovative, sustainable business models; equitable commercial models; zero-profit models; patient assistance programs; and philanthropic efforts.

To help us become a trusted leader in changing the practice of medicine, we are taking steps to ensure our standards align with society's increasingly high expectations by strengthening our compliance function, continuing to educate our associates, and changing how we interact with customers. At the same time, we are working to increase our environmental sustainability, reducing our footprint in our day-to-day operations.

Novartis and the United Nations Sustainable Development Goals

The United Nations Sustainable Development Goals urge countries to "leave no one behind." The third development goal specifically focuses on ensuring healthy lives and promoting well-being for all people of all ages, while others such as goal 1 (no poverty), goal 6 (clean water and sanitation), and goal 10 (reduced inequalities) are inextricably linked to health, either directly or indirectly.

The facts underlying these goals are clear – the world's population is growing and graying, boosting demand for healthcare. At the same time, the increasing cost of caring for people around the world is raising pressure on healthcare systems.

The United Nations predicts that the world's population will continue to grow, with an additional 1 billion people expected to inhabit the planet by 2030, bringing the total global population to about 8.5 billion. Most of this population growth is expected to be in the developing world, where there continues to be tremendous unmet medical need. The world's population also continues to age rapidly, with the number of people aged 60 or older expected to increase by more than 500 million by 2030, to 1.4 billion people.

At the same time, millions of people are migrating from rural areas to cities, sparking changes in lifestyle and diet that over time can affect their health. More than half the world's population now lives in cities and towns, and this number is expected to grow to about 5 billion people by 2030.

These trends are fueling a global increase in chronic diseases such as diabetes and heart disease that may require patients to follow years or even decades of treatment. Cancer and cardiovascular diseases will cause half of all deaths worldwide by 2025, predicts the World Health Organization (WHO).

We have long experience in supporting the United Nations in achieving the development goals. 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.

Ensuring good health and well-being is aligned with our mission.

3 GOOD HEALTH AND WELL-BEING

Our mission is 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 make essential contributions to goals 8, 9 and 13.

8 DECENT WORK AND ECONOMIC GROWTH

Novartis employs 123 000 people worldwide. Our products are available in about 155 countries, and they reached nearly 1 billion people in 2016. We are committed to providing decent employment and promoting a diverse and inclusive working environment.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Innovation is at the core of what we do. We use science-based innovation to discover and develop breakthrough treatments, and we pioneer sustainable business models to deliver them to as many people as possible. Our capability-building efforts focus on patient care, research and development, and business skills, aiming to improve health outcomes and strengthen healthcare systems.

13 CLIMATE ACTION

Climate change threatens development and disproportionately burdens the poorest and most vulnerable, while posing clear health risks. We strive to reduce our carbon emissions and minimize our overall environmental footprint.

Partnerships are at the heart of everything we do.

17 PARTNERSHIPS FOR THE GOALS

Novartis seeks effective partnerships to deliver treatments and quality care to as many people as possible. We partner with governments and the public sector, nongovernmental organizations, local communities and health workers, and research and academic institutes.

Syrian refugees ponder an uncertain future: Zakiya, with her son Waleed, age 10, in their makeshift home.

Access to healthcare

> "What does it mean to incorporate access to medicine into the core of a pharmaceutical company's business strategy? It means that every product designed, every collaboration, every decision made about product launches, every strategic choice on which markets to enter, on how to compete with other players, is addressed with the same mindset: 'How can we improve access to medicine for people, including for the poor?' The change makers in these companies are driving sustainable business models forward and, like the international advocates for access to medicine, increasingly demanding affordable prices and real impact."
>
> **Jayasree K. Iyer,** Executive Director, Access to Medicine Foundation

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 medicines. We are working on ways to reimagine access to healthcare through programs that help patients worldwide get the medicines they need, when they need them, at prices they can afford – including those in lower-income countries weighed down by the dual burden of infectious and chronic diseases.

How we approach it

As our most important CR issue, and one of our key focus areas, access to healthcare is governed by a dedicated Access to Medicine Committee. The committee charter is to establish guiding principles and continually assess opportunities to expand access to treatments for more patients, especially in underserved communities.

Specific responsibilities of the Access to Medicine Committee include:

- Developing and implementing companywide policies and positions on access to medicines, tiered pricing, and criteria for establishing patient assistance programs
- Supporting new and existing access-to-medicine initiatives in the Novartis divisions in line with the CR strategy
- Establishing broad commitments and targets related to access to medicines and healthcare
- Sharing best practices, identifying synergies, and reviewing newly proposed access initiatives in light of external trends

Members of the Access to Medicine Committee include the Group CEO (Chair), the Global Head of Corporate Responsibility (Co-Chair as delegated by the CEO), and representatives from all business divisions and relevant

functions. These representatives include the Sandoz Head of Western Europe, Middle East and Africa; the Pharmaceuticals Head of Asia, Middle East and Africa (Co-Chair as delegated by the CEO); the Oncology Head of Emerging Growth Markets; the Alcon Head of Latin America and the Caribbean; the Pharmaceuticals Head of Market Access; the Novartis Institutes for BioMedical Research (NIBR) Head of Infectious Diseases; the Head of Novartis Social Business; the Head of the Novartis Foundation; and the Secretary of the Access to Medicine Committee. The committee meets three times per year.

To expand access to healthcare, we pursue a variety of approaches. Our access strategy defines our pricing and access approach depending on income segments. We offer a broad range of access-to-medicine programs that provide tailored and scalable solutions, including zero-profit models and drug donations, equitable commercial models, social business initiatives and patient assistance programs.

See our
→ position on access to healthcare.

How we perform

Overall, in 2016, our access-to-healthcare initiatives reached approximately 52 million patients globally. This drop from 66 million in 2015 is largely due to the increased availability of WHO pre-approved generic versions of our artemisinin-based combination therapy for the treatment of malaria, reducing the number of patients using our medicine.

Improved ranking in the Access to Medicine Index

In 2016, Novartis ranked third in the Access to Medicine Index – up from fourth in 2014 and seventh in 2012 – in recognition of our efforts to improve access to healthcare. We were listed as the industry leader in access-to-medicine management and capacity building. Two programs were recognized as best practice: Novartis Access and the Community-based Hypertension Improvement Project (ComHIP).

Social business and zero-profit models

In 2016, we combined Novartis Access, the Novartis Malaria Initiative, and the Healthy Family programs into a single unit called Novartis Social Business.

THE FIRST YEAR OF NOVARTIS ACCESS

In late 2016, we marked the one-year anniversary of the launch of Novartis Access, our portfolio of medicines to fight key chronic diseases. The portfolio includes 15 on- and off-patent medicines addressing cardiovascular diseases, type 2 diabetes, breast cancer and respiratory illnesses. It is offered to governments and public-sector customers in low- and lower-middle-income countries at a price of USD 1 per treatment per month.

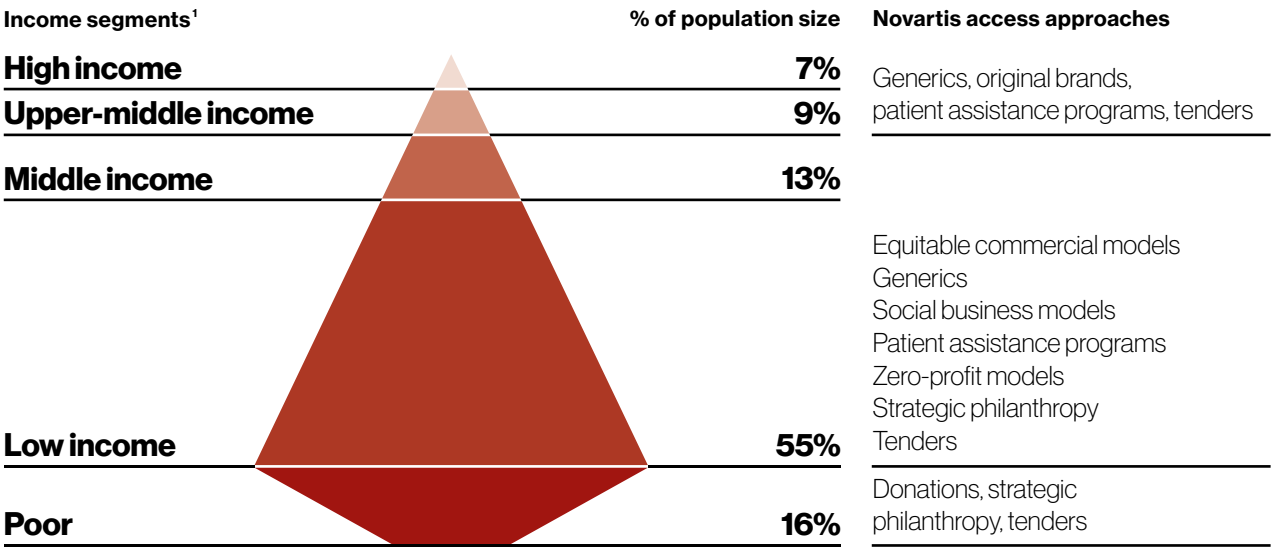
In total, 120 000 treatments, each providing a one-month supply of medicine, have been delivered to Kenya, Ethiopia and Lebanon (through the International Committee of the Red Cross) since launch.

We signed a memorandum of understanding for the implementation of Novartis Access in Rwanda in September, and we expect the first product delivery there in early 2017. We also signed a broad memorandum of understanding with the government of Vietnam, which also covers interventions for noncommunicable diseases such as Novartis Access.

The Novartis Access team is currently in talks with governments and local stakeholders in more than 10 priority countries in sub-Saharan Africa, Southeast Asia, Central America, and Central and Eastern Europe.

At the same time, preparing for future country launches, Novartis Access filed 370 submissions for marketing authorization with health authorities in 21 countries. As we are required to register the portfolio products in all relevant formulations and dosage forms in each country, we have taken this step to facilitate the implementation of the program moving forward.

Novartis access strategy



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

The past 12 months have also brought to the fore some challenges. In particular, we underestimated the paradigm shift our portfolio approach requires in how countries procure medicines. In addition, national essential medicines lists are not regularly updated, hindering countries from purchasing Novartis Access medicines.

Novartis Access will be independently evaluated by a team at Boston University in the US. This research will reveal what works well and what does not, helping us improve the program.

For more information, see
→ the Novartis Access one-year report.

HEALTHY FAMILY PROGRAMS

Healthy Family is an innovative business model that aims to reach more patients in rural areas in the developing world. In 2016, it continued its expansion, reaching more than 7.7 million people through health education sessions in India, Kenya, Vietnam and Indonesia. Nearly 610 000 patients attended specific health camps. Healthy Family is profitable in India and on track to break even in Vietnam and Kenya in 2017.

To improve the quality and impact of the Healthy Family activities, we reassessed and adjusted, where relevant, various program parameters. Specifically, we adjusted the disease area focus, simplified the referral process, capped the number and size of health camps to increase the quality and length of the consultations, and, in some cases, initiated agreements with new partners. As a result, the total number of patients reached in 2016 was smaller than in previous years.

NOVARTIS MALARIA INITIATIVE

In 2016, the Novartis Malaria Initiative achieved another milestone, having delivered more than 800 million treatments without profit – including more than 300 million dispersible pediatric treatments – mostly to the public sector of malaria-endemic countries since 2001.

In December, we announced the launch of an innovative technology-based healthcare program called SMS for Life 2.0 in Kaduna State, Nigeria. SMS for Life 2.0 builds on the award-winning SMS for Life program we launched in 2009. The new and enhanced program will now use smartphones and tablet computers to enable local healthcare workers to track stock levels of nine antimalarials, seven vaccines, and two HIV treatments, and send notifications to district medical officers when stock levels are low. The program will also monitor nine parameters of malaria and seven other diseases, including measles, yellow fever and cholera. In addition, SMS for Life 2.0 will facilitate the training of healthcare workers in local facilities using on-demand eLearning modules.

To find out more about our malaria pipeline, please see
→ page 18.

Equitable commercial models in lower-income countries

Our access strategy framework was approved by the Access to Medicine Committee and the Pharmaceuticals Executive Committee in 2015. This defines a set of tools to develop equitable pricing strategies for lower-income countries, according to the purchasing power of patients and payors. These strategies are systematically applied to key innovative pharmaceutical products that address the disease priorities in these countries. The goal is to maximize patient reach with sustainable commercial models, while minimizing the lag time between introduction in higher- and lower-income countries.

We are tracking the implementation of these efforts through a set of indicators that measure the number of patients with access to our products, as well as the prices patients are actually paying for them. As affordability is also impacted by factors outside of our control – including markups, taxes, tariffs, etc. – our local teams use this data to engage with distribution partners in an effort to reduce markups on Novartis products before they reach patients.

High-quality generic medicines

We are 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 broad portfolio of more than 1000 off-patent medicines covering all major therapeutic areas.

Sandoz is also the pioneer and global leader in biosimilars, which are biological medicines with comparable quality, safety and efficacy to approved reference products. Patents are due to expire on many important biological medicines in the next few years, and the use of much less expensive biosimilars could generate significant savings for healthcare systems. We are on track

> “While in the early days the Novartis approach to access to medicines was mainly focused on philanthropy, our approach has steadily evolved. One major step in this development was the launch of the Novartis Malaria Initiative in 2001, which has enabled us to reach hundreds of millions of patients thanks to an innovative distribution and pricing model. This initiative paved the way for shared value projects that generate value for society through profitable business models, as exemplified by our Healthy Family programs and Novartis Access. I believe these will gain in importance in the future as we strive, together with governments and civil society, to develop ways that enable everybody to improve their quality of life through economic participation and the dignity that accompanies it.”
>
> **Juergen Brokatzky-Geiger,** Global Head of Corporate Responsibility, Novartis

Sandoz Healthcare Access Challenge
In September, Sandoz launched the Sandoz HACk, short for Healthcare Access Challenge. This competition aimed to generate novel solutions to key healthcare access challenges in local communities. Open to 18- to 35-year-olds from around the world, the Sandoz HACk received 150 submissions from 36 countries, including more than 20 lower-income countries. Six finalist entries were selected, from which three winners will be chosen in the first half of 2017. They will receive seed funding and support from mentors to help bring their ideas to life.

to launch five major biosimilars in oncology and immunology in the EU and US by 2020, adding to the three Sandoz biosimilars already on the market worldwide.

In November, Sandoz announced a new collaboration to increase access to medicines by donating up to USD 10 million of products (sales value) annually to Americares – a health-focused relief and development organization that responds to people affected by poverty or disaster with life-changing health programs, medicine and medical supplies. The initial donation will include more than 25 Sandoz products to treat infections; cardiovascular, eye and skin conditions; and musculoskeletal pain.

In December, Sandoz signed a sub-licensing agreement with the Medicines Patent Pool to help produce much-needed hepatitis C treatments for developing countries. Specifically, Sandoz will manufacture daclatasvir, a new direct-acting antiviral that, when used in combination with other treatments, is proven to cure multiple genotypes of the hepatitis C virus.

Patient assistance programs

In 2016, our patient assistance programs worldwide helped more than 130 000 people get medicines they could not afford due to financial hardship, lack of insurance, or inadequate reimbursement. One of our key programs is Novartis Oncology Access, or NOA. NOA is designed to improve access in countries with very limited healthcare reimbursement systems or challenging healthcare environments. In addition to *Glivec*, NOA programs include patient access to *Tasigna* and *Exjade*. Together, NOA and the *Glivec* International Patient Assistance Program (GIPAP) reached more than 80 000 patients worldwide in 2016.

Given changes in the healthcare environment since the GIPAP program was launched 14 years ago, starting in 2017, our longtime partner The Max Foundation will assume full responsibility for developing and managing the program. Novartis Oncology will donate *Glivec* to The Max Foundation to supply patients currently eligible for GIPAP, and provide funding to The Max Foundation to support program operations. China Charity Federation continues to be our partner for these patient assistance programs in China. Since 2010, a total of 50 000 patients in the country have benefited from these programs.

Donations

WORKING TO ELIMINATE LEPROSY

In 2016, Novartis celebrated its 30-year commitment to leprosy elimination. In total, since 2000, we have donated multidrug therapy to 6 million leprosy patients worldwide. The Novartis Foundation continues this legacy by devising novel strategies to fully interrupt the transmission of the disease. At the 19th International Leprosy Congress in September, the foundation presented emerging evidence on the leprosy post-exposure prophylaxis (LPEP) program, which evaluates the effect of providing preventive medicines to close contacts of newly diagnosed patients to decrease the risk of transmission. Partway through the study, LPEP has already shown that it could be integrated into routine practice in endemic countries in the future.

ACCESS TO STATE-OF-THE-ART EYE CARE

Through the Alcon Foundation and corporate giving efforts, our Alcon eye care division is working to enhance sight by supporting efforts to make quality eye care more accessible in the US and abroad. Throughout 2016, Alcon supported 646 medical missions, reaching more than 480 000 patients with eye conditions, and restoring sight for 58 000 patients through surgery. Through the US patient assistance program, Alcon also helped nearly 6 000 patients get the sight-saving medications they needed.

For years, Alcon has partnered with Orbis, which operates a Flying Eye Hospital that provides hands-on training to local eye care specialists and treats patients in some of the world's most underserved areas. Approximately 200 patients are treated during a typical Orbis program. In 2016, Orbis launched its third-generation Flying Eye Hospital, equipped with the latest technology. Alcon supported the aircraft with equipment, products, volunteers and financial assistance. The new Flying Eye Hospital completed its maiden program in Shenyang, China, in September. During the three-week visit, the plane's medical volunteers treated 124 patients and provided hands-on surgical training to 18 local doctors.

Health systems strengthening: managing hypertension

In 2016, the Novartis Foundation, together with global nonprofit PATH, local partners and government agencies, launched a blood pressure management program in Vietnam called Communities for Healthy Hearts. The program is designed to improve the health of adults who have high blood pressure and are living in low-income households in four districts in Ho Chi Minh City, Vietnam's largest urban area.

The Communities for Healthy Hearts program is the Novartis Foundation's second blood pressure program in a lower-income setting. In 2015, the Novartis Foundation launched the Community-based Hypertension Improvement Project in Ghana. Today, the program covers the 200 000 people living in the Lower Manya Krobo District in Ghana's Eastern Region, bringing hypertension screening services closer to the community.

Targets and commitments can be found → on our website.

Novartis access approaches: key performance indicators

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

Social business models

	Patients reached (thousands)			FTEs[1]			People reached (thousands)[2]		
	2016	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Novartis Access	8.4[3]	3.3[3]		14	10				
Healthy Family (in India, Kenya, Vietnam and Indonesia)	609.6[4]	981.2	788.4	495	519	529	7 756.4	7 621.4	6 646.0
Total	**618.0**	**984.5**	**788.4**	**509**	**529**	**529**	**7 756.4**	**7 621.4**	**6 646.0**

Patient assistance programs

	Patients reached (thousands)			Value USD (millions)[5]		
	2016	2015	2014	**2016**	2015	2014
Novartis Patient Assistance Foundation Inc. (US)	45.4	42.6	61.3	1 115.0[6]	707.0	546.9
Oncology/hematology LMIC patient assistance	83.3	80.6	75.3	1 579.1	1523.5	1 431.2
Alcon US patient assistance	5.8[7]	7.8	9.3	9.7[7]	13.2	13.1
Total	**134.5**	**131.0**	**145.9**	**2 703.8**	**2 243.7**	**1 991.2**

Zero-profit model

	Patients reached (thousands)			Value USD (millions)[8]		
	2016	2015	2014	**2016**	2015	2014
Malaria/*Coartem*	49 757.9[9]	64 097.7	70 027.9	80.7	111.5	137.4
Total	**49 757.9**	**64 097.7**	**70 027.9**	**80.7**	**111.5**	**137.4**

Donations

	Patients reached (thousands)			Value USD (millions)[5]		
	2016	2015	2014	**2016**	2015	2014
Alcon medical missions[10]	484.0	393.8	438.6	73.0	43.0	41.4
Leprosy (WHO)	290.0	304.5	308.3	4.4	5.6	5.6
Fascioliasis/*Egaten*[11]	276.2[12]	13.7	233.0	<1	<1	<1
Medicine donations (emergency relief)				1.8	1.1	1.9
Total	**1 050.2**	**712.0**	**979.9**	**79.2**	**49.7**	**48.9**

Health systems strengthening

	Value USD (millions)[13]			FTEs[1]			People reached (thousands)[2]		
	2016	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Novartis Foundation	14.8	12.0	13.1	14	10	10	8 908.6[14]	4 456.0	3 560.2
Novartis research capacity-building programs	3.5	5.5	5.0	6	6	6	1.0	1.0	1.0
Total	**18.3**	**17.5**	**18.1**	**20**	**16**	**16**	**8 909.6**	**4 457.0**	**3 561.2**

	Patients reached (thousands)			Value USD (millions)[5, 8, 13]			FTEs[1]			People reached (thousands)[2]		
	2016	2015	2014	**2016**	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Grand total	**51 560.6**	**65 925.2**	**71 942.1**	**2 882.0**	**2 422.4**	**2 195.6**	**529**	**545**	**545**	**16 666.0**	**12 078.4**	**10 207.2**

[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] Several strategic measures were implemented to improve the quality and impact of the program (capping number and size of health camps, etc).
[5] Wholesale acquisition cost (WAC) plus logistics costs for some programs
[6] Integration of Alcon brands in the program as of August 2016 and a full-year impact of GSK oncology medicines
[7] Data reflects January to July 2016; as of August 2016, the program transitioned to the Novartis Patient Assistance Foundation Inc. (US).
[8] *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.
[9] Increased availability of generic options on the market
[10] Retail value for surgical products
[11] Manufacturing, testing and FTE costs
[12] Some 2015 shipments shifted to 2016.
[13] Operating costs
[14] 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

Ghanaian scientist, Edmund Ekuadzi supervises an exam in pharmacognosy, the study of medicines derived from plants.

Ethics and compliance

> "The commitment to compliance with ethical standards and laws is not demonstrated by creating an abundance of policies, guidelines and formal procedures, but in the real effectiveness of the chosen management tools and the ethical leadership across the whole company. If you want to create sustainable value for your company, you must commit to moral principles and beliefs, and follow them in your day-to-day business."
>
> **Josef Wieland,** Professor of Institutional Economics, Organizational Governance, Integrity Management and Transcultural Leadership at Zeppelin University, Germany

Why it is important

Operating ethically is not only the right thing to do, it is also fundamental to our success as a business. Poor governance and ethical business practices can lead to fines, public scrutiny and distrust – overshadowing good performance, destroying reputation, and undermining the morale and engagement of employees. If we are to achieve our aspiration 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

Our aim is to prevent issues from occurring, drive personal accountability for behaviors, and generate learnings that can be applied across the organization. Our Chief Ethics and Compliance Officer reports directly to the CEO, ensuring the compliance function is represented at the highest levels in the company.

We do not tolerate unethical behavior by our associates anywhere, and we are committed to taking all necessary steps to ensure compliance with our Code of Conduct and all applicable laws.

More information on ethics and compliance can be found → on our website. Our policies and positions on ethics are also listed on our website.

How we perform

Strengthening ethics and compliance

Starting in May 2016, the Chief Ethics and Compliance Officer is also Head of Litigation, reporting to the Group General Counsel of Novartis. By bringing the compliance and legal functions closer together, we can evaluate facts that are uncovered and intended for use in litigation cases to determine if additional compliance actions or policies are warranted. This helps us continuously improve our compliance activities.

We continue to strengthen the Integrity & Compliance (I&C) function, which now has approximately 375 full-time equivalent employees dedicated to integrity and compliance at the local, regional and global levels. Of these employees, 175 were added in the past three years.

We have developed an internal I&C Training Academy. The academy is a web-based tool launched in January 2016 to provide I&C employees the opportunity to further enhance their functional skills and competencies.

We work to identify and further mitigate risk exposure proactively, so it can be reviewed and discussed at a management level. Our goal is to maintain consistent standards of business practices across Novartis, and ultimately to provide the best possible care for patients globally. We added country and global compliance risk assessments for marketing and sales.

Compliance has now become a regular agenda item of leadership meetings across the company. To ensure accountability of local country organizations, our management includes integrity and compliance questions as part of standard business reviews.

It takes significant effort to truly and deeply embed a culture of integrity in a sustainable way across a large, complex and multinational organization. As a result, we do still uncover lapses. We take allegations of any inappropriate behavior very seriously, actively investigate them, and take appropriate disciplinary action.

Following recent cases of misconduct, we have further increased our focus on ensuring that lessons learned are shared immediately and transparently throughout the global organization to identify other similar behaviors and enable intelligent risk mitigation. We continue to invest significant efforts to embed a culture of compliance throughout our organization.

Greater transparency with payments to customers

As of 2016, companies belonging to the European Federation of Pharmaceutical Industries and Associations (EFPIA), including Novartis, publicly disclose payments and other transfers of value to health professionals and healthcare organizations.

Since June, we have made our disclosure reports available on our global website. We will extend this disclosure to include all product segments in EFPIA countries where we have activities – even parts of our business that are not covered by the EFPIA code – and publish them on our global website in 2017. In addition to the EFPIA code, we comply with similar transparency codes and regulations in the US, Japan and Australia.

Anti-bribery and anti-corruption

Our Code of Conduct clearly states our position on bribery and corruption: we do not tolerate any form of bribery or corruption. To ensure compliance with internal and relevant external financial standards and regulations, all our operational reporting units (100%, approximately 350 units) undergo a financial risk assessment and have implemented the Novartis Financial Controls Manual requirements.

There are a number of significant risk areas and controls either directly or indirectly related to corruption, including the proper segregation of duties, competitive bidding and the supplier selection process; assurance on external service providers; our Code of Conduct and Anti-Bribery Policy; marketing and promotional activities; and relationships with third parties.

In 2016, we updated and re-launched our Anti-Bribery Policy. We also launched a global online tool to handle conflicts of interest transparently across the company.

Training on ethics policies and procedures

All Novartis Group company associates are required to complete integrity and compliance training. In 2016, three courses were available via e-training: Code of Conduct, Social Media and Information Management. Three shorter and/or refresher courses were also delivered: Adverse Events, Data Privacy and Anti-Bribery.

During the year, 112 502 associates were invited to complete the Code of Conduct course, and 110 774 (including ECN members) had completed it by December 31. This represents 98% of the invited population. 14 937 new associates were invited to complete the new hire e-training module (which includes a section on anti-bribery and corruption), and 13 585 (91%) had completed it by December 31. Also as of December 31, 72 580 associates were invited to complete the anti-bribery course, and 70 029 had completed it (96% course completion).

Investigating and acting on inappropriate behavior

We take allegations of any inappropriate behavior very seriously, actively investigate them, and take appropriate disciplinary action. Associates can report suspected misconduct to the Business Practices Office (BPO) – an independent team that reports to the Group General Counsel. In 2016, the BPO received a total of 3 595 complaints of alleged misconduct, of which 1 888 were deemed not to be related to misconduct and were delegated for review and action outside the BPO investigative process.

“Patients, customers and shareholders increasingly expect more from companies like Novartis not just in terms of what we do, but how we do it. Our mission is to improve and extend people’s lives, and our stakeholders expect us to do so while conducting ourselves in the right way. Novartis has had several situations recently where it did not live up to these expectations, and we now find ourselves needing to regain the trust of our stakeholders. To do so, we must ensure that our associates, no matter what situation they’re facing, act at all times with integrity. We have to continue to drive a culture anchored in our Values and Behaviors, while at the same time nurturing new ways of thinking about how we engage healthcare professionals. This will take time. But getting this right will allow us to realize our vision of being a trusted leader in changing the practice of medicine.”

Shannon Klinger, Chief Ethics & Compliance Officer and Head of Litigation, Novartis

Changing the way we interact with customers

One of our goals in 2016 was to find better and more inclusive ways to reach a broader cross-section of the medical community. Social expectations are changing rapidly, and educational and promotional practices, which have been widely used by the industry, need to be re-evaluated.

We have 120 pilots for finding new and improved ways of engaging with healthcare professionals that are ongoing or completed. This includes employing technology to supplement face-to-face meetings and bring the experience of international congresses to the local level. For the prominent American Society of Clinical Oncology meeting in June, we used our new virtual conference platform *Vivinda* TV to deliver meeting content on-demand to more than 5 000 virtual delegates in 103 countries – a reach five times greater than in the past. At the European School for Advanced Studies in Ophthalmology, we also used *Vivinda* TV to provide almost 1 800 virtual delegates in 75 countries with online access to meeting content. This significantly exceeded the 600 ophthalmologists who would normally attend the meeting in person. In addition, Novartis partnered with the American Society of Hematology (ASH) to provide 3 000 healthcare professionals with virtual access to their annual congress via the ASH web portal.

Beginning 2017, our company will offer doctors support to attend international medical conferences based on their active participation in the event (i.e., only if they are speakers or presenters of Novartis data, chairs of Novartis-sponsored sessions, or faculty for post-congress education). Novartis will also only sponsor speakers to represent the company in clearly defined instances, such as when a new product becomes available, a new indication is added to an existing product, or significant new clinical data is released.

The BPO initiated investigations of 1 707 reported cases related to misconduct; 893 were substantiated, including 401 that resulted in dismissals or resignations.

Of these investigated allegations, 46% pertained to fraud, 32% to professional practices, and 6% to conflict of interest. Corruption cases can be found across these three categories. Novartis does not currently report data on the nature of confirmed incidents of corruption, or on the termination or non-renewal of contracts with business partners due to violations related to corruption.

ETHICS AND COMPLIANCE KEY PERFORMANCE INDICATORS

	2016	2015	2014
Novartis associates trained and certified on the Code of Conduct[1]	**110 774**	110 638	108 290
Misconduct cases reported/allegations substantiated[2]	**1 707/893**	1 300/1 010	1 547/1 131
BPO allegations per category (%)[3]			
Fraud	**46**	48	44
Professional practices	**32**	29	29
Employee relations	**25**	24	20
Conflict of interest	**6**	7	7
Information protection	**3**	5	5
Quality assurance	**6**	7	3
Research and development	**2**	1	1
Other	**7**	4	3
Dismissals and resignations related to misconduct[4]	**401**	577	620
Suppliers posing an elevated risk under responsible procurement[5]	**441**	475	428
Suppliers with active follow-up[5,6]	**147**	249	222
Suppliers audited[5]	**76**	100	78
Regulatory inspections without major findings (%)	**98.1**	98.4	97.9

[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 life cycle. 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. In 2016, the Business Practices Office (BPO) received a total of 3 595 complaints of alleged misconduct, of which 1 888 were deemed not to be related to misconduct and were delegated for review and action outside the BPO investigative process. The BPO initiated investigations of 1 707 reported cases related to misconduct; 893 were substantiated, including 401 that resulted in dismissals or resignations.

[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.

[5] 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.

[6] Follow-up includes more information requested, audits or on-site assessments.

For more information on significant investigations and related litigations, see
→ pages 217-220 in our Novartis Annual Report 2016.

Targets and commitments can be found
→ on our website.

Jennifer Allport-Anderson sees life dramas reflected in the cells she studies.

Research and development

> “Better treatments for neglected diseases are a crucial priority to achieve our vision of equitable global health. For some diseases, current therapies are encountering increasing resistance, while for others, existing drugs have unacceptable side effects or no drugs are available at all. In recent years, there has been a much-welcomed boost in R&D for neglected diseases, catalyzed by partnerships between academia, pharmaceutical companies, charities and governments. However, we need all sectors to step up investment and increase their efforts to ensure these treatments reach the patients in need.”
>
> **Trevor Mundel,** President of the Global Health Division at the Bill & Melinda Gates Foundation

Why it is important

Research and development as well as a strong pipeline of potential medicines are critical for future business and long-term success. R&D remains a cornerstone of the Novartis strategy and a foundation of our future. We invested USD 9.0 billion on R&D for new drugs and medical devices in 2016, or 18.6% of net sales. Our teams made progress toward fighting devastating diseases ranging from breast cancer to multiple sclerosis to malaria.

We believe innovation that produces breakthrough medicines, devices and solutions will be critical in the coming years as demographic trends increase pressure on healthcare systems to produce the best results at the lowest overall cost. Innovation more broadly is also a key enabler of access to healthcare. Altogether, this supports our efforts to grow in emerging markets and can help us respond to unmet medical needs of patients, whether in the developed or developing world.

How we approach it

Our R&D strategy sets clear priorities. We concentrate on therapeutic areas where there is patient need and where scientific advances present new opportunities, including oncology, cardiovascular, eye care, biosimilars and neuroscience.

We are also exploring new scientific frontiers in areas with great potential for innovation, including immuno-oncology, aging and regenerative medicine, and infectious diseases.

We seek to develop medicines and products that can generate positive real-world outcomes for patients and healthcare providers. The benefits can range from improving the cost-effectiveness of high-quality care to prolonging lives. We are developing services and technologies to increase the benefits of our core products, often in collaboration with healthcare providers and technology companies.

To focus our resources, we completed a portfolio prioritization exercise for projects in development, which led to the acceleration of certain projects and the termination of others. We are concentrating on therapies we believe have the greatest potential to change the practice of medicine, with more than 200 projects in clinical development.

The Novartis Institutes for BioMedical Research (NIBR) is the innovation engine of Novartis. In 2016, we updated our research strategy to ensure that we remain a discovery powerhouse. We are increasing collaboration across traditional scientific and organizational boundaries, with a focus on powerful new technologies that have the potential to help produce therapeutic breakthroughs.

Drug development

When molecules are ready for testing in humans, we organize proof-of-concept studies enrolling small numbers of patients to make an early assessment of a drug's safety and effectiveness.

After a successful proof-of-concept study, our development team decides whether to begin larger clinical trials to test effectiveness and safety in additional patients. We pursue therapies where we can leverage the scale and expertise of Novartis development operations to bring important treatments to large numbers of patients.

In 2016, we created a single Global Drug Development group to manage clinical development for all our therapeutic areas, advancing molecules ranging from checkpoint inhibitors for cancer to a peptide for heart failure to biosimilars for a variety of diseases. This work was previously conducted individually by several organizations within the company. By integrating our development organization, we aim to leverage our collective strength. We can now look at our entire mid-stage pipeline across our Innovative Medicines and Sandoz businesses to identify projects that hold the most promise and take steps to ensure they are properly resourced.

More information on R&D can be found
→ in the innovation section, pages 40-57, of the Novartis Annual Report 2016, and on our website.

How we perform

Infectious diseases

Bacteria, viruses and other micro-organisms continue to significantly impact human health, despite major medical advances. Infectious diseases remain the leading cause of death in children and adolescents, and one of the leading causes of death in adults. We are working across the spectrum of these diseases, including tropical diseases such as malaria that alone kills almost 430 000 people each year.

The Novartis Institute for Tropical Diseases (NITD) is dedicated to finding new medicines for malaria, dengue fever, human African trypanosomiasis and other neglected diseases. In October, we announced that NITD will move its operations and research programs from Singapore to Emeryville, California in the US, where it will be co-located with the infectious diseases research team of NIBR. This move will strengthen NITD for the future by enabling closer collaboration with the NIBR infectious diseases research team and the San Francisco Bay Area life sciences community.

Drug-resistant parasites are spreading in certain regions, so new drugs are urgently needed. Through NITD, we have two compounds in Phase II development for malaria: KAF156 and KAE609.

In September, the results of a proof-of-concept study for KAF156 were published. Malaria parasites, including parasites resistant to the standard treatment, were observed to disappear rapidly from the blood of patients who received either multiple or single doses of the compound in an exploratory Phase II clinical trial. We will lead the development of KAF156 with scientific and financial support from the Medicines for Malaria Venture (in collaboration with the Bill & Melinda Gates Foundation). We are exploring ways to combine it with another agent to develop a new treatment option for malaria that is active against drug-resistant parasites, and it could potentially become a single-dose malaria cure. KAE609 continues to be evaluated for the role that it may play in the battle against the disease.

> "Scientists are obsessed with the differences between academia and industry, and I just don't see it anymore. The culture of science at the basal level is just this hope of being connected to a great idea and then seeing it through to completion. In this moment, pharmaceutical companies are much more interested in public-private partnerships, in open modes of discovery, than ever before. I think this is an evident trend in the industry, and we are well poised at Novartis to be a trendsetter and exemplary leader. In my opinion, connectivity is the new scientific priority."
>
> **Jay Bradner,** M.D., President, Novartis Institutes for BioMedical Research

Fighting antimicrobial resistance
Drug-resistant bacteria are an emerging threat to public health. In 2016, we joined with leading industry peers to present a roadmap for combatting antimicrobial resistance (AMR). The signatories made four key commitments they will deliver by 2020 to reduce AMR: reduce the environmental impact of the production of antibiotics; help ensure antibiotics are used only by patients who need them; improve access to current and future antibiotics, vaccines and diagnostics; and explore new opportunities for open collaboration between industry and the public sector.

Novartis has a long history in developing antibiotic treatments, and we continue to conduct research into new antibiotic treatments for the most devastating infectious diseases. In 2016, we began a first-in-human clinical trial to test an injectable compound designed to kill drug-resistant gram-negative bacteria.

About 66 million patients take our medicines to tackle bacterial infections every year, and we are working to broaden access to these treatments in underserved markets around the world. Our generic medicines division, Sandoz, is also the world's largest generic antimicrobial producer.

High-quality generic anti-infective medicines are a key part of the provision of global healthcare, underpinning most common surgical procedures and treatments such as chemotherapy, as well as treating acute bacterial infections. More than 70% of anti-infectives sold globally are generic medicines.

We also reported a new target for three neglected diseases: African sleeping sickness, leishmaniasis and Chagas disease. Clinically, these diseases – responsible for 50 000 deaths annually – seem quite distinct, but they are all caused by parasites called kinetoplastids that belong to the same class of single-celled organisms. Working in lab models, our researchers demonstrated that it may be possible to treat all three diseases with a single class of compound that blocks cellular machinery known as the proteasome.

Adaptive R&D
Adaptive R&D is the modification of an existing medicine to improve therapeutic efficacy, safety, and access to medicine, and – most importantly – to generate a positive health outcome. Most often, this work is done with a specific focus on poor and vulnerable patient groups, such as children or the elderly.

Our Established Medicines franchise manages a product portfolio of more than 90 mature brands that span 11 therapeutic areas. We systematically evaluate and execute adaptive R&D projects related to mature products in our existing portfolio.

These may include development of new formulations that deliver an incremental benefit to patients, such as age-appropriate formulations, formulations that increase adherence, or dosage forms with increased stability and new routes of delivery. As an example, we are currently working on developing a once-daily form for lumefantrine, which is also a key component of *Coartem*, our artemisinin-based combination therapy against malaria.

We also look for ways to expand the clinical use of existing medicines into new indications and populations. This includes ongoing work on new indications, such as multidrug-resistant tuberculosis for *Lamprene* (clofazimine), an agent to treat leprosy.

In addition, our Center of Excellence for Emerging Markets collaborates closely with the global program teams across the Innovative Medicines Division to ensure that adaptive R&D considerations, especially formulations for specific age groups or geographies, are firmly embedded in the development plans for our new products.

Scientific capability building
We contribute to building scientific and clinical capabilities in emerging countries through the Novartis Next Generation Scientist and Visiting Scholar programs. Since 2010, 165 young scientists and clinicians from 24 countries across Africa, Asia and Latin America have participated in these programs.

Additionally, since 2011, the WHO Tropical Disease Research (TDR) group has sponsored clinical research fellows at Novartis. NIBR has also been participating since 2014 in a fellowship scheme set up by the European & Developing Countries Clinical Trials Partnership (EDCTP) together with the European Federation of Pharmaceutical Industries and Associations (EFPIA). The primary objective of the EDCTP-EFPIA and WHO TDR programs is to support capacity-building efforts by providing opportunities for sub-Saharan African scientists to gain hands-on clinical trial experience in a pharmaceutical research setting. In 2016, a scientist from Addis Ababa University in Ethiopia started a one-year fellowship at NIBR.

In 2016, we also assisted clinical research centers in Kenya, Ghana, South Africa and Tanzania in strengthening their capabilities to conduct and manage Phase I clinical trials. This was achieved through a multifaceted approach involving scientific exchange, infrastructure development, and educational programs.

Innovation key performance indicators[1]

	2016	2015
Projects entering development pipeline[2,3]	**5**	8
Ongoing Phase III programs[4]	**29**	37
US FDA breakthrough therapy designations[5]	**5**	0
Major submissions (US, EU, JP)[6]	**24**	14
Major approvals (US, EU, JP)[6]	**16**	20
New molecular entity (NME) approvals[7]	**3**	6
Investment[8] in infectious and neglected diseases[9]	**29**	42

[1] Includes Innovative Medicines and Sandoz biosimilars only
[2] Includes programs entering confirmatory development, based on internal R&D activities. First patient, first visit (FPFV) has occurred in post-proof-of-concept stage. Also includes small molecules, biologics; new fixed-dose combinations of existing active pharmaceutical ingredients (APIs); and new target indications, defined as new disease or new line of treatment (e.g., first line vs. second line). Counted by indication and not compound
[3] This number has been adjusted due to the revised definition of projects entering portfolio. In 2015, we reported it as 25.
[4] Includes projects with FPFV in a Phase III study but not yet filed in the US, EU or Japan
[5] Number of breakthrough therapy designations by the US Food and Drug Administration for therapies under development by Novartis
[6] Includes small molecules, biologics; new fixed-dose combinations of existing APIs; and new target indications, defined as new disease or new line of treatment (e.g., first line vs. second line)
[7] Includes NMEs such as small molecules, biologics; in the EU, new fixed-dose combinations of existing APIs
[8] USD millions
[9] Novartis Institute for Tropical Diseases and Novartis Institutes for BioMedical Research neglected disease programs, and pharmaceutical development on malaria, tuberculosis and neglected diseases

Targets and commitments can be found
→ on our website.

Despite eyesight problems, Yuko Yoshikawa (center foreground) throws herself into the communal fitness sessions that are a feature of Japanese life.

People

> “The Sustainable Development Goals (SDGs) provide opportunities for increased implementation and measurement in the area of business and human rights. Business has a key role to play in helping meet the SDGs, but this role comes with responsibility. Simply put, companies can’t be supporting access to healthcare, while at the same time undermining employees’ health through unsafe labor conditions or the health of surrounding communities through dangerous emissions.”
>
> **Margaret Jungk,** Managing Director, Human Rights, Business for Social Responsibility (BSR)

Why it is important

The success of Novartis depends on the innovation, performance and behavior of our employees. Talented, committed and responsible people from diverse backgrounds are essential for successfully implementing our strategy – so it is critical to create the right organization and culture, while planning for, developing and retaining highly talented and diverse employees.

How we approach it

We continue to reinforce a company culture that supports our people as they face new challenges in a rapidly evolving healthcare environment. Our values help us execute the Novartis strategy and describe the professional behavior we expect from our employees.

We use six Values and Behaviors (V&Bs) to inform our recruitment activities, shape employee development programs, and help guide individual performance assessments and decisions about bonuses and other rewards. Training programs ensure our people are familiar with these values and know how to apply them in their jobs.

To operate successfully as a global organization, it is essential that our people reflect the rich cultural, ethnic and gender diversity of our markets. To this end, we adopted a new Novartis diversity and inclusion strategy in 2016.

As a healthcare company, we consider the right to health to be a basic human right. We believe each sphere of society – from government and charitable organizations to medical professionals and business – has a role to play in support of this right. The protection and respect for human rights are relevant to all aspects of our business, including research and development, clinical trials, and the marketing and pricing of medicines.

We respect and support the protection of human rights, as enshrined in the United Nations Universal Declaration of Human Rights. We are also committed to upholding the labor standards set out by the International Labor Organization. Since 2001, Novartis has been a signatory to the UN Global Compact, endorsing the 10 principles including those related to labor and human rights. We also support and implement the UN Guiding Principles on Business and Human Rights. In 2016, Novartis started working on a human rights impact assessment.

How we perform

Attracting and retaining employees

Novartis is fortunate to be widely recognized as an attractive employer. Last year we received 700 000 job applications and hired 18 000 staff, in addition to 3 750 internal moves.

Staff turnover rose modestly. Voluntary turnover of all staff was 7.4% in 2016, versus 7.3% the prior year. That compares with an average 9.7% for the industry.

Voluntary turnover of high performers was 5.8%, compared to 5.5% in 2015. Turnover for Novartis Top Leaders – the company's 356 most senior executives – was 5.6%. The Executive Committee of Novartis (ECN) analyzed the risk of these people leaving and initiated mitigation plans where appropriate.

While there was a gradual decline in turnover across most units, we do see pockets of higher turnover in specific areas such as our global sales force, and in some emerging markets, including Thailand, Taiwan and China, with sharp competition for talent. Regular analysis has helped us better forecast groups at higher risk of leaving and enabled targeted retention efforts.

We also made progress in improving our succession planning. To further strengthen succession plans for key leadership positions, we introduced assessment centers to identify and develop people with high potential. In 2016, 48 people were enrolled.

Reinforcing talent, capabilities and leadership

The success of our new operating model will depend on having the right people in the right place at the right time. This is the aim of the five-year integrated talent and leadership strategy, which was introduced in 2015 and led, in 2016, to the appointment of new leaders in some of the company's most senior roles. This strategy has also helped identify, assess and develop high-potential employees. Some 77% of senior roles were filled internally in 2016, reflecting our commitment to developing talented individuals within the organization and accelerating their careers.

Of specific note is the launch of the Enterprise Leadership Development Program (ELDP) in 2015, which has led to a significant improvement in succession planning for the most senior leadership roles. In 2016, a total of 25 senior executives took part in the ELDP. In tandem, we continue to focus on the targeted mapping of talented individuals outside the organization.

The talent strategy also aims to increase management accountability for developing diverse teams and creating an inclusive work environment. Starting in 2016, the appraisal framework for all managers included a mandatory 20% objective measuring their people-related performance.

We are also investing in sophisticated data analytics to predict future workforce needs and help understand recruitment trends. Two pilots were conducted with NIBR in 2016. The first examined turnover data to find out who was more or less likely to leave, and helped us to engage and retain key staff. The second addressed diversity, and identified ways to attract more female employees and help them progress in the organization. Data analytics will be scaled up this year, building on the success of these pilots.

Strengthening the Novartis culture

At the heart of the new Novartis operating model is the evolution of the company's culture to reflect new ways of working and the changing business environment. This has led to even greater focus on the revised set of Novartis V&Bs introduced in 2015. These are now integrated into all people processes, from recruitment to performance assessment.

We made further progress in 2016 in diversifying our workforce. We achieved our initial aspiration of 25% female representation among Novartis Top Leaders. And we have 42% female representation in management. Measures include acquiring new talent, using focus group discussions to identify potential barriers to advancement, mentoring, and expanding leadership programs.

We have expanded the Executive Female Leadership Program (EFLP) that started in the Pharmaceuticals Division in 2010. This year-long program offers intensive leadership experience for women, including coaching,

Supporting the organization through change

In 2016, Novartis completed the transition to a new operating model, which involved integrating 38 000 employees, or about a third of the workforce, into new business entities. To a large extent, the work done to ensure that managers and employees felt supported – in other words, that they understood why it was taking place, how it could impact them, and what behaviors should be fostered to ensure success – enabled the successful implementation of these changes.

We conducted a Novartis Leaders Forum in September that was attended by the company's most senior executives to ensure alignment on the future direction of the company, define roles and responsibilities, and discuss how the culture needed to evolve with an emphasis on collaboration. Subsequently, each leadership team met to cascade the strategy, operating model, and ways of working throughout the organization.

We developed a program of activities and supporting materials that were shared with leaders, enabling them to conduct meetings to educate and motivate their teams and ensure they were fully engaged with the new operating model. The rollout began in late 2016 and will extend into early 2017.

> Any organization or team can only achieve its aspirations when it is supported by the right culture. Our culture is about what we value and how we behave. We sense it, we see it, we hear it, we feel it in the way we talk, interact and work together. At Novartis, innovation, integrity, quality, courage, performance and collaboration are the values that define who we are. They guide the choices we make every day and how we interact with others. Our culture shows us the way. It comes to life when we hire, assess, develop, promote, appoint and reward people and teams. It helps us achieve more together than individuals could achieve alone."
>
> **Steven Baert,** Head of Human Resources, Novartis

workshops, and senior sponsorship and mentorship. Since inception, 147 female leaders have been involved in the program. Of these, 74% have since been promoted or moved to new roles, with a 91% retention rate. The EFLP and similar programs in other parts of the company are being expanded in 2017 to cover the whole of Novartis.

We are also pursuing greater cultural diversity. We implemented Emerging Market Talent Boards in Asia and Latin America, which facilitated 37 senior-level moves of talented individuals to new roles in 2016. In addition, our 12-month Emerging Market Early Talent Program had 22 participants in 2016.

Health and safety

Employee health and safety is an integral part of an employer's responsibility. Novartis Group companies are committed to providing all associates with safe workplaces.

Novartis continuously seeks innovative, sustainable strategies and systems to strengthen our commitment to health, safety and the environment (HSE) and business continuity. Rigorous technical standards, reinforced by engineering solutions, ensure that workplaces are safe for Novartis Group company associates as well as third-party personnel and contractors.

Novartis proactively fosters and encourages a strong culture of safe behavior and on-site health promotion. Our Occupational Medicine department delivers programs to maintain health, reduce absenteeism, and enhance employees' ability to return to work after injury or illness. In addition, a significant number of units have introduced safety culture initiatives – behavior-based safety programs – to complement existing measures for ongoing safety management at sites. Local management teams undertake a number of measures to promote safety awareness, including on-site walkthrough inspections by senior managers, with a focus on serious injury and fatality (SIF) exposures and their safety controls.

LOST-TIME INJURY AND ILLNESS RATE (LTIR)

Novartis reports work-related injuries and illnesses among Group company associates. Our lost-time injury and illness rate (LTIR) is a key performance indicator, enabling direct comparison between the performance of our units and on a country-by-country basis. Since 2014, the LTIR also includes third-party personnel. In 2016, the overall LTIR for Novartis associates and third-party personnel was further reduced to 0.08 per 200 000 hours, from 0.11 in the previous year. This represents a 27% reduction.

TOTAL RECORDABLE CASE RATE (TRCR)

Many injury and illness cases without lost time have the potential to lead to lost time. Identifying and managing the circumstances in which these incidents occur ultimately reduces the overall risk of having a serious incident, lost-time injuries and illnesses, or even fatalities. A recordable case includes:

- Work-related injury with or without lost time
- Work-related illness with or without lost time
- Work-related loss of consciousness
- Work-related fatality

The total recordable case rate (TRCR) is calculated by dividing all recordable cases by hours worked, and multiplying this number by 200 000 for standardization. Since 2014, the TRCR also includes third-party personnel. In 2016, the Novartis Group TRCR was 0.29, down from 0.40 in 2015.

More information on health and safety can be found
→ on pages 77-81 of this report.

Expanding our corporate volunteering program

In 2015, we put in place a corporate volunteering platform through which Novartis associates can register a potential corporate responsibility project idea or sign up to become a corporate volunteer. In 2016, the program expanded significantly, launching in several markets including low- and middle-income countries. The scope of projects in the platform is broad and includes partnerships with global charitable organizations, remote and on-the-ground capability building, one-time and recurring pro bono services, and local efforts to support smaller-scale foundations and institutions.

Corporate Responsibility Awards

In 2015, we launched the Corporate Responsibility Awards. These recognize Novartis associates and teams who are delivering societal value and leading by example to increase associate engagement in CR and enhance our collective contribution to improving health outcomes. The four award categories are integration of CR in business, healthcare delivery, environmental sustainability, and associate engagement in CR.

In 2015, more than 65 individuals and teams were nominated, with four overall winners recognized for their achievements in Ethiopia, Taiwan, the US and Vietnam.

In 2016, in conjunction with the CR Awards, we launched the CR Innovation Grant, a non-promotional and non-commercial grant of up to USD 50 000 to support one project focused on healthcare delivery. Submissions for the 2016 awards are closed, and we have received 73 submissions from 27 different countries.

PEOPLE KEY PERFORMANCE INDICATORS

	2016	2015	2014
Full-time equivalent positions/headcount[1]	**118 393/ 122 985**	118 700/ 122 966	117 809/ 122 113
Voluntary turnover (%)	**7.4**	7.3	7.0
Overall turnover (%)	**12.2**	13.5	13.0
Voluntary turnover of high[2] performers (%)	**5.8**	5.5	5.1
Internal hires/external hires (%)	**47.0/53.0**	44.8/55.2	44.4/55.6
Women in management: % of management[3]/% of Board of Directors	**42/25**	41/27	40/18
Associate nationalities	**142**	145	147
Annual training hours per employee	**27.8**	27.3	27.0
Associates represented by a trade union or covered by a collective bargaining agreement (%)[4]	**41**	42	43
Lost-time injury and illness rate (per 200 000 hours worked)[5]	**0.08**	0.11	0.12
Total recordable case rate (per 200 000 hours worked)[5,6]	**0.29**	0.40	0.43

[1] Headcount reflects the total number of associates in our payroll systems. Full-time equivalent adjusts headcount for associates working less than 100%. All data as of December 31

[2] We have refined the high-performer definition methodology to reflect the focus on Values and Behaviors, and have restated 2015 data.

[3] Management defined locally

[4] Non-management associates

[5] Data include Novartis associates and third-party personnel managed by Novartis associates.

[6] Includes all work-related injury and illness, whether leading to lost time or not

Targets and commitments can be found
→ on our website.

Ghanaian scientist, Edmund Ekuadzi visits the rainforest with Clifford Osafo Asare, an herbalist.

Environment

> “The Paris Agreement on global warming sets a very ambitious agenda for the international community, and recognizes the critical role of companies in accelerating the transition to a low-carbon future. The challenge for companies is to approach climate change as an opportunity for growth and innovation. In doing so, they must step up their emission reduction targets and be transparent about their actions and the obstacles they face in meeting their commitments. The challenge for governments is to ensure the right regulatory frameworks and economic incentives are in place to help companies scale up their efforts.”
>
> **Lise Kingo,** Executive Director, United Nations Global Compact

Why it is important

While the pharmaceutical industry is not an energy- or carbon-intensive sector, energy efficiency and greenhouse gas (GHG) emissions reduction are important for the long-term success of Novartis.

We expect both our business and our operations to be impacted by the growing effects of climate change and the shifting weather patterns in many regions. With energy, GHG emissions and water resources becoming greater cost factors, efficiency improvements and alternate sources will be more important. In the long term, the increasingly severe effects of rising sea levels, extreme weather, changing precipitation patterns, and water scarcity could also influence the way Novartis selects new locations and how these would be protected against the effects of climate change.

Beyond the impact of climate on the company, there are several SDGs that are directly linked to the environment, both in terms of protecting the environment as well as mitigating the effects of climate change, such as goals 6 and 13. We are fully committed to doing our part to help achieve these goals.

How we approach it

Novartis has embedded climate change into its corporate strategy with a Vision 2030 on Environmental Sustainability. In line with targets included in the SDGs and national commitments for the Paris Agreement, we have set targets of reducing Scope 1 and Scope 2 GHG emissions by 30% by 2020, and by 50% by 2030 (against a 2010 baseline). We are committed to protecting water quality and decreasing water consumption, and reducing the carbon footprint of our global supply chain. We also plan to reduce non-recycled operational waste relative to production quantities by 30% compared to 2010.

Further, we have set an internal carbon price of USD 100 per ton (t) of carbon dioxide equivalent (CO_2e), based on the World Bank’s estimated cost of climate change to society. This helps us identify projects that can cost-effectively reduce our GHG emissions and drive investments into areas of higher energy efficiency and toward more renewable energy.

Beyond climate change, we also aim to minimize the impact of our operations and products on the environment. This includes conserving water and minimizing our

water footprint along the entire materials supply chain, and preventing pharmaceuticals from entering the aquatic environment.

Most pharmaceuticals in the environment are a result of excretions from treated patients and the improper disposal of unused or expired medicine. However, very small quantities can come from drug manufacturing effluents and R&D facilities. We constantly strive to minimize any release of active pharmaceutical ingredients into wastewater from our operations.

To minimize emissions and waste material, we first try to use materials effectively to prevent waste, and if generated, reduce and recycle it before treatment, incineration or disposal. We take advantage of opportunities for reuse and recycling, work to keep the environmental impact of waste at a minimum, and maximize energy use from waste.

How we perform

Impact of our daily operations

In 2016, we took our first steps toward achieving our 2020 targets. Overall, we reduced our net GHG emissions by 18.7% versus 2010, with an additional net reduction by 10 kilotons (kt) in 2016. Halogenated volatile organic compound emissions declined to 51 tons, and non-halogenated volatile organic compound emissions declined to 481 tons.

We also improved the efficiency of our non-recycled total operational waste per unit of production by 18.7% versus our 2010 baseline. The total amount of hazardous waste not recycled in 2016 for the Novartis Group was 60.2 kt, compared to 57.6 kt in 2015. An additional 78.4 kt of hazardous waste, mainly solvents, were recycled. For non-hazardous waste – which includes mixed or household waste, packaging waste, compostable waste and inert waste – the total amount not recycled for the Novartis Group in 2016 was 17.9 kt, compared to 20.6 kt in 2015. An additional 64.5 kt of non-hazardous waste were collected for recycling. The recycling rate for non-hazardous waste was up from 75% in 2015 to 78% in 2016.

Our total water use decreased from 91.5 million cubic meters (m^3) in 2015 to 82.5 million m^3 in 2016, as we continued to run water-saving programs at sites of high water scarcity.

We continued to find ways to improve our environmental footprint in our day-to-day operations. For instance, at our facility in Grimsby, UK, we implemented new wastewater technology that uses microbubbles. This technology was first introduced at our plant in Ringaskiddy, Ireland, in 2015. There, it reduced electricity demand by 160 kilowatts per year and carbon emissions by 600 tons per year, without impacting the performance of the plant.

Infrastructure projects to improve environmental performance

Throughout 2016, a cross-divisional team including the energy managers of divisions and the experts from Novartis Business Services – Real Estate and Facility Services began selecting major facility as well as infrastructure projects and measures necessary to achieve our 2020 goals, based on the savings as determined by our internal carbon price of USD 100/tCO_2e.

We identified opportunities for contracting renewable wind and solar electricity as priority actions. Projects will be submitted to top management for approval. Given the capital nature of these projects, we expect to be able to report on concrete projects in 2017.

Sustainable forestry projects

Our four forestry projects in Argentina, Mali, China and Colombia provide long-term benefits to the environment – and to local communities. Besides carbon sequestration, these benefits range from conserving or enhancing biodiversity to building capacity and generating employment and local revenues. Ultimately, these projects help foster long-term economic growth for local economies. We believe that by designing our forest carbon sink projects with sustainability criteria in mind, they will remain viable in the long term and bring economic, social and environmental benefits to the communities where they are established.

For example, in 2007 we established a jatropha plantation rural energy project in Mali. The seeds of this shrub can be used to press oil, make biofuel for energy in rural areas, and produce a natural fertilizer. In this smallholder agroforestry project, local farmers plant jatropha together with their annual crops.

> “Novartis has embedded climate change into its corporate strategy and developed a vision for environmental sustainability underpinned by targets in key impact areas. Further, we have set an internal carbon price to reflect the cost of climate change to society. This will help us make the case for low-carbon investments and better manage the risks associated with climate change.”
>
> **André Wyss,** President, Novartis Operations

Recognition for our environmental efforts
Our efforts in environmental sustainability were recognized throughout 2016 in the Dow Jones Sustainability Index (DJSI) and CDP Climate and Water Scores.

In the DJSI, we were recognized as an industry leader in climate strategy and environmental reporting. Novartis showed overall improvement in all environmental topics, with significant improvement in environmental reporting and operational eco-efficiency. This reflects the success of our work on environmental sustainability, as well as our efforts to improve our reporting capabilities internally.

Likewise, Novartis also improved its position in the 2016 CDP Climate and Water Scores, receiving an A-rating on both. Additionally, we were recognized among category leaders in healthcare and among country leaders in the Germany/Austria/Switzerland cluster.

In 2016, to quantify not just the benefits from carbon sequestration but also any environmental and social benefits it may bring, we undertook an evaluation of the project to determine its social return on investment (SROI).

The study evaluated the project from its inception in 2007 through 2015. Over that time, 5 000 farmers participated in the program in Mali, with 2 500 hectares of jatropha planted. An analysis showed that during these years, 9 000 tons of CO_2e were sequestered. Moreover, the project provided an additional income of 100 EUR per year per farmer, and created 50 temporary and permanent jobs.

A subsequent analysis compared the financial contribution from Novartis to the various social benefits, including additional income for farmers, benefits to the local economy such as jobs created and biofuel produced, and the environmental gains of carbon sequestration. In the end, the analysis showed an SROI of 180% for the initial eight years. The SROI could be even higher if additional improvements and efficiencies are made in the coming years.

While the impacts of this study are only exploratory, the analysis shows that in the case of the Mali project, carbon sequestration is not the greatest social benefit – economic development is. We will continue to work to find ways to similarly analyze the impact of all four carbon offset projects in the future.

ENVIRONMENT KEY PERFORMANCE INDICATORS

	2016	2015	2014
Energy use (million gigajoules), on site and purchased	**16.6**	17.2	17.0
Greenhouse gas (GHG) emissions, Scope 1, combustion and process (1 000 tCO_2e)	**396.6**	396.8	393.8
GHG emissions, Scope 1, vehicles (1 000 tCO_2e)	**134.7**	138.9	148.3
GHG emissions, Scope 2, purchased energy (1 000 tCO_2e)	**821.4**	826.4	818.6
GHG emissions, Scope 3, business travel (1 000 tCO_2e)	**135.8**	231.0	186.2
Total GHG emissions, Scope 1 and Scope 2 (1 000 tCO_2e)	**1 352.7**	1 362.1	1 360.6
GHG offsets (1 000 tCO_2)	**68.3**	69.2	64.7
GHG emissions (Scope 1 and Scope 2) per sales (tCO_2e per million USD)	**27.9**	27.6	26.1
GHG emissions (Scope 1 and Scope 2) per FTE (tCO_2e)	**11.4**	11.5	11.5
Halogenated volatile organic compounds (VOCs) (t)	**50.7**	66.4	86.0
Non-halogenated VOCs (t)	**480.8**	517.1	630.1
Non-hazardous waste recycled (%)	**78.3**	75.5	75.3
Hazardous waste recycled (%)	**56.5**	67.3	69.1
Non-hazardous waste not recycled (1 000 t)[1]	**17.9**	20.6	21.2
Hazardous waste not recycled (1 000 t)[1]	**60.2**	57.6	60.2
Water use (million m^3)	**82.5**	91.5	92.5
Water discharge (million m^3)	**16.2**	17.2	17.0

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

Targets and commitments can be found
→ on our website.

Managing corporate responsibility

Governance

Corporate responsibility is endorsed and ingrained at the highest level in the company. The Governance, Nomination and Corporate Responsibilities Committee (GNCRC) of the Board of Directors specifically 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.

The ECN members include CR objectives in their balanced scorecard, which is used to determine their compensation. The CEO has specific personal CR objectives.

The Global Head of Corporate Responsibility reports to the CEO and incorporates 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 CR efforts are driven by a team of senior leaders comprising the Corporate Responsibility Board. This board coordinates companywide activities through representation from all relevant functions and divisions, and is responsible for making recommendations to the ECN on CR strategy, targets, policies, materiality and stakeholder engagement.

Specific areas of key importance also 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 HSE Steering Committee is responsible for providing overall guidance within its functional portfolio.

CR materiality assessment

Novartis conducted a CR materiality analysis in 2013. In 2014, we began implementing activities to follow up on these results, and in 2015 we conducted a review of our top priorities in CR. In late 2016, we kicked off our second full materiality assessment to help us understand the CR issues that matter to key internal and external stakeholders, as well as stakeholders' needs and expectations. We began conducting interviews, aiming to reach approximately 400 individuals from all relevant stakeholder groups worldwide, including executives across our company; customers; academics; and representatives of patient organizations, nongovernmental organizations (NGOs), health institutions, and other groups considered important to the industry and our business.

As with our previous materiality assessments, we will use the findings (which will be available in 2017), to guide our strategy, track issues of concern, inform and prioritize our CR programs, and establish meaningful metrics against which to measure our CR performance. This assessment follows the methodology of our first CR materiality analysis from 2013, which was refreshed in 2015. It will, however, include new elements that will help us gain fresh insights and strengthen the value of the materiality assessment as a management tool.

Issue identification

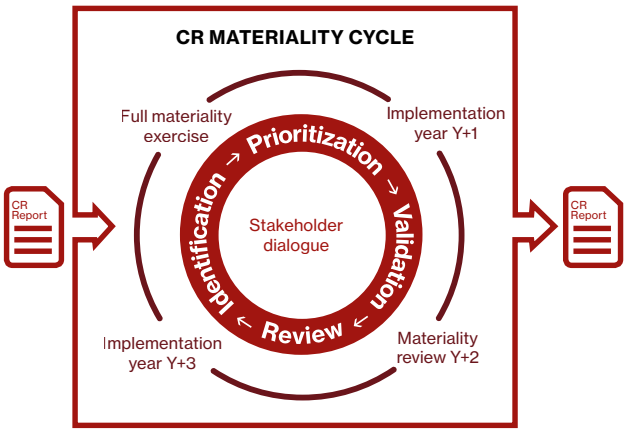
We evaluate a vast range of internal and external data – including analyst reports, media articles and stakeholder feedback – to identify and define issues that are likely to be perceived as important by our stakeholders, but that are not yet included in our list of key topics. In 2013, we identified a total of 46 issues, and we added four new topics in 2015. Desk research is currently ongoing for our next assessment.

Prioritization and validation

Our survey and interviews will be conducted in two phases. In the first phase, we will reach out to around 200 internal stakeholders. We will survey them via an online questionnaire, and then conduct one-on-one interviews to determine the issues they think are most important and relevant to Novartis. The interviewees will include senior executives from all Novartis divisions, as well as members of the ECN and the Board of Directors. Based on this input, our second phase will start in 2017 with an in-depth stakeholder mapping exercise to identify key external stakeholders who should be involved in the project. We will ensure the list of external stakeholders is comprehensive and again includes customers; academics; and representatives of patient organizations, NGOs, health institutions, and all other groups considered important to the industry and our business.

To strengthen the value of the CR materiality assessment as a management tool for the business and functions, we plan to organize CR materiality roundtables and scenario planning workshops in selected countries.

Review
The results of the materiality assessment are reviewed by the CR Board and presented to top management in the divisions and relevant functions. We then set up working groups to address the most important issues and develop action plans.



Topics identified
Our 2013 CR materiality exercise identified 25 issues (grouped into eight key clusters) that were consistently ranked as significant to the internal and external stakeholders we engaged in our analysis. Of these eight clusters, we decided to focus on three priority areas: access to healthcare, governance and ethical business practices, and research and development.

Our 2015 materiality review brought us to the same conclusions as in 2013. The rating of the top 25 issues remained similar, with three additional issues added to the original 25 topics:

- Access to healthcare: noncommunicable diseases
- Environmental protection: pharmaceuticals in the environment
- Patient focus: rising costs of healthcare/insurance

The materiality review also helped us identify new societal issues of increasing importance to our stakeholders, including:

- Community engagement: structurally high youth unemployment
- Governance and ethical business practices: corporate tax
- Transparency/better communication: nonfinancial disclosure

Follow-up
We continue to work to address the most important topics identified by our stakeholders. For example, in R&D, we are actively working on adaptive development of our existing medicines, with the goal of improving access, safety, efficacy and outcomes for specific groups. We have several programs underway in our Established Medicines franchise for the development of new formulations that deliver a benefit to patients, such as age-appropriate formulations that increase compliance, and dosage forms with increased stability and new routes of delivery.

In addition to running programs such as Novartis Access and the Novartis Malaria Initiative, we updated the access-to-healthcare position of the company in 2016. We are also integrating equitable commercial models for lower-income countries involving both our existing and newly launched products.

In an effort to improve our ethics and governance transparency, we now publicly disclose payments and other transfers of value to healthcare professionals and organizations for prescription pharmaceuticals. Since June, we have made our disclosure reports available on our global website. We will extend this disclosure to include all product segments in European Federation of Pharmaceutical Industries and Associations (EFPIA) countries where we have activities – even parts of our business that are not covered by the EFPIA code – and publish them on our global website in 2017.

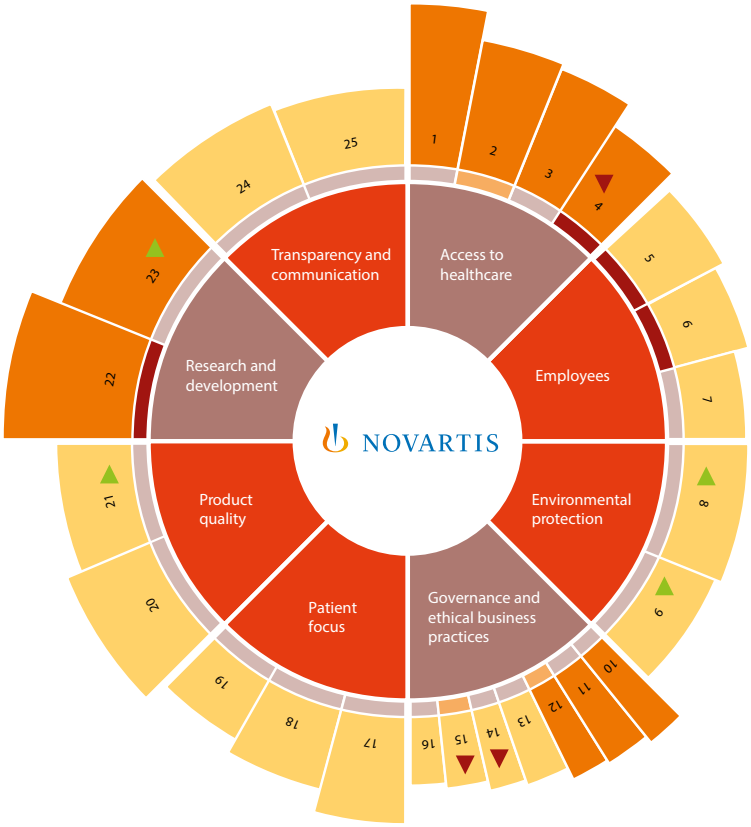
Reporting and targets

Our Annual Report serves as our primary reporting mechanism for corporate responsibility, and we have published a combined financial and CR report since 2000. Our Corporate Responsibility Performance Report consolidates the company's CR reporting and details our progress against our targets. It is based on the Global Reporting Initiative (GRI) G4 guidelines, with disclosure at "comprehensive" level.

At Group level, we collect key performance indicators related to access to healthcare, which include the number of patients reached and the value of our major access initiatives. Divisions and functions have their own performance measures to support the Novartis CR strategy through their core activities; they report on progress at least once a year to the CR Board. For internal evaluation purposes, we also track the actual cost (investment) for each of our major access initiatives and report these as part of our annual CR strategy update.

Our CR targets can be found
→ on our website.

CR materiality results



Key
- Novartis CR key material areas
- Novartis CR material topics
- Novartis CR key material topics
- Other areas
- External expectations exceed internal by more than 10%
- Internal expectations exceed external by more than 10%
- Difference between expectations is less than 10%

▲ Topics that have gained importance in 2015 vs. 2013
▼ Topics that have lost importance in 2015 vs. 2013

The relative importance of an issue is indicated by the height of the column, not its width.

Access to healthcare
1 Lower-income patients
2 Product pricing
3 Partnering
4 Intellectual property

Employees
5 Recruitment and retention
6 Diversity and inclusion
7 Health and safety

Environmental protection
8 Pollution, waste and effluents
9 Energy and climate change

Governance and ethical business practices
10 Integrity and compliance management
11 Responsible clinical trials
12 Bribery and corruption
13 Responsible marketing/advertising
14 Board structure and independence
15 Responsible lobbying and political contributions
16 Risk and crisis management

Patient focus
17 Health outcome contribution
18 Demographic changes in society
19 Security of product supply

Product quality
20 Quality of drugs
21 Counterfeit medicines

Research and development
22 Innovation and R&D pipeline
23 R&D in neglected diseases

Transparency and communication
24 Stakeholder engagement and dialogue
25 Disclosure and labeling

Topics seen as key in 2015 by external stakeholders not included in top 25 in 2013
- Access to healthcare: noncommunicable diseases
- Environmental protection: pharmaceuticals in the environment
- Patient focus: rising costs of healthcare/insurance

New societal issues added in 2015 based on research
- Access to healthcare: noncommunicable diseases
- Governance and ethical business practices: corporate tax
- Community engagement: youth unemployment
- Transparency/better communication: nonfinancial disclosure

Stakeholder engagement

Through formal and informal interactions, we engage with an increasingly complex range of stakeholders who have diverse, sometimes conflicting, expectations on key CR issues.

Stakeholders include patients and caregivers, associates, healthcare providers, policy makers, nongovernmental organizations, shareholders and other financial market participants, local communities, and partners from the pharmaceutical and other industries.

Approach to stakeholder engagement

We engage with our stakeholders in a variety of ways by convening dialogues, roundtables and webinars on key CR issues such as access and ethics. These platforms enable us to actively communicate with participants and respond to open questions. Beyond this, we engage with patient advocacy organizations to better understand patient needs; participate in congresses to interact with the scientific community; engage in public policy work to meet with authorities and regulators; implement a global employee survey to gauge associates' perspectives on the company; and conduct roundtables to exchange experiences and expectations with our suppliers.

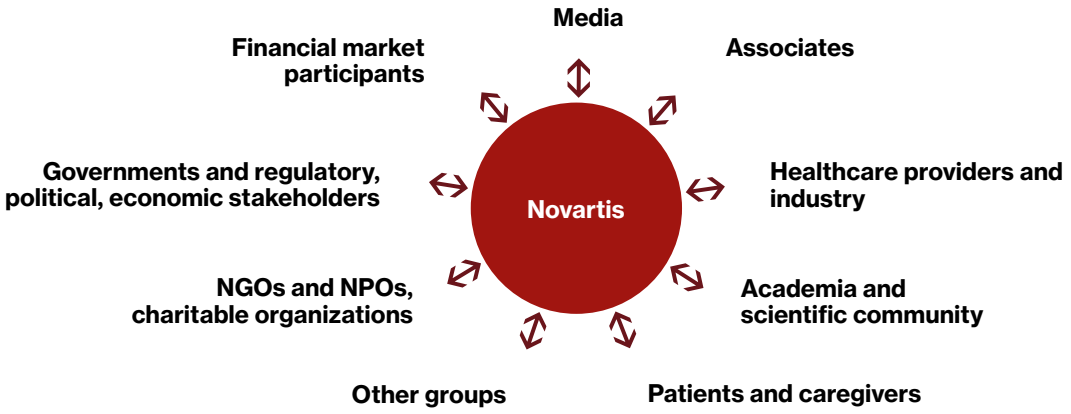
Stakeholder engagement at Novartis helps us to:

- Participate actively in civil society
- Learn and gain relevant knowledge regarding our business and the expectations of our stakeholders
- Correct misperceptions and voice our arguments in the social debate
- Make strategic adjustments in our operations to optimize our business success
- Build trust and reach common understanding when differences arise
- Implement projects on the ground
- Share responsibility to bring holistic solutions beyond treatments

In 2016, we conducted one stakeholder webinar on R&D, two stakeholder events in Geneva and Basel with approximately 200 stakeholders each, and an online survey to seek stakeholders' feedback on key CR topics.

Throughout the year, we also communicate with investors about our environmental, social and governance performance, and we respond to additional information requests. In 2016, more than 60 investors took part in our investor call focusing on ethical business practices.

Stakeholders with whom we engage



Andreas von Planta, Ph.D., member of the Novartis Board of Directors, and Chairman of the Governance, Nomination and Corporate Responsibilities Committee

"I would like to commend Novartis for the quality of its corporate responsibility reporting, which has evolved in recent years from disclosure on philanthropic initiatives to a strategic tool to explain how the company is creating value for stakeholders. In the future, a growing area related to sustainability disclosures will be the quantification and valuation of externalities. The work Novartis has started in 2016 on valuing its financial, environmental and social externalities is one step toward more integrated thinking and reporting."

Quantifying economic, environmental and social impacts

In 2016, we started developing an approach to capture, measure and value the positive and negative external economic, environmental and social impacts created by our activities and related initiatives in the communities where we operate. This approach should provide us with new insights into the impact of our operations in a country, provide increased transparency for informed decision-making, and assist us in prioritizing activities that create the largest societal value. Further, it should support enhanced transparency in our nonfinancial disclosures by quantifying in financial terms key societal impacts.

We are currently piloting this approach in China and Kenya, and worldwide with regard to environmental impacts. This includes assessing the social and environmental value of our forest carbon sink projects in Argentina and Mali. The pilots demonstrate that our approach to assess societal externalities can be replicated in other countries and programs.

CR material clusters and GRI G4 aspects

The Aspect Boundary,[1] within the organization, applies across the organization and includes employees (as defined by this report).

Material areas	Key topics	Relevant G4 aspects	Aspect Boundary outside the organization
Access to healthcare	Lower-income patients Product pricing Partnering Intellectual property	**ECONOMIC ASPECTS** — Economic performance — Market presence — Procurement practices — Indirect economic impacts **SOCIAL ASPECTS** **Society** — Local communities	— Governments and regulatory, political, economic stakeholders — Healthcare providers and industry — NGOs and NPOs, charitable organizations — Patients and caregivers
Governance and ethical business practices	Integrity and compliance management Responsible clinical trials Bribery and corruption Responsible marketing/ advertising Board structure and independence Responsible lobbying and political contributions Risk and crisis management	**ECONOMIC ASPECTS** — Economic performance — Indirect economic impacts — Market presence — Procurement practices **ENVIRONMENTAL ASPECTS** — Compliance — Supplier environmental assessment — Environmental grievance mechanisms **SOCIAL ASPECTS** **Labor practices and decent work** — Supplier assessment for labor practices — Labor practices grievance mechanisms **Human rights** — Investment — Non-discrimination — Freedom of association and collective bargaining — Child labor — Forced or compulsory labor — Indigenous rights — Security practices — Assessment — Supplier human rights assessment — Human rights grievance mechanisms **Society** — Anti-corruption — Public policy — Anti-competitive behavior — Compliance — Supplier assessment for impacts on society — Grievance mechanisms for impacts on society **Product responsibility** — Customer health and safety **Product and service labeling** — Marketing communications — Customer privacy — Compliance	— Financial market participants — Governments and regulatory, political, economic stakeholders — Healthcare providers and industry — NGOs and NPOs, charitable organizations — Patients and caregivers
Research and development	Innovation and R&D pipeline R&D in neglected diseases	**SOCIAL ASPECTS** **Product responsibility** — Customer health and safety **Human rights** — Indigenous rights	— Academia and scientific community — Governments and regulatory, political, economic stakeholders — Healthcare providers and industry — NGOs and NPOs, charitable organizations

[1] Refers to the description of where impacts occur for each Material Aspect

Employees	Recruitment and retention of employees Diversity and inclusion Health and safety	**SOCIAL ASPECTS** **Labor practices and decent work** – Employment – Labor/management relations – Occupational health and safety – Training and education – Diversity and equal opportunity – Equal remuneration for women and men – Supplier assessment for labor practices – Labor practices grievance mechanisms **Human rights** – Non-discrimination **ECONOMIC ASPECTS** – Market presence	– Governments and regulatory, political, economic stakeholders – Human resources
Environmental protection	Pollution, wastes and effluents Energy and climate change	**ENVIRONMENTAL ASPECTS** – Materials – Energy – Emissions – Effluents and waste – Products and services – Compliance – Overall – Supplier environmental assessment – Environmental grievance mechanisms	– Financial market participants – Governments and regulatory, political, economic stakeholders – NGOs and NPOs, charitable organizations – Other groups
Product quality	Quality of drugs Counterfeit medicines	**SOCIAL ASPECTS** **Product responsibility** – Customer health and safety **Product and service labeling** – Marketing communications – Customer privacy – Compliance	– Financial market participants – Governments and regulatory, political, economic stakeholders – Healthcare providers and industry – Patients and caregivers
Transparency and communication	Stakeholder engagement and dialogue Disclosure and labeling	**ECONOMIC ASPECTS** **Economic performance** – Procurement practices **SOCIAL ASPECTS** **Society** – Local communities **Product responsibility** – Marketing communications – Customer privacy – Product and service labeling	– Governments and regulatory, political, economic stakeholders – Healthcare providers and industry – Media – NGOs and NPOs, charitable organizations – Patients and caregivers
Patient focus	Health outcome contribution Demographic changes in society Security of product supply	**ECONOMIC ASPECTS** – Economic performance – Procurement practices **ENVIRONMENTAL ASPECTS** – Supplier environmental assessment **SOCIAL ASPECTS** **Labor practices and decent work** – Supplier assessment and labor practices **Human rights** – Supplier assessment on human rights **Society** – Local communities – Supplier assessment for impacts on society **Product responsibility** – Customer health and safety	– Academia and scientific community – Governments and regulatory, political, economic stakeholders – Healthcare providers and industry – Patients and caregivers

Juergen Brokatzky-Geiger

We must stay focused on our expertise

As we embark on a new year, I look back with pride on all Novartis has achieved in corporate responsibility (CR). At the same time, my mind is on the future, and I believe we're poised to make an even greater difference in the months and years to come.

Corporate responsibility is an essential ingredient of good business, and a core part of *our* business. When I assumed my current role in February 2014, we made it our team goal to embed this concept into our culture, while developing a sound and sustainable CR strategy. That strategy is now in place, and it's driving our ability to successfully pioneer new business approaches, create scalable solutions to global healthcare challenges, and partner with organizations that share our mission of improving and extending people's lives.

We learned early on that CR isn't only about what we do; how we do it is just as important. That's why we take a twofold approach – expanding access to healthcare and doing business responsibly – to build value for our company, our shareholders and our society. We've accomplished a lot along the way.

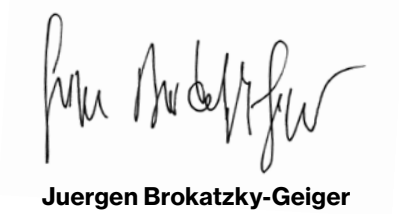
In 2014, for example, we established new committees to strengthen our CR governance. A year later, we achieved a first in the industry by launching Novartis Access to improve the accessibility and affordability of treatments for chronic diseases in lower-income countries. Novartis Access incorporates learnings from our Healthy Family social business, and is designed to be commercially sustainable to ensure long-term success.

While expanding access to healthcare, we've also reinforced our culture of integrity. Transparency is a key element of responsible business, and we're striving to meet stakeholders' growing demands for disclosure through our CR reporting. Our CR Performance Report 2015 was highly commended in the 2016 Responsible Business Awards for its data-driven reporting and clear materiality analysis. Moreover, in an effort to increase transparency in our nonfinancial disclosures, we've started developing an approach to financially quantify key societal impacts created by our activities and related initiatives.

Recognizing that CR impacts employee engagement, we've taken steps to further involve our associates. Most notably, we introduced a corporate volunteering platform that "matches" associates with various CR projects that they're also able to pitch. We significantly expanded this program in 2016 because we know that when our company does good, associates feel good.

Our CR reach extends to international goals set forth by the United Nations (UN). Through our work on malaria and leprosy, we contributed to the UN Millennium Development Goals, and the recently launched Sustainable Development Goals are shaping our future CR work. While looking ahead, we must stay focused on our core competencies and build on the foundation we created together. That means working to control and eliminate diseases that threaten so many lives in the developing world, researching and developing medicines to address unmet needs, providing training and tools to empower communities and promote sustainable change, and upholding our high ethical standards.

We still have a lot of work to do. But the last three years demonstrated what we can do, and I'm optimistic about the future.



Juergen Brokatzky-Geiger
Global Head, Corporate Responsibility

GRI G4 index

General standard disclosures

G4
SD

		UNGC PRINCIPLE	UN SDG	NOTES	PAGE
Strategy and analysis					
G4–1	Statement from the most senior decision-maker of the organization				3
G4–2	Key impacts, risks and opportunities				46
Organizational profile					
G4–3	Name of the organization				2
G4–4	Primary brands, products and services				AR 2016 p. 19
G4–5	Location of the organization's headquarters				2
G4–6	Countries of operation				AR 2016 p. 246
G4–7	Nature of ownership and legal form				AR 2016 p. 106
G4–8	Markets served				AR 2016 p. 197
G4–9	Scale of the organization				2
G4–10	Number of employees	**6**	8 12		47
G4–11	Employees covered by collective bargaining agreements	**3**	8		47
G4–12	Organization's supply chain	**3, 4, 5, 6, 8, 10**			47
G4–13	Significant changes to the organization's size, structure, ownership, or its supply chain				AR 2016 p. 190
G4–14	Precautionary approach	**7**			50
G4–15	Economic, environmental and social charters, principles, or other initiatives	**1, 8**			50
G4–16	Memberships of associations and national or international advocacy organizations	**1, 8**			51
Identified Material Aspects and Boundaries					
G4–17	Entities included in the organization's consolidated financial statements or equivalent documents				AR 2016 p. 246
G4–18	Process for defining the report content and the Aspect Boundaries				28
G4–19	Material Aspects identified in the process for defining report content				29
G4–20	Aspect Boundaries within the organization				33
G4–21	Aspect Boundaries outside the organization				33
G4–22	Restatements of information				6
G4–23	Significant changes from previous reporting periods in the scope and Aspect Boundaries				6
Stakeholder engagement					
G4–24	Stakeholder groups engaged by the organization				31
G4–25	Basis for identification and selection of stakeholders with whom to engage				31
G4–26	Approach to stakeholder engagement				31
G4–27	Key topics and concerns raised through stakeholder engagement				31

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SD

		UNGC PRINCIPLE	UN SDG	NOTES	PAGE
Report profile					
G4–28	Reporting period				6
G4–29	Date of most recent previous report				6
G4–30	Reporting cycle				6
G4–31	Contact point for questions regarding the report or its contents				6
G4–32	"In accordance" option, index and external assurance				6
G4–33	External assurance				97
Governance					
G4–34	Governance structure of the organization				AR 2016 p. 79
G4–35	Process for delegating authority for economic, environmental and social topics from the highest governance body to senior executives and other employees				28
G4–36	The organization has appointed an executive-level position or positions with responsibility for economic, environmental and social topics, and whether post holders report directly to the highest governance body				28
G4–37	Processes for consultation between stakeholders and the highest governance body on economic, environmental and social topics. If consultation is delegated, describe to whom and any feedback processes to the highest governance body		16		28
G4–38	Composition of the highest governance body and its committees		5 16		AR 2016 p. 86
G4–39	Chair of the highest governance body is also an executive officer		16		AR 2016 p. 90
G4–40	Nomination and selection processes for the highest governance body and its committees, and the criteria used for nominating and selecting highest governance body members		5 16		AR 2016 p. 86
G4–41	Processes for the highest governance body to ensure conflicts of interest are avoided and managed. Report whether conflicts of interest are disclosed to stakeholders		16		AR 2016 p. 91
G4–42	Highest governance body's and senior executives' roles in the development, approval, and updating of the organization's purpose, value or mission statements, strategies, policies and goals related to economic, environmental and social impacts				AR 2016 p. 89
G4–43	Measures taken to develop and enhance the highest governance body's collective knowledge of economic, environmental and social topics		4		28
G4–44	Processes for evaluation of the highest governance body's performance with respect to governance of economic, environmental and social topics				AR 2016 p. 92
G4–45	Highest governance body's role in the identification and management of economic, environmental and social impacts, risks and opportunities		16		AR 2016 p. 89
G4–46	Highest governance body's role in reviewing the effectiveness of the organization's risk management processes for economic, environmental and social topics				AR 2016 p. 89
G4–47	Frequency of the highest governance body's review of economic, environmental and social impacts, risks and opportunities				AR 2016 p. 89
G4–48	Highest committee or position that formally reviews and approves the organization's sustainability report and ensures that all Material Aspects are covered				6
G4–49	Process for communicating critical concerns to the highest governance body				28

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SD

		UNGC PRINCIPLE	UN SDG	NOTES	PAGE
G4–50	Nature and total number of critical concerns that were communicated to the highest governance body, and the mechanism(s) used to address and resolve them			Number and nature of concerns are not disclosed	AR 2016 p. 90
G4–51	Remuneration policies for the highest governance body and senior executives for the below types of remuneration				AR 2016 p. 112
G4–52	Process for determining remuneration. Report whether remuneration consultants are involved in determining remuneration and whether they are independent of management. Report any other relationships which the remuneration consultants have with the organization				AR 2016 p. 114
G4–53	How stakeholders' views are sought and taken into account regarding remuneration, including the results of votes on remuneration policies and proposals, if applicable		16		AR 2016 p. 114
G4–54	Ratio of the annual total compensation for the organization's highest-paid individual in each country of significant operations to the median annual total compensation for all employees (excluding the highest-paid individual) in the same country			Information is confidential and not disclosed	
G4–55	Ratio of percentage increase in annual total compensation for the organization's highest-paid individual in each country of significant operations to the median percentage increase in annual total compensation for all employees (excluding the highest-paid individual) in the same country			Information is confidential and not disclosed	
Ethics and integrity					
G4–56	Organization's values, principles, standards and norms of behavior such as codes of conduct and codes of ethics	**1, 2, 3, 4, 5, 6, 8, 10**	16		52
G4–57	Internal and external mechanisms for seeking advice on ethical and lawful behavior, and matters related to organizational integrity, such as helplines or advice lines	**10**	16		Novartis website
G4–58	Internal and external mechanisms for reporting concerns about unethical or unlawful behavior, and matters related to organizational integrity, such as escalation through line management, whistleblowing mechanisms or hotlines	**10**	16		Novartis website
Disclosure on management approach					
DMA	Access to healthcare				9
DMA	Ethics and compliance				14
DMA	Research and development				17
DMA	People				21
DMA	Environment				25

G4
EC

Economic

		UNGC PRINCIPLE	UN SDG	NOTES	PAGE
Economic performance					
G4–EC1	Direct economic value generated and distributed		2 5 7 8 9		53
G4–EC2	Financial implications and other risks and opportunities for the organization's activities due to climate change	**7, 8, 9**	13		54
G4–EC3	Coverage of the organization's defined benefit plan obligations				AR 2016 p. 226
G4–EC4	Financial assistance received from government				55
Market presence					
G4–EC5	Ratios of standard entry-level wage by gender compared to local minimum wage at significant locations of operation	**6**	1 5 8	Data not split by gender – see full response for detail	56
G4–EC6	Proportion of senior management hired from the local community at significant locations of operation		8		56
Indirect economic impacts					
G4–EC7	Development and impact of infrastructure investments and services supported		2 5 7 9 11		57
G4–EC8	Significant indirect economic impacts, including the extent of impacts		1 2 8 10 17		57
Procurement practices					
G4–EC9	Proportion of spending on local suppliers at significant locations of operation	**6**	12		48

G4
EN

Environment

		UNGC PRINCIPLE	UN SDG	NOTES	PAGE
Materials					
G4–EN1	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	58
G4–EN2	Percentage of materials used that are recycled input materials	**8**	8 12		58
Energy					
G4–EN3	Energy consumption within the organization	**7, 8, 9**	7 8 12 13		59
G4–EN4	Energy consumption outside of the organization	**8**	7 8 12 13		59
G4–EN5	Energy intensity	**8**	7 8 12 13		60
G4–EN6	Reduction of energy consumption	**7, 8, 9**	7 8 12 13		60
G4–EN7	Reductions in energy requirements of products and services	**8, 9**	7 8 12 13		61
Water					
G4–EN8	Total water withdrawal by source	**7, 8**	6 12		61
G4–EN9	Water sources significantly affected by withdrawal of water	**7, 8, 9**	6 12		62
G4–EN10	Percentage and total volume of water recycled and reused	**7, 8, 9**	6 12		63
Emissions					
G4–EN15	Direct greenhouse gas (GHG) emissions (Scope 1)	**7, 8**	3 12 13 14 15	Biogenic emissions not reported – see full response for detail	63
G4–EN16	Energy indirect GHG emissions (Scope 2)	**7, 8**	3 12 13 14 15		64
G4–EN17	Other indirect GHG emissions (Scope 3)	**7, 8**	3 12 13 14 15		65
G4–EN18	GHG emissions intensity	**8**	13 14 15		65
G4–EN19	Reduction of GHG emissions	**7, 8, 9**	13 14 15		65
G4–EN20	Emissions of ozone-depleting substances (ODS)	**7, 8, 9**	3 12	Total inventory provided rather than imports and exports	67
G4–EN21	NO_x, SO_x and other significant air emissions	**7, 8, 9**	3 12 14 15		67
Effluents and waste					
G4–EN22	Total water discharge by quality and destination	**7, 8, 9**	3 6 12 14		68
G4–EN23	Total weight of waste by type and disposal method	**7, 8**	3 6 12		70
G4–EN24	Total number and volume of significant spills	**8, 9**	6 12 14 15		72
G4–EN25	Weight of transported, imported, exported or treated waste deemed hazardous under the terms of the Basel Convention Annex I, II, III and VIII, and percentage of transported waste shipped internationally	**8**	3 12	Transported, imported and exported waste not reported	
G4–EN26	Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the organization's discharges of water and runoff	**8**	6 14 15		72
Products and services					
G4–EN27	Extent of impact mitigation of environmental impacts of products and services	**7, 8, 9**	6 8 12 13 14 15		72
G4–EN28	Percentage of products sold and their packaging materials that are reclaimed by category	**8**	8 12		72
Compliance					
G4–EN29	Monetary value of significant fines and total number of non-monetary sanctions for noncompliance with environmental laws and regulations	**7, 8**	16		73

G4
EN

		UNGC PRINCIPLE	UN SDG	NOTES	PAGE
Transport					
G4–EN30	Significant environmental impacts of transporting products and other goods and materials for the organization's operations, and transporting members of the workforce	**8, 9**	11 12 13		73
Overall					
G4–EN31	Total environmental protection expenditures and investments by type	**7, 8, 9**	7 9 12 13 14 15 17		74
Supplier environmental assessment					
G4–EN32	Percentage of new suppliers that were screened using environmental criteria	**7, 8, 9**		Absolute number provided rather than % – see full response for detail	47
G4–EN33	Significant actual and potential negative environmental impacts in the supply chain and actions taken				47
Environmental grievance mechanisms					
G4–EN34	Number of grievances about environmental impacts filed, addressed and resolved through formal grievance mechanisms	**8**	16		74

G4
LA

Social: labor practices and decent work

		UNGC PRINCIPLE	UN SDG	NOTES	PAGE
Employment					
G4–LA1	Total number and rates of new employee hires and employee turnover by age group, gender and region	6	5 8		75
G4–LA2	Benefits provided to full-time employees that are not provided to temporary or part-time employees, by significant locations of operation	6	8		75
G4–LA3	Return-to-work and retention rates after parental leave, by gender	6	5 8		75
Labor/management relations					
G4–LA4	Minimum notice periods regarding operational changes, including whether these are specified in collective agreements	3			76
Occupational health and safety					
G4–LA5	Percentage of total workforce represented in formal joint management-worker health and safety committees that help monitor and advise on occupational health and safety programs		8	Data reported by % sites rather than % total workforce – see full response for detail	76
G4–LA6	Type of injury and rates of injury, occupational diseases, lost days and absenteeism, and total number of work-related fatalities, by region and by gender		3 8	Data not split by gender; data on non-occupational absenteeism, and on injury rate and occupational disease for contractors not available – see full response for detail	77
G4–LA7	Workers with high incidence or high risk of diseases related to their occupation		3 8		80
G4–LA8	Health and safety topics covered in formal agreements with trade unions		8		81
Training and education					
G4–LA9	Average hours of training per year per employee by gender and by employee category	6	4 5 8		82
G4–LA10	Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings		8		82
G4–LA11	Percentage of employees receiving regular performance and career development reviews, by gender and by employee category	6	5		82
Diversity and equal opportunity					
G4–LA12	Composition of governance bodies and breakdown of employees per employee category according to gender, age group, minority group membership, and other indicators of diversity	6	5 8		83
Equal remuneration for women and men					
G4–LA13	Ratio of basic salary and remuneration of women to men by employee category, by significant locations of operation	6	5 8 10		83
Supplier assessment for labor practices					
G4–LA14	Percentage of new suppliers that were screened using labor practices criteria	6	5 8 16	Absolute number provided rather than % – see full response for detail	47
G4–LA15	Significant actual and potential negative impacts for labor practices in the supply chain and actions taken		5 8 16		47
Labor practices grievance mechanisms					
G4–LA16	Number of grievances about labor practices filed, addressed and resolved through formal grievance mechanisms	6	16	Specific number for labor practices not available – see full response for detail	83

G4
HR

Social: human rights

		UNGC PRINCIPLE	UN SDG	NOTES	PAGE
Investment					
G4–HR1	Total number and percentage of significant investment agreements and contracts that include human rights clauses or that underwent human rights screening	**1, 2**		Inclusion of figures not possible – see full response for detail	84
G4–HR2	Total hours of employee training on human rights policies or procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained	**1**			84
Non-discrimination					
G4–HR3	Total number of incidents of discrimination and corrective actions taken	**6**	8 16	Number of incidents not reported – see full response for detail	85
Freedom of association and collective bargaining					
G4–HR4	Operations and suppliers identified in which the right to exercise freedom of association and collective bargaining may be violated or at significant risk, and measures taken to support these rights	**3**	8		85
Child labor					
G4–HR5	Operations and suppliers identified as having significant risk for incidents of child labor, and measures taken to contribute to the effective abolition of child labor	**5**	8 16		86
Forced or compulsory labor					
G4–HR6	Operations and suppliers identified as having significant risk for incidents of forced or compulsory labor, and measures to contribute to the elimination of all forms of forced or compulsory labor	**4**	8		86
Security practices					
G4–HR7	Percentage of security personnel trained in the organization's human rights policies or procedures that are relevant to operations	**1**	16		86
Indigenous rights					
G4–HR8	Total number of incidents of violations involving rights of indigenous peoples and actions taken	**1**	2		86
Assessment					
G4–HR9	Total number and percentage of operations that have been subject to human rights reviews or impact assessments	**1**		Inclusion of figures not possible – see full response for detail	87
Supplier human rights assessment					
G4–HR10	Percentage of new suppliers that were screened using human rights criteria	**2**		Absolute number provided rather than % – see full response for detail	47
G4–HR11	Significant actual and potential negative human rights impacts in the supply chain and actions taken	**2**			47
Human rights grievance mechanisms					
G4–HR12	Number of grievances about human rights impacts filed, addressed, and resolved through formal grievance mechanisms	**1**	16	Specific number for human rights not available – see full response for detail	87

G4
SO

Social: society

		UNGC PRINCIPLE	UN SDG	NOTES	PAGE
Local communities					
G4–SO1	Percentage of operations with implemented local community engagement, impact assessments and development programs	**1**		Percentage figure not reported – see full response for detail	88
G4–SO2	Operations with significant actual or potential negative impacts on local communities	**1**	1 2	We are currently working to better measure and quantify our impacts on local communities and may disclose data in 2017	
Anti-corruption					
G4–SO3	Total number and percentage of operations assessed for risks related to corruption and the significant risks identified	**10**	16		89
G4–SO4	Communication and training on anti-corruption policies and procedures	**10**	16	Figures for training of governance body members and business partners not reported	89
G4–SO5	Confirmed incidents of corruption and actions taken	**10**	16	Nature of confirmed incidents of corruption, termination or non-renewal of contracts with business partners due to violations related to corruption not reported – see full response for detail	90
Public policy					
G4–SO6	Total value of political contributions by country and recipient/beneficiary	**10**	16	Data not reported by country and recipient – see full response for detail	90
Anti-competitive behavior					
G4–SO7	Total number of legal actions for anti-competitive behavior, anti-trust, and monopoly practices and their outcomes		16		AR 2016 p. 216
Compliance					
G4–SO8	Monetary value of significant fines and total number of non-monetary sanctions for noncompliance with laws and regulations		16		AR 2016 p. 216
Supplier assessment for impacts on society					
G4–SO9	Percentage of new suppliers that were screened using criteria for impacts on society			Absolute number provided rather than % – see full response for detail	47
G4–SO10	Significant actual and potential negative impacts on society in the supply chain and actions taken				47
Grievance mechanisms for impacts on society					
G4–SO11	Number of grievances about impacts on society filed, addressed and resolved through formal grievance mechanisms		16	Specific number for impacts on society not available – see full response for detail	91

G4
PR

Social: product responsibility

		UNGC PRINCIPLE	UN SDG	NOTES	PAGE
Customer health and safety					
G4–PR1	Percentage of significant product and service categories for which health and safety impacts are assessed for improvement			No overall % reported – see full response for detail	92
G4–PR2	Total number of incidents of noncompliance with regulations and voluntary codes concerning the health and safety impacts of products and services during their life cycle, by type of outcomes		16		16
Product and service labeling					
G4–PR3	Type of product and service information required by the organization's procedures for product and service information and labeling, and percentage of significant product and service categories subject to such information requirements		12	No overall % reported – see full response for detail	93
G4–PR4	Total number of incidents of noncompliance with regulations and voluntary codes concerning product and service information and labeling, by type of outcomes		16		93
G4–PR5	Results of surveys measuring customer satisfaction				93
Marketing communications					
G4–PR6	Sale of banned or disputed products				93
G4–PR7	Total number of incidents of noncompliance with regulations and voluntary codes concerning marketing communications, including advertising, promotion and sponsorship, by type of outcomes		16	Data not split by type of noncompliance – see full response for detail	94
Customer privacy					
G4–PR8	Total number of substantiated complaints regarding breaches of customer privacy and losses of customer data		16		94
Compliance					
G4–PR9	Monetary value of significant fines for noncompliance with laws and regulations concerning the provision and use of products and services		16		AR 2016 p. 216

In Brisbane, Australia, groundskeeper and skin cancer survivor Malcolm Caddies protects himself from the sun as he prepares the field for a rugby match at Suncorp Stadium.

General standard disclosures

G4 SD 2

Key impacts, risks and opportunities

SIGNIFICANT ECONOMIC, ENVIRONMENTAL AND SOCIAL IMPACTS OF THE ORGANIZATION, AND ASSOCIATED CHALLENGES AND OPPORTUNITIES

We focus our corporate responsibility (CR) work in two areas that underscore our mission of discovering new ways to improve and extend people's lives:

- Expanding access to healthcare: we work to control and eliminate diseases such as malaria and leprosy, pioneer new business approaches to reach underserved patients, and find new treatments and adaptive solutions to improve health in developing countries.
- Doing business responsibly: this is a core part of Novartis. We care for our associates, strive to positively contribute to the communities where we live and work, and protect the environment. We conduct business ethically, maintaining a Code of Conduct and governance system to ensure our associates uphold our values.

Key topics of focus were identified through our extensive CR materiality process in 2013 and confirmed during our 2015 CR materiality review. These topics, which present both opportunities and risks, can be found on page 30 of this report. On page 28 we explain our materiality process and how we have prioritized these topics. Our progress in addressing these key topics throughout 2016 is detailed on pages 9-27. Our performance is monitored through our key performance indicators on page 13, and our CR targets are available on our website.

Business divisions and relevant functions develop annual and mid-term CR targets to support the Novartis CR strategy as defined by Novartis management. Target owners are responsible for reporting on progress at least once annually to the CR Board; the CR Board can propose corrective actions if needed. A balanced scorecard highlighting priority CR objectives is assembled quarterly and shared with the Executive Committee of Novartis (ECN).

Key CR objectives are also included in the ECN balanced scorecard, with progress reported on a monthly basis.

Risks and opportunities

All organizations face a variety of risks at both strategic and operational levels. Some risks are beyond an organization's immediate control. Each risk has a certain likelihood of occurrence and potential impact, including impact on people, equipment or property, the environment, reputation or business.

For instance, in recent years, the possibility of political or regulatory action on drug prices has become a greater risk for the entire industry. Such action could take a variety of forms, from restrictions on price increases and mandates to provide broad access to treatments, to changes in intellectual property laws.

Novartis aims to systematically identify and assess risks. We manage risks proactively by implementing preventive and contingency measures to reduce the likelihood of an event occurring and the severity of its consequences.

The two most important tools for health, safety and environment (HSE) and business continuity risk management are risk portfolios and audits. The Novartis Global HSE Policy applies to all associates of Novartis AG and its affiliates. The principles of this policy apply where Novartis has operational responsibility (i.e., locations operated or controlled by a Novartis company – either owned or rented – and joint ventures in which Novartis bears operational responsibility). This policy contains the company's global principles and management practices, and is aligned with applicable laws and industry codes such as the international management standards for environment (ISO 14001) and occupational health and safety (OHSAS 18001).

In addition, a business continuity management process is an integral part of the Novartis risk management framework for business-related risks.

The Corporate Risk Management function is overseen by the Board's independent Risk Committee. The Compensation Committee works closely with the Risk Committee to ensure that the compensation system does not lead to excessive risk-taking by management (for details, see the Compensation Report on page 110 of the Novartis Annual Report 2016). Organizational and process measures have been established to identify and

mitigate risks at an early stage. Organizationally, the individual divisions are responsible for risk and risk mitigation, with specialized corporate functions – such as Group Finance; Group Quality Assurance; Corporate Health, Safety and Environment and Business Continuity Management; and Integrity & Compliance – providing support and controlling the effectiveness of risk management by the divisions in these respective areas.

Responsible procurement (RP) helps ensure our goods and services are ethically sourced by requiring the companies with which we do business to meet the standards of ethics, business integrity and environmental practice that we expect. In 2016, we conducted a materiality assessment in the supply chain to ensure that our current processes meet the recent heightened external interest, additional scrutiny and new regulations. One of the outcomes was the establishment of a cross-functional steering committee. This committee has the accountability to expand our current RP program into a comprehensive third-party risk framework across Novartis.

For more on the risks Novartis faces and the steps we are taking to address them, please see
→ page 167 of the Novartis Annual Report 2016.

G4 SD 10

Number of employees

Novartis Group companies employed about 123 000 people globally on December 31, 2016 (headcount continuing operations):

- 29 518 work in Asia Pacific
- 24 882 in North America
- 62 240 in Europe, Middle East and Africa
- 6 221 in Latin America

There are 117 607 permanent contracts and 5 378 temporary contracts.

G4 SD 11

Employees covered by collective bargaining agreements

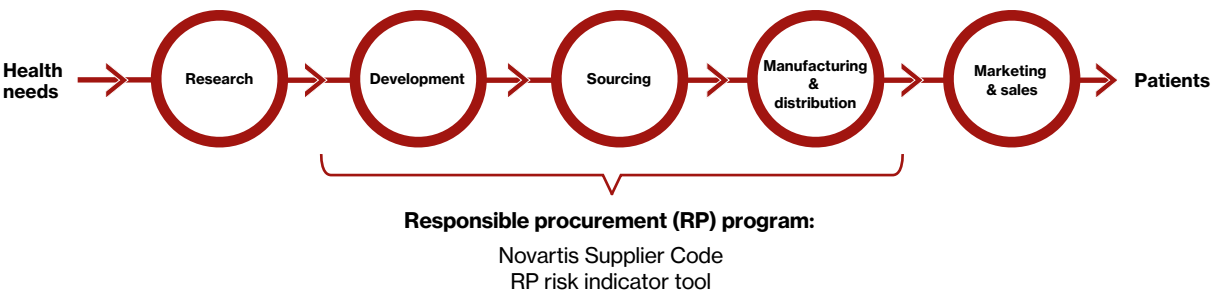
According to the global Corporate Citizenship Survey 2016, which covered roughly 82% of the total number of associates, 41% of non-management employees are represented by an internal employee representation body (i.e., Novartis internal works councils), and 26% are also represented by an external employee representation body (i.e., labor union). 33% of Novartis Group company associates worldwide (excluding management) are covered by a collective bargaining agreement.

G4 SD 12

Organization's supply chain

Procurement, accountable for an annual global spend of more than USD 21 billion, is a strategic partner to the business. Operating across 60 countries, Novartis has a network of approximately 1 080 procurement professionals and more than 110 000 suppliers.

Our value chain



Local supplier spend

	Spend			Supplier[3]	
Country	Total %	Direct spend[1] %	Indirect spend[2] %	Total	%
United States	31.6	26.5	33.3	16 494	14.9%
Switzerland	14.3	7.4	16.6	6 408	5.8%
Germany	9.8	15.7	7.8	13 095	11.8%
United Kingdom	6.1	5.3	6.4	4 023	3.6%
China	3.0	5.0	2.3	3 494	3.1%
Austria	2.6	4.6	2.0	2 871	2.6%
Italy	2.6	2.5	2.7	3 294	3.0%
France	2.6	4.3	2.1	3 455	3.1%
Spain	2.4	3.0	2.2	4 265	3.8%
India	2.2	3.2	1.8	2 846	2.6%
Japan	2.1	2.3	2.0	5 684	5.1%
Belgium	1.9	0.5	2.3	1 387	1.2%
Slovenia	1.8	3.8	1.1	2 012	1.8%
Canada	1.6	1.3	1.7	2 262	2.0%
Singapore	1.3	0.3	1.7	1 890	1.7%
Rest of the world	14.0	14.3	13.9	37 493	33.8%
Grand total	**100.0**	**100.0**	**100.0**	**110 973**	**100.0%**

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

WORKING WITH OUR SUPPLIERS

Novartis engages thousands of new suppliers each year, across a supply chain that extends into almost every country in the world. 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 (ILO).

The Novartis Global Policy of Procurement of Goods and Services from Third-Party Suppliers describes expectations when committing company resources to third-party 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 by one global 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), more than 70% of spend is on local suppliers.

NOVARTIS SUPPLIER CODE

The Novartis Supplier Code sets out our expectations of suppliers on ethical standards in fair labor practices, health and safety, environmental protection, animal welfare, anti-bribery and data privacy.

RESPONSIBLE PROCUREMENT PROGRAM

RP focuses on four key principles:

- **Risk-based:** using risk assessments that take country and sector into account, we identify suppliers that pose elevated risks and accurately target our efforts to where they are most needed: on high-risk suppliers
- **Modular:** covers labor rights, HSE, animal welfare, anti-bribery and fair competition, and data privacy
- **Integrated:** fully integrated into our sourcing process as part of our day-to-day procurement operations, and draws on our global network of subject matter experts in labor, HSE, animal welfare and anti-bribery
- **Collaborative:** engages and supports suppliers to improve their social responsibility and ethical business practices

ACTIVE MONITORING OF RISK AND RESPONSIBILITY

We focus our attention on risk and responsibility in the supply chain. Expectations are addressed in the early stages of the supplier selection process. Our 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 the approximate 95% of suppliers that present little or no ethical risk, enabling us to concentrate our efforts on the small number of suppliers where a significant risk exists or where we can influence change. Most importantly, it gives 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.

2016 RP FINDINGS

In 2016, 441 suppliers were identified as posing an elevated risk, including environmental, labor and human rights. One supplier can pose multiple risks. Of these:

- 242 suppliers were identified as posing an elevated HSE risk. Active follow-up actions, including desktop reviews and/or audits, were taken with 15 suppliers. In 15 cases, HSE audits were conducted. Improvement plans were developed in collaboration with relevant suppliers, in cases of noncompliance identified in the following elements of our Supplier Code:
  - Worker protection
  - Risk and process safety
  - Emergency preparedness and response
  - Environmental authorizations
  - Waste and emissions
  - Spills and releases
- 178 suppliers were identified as posing an elevated human rights or labor rights risk. Active follow-up actions, including desktop reviews and/or audits, were taken with 83 suppliers. In six cases, labor audits were conducted. Improvement plans were developed in collaboration with relevant suppliers, in cases of noncompliance identified in the following elements of our Supplier Code:
  - Freely chosen employment
  - Worker protection
  - Record keeping
  - Fair treatment
  - Wages, benefits and working hours
- 57 suppliers were identified as posing an elevated animal welfare risk. In 55 cases, active follow-up actions and/or audits were conducted. Improvement plans were developed in collaboration with relevant suppliers.
- Regarding screening for impacts on society, we include anti-bribery criteria. Data is reported and analyzed on a country-by-country basis. Our RP practice focuses on applying our expertise to help suppliers find lasting solutions to complex issues, ultimately improving standards and reducing their overall negative impacts on society.

Tackling environmental and social projects in the supply chain

Novartis established the Practitioners Working Group (PWG) in 2014 to build a consistent approach to engaging with our key suppliers on responsible procurement.

Each year, the PWG conference brings together representatives from Novartis and our supply chain to share best practices and discuss themes ranging from labor rights to health, safety and the environment.

During the 2016 event, discussions explored how to move beyond monitoring risks to build closer partnerships and mutual understanding of expectations and challenges. As an outcome of the conference, participants agreed to work together on two projects on carbon and water footprints. In addition, specific projects will also look at ways to improve diversity in supplier plants and create greater awareness of the Novartis Supplier Code.

The Novartis RP team in India will guide and oversee the work throughout 2017.

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, animal welfare, anti-bribery and data privacy. Data privacy is not included in the table below because we currently do not have a global approach to managing data privacy. This is managed at the country level.

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 guideline 8 HSE guidance note 7.2	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	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.				

G4 SD 14

Precautionary approach

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. Novartis takes its 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.

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

G4 SD 15

Economic, environmental and social charters, principles, or other 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, and the OECD Convention on Combating Bribery of Foreign Public Officials.
- 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

G4 SD 16

Memberships of associations and national or international advocacy organizations

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
- 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:
  - Switzerland, where the national associations are Interpharma and Intergenerika
  - The US, where the key national organizations are Pharmaceutical Research and Manufacturers of America (PhRMA), the Biotechnology Innovation Organization (BIO), the Generic Pharmaceutical Association (GPhA)
  - The EU, where the regional organizations are the 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
  - Global associations including the International Federation of Pharmaceutical Manufacturers & Associations (IFPMA)
- National associations in most markets where Novartis has a legal subsidiary

G4 SD 56

Organization's values, principles, standards and norms of behavior such as codes of conduct and codes of ethics

Our vision, mission and strategy are detailed on page 7 of this report. Strong values define our culture and help us execute the Novartis strategy in line with our mission and vision. Our values are innovation, quality, collaboration, performance, courage and integrity. They describe the professional behavior we expect from our employees.

Novartis Code of Conduct

Novartis adopted its first global Code of Conduct in 1999. An amendment was later added, reflecting the Group's commitment to the UNGC. Our Code of Conduct was revised in 2001, and most recently in 2011. Our Code of Conduct is based on five core principles (for details of these principles, see the Novartis Code of Conduct):

- **Patients:** patient benefit and safety is at the heart of everything we do.
- **Associates:** we treat our associates fairly and respectfully.
- **Shareholders:** we are committed to outstanding and sustainable performance with integrity.
- **Healthcare partners:** we strive to be a trusted healthcare partner.
- **Society:** we aspire to be a good corporate citizen.

Every Novartis associate is required to take part in yearly Code of Conduct trainings, including certification. In 2016, 110 774 associates were trained and certified on the Code of Conduct. Compliance with the Code of Conduct is included in the terms of employment of all Novartis associates and is closely monitored.

Policies

Novartis further regulates ethical business practices through its internal policies, which are fully aligned with the overarching Code of Conduct. These policies set global standards for the most common business practices at Novartis. Implementation and enforcement of these policies are supported by regular training in local languages (including e-learning), monitoring of existing controls, and internal audits.

MARKETING PRACTICES

- Pharma: Novartis Pharma Principles and Practices for Professionals (NP4)
- Alcon: Alcon Policy on Promotion and Interaction with Healthcare Professionals (AP3)
- Sandoz: Sandoz Professional Practices Policy (SP3)

INTERACTIONS WITH PATIENTS

- Novartis Institutes for BioMedical Research (NIBR): Policy for Interactions with Patients, Physicians, and Institutions for NIBR (PIPPIN)

ETHICS AND COMPLIANCE

A worldwide network of compliance officers advise on compliance matters and handle any issues that arise locally. The Novartis Chief Ethics and Compliance Officer and Head of Litigation presents an update on the compliance program semi-annually to the Audit and Compliance Committee of the Novartis Board of Directors. The Chief Ethics and Compliance Officer and Head of Litigation reports to the CEO and the Group General Counsel. She has overall responsibility for the Code of Conduct, the anti-bribery program and ethical business practices.

For more information about ethics and compliance, see → our website.

Elsa Anderson and her classmates prepare for a choral performance in Rockport, Massachusetts in the US. Her mother, Jennifer Allport-Anderson, is a researcher at the Novartis Institutes for BioMedical Research (NIBR) in Cambridge, Massachusetts.

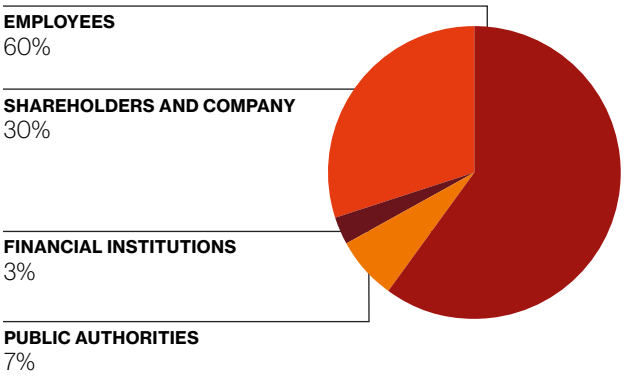
Economic

G4 EC 1

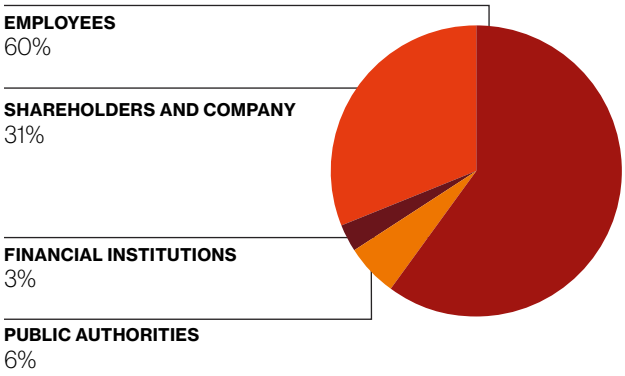
Direct economic value generated and distributed

Origin of value added	2016 USD millions	2016 % of net sales	2015 USD millions	2015 % of net sales
Net sales	**48 518**	**100.0%**	**49 415**	**100.0%**
Other revenues, change in inventory and own manufactured items	1 153	2.4%	1 429	2.9%
Total	**49 671**	**102.4%**	**50 844**	**102.9%**
Material costs and other operating expenses	–21 125	–43.5%	–22 610	–45.8%
Material costs	–5 187	–10.7%	–5 536	–11.2%
Other operating expenses	–15 938	–32.8%	–17 074	–34.6%
Gross value added	**28 546**	**58.8%**	**28 234**	**57.1%**
Depreciation, amortization and impairments	–6 176	–12.7%	–5 575	–11.3%
Financial income net	–447	–0.9%	–454	–0.9%
Income from associated companies	703	1.4%	266	0.5%
Net value added	**22 626**	**46.6%**	**22 471**	**45.5%**

Distribution of net value added 2016



Distribution of net value added 2015



G4 EC 2

Financial implications and other risks and opportunities for the organization's activities due to climate change

In 2016, Novartis participated in a pilot application of the Natural Capital Protocol, launched in June 2016 by the Natural Capital Coalition and WBCSD. For the first time, the protocol allowed Novartis to determine its environmental externalities as a monetarized value for all relevant environmental impacts and dependencies. The valuation included environmental emissions from our own operations as well as an assessment of the emissions from our global direct materials supply chain. The extent of these emissions was produced using a macro-economic input/output model with a statistical tool based on spend data. Results confirm that carbon and other air emissions, as well as water use along the supply chain, are the major external environmental costs for Novartis. We will follow up with our key suppliers on specific areas related to environmental matters in 2017.

Novartis responds to a range of physical, regulatory, and other risks and opportunities driven by climate change. For complete details of our work to address climate change risks and opportunities, see CC5 and CC6 of the CDP Investor Information Request Response. An overview is provided below.

Physical risks

As a company with products available in about 155 countries, we understand that potential physical risks as a result of climate change are not limited to a particular region or country. Our operations may become directly affected by physical risks related to climate change in the same way as any other business that operates worldwide. While extreme weather events, changes in weather patterns, and rising temperatures and/or sea levels are not expected to strongly influence our operational plans and decisions within the next five years, we are working to identify, quantify and manage these potential risks. Reinforcement of site infrastructure to account for changes in precipitation extremes and droughts could amount to an estimated USD 2-5 million cost per site.

Suppliers of chemicals and intermediates, energy and packaging materials could be affected by physical risks of climate change. Severe events due to climate change could affect supply continuity for such materials and services. We have programs in place to ensure business continuity, which include risks of supply interruptions. Prices for agricultural commodities potentially may increase by 20-30% over the next 10 to 15 years as a result of climate change.

We are aware that rising sea levels could result in protective measures being required for industrial areas near the coastline and in lowland areas where we operate (e.g., in Shanghai, Dhaka or Singapore). Flooding of manufacturing operations could lead to higher capital and operational costs, and at-risk operations with smaller asset values or in poorer areas may need to be relocated.

The availability of fresh water is another area where some of the Novartis operations (primarily the manufacture of anti-infective pharmaceuticals by fermentation) could be affected in the long term. The fresh water needed for cooling is normally supplied directly from rivers or from groundwater layers at river banks. All of our anti-infective sites are located in areas where the availability of fresh water is currently abundant or sufficient – and is expected to be for the next 15 to 20 years. However, energy and water costs in water-scarce areas could increase by 20-30% due to increased water stress. For the top 10 water-scarce sites, total electricity costs in 2015 were USD 32 million, and total water costs were USD 7 million. An increase as estimated above would result in an additional USD 8-12 million per year in costs.

At a corporate level, Novartis has identified short-term and long-term risks related to water scarcity based on the WBCSD Global Water Tool. Locations with higher potential risks have been asked to conduct assessments to manage and minimize their dependence on water.

Potential reductions in biodiversity caused by climate change may have long-term impacts on our business. According to a 2007 report by the Intergovernmental Panel on Climate Change (IPCC), temperature increases of 1.5-2.0°C above pre-industrial levels (the expected increase to occur by 2050 due to global warming) could lead to the extinction of 20-30% of known plant and animal species. With more than 60% of all new anti-cancer and anti-infective agents in the period 1984 to 1995 coming from natural products or their derivatives, Novartis could suffer from a reduction in biodiversity over the next 30 to 50 years. Current Novartis products based on natural compounds together bring in more than USD 2 billion in net sales.

Antimicrobial resistance is a global threat, predicted to result in 10 million deaths per year by 2050. Following the Davos Declaration signed by more than 100 entities in January 2016, Novartis and 12 pharmaceutical companies signed the Industry Roadmap for Progress on Combating Antimicrobial Resistance in September. We are committed to collective action, including reducing the environmental impact of the production of antibiotics; ensuring antibiotics are only used by patients who need them; improving affordable access to high-quality new and existing antibiotics globally; and exploring new opportunities for open collaboration between industry and public researchers. Work is currently underway in each of these areas and Novartis is actively involved.

Regulatory risks and opportunities

Regulation driven by climate change can present risks and opportunities for our business. For example, cap-and-trade schemes and international agreements could cause an increase in operational costs over the next five to 10 years, with a strong likelihood that they will directly impact Novartis.

In total, we have invested more than USD 150 million in our energy and climate management programs over the last seven years to ensure that we minimize the associated risks and position ourselves to benefit from potential opportunities. Energy projects over the last seven years had an average payback of less than three years. Costs for the energy management programs were exceeded by the savings achieved. Since the introduction of our energy program in 2008, we have reduced annual energy costs by USD 76 million through projects, compared to a business-as-usual scenario.

With respect to regulatory schemes (such as the Kyoto Protocol and potential future agreements), Novartis has taken a proactive approach due to their growing importance, even though climate change currently has limited direct impact on our industry.

In 2015, Novartis leadership endorsed a carbon price of USD 100 per ton (t) of carbon dioxide equivalent (CO_2e), in line with the cost of climate change to society as calculated by the World Bank. Building a carbon price into investment decisions is important, as it helps identify projects that will most cost-effectively reduce GHG emissions. Novartis has also signed the Business Leadership Criteria on Carbon Pricing of the Caring for Climate Initiative of the UNGC, and joined the group of companies committing to science-based targets on climate change.

For more details on our corporate energy and climate strategy, see
→ G4–EN15: Direct greenhouse gas (GHG) emissions (Scope 1).

G4 EC 4

Financial assistance received from government

No government is registered with more than 2% of our share capital as of December 31, 2016. However, according to a disclosure notification filed with Novartis AG, Norges Bank (Central Bank of Norway), Oslo, held 2.02% of the share capital of Novartis AG as of this date.

Investment grants, research and development (R&D) grants, and other relevant types of grants

Within the Novartis Group, some entities receive grants from various governments and private organizations linked to specific activities. As an example, within NIBR, certain entities – mainly the Friedrich Miescher Institute, the Genomics Institute of the Novartis Research Foundation, and the Novartis Institute for Tropical Diseases – receive research grants from private organizations such as the Wellcome Trust and governments (US, EC, Switzerland). In the US, the Novartis Institutes for BioMedical Research Inc. (NIBRI) also receives a grant from the US government. In total, these grants are not material to Novartis (2016 amount received: USD 23 million).

Financial assistance from export credit agencies

Novartis uses export credit agencies when insurance policies exist to cover or transfer political and commercial risk, and if Novartis considers coverage necessary. Insurance premiums are paid and claims are raised if and when losses occur on covered transactions, and recovery is considered impossible. However, these insurance policies and any related recovery are not material to the Group.

Tax relief and tax credits

Novartis publishes an overall analysis of the tax rate. Tax authorities offer different types of tax credits. For Novartis, the tax benefits result from R&D credits, which are typically offered to the pharmaceutical industry as an incentive to intensify R&D activities in the respective jurisdiction. In 2016, the overall effect of such credits and allowances on the expected tax rate amounted to a 2.8 percentage-point benefit (approximately USD 215 million).

(As a percentage)	2016 (%)	2015 (%)	2014 (%)
Applicable tax rate	13.2	12.4	11.7
Effect of disallowed expenditures	3.5	3.5	2.9
Effect of utilization of tax losses brought forward from prior periods	–0.2	–0.2	–0.3
Effect of income taxed at reduced rates	–0.2	–0.3	–0.6
Effect of tax credits and allowances	–2.8	–2.7	–1.8
Effect of tax rate change on opening balance	0.2	–0.5	
Effect of write-off of deferred tax assets	0.5		
Effect of write-down and reversal to write-down of investments in subsidiaries	–1.0	–0.9	0.9
Effect of tax benefits expiring in 2017	–0.5	–0.4	–0.8
Effect of non-deductible losses in Venezuela	1.3	1.2	
Effect of prior-year items	0.2	1.0	0.8
Effect of other items[1]	0.1	0.5	–0.2
Effective tax rate for continuing operations	**14.3**	**13.6**	**12.6**
Effective tax rate for discontinued operations		13.7	–27.4
Effective tax rate	**14.3**	**13.7**	**13.8**

[1] Other items in 2016 (+0.1%) include one-time impacts for the deferred tax effects on the net assets of certain subsidiaries resulting from the change in their tax status (–6.2%), the changes in uncertain tax positions (+5.1%) and other items (+1.2%).

Analysis of tax rate

The main elements contributing to the difference between the Group's overall applicable tax rate (which can change each year since it is calculated as the weighted average tax rate based on pre-tax income of each subsidiary) and the effective tax rate are:

Novartis has a substantial business presence in many countries and is therefore subject to different income and expense items that are non-taxable (permanent differences) or taxed at different rates in those tax jurisdictions. This results in a difference between our applicable tax rate and effective tax rate, as shown in the table above.

The utilization of tax-loss carry-forwards lowered the tax charge by USD 18 million in 2016, and by USD 15 million and USD 34 million in 2015 and 2014, respectively.

For further details, see
→ pages 201-202 of the Novartis Annual Report 2016.

G4 EC 5

Ratios of standard entry-level wage by gender compared to local minimum wage at significant locations of operation

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. These living wages are usually above the local minimum wage.

In 2016, the living wage survey covered 77[1] countries with 50 or more associates. There were 405 associates below agreed living wages confirmed by these countries. Our local human resources (HR) adjusted or will adjust their wages accordingly (depending on the locally agreed adjustment period). At major operations[2] where local minimum wage requirement (which tend to focus on poverty levels for individuals) exist, the Novartis living wage can be higher than the legal minimum standard.

We track living wage data at country level but not by gender. Country managers are tasked with ensuring that all associates, regardless of gender, are paid at least the confirmed living wage. They report back on any incidents of noncompliance to the global HR function.

[1] Originally 78 countries. Venezuela was excluded from the living wage survey due to the lack of official indicators and no accurate benchmarks available to measure basic work/humanitarian dimensions as a result of the continuing economic crisis in 2016.
[2] Our major operations (based on number of associates) are located in Switzerland, Germany, the US and China.

G4 EC 6

Proportion of senior management hired from the local community at significant locations of operation

The percentage of local managers (i.e., managers holding the nationality of the country in which they work) is as follows at significant locations of operation: Switzerland 18%, Germany 68%, and China 84%. We do not collect data on nationality for our US operations.

G4 EC 7

G4 EC 8

Development and impact of infrastructure investments and services supported

In our industry, main indirect impacts are linked with increasing access to healthcare. Novartis products reached nearly 1 billion patients in 2016, and of these patients, approximately 52 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.
- In 2016, our Healthy Family programs reached more than 7.7 million people through health education sessions in India, Kenya, Vietnam and Indonesia. In addition, nearly 610 000 patients attended specific health camps.
- Through 646 medical missions, Alcon provided eye health education, trained physicians, and brought treatments to places without access to care in 2016.
- We are contributing to building scientific and clinical capabilities in emerging countries through the Novartis Next Generation Scientist (NGS) and Visiting Scholar programs. Each year, approximately 20 NGS interns and up to 10 visiting scholars from across the developing world are selected to carry out research projects using state-of-the-art techniques and equipment that can also be implemented within their local infrastructure. Since 2010, 165 young scientists and clinicians from 24 countries across Africa, Asia and Latin America participated in these programs. The programs have contributed to peer-reviewed publications, presentations at international conferences, the advancement of local healthcare infrastructure, and the creation of an international network of scientific and clinical leaders in emerging countries.

For more information on our access-to-healthcare programs, see
→ see page 9.

Quantifying the economic, environmental and social impacts of our activities

In 2016, Novartis started developing an approach to capture and measure positive and negative economic, environmental and social impacts created by our activities and related initiatives in the communities where we operate. This approach provides new insights into our operations and could help support decision-making and prioritized activities that create the biggest societal value. Further, it could enable Novartis to increase transparency in our disclosures by quantifying in financial terms key societal impacts.

We are currently piloting this approach to assess and value our global environmental impacts, including the impact generated by our supply chain. Country pilots covering economic and social aspects have also been run in China and Kenya. Further, we have conducted an assessment of the social and environmental value of our forest carbon sink projects in Argentina and Mali.

These pilots demonstrate that the approach can be replicated in other countries and programs. Preliminary results in China and Kenya show that our activities have created substantial societal value. For example, in China, we estimate that in addition to the approximately 7 400 full-time equivalent associates, our activity in the country indirectly resulted in approximately 39 000 additional jobs. The pilot in China also revealed negative environmental impacts related to water, waste and greenhouse gases created by our own and supply chain activities. For both countries, we also calculated the contribution our activities make to their gross domestic product.

In 2016, we also assessed the benefits of our forest carbon sink projects. For our project in Argentina, the results showed that 60% of its societal benefits arise from sequestration and 36% from ecosystem services. The project has a social return on investment (SROI) of 220% for the initial eight years. For the Mali jatropha initiative, 70% of the societal benefits arise from income generation for rural farmers and 18% from environmental benefits (including carbon sinks). This project has an SROI of 180% for the initial eight years.

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 2016, the company placed orders worth about CHF 3 billion with companies in the 26 Swiss cantons. Novartis indirectly secured more than 40 000 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.

Researcher Edmund Ekuadzi, an expert on the medical properties of plants, examines a specimen gathered in his homeland of Ghana.

Environment

G4 EN 1

Materials used by weight or volume

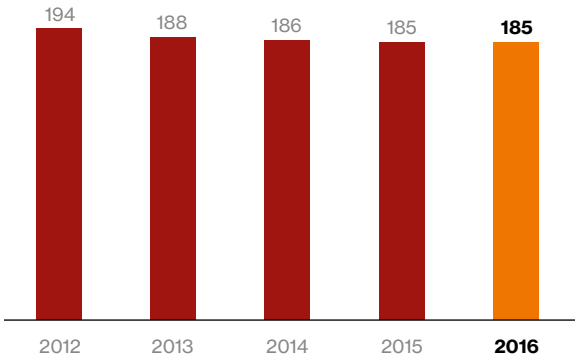
As a large global organization, we are expected to manage, minimize and report on our environmental impacts, and increase the efficient use of raw materials and natural resources. Novartis collects measured data on raw and packaging material use on a quarterly basis at key sites. However, due to the thousands of different materials used in our production, we believe that at this stage, it is not meaningful for our business to report on material types or their sources. Our vision on material and waste for 2030 is to establish closed material loops for our major materials and to avoid adverse effects from waste disposal.

Novartis monitors and reports total production as the total weight of all products delivered from all Novartis Group companies' manufacturing facilities. Total production covers all types of products, including chemical and fermentation products, active pharmaceutical ingredients and finished dosage forms, as well as eye care drugs, surgical equipment and vision care products. Total production for 2016 remained stable with 185 kilotons (kt).

With respect to material and waste, total production is the denominator for our waste target for 2020: to reduce total non-recycled operational waste relative to production quantities by 30% compared to 2010.

For more information on our waste management strategy, see
→ G4–EN23: total weight of waste by type and disposal method.

Production total
(in kt)



G4 EN 2

Percentage of materials used that are recycled input materials

We do our best to use recycled materials wherever possible. We favor raw materials with a reduced environmental footprint (i.e., materials that are less hazardous or that lead to less environmental impact during production), and prefer materials from renewable sources if technically feasible and economically viable.

The majority of the solvents we use are recycled, to a large extent within our operations and partly by contractors for third-party users. Solvents that are not recycled are either used as alternative fuels or are incinerated at waste facilities that recover the energy generated from combustion. The waste solvents reused at our sites constitute recycled input materials. At the five chemical operations plants of the Novartis Innovative Medicines Division, 52.7% of the solvents used in 2016 were from recycled input materials.

G4 EN 3

Energy consumption within the organization

Novartis has a long-standing, comprehensive energy program with two main objectives:

- Improve energy efficiency of all industrial and commercial operations
- Use renewable energy sources where available and feasible

Energy consumption is reported quarterly at all Novartis sites. We monitor the purchase and use of all types of energy sources and fuels. In 2016, total energy use decreased by 3.4% to 16.63 million gigajoules (GJ), compared to 17.21 million GJ in 2015.

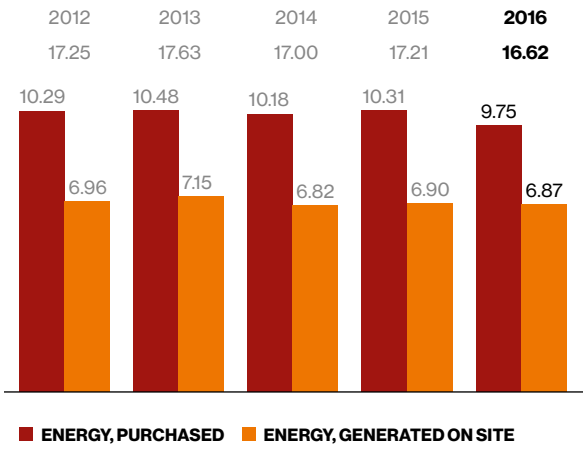
On-site-generated energy

A high proportion of our on-site energy use comes from low carbon-intensive and renewable energy sources. The data is separated into energy generated from fossil sources (natural gas, light oil, heavy oil and fossil waste), biomass fuels and renewable sources (photovoltaic, thermal solar, hydroelectric, etc.). Conversion and transformation factors for fuels are based on standards used by the International Energy Agency (IEA).

In 2016, our total on-site-generated energy slightly decreased by 0.4%, from 6.90 million GJ in 2015 to 6.87 million GJ. 93% of our on-site energy came from the combustion of natural gas and 2% from renewable fuel sources. On-site renewable sources are primarily wood chips, sugar cane residues (bagasse), and biogas from mycelium waste. In 2016, the solar photovoltaic capacity of Novartis amounted to approximately 1 megawatt.

Energy use

(in million GJ)



Purchased energy

The use of purchased energy, including electricity, steam and hot water, is calculated from the net value of all energy acquired from external sources. Conversion and transformation factors for purchased energy are based on standards used by the IEA.

Our total purchased energy decreased by 5.4%, from 10.31 million GJ in 2015 to 9.75 million GJ in 2016. Purchased electricity currently accounts for around 83% of the total amount of purchased energy. Purchased steam accounts for 13%, with other energy such as hot water making up the remainder.

G4 EN 4

Energy consumption outside of the organization

We do not collect information on energy consumption for areas outside the organization (upstream and downstream). For the materials supply chain, we assess the carbon footprint and report this as Scope 3 GHG emissions. We believe that climate (GHG) impact is the most relevant aspect related to energy consumption and is therefore more important to report compared to energy figures.

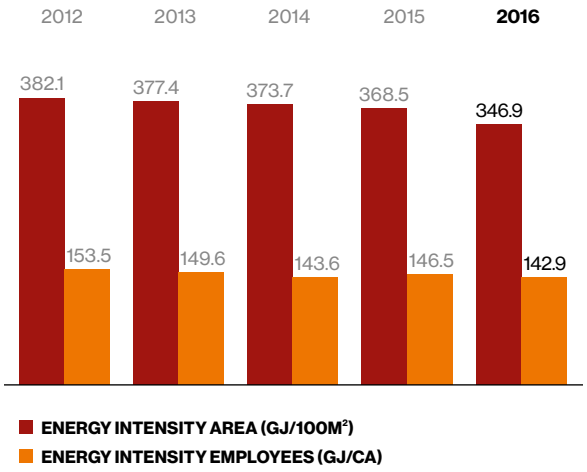
G4 EN 5

Energy intensity

Energy intensity is considered a valid indicator to support site energy managers and local management in evaluating progress being made against targets and considering further measures toward higher energy efficiency. We measure energy consumption in relation to sales, production quantity, number of associates, and indoor area conditioned for specified type of operation. These parameters may vary widely depending on the type and portfolio of products being manufactured in a certain operation, the type of application of a particular building, and the climate zone where the operating unit is located.

The overall energy intensity per number of associates for the Novartis Group decreased by 13.6% in the period 2010 to 2016, from 165 to 143 GJ per full-time employee. The energy intensity per indoor area for the Novartis Group decreased 11.8% in the same period, from 3 930 to 3 470 megajoules (MJ) per square meter.

Energy intensity



G4 EN 6

Reduction of energy consumption

The availability of resources – predominantly energy and fresh water – is becoming more constrained, and prices are expected to increase in the longer term. Novartis makes every effort to protect the environment, limit the intake of natural resources, and use them more efficiently.

Energy management program

In an effort to further increase energy efficiency, ultimately reducing GHG emissions, Novartis has a comprehensive energy management program in place – and energy managers use a systematic process to ensure energy considerations are given appropriate attention in investment projects. All of our major sites have been audited to assess energy systems and identify the potential for improvement, for example through energy-saving measures and the use of renewable energy.

New projects are a major focus for energy savings, as it is more effective to build in efficiency from the beginning than to redesign an existing system. Many of our energy efficiency projects demonstrate short payback periods: Novartis has over the last seven years invested more than USD 150 million in energy projects, with an average payback below three years.

During 2016, Novartis invested about USD 16 million in specific energy projects, allowing for energy savings of 177 terajoules and 17.6 kt CO_2e of GHG emission reductions (each about 1% of the Group totals). Cost savings from these projects amounted to USD 4.7 million energy cost savings and – based on our internal carbon price of USD 100 per ton of CO_2e – an additional 1.8 million savings of carbon costs.

Full switch to LED lighting in India

Our pharmaceutical manufacturing plant for solid products in Kalwe, India, has stepped up its energy efficiency program. Following several improvements on the boiler, compressed air and HVAC systems, the site implemented new technology in 2016. LED lighting was installed throughout manufacturing and offices, bringing 15% higher illumination and offering considerable energy and cost savings. An investment of just USD 22 000 led to annual savings of USD 38 000, representing 1.2% of the site's total energy bill.

Together with other energy projects implemented in 2016, the site saved 500 tons of CO_2 emissions, or an additional 2% of its 2016 greenhouse gas footprint. This is particularly important, as electricity generation is predominantly still coal-based in India. Since 2010, thanks to its energy and climate program, the Kalwe site saved 7 600 tons of CO_2 and more than USD 1.2 million – representing almost 40% of the site's total energy cost, with an average payback of up to one year. Including external carbon cost, as determined by our carbon price of USD 100 per ton of CO_2e, the savings are close to USD 0.8 million – or 63% more than based on energy costs only.

Energy efficiency targets and outlook

Since 2003, the Novartis Group has successfully introduced energy efficiency targets. In 2008, Novartis started to report energy savings achieved through energy projects and to use this data to set energy performance targets for sites and divisions. Each division implemented energy projects to reduce its 2008 energy consumption in accordance with specific targets. In 2016, total annual energy savings achieved through energy projects amounted to USD 76 million of energy costs and 3.21 million GJ of energy. This accounts for 18.9% of the 2008 energy consumption, or 21.2% of 2008 energy costs across all sites.

For more about our approach to energy efficiency, see → the Energy and Climate section of the Novartis website.

We believe these significant achievements result from our ongoing energy management programs. We continue our efforts to further improve our energy performance and support our GHG emissions reduction targets. We expect the trend in improved energy efficiency to continue in future years as a result of our energy efficiency programs spreading throughout the organization. Novartis will continue monitoring energy project savings as a major element in view of its new GHG reduction targets for 2020 and 2030.

New energy-efficient Global Service Center

Our Hyderabad commercial site in India has long been a landmark location in terms of energy efficiency, and was the first Novartis site to receive a LEED Platinum certification for a building. The new campus for the Global Service Center was launched in 2016 and again shows outstanding energy efficiency features.

With a double-insulated roof and walls, and double-glazed windows, the building aims to achieve LEED Platinum certification, scoring for site location, energy, water, material selection, and indoor quality parameters. On the roof, the new building also entails an 85 kilowatt solar photovoltaic array and solar-thermal heaters for hot water requirements, allowing 68 tons of CO_2e of GHG savings.

Overall, the building exemplifies best practice energy performance with less than 300 MJ per square meter, which is 38% superior to a standard design and 25% better than existing buildings.

G4 EN 7

Reductions in energy requirements of products and services

Pharmaceuticals and medical products in general do not require energy during use, and therefore we do not consider this indicator relevant for our business. Medical devices – which today may include electronic features for more effective use and for the support of patients – are being developed following design rules that include environmental aspects of energy efficiency and durability.

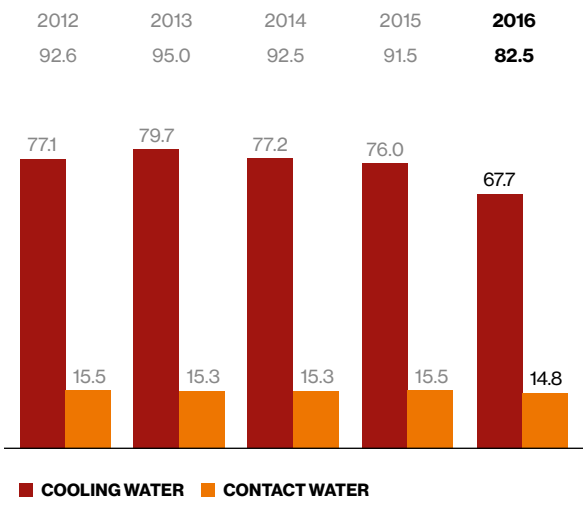
G4 EN 8

Total water withdrawal by source

Conserving water at our facilities is a priority, especially in geographical areas where water is scarce, and particularly at our manufacturing facilities where our water use is highest. Novartis monitors water streams into its sites by source, and out from the sites by discharge stream, as well as various types of water use at the sites on a quarterly basis. Water volumes are measured at all manufacturing sites and at the majority of large administration sites. Water data is estimated at small administration sites based on associate numbers and average assumed consumption per person and per day. Such water balance methodology enables effective water resource and cost management, and helps achieve complete and accurate information on water use.

Our total water use decreased from 91.5 million cubic meters (m^3) in 2015 to 82.5 million m^3 in 2016. We purchased 17.3 million m^3 (21%) from water suppliers, and 65.3 million m^3 (79%) is abstracted from groundwater wells or from surface water bodies (directly from the environment).

Water use
(in million m^3)



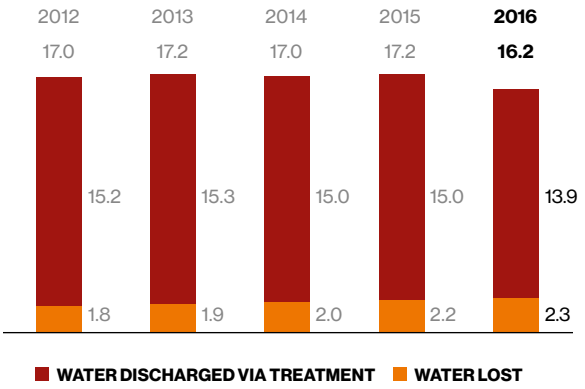
The water directly abstracted from the environment is used mainly for cooling purposes before being returned to the source. This water is primarily used for the cooling of fermentation and other biochemical processes, for the cooling of computer servers of data centers, and for comfort cooling of offices. Such free cooling with water enables us to largely reduce the environmental impact related to energy consumption compared to using mechanical chillers.

The use of contact water (water that came into contact with process ingredients) decreased in 2016 to 14.8 million m^3, compared to 15.5 million m^3 in 2015. Our operational water footprint decreased to 16.2 million m^3 in 2016, compared to 17.3 million m^3 in 2015. Our operational water footprint includes our grey water footprint (water output that goes through wastewater treatment, 13.9 million m^3), and our blue water footprint (water that is lost mainly through evaporation from cooling towers, 2.3 million m^3).

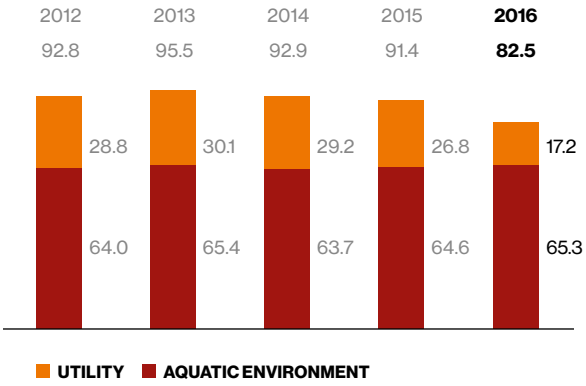
We have reported comprehensive water use and impact data via the CDP water program since 2010. Novartis achieved score level A- for the CDP water scoring in 2016, and is part of the leaders category for the healthcare sector.

See our
→ 2016 response to CDP water.

Water footprint
(in million m^3)



Water input by source
(in million m^3)



G4 EN 9

Water sources significantly affected by withdrawal of water

There are no water sources significantly affected by withdrawal of water from our operations; 21% of total water used is supplied by local public water utilities. The remaining 79% of total water used is drawn from groundwater wells or surface water bodies, and is used for cooling before being returned to the source with a minor increase in temperature.

Water footprint

Novartis assesses the location of sites according to areas of potential water scarcity by 2025 using WBCSD's Global Water Tool. We have intensified water-saving initiatives at sites located in these water-scarce areas, as well as other locations.

Strategies on water abstraction and the use of water for cooling vary widely from site to site, depending on the availability of water. We have made concerted efforts to reduce our water footprint, including water lost and water that requires treatment at locations where fresh water is scarce. Sites located in areas where water is scarce are identified, and their specific risks are considered as part of our risk assessment procedures based on risk portfolio.

Sites with a high level of water scarcity and high water footprint are included in a global water-saving program. This water-saving program was initiated in 2013 at the top 10 sites with respect to water footprint and water scarcity, and was extended to eight additional sites during 2014. These sites – located in South and Southeast Asia, the US and Europe – conducted water audits, determined water flows, identified water-saving opportunities, set local water-saving targets, and since 2014 have implemented relevant water-saving projects. The top 10 Novartis sites in water-scarce regions achieved more than 20% savings of their total water footprint since 2010.

In 2016, we also estimated the water footprint of the materials supply chain with an economic input/output model based on spend data. The water consumption of the entire supply chain of purchased goods and materials being used in our products amounts to 126 million m^3, which is 7.4 times more than our own internal water footprint.

G4 EN 10

Percentage and total volume of water recycled and reused

The availability of resources – predominantly energy and fresh water – is becoming more constrained, and prices are expected to continue to increase. Novartis makes every effort to protect the environment, limit the intake of natural resources, and use them more efficiently.

In 2016, Novartis recycled 19.9 million m^3 of water, which is 24.1% of our total water use, including contact water and non-contact cooling water (comparable to 24.2% in 2015).

For more details on overall volumes and calculation methods, see → G4–EN8: total water withdrawal by source.

G4 EN 15

Direct greenhouse gas (GHG) emissions (Scope 1)

Novartis has reported its GHG emissions in accordance with the World Resources Institute (WRI) and WBCSD's Greenhouse Gas Protocol for all sites under its operational control since 2005, and has reported emissions via the CDP since 2003. The reporting structure includes Scope 1 GHG emissions from stationary combustion installations and from production processes, as well as Scope 1 GHG emissions from company-owned or leased vehicles. GHG emissions are reported on a quarterly basis and calculated in metric tons of CO_2e using emission factors provided by energy suppliers or factors from the IEA. Novartis uses the global warming potential (GWP) factors from the 2007 IPCC report for GHGs, other than CO_2.

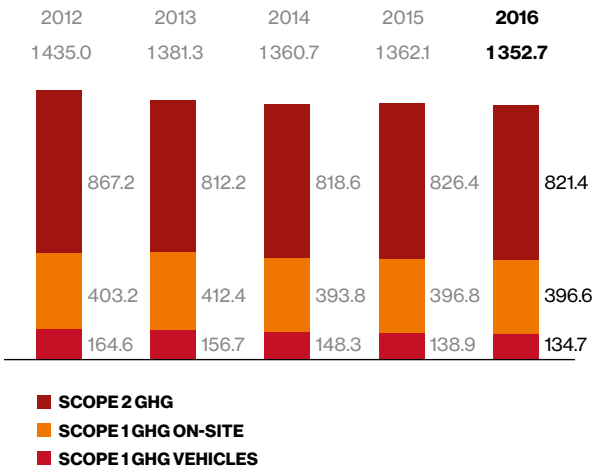
For more details on our overall GHG emissions target, performance and reduction measures, including carbon offsets, see → G4–EN19: reduction of greenhouse gas (GHG) emissions.

The total amount of on-site Scope 1 GHGs, mainly CO_2, emitted from the combustion of fossil fuels at Novartis sites in 2016 was 396.6 kt – stable compared to 2015 (396.8 kt). Emissions of hydrofluorocarbons (HFCs) from refrigeration systems totaled 9.1 kt CO_2e. GHG emissions from production processes amounted to approximately 3.2 kt.

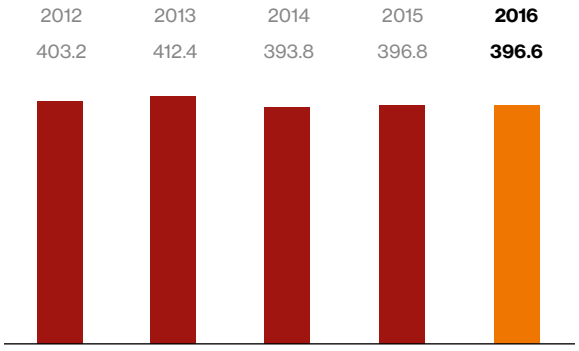
Scope 1 GHG emissions from the use of company-owned or leased vehicles are monitored and reported separately. In 2016, these totaled 134.7 kt, compared to 138.9 kt in 2015 (a 3% decrease). Scope 1 GHG emissions from vehicles have decreased by 34.4% since 2010. This decrease is mainly due to the use of more efficient fleet vehicles, as well as conservative and safe driving habits. With this decrease, we are on track to achieve our Scope 1 GHG from vehicles target: a 50% reduction in 2010 emissions by 2020.

GHG emissions of non-Kyoto gases such as hydrochlorofluorocarbons (HCFCs), which are not included in Scope 1 GHG emissions, totaled approximately 2.5 kt. The primary sources of these emissions are losses from refrigeration equipment. Novartis does not collect data on biogenic CO_2 emissions, as the potential quantities are not considered relevant.

GHG emissions
(in kt CO_2e)



GHG emissions, Scope 1, combustion and process
(in kt CO_2e)



EXTERNAL SCHEMES

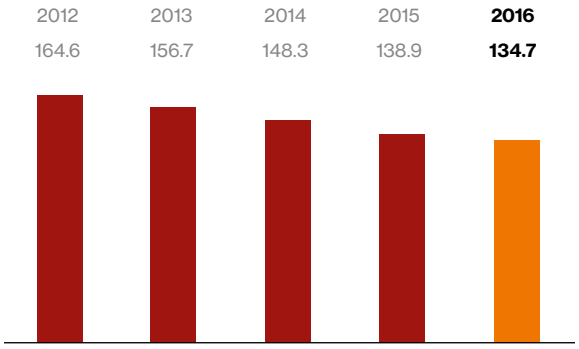
Novartis operates six sites in the EU that are included in the EU Emissions Trading Scheme. More sites in other regions or countries may become part of similar trading schemes in future years. With respect to regulatory schemes and commitments, such as an agreement to come into force as a consequence of the Paris Agreement, we have taken a proactive approach toward the implementation of such schemes on GHG emissions at Novartis.

We have reported comprehensive energy and GHG data via the CDP climate program since 2003. Novartis achieved a score level A- for the CDP climate scoring in 2016, and is part of the leaders category for the healthcare sector.

See our
→ 2016 response to CDP climate.

GHG emissions, Scope 1, from vehicles

(in kt CO_2e)



G4 EN 16

Energy indirect greenhouse gas (GHG) emissions (Scope 2)

Novartis has reported its GHG emissions in accordance with WRI and WBCSD's Greenhouse Gas Protocol for all sites under its operational control since 2005. The reporting structure includes Scope 2 GHG emissions from purchased energy sources such as electricity, steam and other purchased energy sources.

Novartis did recalculate Scope 2 GHG emissions following the location- and market-based methods in accordance with the GHG Protocol Scope 2 Guidance released in 2015. The newly introduced market- and location-based methods reflect the emissions from the electricity that a company is purchasing compared to the electricity that is generated locally.

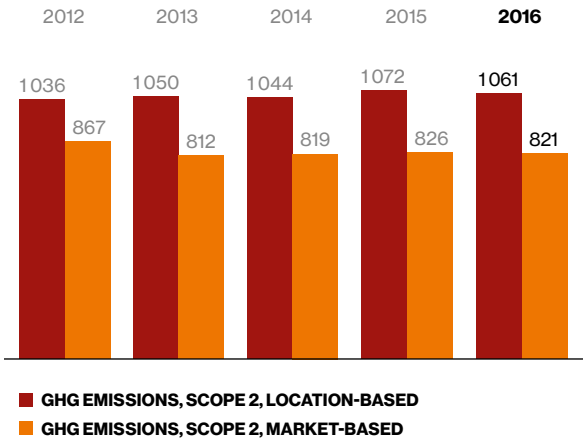
Market-based Scope 2 GHG emissions are calculated using emission factors derived from contractual instruments or provided by energy suppliers, while location-based Scope 2 emissions are calculated using standard factors from the IEA. Both are reported on a quarterly basis in metric tons of CO_2e. In the absence of contractual agreements for the market-based method, we use location-based emission factors. This approach supports our strategy to increase our proportion of renewable-based electricity worldwide to reduce our Scope 2 GHG emissions.

In 2016, our market-based Scope 2 GHG emissions totaled 821 kt, compared to a calculated 1 061 kt for location-based Scope 2 GHG emissions. Our Scope 2 GHG emissions are primarily originating from electricity generation (86%). The difference of 240 kt between the two calculation methods represents the emissions avoided through the establishment of renewable energy supplier contracts and renewable energy certificates.

For more details on our GHG emissions target and reduction measures, see
→ G4–EN19: reduction of greenhouse gas (GHG) emissions.

GHG emissions, Scope 2

(in kt CO_2e)



G4 EN 17

Other indirect greenhouse gas (GHG) emissions (Scope 3)

Scope 3 GHG emissions from the purchase of direct goods and materials that are used in our products were estimated, through an economic input/output model based on spend data, at 4 008 kt. Most relevant spent categories based on absolute carbon footprint include contract manufacturing (39%), chemicals (35%), and packaging (12%).

Scope 3 GHG emissions from our global business flights in 2016 totaled 136 kt, compared to 231 kt the year before. This number is based on detailed information from our worldwide travel agent, who calculates the data in metric tons of CO_2e using the UK Department for Environment, Food and Rural Affairs (DEFRA) emission factors. The amount was largely reduced due to a strict travel regime implemented in 2016. GHG emissions from the four company-owned or leased aircraft, totaling 5.7 kt, have been included in the Scope 1 company vehicle fleet reporting.

Scope 3 GHG emissions from waste disposal are calculated every year on the basis of waste disposal quantities and GHG emission factors from the Ecoinvent database. In 2016, Scope 3 GHG emissions from the disposal of waste were calculated to be 52 kt CO_2e, compared to 61 kt CO_2e in 2015.

The use of Novartis products does not generally result in GHG emissions, with the exception of an inhaler product that uses HFC-R134a as a propellant. Scope 3 emissions from the use of this product in 2016 amounted to 112 kt CO_2e, which is the same as in 2015.

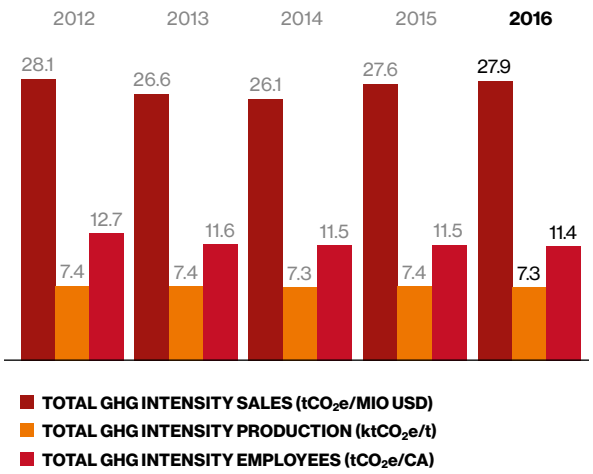
Biogenic CO_2 emissions are not considered relevant and are not included in the Scope 3 figures calculated above.

G4 EN 18

Greenhouse gas (GHG) emissions intensity

In 2016, total Scope 1 and Scope 2 GHG emissions per associate were 11.4 tCO_2e, and total Scope 1 and Scope 2 GHG emissions per production quantity were 7.3 kt CO_2e per tons produced. These two indicators remain stable versus 2015 and 2014. We noticed a slight increase in total Scope 1 and Scope 2 GHG emissions per sales, which were 27.9 tCO_2e per million USD in 2016, compared to 27.6 tCO_2e per million USD in 2015.

GHG intensity



G4 EN 19

Reduction of greenhouse gas (GHG) emissions

As in previous years, the Novartis Group achieved an absolute reduction in total Scope 1 and Scope 2 GHG emissions in 2016, decreasing by 0.7% – from 1 362 kt of CO_2e in 2014 to 1 353 kt of CO_2e in 2016 – not considering sequestration from our forest carbon sink projects. Total Scope 1 GHG emissions decreased by 0.8% between 2015 and 2016, while Scope 2 GHG emissions slightly decreased by 0.6% over the same period.

For more details on specific GHGs and calculation methods, see → G4–EN15: direct greenhouse gas (GHG) emissions (Scope 1).

In 2015, Novartis included energy and climate in its new strategy on environmental sustainability as one of four strategic priority areas. Novartis committed to two major milestones on our long-term path to carbon neutrality: we established targets on total GHG emissions for 2020 and for 2030, representing an absolute reduction of 30% by 2020 and of 50% by 2030, compared to a 2010 baseline.

Together with the new strategy, Novartis leadership has endorsed a carbon price of USD 100 per ton of CO_2e, in line with the cost of climate change to society as calculated by the World Bank and as recommended by the UNGC.

Throughout 2016, a cross-divisional team began to select major facility and infrastructure projects and measures necessary to achieve our 2020 goals, based on the savings as determined by our internal shadow carbon price of USD 100/tCO_2e. We identified opportunities for contracting renewable wind and solar electricity as priority actions.

In 2016, when participating in the pilot application of the Natural Capital Protocol (launched in June 2016 by the Natural Capital Coalition and WBCSD), we also used the internal carbon price to quantify the environmental externalities of our own operations and direct materials supply chain.

Forest carbon sinks

While our main focus is to lower GHG emissions through internal operational improvement programs, Novartis is also taking advantage of carbon sinks, which are generated by owned forestry projects. These forestry projects are implemented in accordance with certification schemes such as the UN Clean Development Mechanism (CDM) and voluntary schemes. These schemes are designed to quantify the amount of carbon dioxide removed from the atmosphere through sequestration into the forest's biomass. They are accounted for compensating part of the GHG emissions generated from the use of fossil energy in our operations.

To date, Novartis has established four forest carbon sink projects, located in Argentina, Mali, China and Colombia.

Around 3 million trees were planted on Novartis-owned land in Argentina between 2007 and 2010. The forestry project was certified by the Forest Stewardship Council and registered by the UN Framework Convention on Climate Change (UN FCCC) as a CDM project in February 2011. The carbon credits, issued by UN FCCC in 2013, were accounted by Novartis as compensation for part of its own GHG emissions and formally retired from the UN FCCC credit accounts. Total carbon sinks achieved by the end of 2016 from this afforestation amounted to 360 kt CO_2e.

Novartis sponsors a smallholder jatropha plantation and biofuel project in Mali, which is the first agroforestry project registered under the voluntary Verified Carbon Standard in Africa. The harvest from these plantations is pressed into jatropha oil used for soap manufacturing, engine fuel and electricity generation. Since 2007, jatropha bushes have been planted by more than 5 000 local farmers. Carbon sinks achieved through the Mali jatropha agroforestry project amounted to 15 kt CO_2e by the end of 2016.

In Sichuan, China, we are supporting the afforestation of 4 100 hectares of land with 9 million trees. The project began in 2011, and by the end of 2016, more than 4 000 hectares were planted with the help of local communities. The project is also generating benefits for the local communities and for environmental protection and biodiversity.

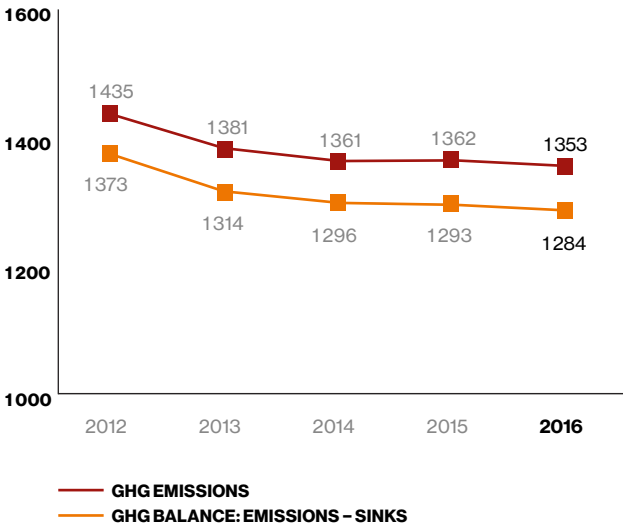
In 2013 and 2014, we purchased 3 596 hectares of farmland in Colombia for afforestation, and by the end of 2016, we had planted 1 386 hectares with commercial and native tree species. The plantation will be completed in 2017, and the project is nearly ready for registration as a UN FCCC CDM project.

Carbon sinks achieved in 2016 from our forestry projects amounted to 68 kt CO_2e, or 4.3% of our 2010 baseline GHG emissions. As of 2016, we have reduced total GHG emissions, taking into account sequestration from our forest carbon sink projects, by 18.7% compared to 2010.

In 2016, with the use of the Natural Capital Protocol, we also quantified the social and environmental benefits of the forest carbon sink projects. Depending on the type of project, other environmental or social benefits reach similar or bigger benefit than from carbon sequestration. This confirms our belief that these carefully designed forestry projects are net positive for the natural environment by protecting water sheds and increasing biodiversity – as well as for social development and long-term economic growth in project areas.

GHG emission balance

(in kt CO_2e)



Social return on investment from forest carbon sink projects

To better determine the multiple benefits of its forest carbon sink projects, Novartis assessed the social and environmental value of two of its forest carbon sink projects in Argentina and Mali in 2016, using the methodology described in the Guide for Social Return on Investment. While measuring gains in carbon storage from trees is standard practice, quantifying other benefits remains challenging.

The primary objective of the forestry projects is to reduce the company's carbon footprint, but we designed them to also generate other benefits for the environment and local communities.

In 2016, we also assessed the benefits of our forest carbon sink projects. For our project in Argentina, the results showed that 60% of its societal benefits arise from sequestration and 36% from ecosystem services. The project has a social return on investment (SROI) of 220% for the initial eight years. For the Mali jatropha initiative, 70% of the societal benefits arise from income generation for rural farmers and 18% from environmental benefits (including carbon sinks). This project has an SROI of 180% for the initial eight years.

Because a large proportion of the investment was made to establish the projects and tree plantation in the first years, social returns on our investment are expected to increase in the coming years.

G4 EN 20

Emissions of ozone-depleting substances

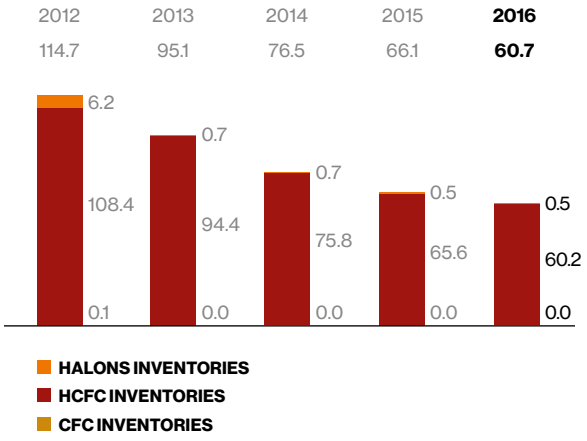
In 2016, Novartis sites globally reported a total inventory of 60.7 tons of ozone-depleting substances (ODS), which amount to 7.1 tons of CFC-R11 equivalent – compared to 65.6 tons in 2015 (7.3 tons of CFC-R11 equivalent). The 2016 figure includes 60.2 tons of HCFC refrigerants and 520 kilograms (kg) of halons. CFC refrigerants have now been completely phased out of all Novartis facilities. Additionally, HCFC inventories are continually replaced with chlorine-free HFCs or with natural refrigerants. In 2016, HFCs – which have an ODS factor of zero – amounted to 155.5 tons for Novartis. Novartis does not produce ODS through its processes or products.

Emissions caused by ODS losses in 2016, reported in metric tons of CFC-R11 equivalents, were 92 kg, compared to 183 kg in 2015. ODS are not included in any Novartis product. Novartis intends to minimize the use of synthetic refrigerant materials, and natural refrigerant materials are the preferred alternative in new equipment. HCFCs and halons in existing equipment are being replaced when refilling becomes necessary.

Data is calculated into CFC-R11 equivalents using the factors from the 2007 IPCC report.

ODS inventories

(in tons)



G4 EN 21

NO_x, SO_2 and other significant air emissions

As a further disclosure of relevant emissions into air, Novartis reports halogenated and non-halogenated volatile organic compounds (VOCs), sulfur dioxide (SO_2), and nitrogen oxide (NOx) inorganic pollutants and particulates. VOCs mainly originate from the use of halogenated and non-halogenated solvents in various production processes, and are either measured or calculated using mass-balance equations. Inorganic pollutants and particulates arise primarily from the combustion of fuels for steam generation and heating, and are either measured or calculated using standard emission factors from the IEA. Other possible air emissions are not considered relevant.

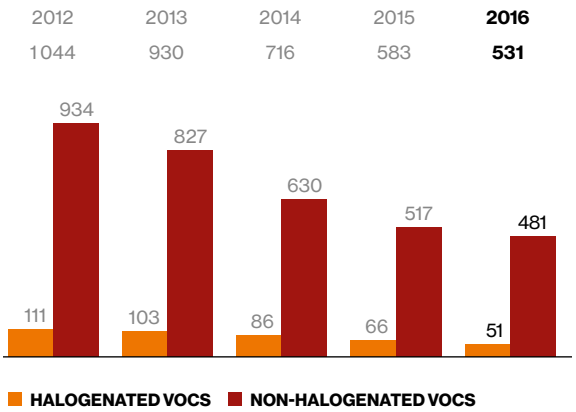
VOCs

In 2016, our emissions of halogenated VOCs decreased to 51 tons, from 66 tons in 2015. Similarly, non-halogenated VOC emissions were reduced from 517 tons in 2015 to 481 tons in 2016.

VOCs are the precursors of photochemical (tropospheric) ozone creation that leads to smog and related detrimental effects on health and the environment. Halogenated VOCs are greenhouse gases and contribute to GHG emissions. Emissions are strongly influenced by products that require solvent-based production processes and by the significant lead time to change production processes. The Novartis Group emphasizes reductions in VOC emissions in operations worldwide, and set a target to reduce non-halogenated VOC emissions by 40% and halogenated VOCs by 48% below 2008 values by 2016. Both targets have been well exceeded, primarily due to the installation of effective abatement measures at various manufacturing sites.

VOC emissions

(in tons)



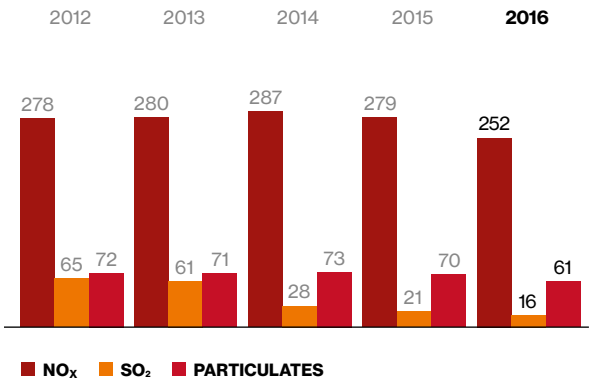
Inorganic air pollutants and particulates

In 2016, inorganic air pollutant emissions for the Novartis Group totaled 16 tons for SO_2 and 251 tons for NOx, compared to 21 tons and 279 tons in 2015, respectively. Particulate emissions amounted to 61 tons in 2016, compared to 71 tons in 2015. NOx emission levels from company-owned or leased vehicles are not included in these figures.

The strong reductions in SO_2 that occurred in 2015 and 2016 are the result of several sites in India replacing fuel oil with natural gas. The distribution of NOx and particulates emissions is similar to that for the consumption of fuels for on-site-generated energy.

Inorganic air pollutants have long been a focus of environmental improvement at Novartis. We have implemented measures to increase energy efficiency, replace fuel oil, and use best-in-class controlled furnace technology – managing to continuously decrease inorganic air pollutants including SO_2 during the last couple of years. We expect further decreases in the coming years.

Inorganic air pollutants
(in tons)



G4 EN 22

Total water discharge by quality and destination

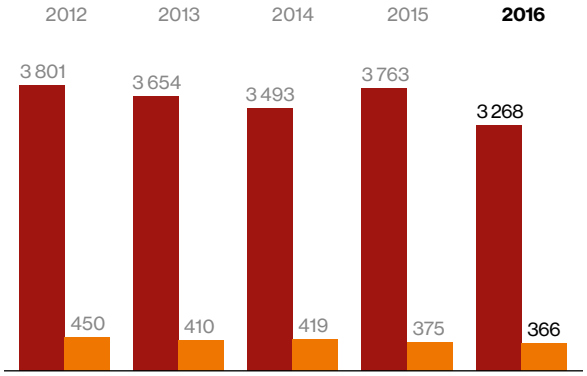
Novartis monitors water streams into its sites by source and out by discharge stream, as well as various types of water use on a quarterly basis. Water discharge is reported in volumes released to the environment, sent for treatment, entering products, evaporated, or used for other purposes. Discharge volumes to treatment closely match input and contact water usage volumes, and amounted to 13.9 million m^3 in 2016.

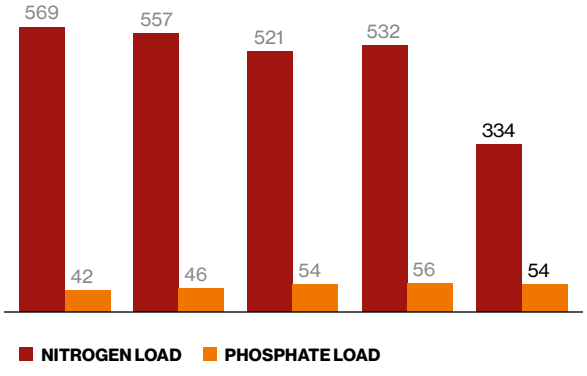
More than 99% of all non-contact water used for cooling is released back into the environment, which accounts for 80% of all water outputs. The rest of the cooling water, together with the contact water used in processes, is sent to water treatment plants – accounting for 17% of our water outputs. (As treatment generally occurs in off-site wastewater treatment plants, treatment methods vary.) The remaining water is used in products, evaporates, or is used for other purposes such as irrigation.

With regard to the quality of water discharged, Novartis reports total effluent load using the standard chemical oxygen demand (COD) and total suspended solids (TSS) parameters. The amounts reported are the loads that finally reach groundwater or surface water bodies. In cases where discharged wastewater is treated off-site, for example in public wastewater treatment plants, the specific removal efficiency of such treatment is considered for the amounts reported.

The COD load on the aquatic environment from Novartis Group operations decreased from 3 763 tons in 2015 to 3 268 tons in 2016. TSS decreased as well from 375 tons in 2015 to 366 tons in 2016. Total nitrogen load significantly decreased from 532 tons in 2015 to 334 tons in 2016, due to the sale of our manufacturing site in Frankfurt, Germany. After several years of increase, phosphate load remained stable with 54 tons in 2016, compared to 56 tons in 2015.

Emissions into water
(in tons)





Replicating more efficient water treatment

Energy and water efficiency projects are most attractive when they can be replicated from one site to another. In 2013, our chemical operations site in Ringaskiddy, Ireland, discovered and implemented a new wastewater treatment technology using microbubbles for the aeration of wastewater tanks. This led to remarkable energy savings, better cleaning efficiency, and effluent load reductions.

The same technology has now been replicated at our chemical operations site in Grimsby, UK, with similar benefits. Removal efficiency of COD has proven to be equally good or better at a level of 93%, and the total annual COD load was reduced from 400 to 300 tons (or by 25%). The energy consumption of the wastewater treatment plant could be reduced by 22%, which would result in a GHG emission reduction of approximately 500 tons of CO_2e per year. Savings in energy costs total USD 160 000 per year (representing about 2% of the site's total energy bill).

Novartis has not set a Group target on emissions into water of these sum parameters. Effluent water is always treated in state-of-the-art facilities, and therefore, remaining effluent loads do not have a big impact on the environmental quality of water bodies near our sites. However, we closely monitor specific parameters such as the release of drug substances into water, and take the appropriate mitigation and risk minimization measures when necessary.

Our major area of concern around water is preventing pharmaceuticals from entering the aquatic environment. The majority of pharmaceuticals in the environment are a result of excretions from treated patients and the improper disposal of unused or expired medicine. However, relatively small quantities can come from drug manufacturing effluents and R&D facilities. We regularly monitor the levels of active pharmaceutical ingredients (APIs) in Novartis effluents and the aquatic environment as a result of Novartis activities. These levels are below those approved as safe by medical regulatory agencies and therefore do not present a health risk.

In 2015, Novartis included water micropollutants in its new strategy on environmental sustainability as one of four strategic priority areas. Our vision is to generate no adverse effects on water quality and water depletion from our sites and products. Our target for 2020 is to keep our drug substance effluents from our manufaturing sites tenfold below the predicted "no effect" concentration. In 2016, all sites generating wastewater – which potentially includes APIs – conducted a detailed assessment of their effluents, and the drug substances with potential risk were identified.

In addition, Novartis participates in Europe's largest public-private initiative, IMI iPiE (Innovative Medicines Initiative on the Intelligent Assessment of Pharmaceuticals in the Environment), which is developing a framework to identify the potential risk of pharmaceuticals to the natural environment and thus directs the way to perform an appropriate hazard assessment. When it is finalized, this predictive tool will be used to assess new and existing products, and the results will be available to support scientific and political discussions worldwide.

G4 EN 23

Total weight of waste by type and disposal method

Novartis follows a clear waste management strategy. The aim is to prevent, reduce or recycle waste, or use it as an energy source before safe disposal. Waste prevention and reduction are always preferred to treatment, incineration or disposal. This ensures that the overall environmental impact related to waste remains minimal, while energy use from waste is maximized. Opportunities for recycling and energy recovery from both hazardous and non-hazardous waste are always considered. All Novartis sites report waste data on a quarterly basis. Novartis classifies waste by type and according to the disposal routes: recycling, treatment, incineration with and without energy recovery, and landfill.

We have a strict policy of not sending any hazardous waste to landfills, regardless of local regulations that may still permit this. Waste contractors are audited on a regular basis to ensure adherence to our standards.

Operational waste – both hazardous and non-hazardous – is an important area of environmental management for our manufacturing facilities, as well as for research and administrative sites. Group objectives include the proper management of hazardous waste and risks related to disposal, in particular disposal into landfills.

Hazardous waste

In 2016, the total amount of hazardous waste for the Novartis Group decreased to 138.6 kt, from 176.4 kt in 2015. The total amount of hazardous waste not recycled in 2016 was 60.2 kt, compared to 57.6 kt in 2015. An additional 78.4 kt of hazardous waste, mainly solvents, were subject to recycling. The recycling rate for hazardous waste dropped from 68% to 56%. These numbers have been impacted by the sale of our Frankfurt manufacturing site. Novartis has completely eliminated disposal of hazardous waste with organic content to landfills.

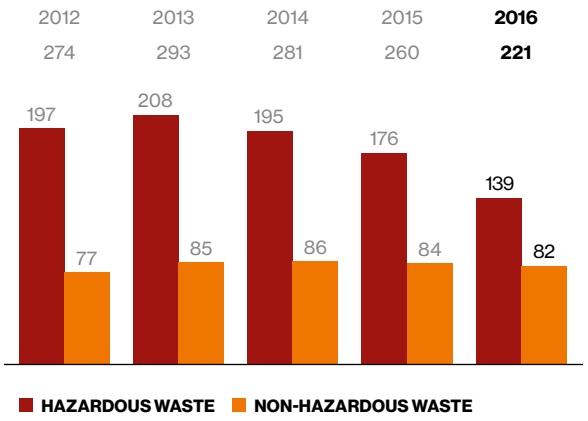
Non-hazardous waste

Non-hazardous waste reported includes mixed or household waste, packaging waste, compostable waste and inert waste. In 2016, non-hazardous waste totaled 82.4 kt, compared to 84.1 kt in 2015. Total amounts of non-hazardous waste not recycled for the Novartis Group in 2016 were 17.9 kt, compared to 20.6 kt in 2015. An additional 64.5 kt of non-hazardous waste were collected for recycling. The recycling rate for non-hazardous waste increased from 75% to 78%.

Keeping non-hazardous waste to a minimum and maximizing its recycling rate is a constant challenge. Novartis makes ongoing efforts in all areas to minimize non-hazardous waste that cannot be recycled at its operations globally. We are installing waste segregation programs at many sites that enable better use of recycling routes for materials such as paper, cardboard, glass and plastics – for example from packaging, offices and production processes.

Total operational waste

(in kt)



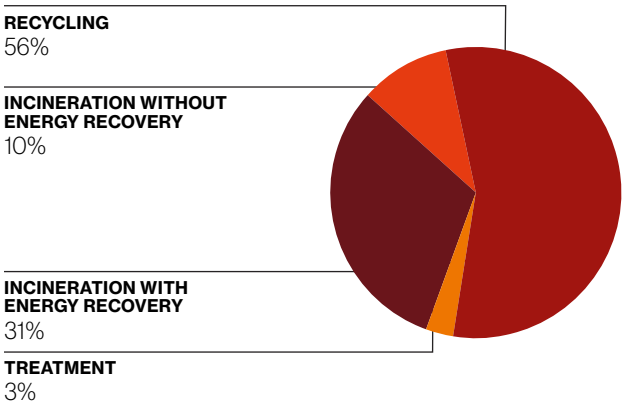
In 2015, Novartis included materials and waste in its new strategy on environmental sustainability as one of four strategic priority areas. Our vision is to establish closed material loops for our major materials and to avoid adverse effects from waste disposal. The target for 2020 is to reduce total non-recycled operational waste relative to production quantities by 30% compared to 2010.

Recommendation of Novartis for the disposal of unused medicines

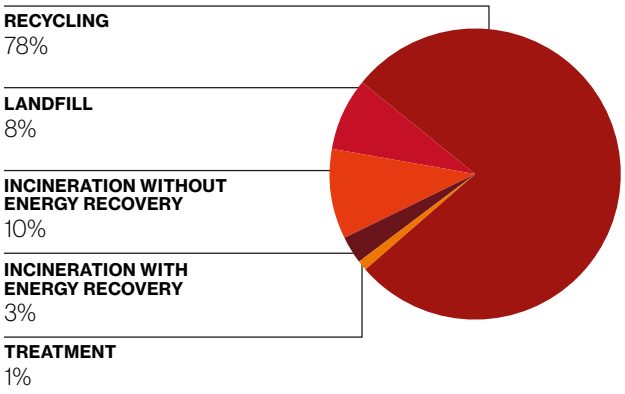
Society's awareness and concern regarding environmental issues continues to grow, as does the technical ability to detect substances of synthetic or natural origin in our surroundings. Novartis shares society's desire to protect the environment and is taking necessary steps to minimize the environmental impact of its activities and products over their life cycle. One step concerns the appropriate and environmentally benign disposal of unused medicines.

Novartis recommends to patients and consumers of pharmaceutical and medicinal products to dispose of any unused or expired medicinal products or waste materials in accordance with local requirements and the disposal instructions provided with the products.

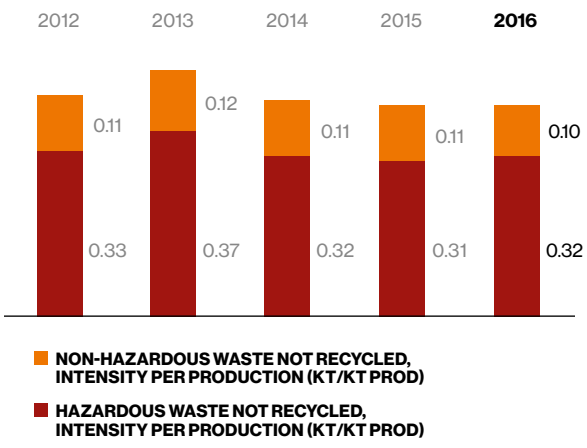
Disposal of hazardous waste in 2016



Disposal of non-hazardous waste in 2016



Waste not recycled, intensity per production



G4 EN 24

Total number and volume of significant spills

No significant spills were reported in 2016. This was also the case in 2015.

G4 EN 26

G4 EN 27

G4 EN 28

Extent of impact mitigation of environmental impacts of products and services

Novartis is committed to minimizing the environmental impact of its products over their entire life cycle. As scientific knowledge and stakeholder expectations evolve in this field, we regularly benchmark our activities and actively support researchers, regulators and other groups in developing more efficient environmental practices.

Sustainable packaging

Novartis maintains a Group-wide initiative on sustainable packaging, and seeks to design packaging that both minimizes environmental impacts and meets all regulatory, quality, functional and design requirements.

We have developed and issued a sustainable packaging guide for packaging design teams. We also engage with clients and packaging material suppliers to determine needs and identify more sustainable packaging solutions. Best practice packaging case examples are collected and shared among packaging designers across the company. Improvements are quantified based on a set of packaging indicators.

For more about our efforts to reduce our footprint, see
→ the Environmental Sustainability page of the Novartis website.

For more about our strategy to minimize the impact of pharmaceuticals in the environment, including the release of drug substances into water, read
→ our position on the Novartis website.

G4 EN 29

Monetary value of significant fines and total number of non-monetary sanctions for noncompliance with environmental laws and regulations

Novartis Group companies around the world paid a total of USD 22 990 in fines for minor HSE violations in 2016. No additional non-monetary penalties were reported in 2016.

Management systems

We operate using robust environmental management systems to drive good practices and compliance across our sites. A total of 42 Novartis Group company facilities have ISO 14001 or Eco-Management and Audit Scheme (EMAS) certification for their environmental management systems (compared to 45 facilities in 2015). In addition, 26 sites have OHSAS 18001 (British standard for occupational health and safety management systems) certification (compared to 26 facilities in 2015).

In terms of production amounts manufactured at certified sites, ISO/EMAS certifications cover 85% of production (down from 90% in 2015), and OHSAS certifications cover 38% of production (compared to 38% in 2015).

Risk management

We take a precautionary approach to minimizing environmental impacts across all our operations. This includes managing risks proactively through appropriate preventive and contingency measures.

For more details, see
→ G4–14: precautionary approach.

We undertake site analyses and audits to assess site-specific risks, and we deliver HSE training to staff to embed good HSE practices. Divisional and corporate risk portfolios are prepared on an annual basis, and corresponding risk minimization actions are devised and implemented. In 2016, 41 Group HSE inspections, including 15 legal compliance reviews and 11 business continuity conformance reviews, were completed. In addition, two themed audits and four site audits were completed by Internal Audit.

G4 EN 30

Significant environmental impacts of transporting products and other goods and materials for the organization's operations, and transporting members of the workforce

The largest direct transportation impact identified at Novartis is the GHG emissions associated with the use of passenger cars for sales representatives. CO_2 emissions of owned and leased vehicles are measured and reported on a yearly basis in CO_2e based on the GHG Protocol methodology and factors from the 2007 IPCC report.

In 2016, Scope 1 GHG emissions from the use of company-owned or leased vehicles totaled 134.7 kt, a 3% decrease. Scope 1 GHG emissions from vehicles have decreased by 34.4% since 2010. This decrease is due to the introduction of hybrid gasoline electric cars, the increased use of diesel engines fitted with particulate filters, and other emission reduction measures such as the use of liquid natural gas or biofuels.

Scope 3 GHG emissions from our global business flights in 2016 totaled an estimated 136 kt, compared to 231 kt the year before. This number is based on detailed information from our worldwide travel agent, who calculates the data in metric tons of CO_2e using the UK DEFRA emission factors. The amount was largely reduced due to a strict travel regime implemented in 2016. GHG emissions from the four company-owned or leased aircraft, totaling 5.7 kt, have been included in the Scope 1 company vehicle fleet reporting.

Freight conversion from air to sea

Work is underway to quantify the impact of GHG emissions from the transportation of finished products to distribution centers and end users. Where possible and feasible from a product quality standpoint, efforts are being made to move from air to sea freight.

In 2014, the Global Supply Chain Management team started an initiative to move from air to sea freight. In three years, sea freight increased from 11% in 2013 to 37% in 2016. In the same time, the average GHG emission in gram per ton-kilometer (g/tkm) was reduced by 44%, from 640 to below 450 g/tkm. This corresponds to a total of 31 kt CO_2e saved annually compared to a business-as-usual scenario.

Sea freight not only brings environmental benefits, but also enables major cost savings and a more reliable control during the trip, ensuring the entire delivery is kept at the required temperature and humidity conditions compared to air freight.

G4 EN 31

Total environmental protection expenditures and investments by type

We believe environmental stewardship makes good business sense. We adopt a preventive approach, striving to make efficient use of natural resources and to minimize the environmental impact of our activities and products.

Novartis does not collect separate expenditures for all areas of environmental protection, as many measures are integrated and therefore expenditures cannot feasibly and reliably be extracted as separate figures.

Environmental protection expenditures

Type of expenditures	Amount (USD millions)
Total cost for waste disposal	49.8
Total cost for energy	291.4
Investments in energy-saving projects	15.8
Total cost for water supply and treatment	40.9

G4 EN 34

Number of grievances about environmental impacts filed, addressed, and resolved through formal grievance mechanisms

Novartis is not aware of any grievances about environmental impacts filed, addressed and resolved through formal grievance mechanisms in 2016.

Juan Pedro Garcia Hernández leads his mother, who has Alzheimer's disease, through regular exercises. They keep her engaged and raise her spirits.

Labor practices and decent work

G4 LA 1

Total number and rates of new employee hires and employee turnover by age group, gender and region

On December 31, 2016, new hires totaled 18 208 associates: 8 632 men and 9 567 women plus nine associates with no disclosed gender. The overall turnover rate in 2016 was 12.2%, and voluntary turnover was 7.4% (permanent employees only).

The highest voluntary turnover rate, 11.5%, is among the 21- to 25-year age group within Generation Y, and the lowest voluntary turnover rate, 3.5%, is among the 51- to 55-year age group within the baby boomers generation.

G4 LA 2

Benefits provided to full-time employees that are not provided to temporary or part-time employees, by significant locations of operation

At significant locations of operation,[1] full-time Group company associates are eligible for or covered by health, retirement, disability and maternity benefits (including parental leave and paternity leave). In most significant locations of operation, Novartis Group company associates are also eligible for flex time, telecommuting, child care, bereavement leave, sabbatical programs, and employee assistance programs. At some significant locations of operation, health management services are provided as well. Depending on specific legal requirements, additional benefits such as pension and medical insurance are also available to associates.

[1] Our major operations (based on number of associates) are located in Switzerland, Germany, the US, China and India.

G4 LA 3

Return-to-work and retention rates after parental leave, by gender

According to the global Corporate Citizenship Survey 2016, which covered roughly 82% of the total number of associates, most of the associates who were on parental leave returned to work afterwards. According to the same survey, 55% of Novartis Group company associates are offered maternity leave and 45% of Novartis Group company associates are offered paternity leave, fulfilling more than the minimum legal obligations

Additionally:

- 78% of Novartis Group company associates have access to flexible working arrangements.
- 68% of Novartis Group company associates have access to reduction of working time (part time).
- 78% of Novartis Group company associates have access to workplace flexibility (home office).
- 63% of Novartis Group company associates have access to dependent care support, a child care center/support (e.g., a site child care center, referrals to agencies, backup child care support, etc.), or nursing care (e.g., lactation support).
- 72% of Novartis Group company associates have access to care management (e.g., employee assistance program, free-of-charge medical care).

G4 LA 4

Minimum notice periods regarding operational changes, including whether these are specified in collective agreements

We engage in constructive dialogue with employees and employees' representatives. In general, minimum notice periods regarding operational changes are defined by law, by collective bargaining agreements or by individual labor contracts in all countries. Where relevant, local legislation and collective bargaining agreement specifications on notice periods vary, ranging from 30 to 180 days and more. In general, Novartis Group company associates and their representatives are informed at the earliest possible time (usually between 30 and 180 days). In addition to regulations in collective bargaining agreements, social plans and balance of interests negotiated with employee representatives may allow longer pre-notice and notice periods, as well as severance pay, redeployment to other Novartis companies, outplacement services or transition assistance in compliance with the regulatory or collective bargaining agreement requirements.

G4 LA 5

Percentage of total workforce represented in formal joint management/worker health and safety committees that help monitor and advise on occupational health and safety programs

Since 2015, we have been collecting information on the number of sites that have implemented a formal joint management/worker health and safety committee that regularly meets to monitor and advise on the site's occupational health and safety program and performance. In 2016, 84% of sites with more than 100 Novartis Group company associates implemented health and safety committees. Relevant sites such as manufacturing, research and development have 100% coverage. Office sites infrequently have HSE committees, and tend to appoint safety coordinators instead. Overall, 88% of Novartis Group company associates are represented in such committees.

G4 LA 6

Type of injury and rates of injury, occupational diseases, lost days and absenteeism, and total number of work-related fatalities, by region and by gender

Employee health and safety is an integral part of an employer's responsibility. Novartis Group companies are committed to providing all associates with safe workplaces.

Novartis continuously seeks innovative, sustainable strategies and systems to strengthen our commitment to HSE and business continuity. Rigorous technical standards, reinforced by engineering solutions, ensure that workplaces are safe for Novartis Group company associates as well as third-party personnel and contractors.

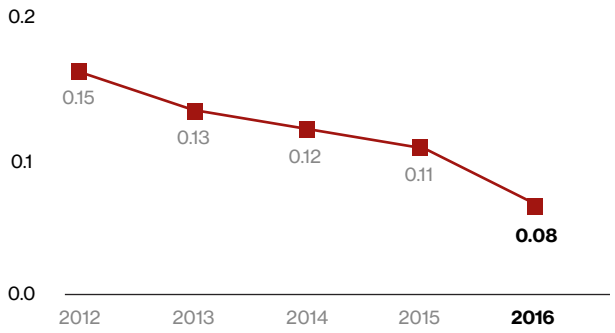
Novartis proactively fosters and encourages a strong culture of safe behavior and on-site health promotion. Our Occupational Medicine department delivers programs to maintain health, reduce absenteeism, and enhance employees' ability to return to work after injury or illness. In addition, a significant number of units have introduced safety culture initiatives – behavior-based safety programs – to complement existing measures for ongoing safety management at sites. Local management teams undertake a number of measures to promote safety awareness, including on-site walkthrough inspections by senior managers with a focus on serious injury and fatality (SIF) exposures and their safety controls.

Serious injury and fatality prevention

At Novartis, we are placing increasing emphasis on the analysis and reduction of cases with SIF potential. A SIF case is defined as a work-related incident that results in a serious injury or even death to the person involved. The SIF prevention program was developed in 2014 and rolled out to the sites across Novartis in 2015 to evaluate and prevent situations with SIF potential. Reporting on SIF cases and cases with SIF potential is part of the SIF prevention program. In 2016, we recorded five serious injuries and no fatalities.

To further focus on competency and process improvements, a global training program has been developed including equipment-specific and instructor-led demonstration of competency in the SIF prevention areas. These technical training workshops for HSE professionals and associates from facilities or engineering at each manufacturing site have been rolled out across the company, with a focus on high-risk activities. In parallel, the rollout of the SIF prevention program continued through reliability verification of identified safety controls to ensure that appropriate measures are in place for safe work conditions during high-risk activities with SIF potential.

Lost-Time Injury and Illness Rate



Lost-Time Injury and Illness Rate

Novartis reports work-related injuries and illnesses among Group company associates. Our lost-time injury and illness rate (LTIR) is a key performance indicator, enabling direct comparison between the performance of our units and on a country-by-country basis. Since 2014, the LTIR also includes third-party personnel. In 2016, the overall LTIR for Novartis associates and third-party personnel was further reduced to 0.08 per 200 000 hours, from 0.11 in the previous year. This represents a 27% reduction.

Total Recordable Case Rate

Many injury and illness cases without lost time have the potential to lead to lost time. Identifying and managing the circumstances in which these incidents occur ultimately reduces the overall risk of having a serious incident, lost-time injuries and illnesses, or even fatalities. A recordable case includes:

- Work-related injury with or without lost time
- Work-related illness with or without lost time
- Work-related loss of consciousness
- Work-related fatality

The total recordable case rate (TRCR) is calculated by dividing all recordable cases by hours worked, and multiplying this number by 200 000 for standardization. Since 2014, the TRCR also includes third-party personnel. In 2016, the Novartis Group TRCR was 0.29, down from 0.40 in 2015.

Continuing management commitment and rigorous rollout of the aforementioned comprehensive SIF prevention program, combined with ongoing training for Group company associates, have driven our progress in overall injury and illness reduction. All significant incidents – including incidents with SIF potential, incidents with lost time, and relevant near-misses – are investigated. The level and extent of the investigation reflect the seriousness or potential impact of the event. Suitable processes and criteria such as risk/potential consequences and learning potential are put in place to ensure that investigations are carried out adequately.

Occupational injury and illness to company associates

During 2016, a total of 305 Group company associates suffered work-related injuries. Of these, 83 (2015: 126) led to days off work (integrated into the LTIR). The distribution of injuries by immediate cause indicates that the most prominent safety issues are related to non-operational activities such as slips, trips and falls at offices and sites, and transport accidents within the sales force. Together, these causes account for 55% of occupational injuries with lost time.

Novartis sites reported a total of 17 occupational illnesses in 2016, compared to 24 in 2015. Of these, six – compared to two in 2015 – led to days off work. This figure is integrated into the LTIR, and represents 6% of the total lost-time cases. There were no recorded chronic poisonings; we have an existing preventive health protection strategy with regard to the handling of potentially hazardous substances. The most prominent work-related health issue remains musculoskeletal disease, which accounted for 41% of illness cases in 2016.

The lost-time occupational illness rate was 0.005 per 200 000 working hours in 2016, compared to 0.001 in 2015. The Total Recordable Occupational Illness Rate was 0.013 per 200 000 working hours in 2016, compared to 0.018 in 2015.

Occupational injury and illness to third-party personnel

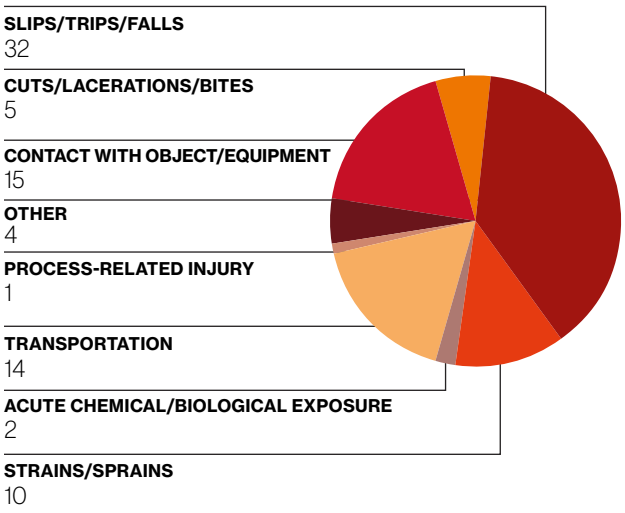
Beyond Novartis Group company associates, we recognize our responsibility to promote the health and safety of third-party personnel (TPP). TPP are those individuals employed by a third party that invoices Novartis for hours completed. They work regularly on Novartis premises and receive day-to-day work assignments from Novartis Group company associates. Some companies refer to these individuals, including sub-contracted workers, as contractors (see below "occupational injury and illness to contractors" for our definition of contractors).

In 2016, Novartis employed more than 12 500 TPP. There were 56 occupational injuries and illnesses among this group. Of these, 14 resulted in lost time. There were no fatalities among TPP in 2016. As with our own Group company associates, any incident is rigorously investigated to reduce the total number of work-related incidents.

Due to the increasing number of TPP working for Novartis, LTIR and TRCR targets since 2014 include this population (see LTIR and TRCR sections above). The TPP LTIR for 2016 was 0.11 (compared to 0.17 in 2015), and the TPP TRCR for 2016 was 0.46 (compared to 0.52 in 2015). Novartis does not differentiate between occupational injuries or illnesses for TPP. As a consequence, it is not possible to calculate a lost-time occupational illness rate for TPP.

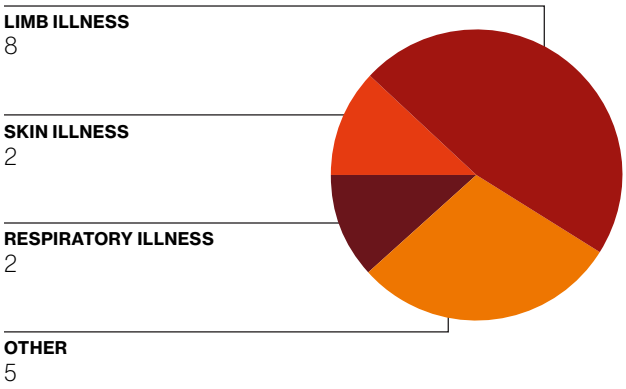
Injury with lost time 2016

Total: 83 associates



Illness with and without lost time 2016

Illness total: 17 associates



Occupational injury and illness to contractors

Beyond Novartis Group company associates and TPP, we recognize our responsibility to promote the health and safety of contractors. Contractors are those individuals employed by companies undertaking work for Novartis within the terms of a contract or service agreement. In contrast with TPP, contractors receive day-to-day work assignments from their companies' management and are hired to complete a job on their own. Novartis only reports health and safety data from contractors who regularly work at a Novartis site, such as

cleaning, catering, security, engineering and maintenance personnel. These contractors, known as “fixed” or “nested” contractors, work a minimum of one month per year for Novartis.

As of 2011, Novartis reports the LTIR for contractors, but not the TRCR for this group. Because we cannot precisely determine the number of cases without lost time for this group on a global level, the rate would be inaccurate and unreliable.

Novartis employed approximately 16 100 contractors during 2016. There were 63 occupational injuries and illnesses with lost time among this group in 2016. The contractor LTIR for 2016 was 0.44 (compared to 0.27 in 2015). Novartis does not differentiate between occupational injuries or illnesses for contractors. As a consequence, it is not possible to calculate a lost-time occupational illness rate for this group.

THIRD-PARTY PERSONNEL INJURIES

Year	Number of TPP	Number of injury cases w/wo lost time
2012	10 000	132
2013	10 700	61
2014	11 400	60
2015	11 800	62
2016	12 500	56

NOVARTIS GROUP COMPANY ASSOCIATES HEALTH AND SAFETY, BY REGION

Region	Total injury and illness cases	Fatalities	Total cases with lost time	Total lost-time days	Total working hours	TRCR	LTIR
Europe	161	0	57	750	99 721 728	0.32	0.11
North America	129	0	14	103	48 437 611	0.53	0.06
Latin America	3	0	3	26	11 160 809	0.05	0.05
Asia	21	0	11	55	63 580 066	0.07	0.03
Middle East and Africa	4	0	1	3	8 261 710	0.10	0.02
Oceania	4	0	3	12	1 446 911	0.55	0.41
Total	**322**	**0**	**89**	**949**	**232 608 835**	**0.28**	**0.08**

NOVARTIS GROUP THIRD-PARTY PERSONNEL HEALTH AND SAFETY, BY REGION

Region	Total injury and illness cases	Fatalities	Total cases with lost time	Total working hours	TRCR	LTIR
Europe	17	0	6	8 189 200	0.42	0.15
North America	35	0	6	7 173 759	0.98	0.17
Latin America	0	0	0	1 540 660	0.00	0.00
Asia	3	0	1	6 592 938	0.09	0.03
Middle East and Africa	1	0	1	662 015	0.30	0.30
Oceania	0	0	0	243 920	0.00	0.00
Total	**56**	**0**	**14**	**24 402 492**	**0.46**	**0.11**

Overall health and safety data by region

The above and below tables present selected key health and safety performance figures by region. Due to privacy and equal opportunity considerations, Novartis does not break down health and safety data by gender.

For more about our approach to creating a safe workplace, see → the dedicated section of the Novartis website.

NOVARTIS GROUP COMPANY CONTRACTORS HEALTH AND SAFETY, BY REGION

Region	Fatalities	Total cases with lost time	Total working hours	LTIR
Europe	0	48	14 817 411	0.65
North America	0	8	5 871 400	0.27
Latin America	0	0	2 623 894	0.00
Asia	0	7	4 944 670	0.28
Middle East and Africa	0	0	595 655	0.00
Oceania	0	0	0	0.00
Total	**0**	**63**	**28 853 030**	**0.44**

G4 LA 7

Workers with high incidence or high risk of diseases related to their occupation

Novartis associates at many sites handle highly hazardous or infectious materials. Owing to the high level of risk management, there are no occupational illnesses recorded in this group. However, Novartis sites reported a total of 17 occupational illnesses in 2016. For a more detailed explanation of the occupational illnesses, see G4–LA6: type of injury and rates of injury, occupational diseases, lost days, and absenteeism.

Biosafety

Handling biological materials is an integral and essential part of research, development and manufacturing programs at Novartis. Biological materials can include human or animal pathogens, genetically modifed viruses, and experimental or transgenic animals.

We take great care to ensure we prevent misuse of material. Our biosafety program sets out standards, tools and practices for associates to manage potential risks when handling biological materials. Risk management and safety measures are stipulated in our guidelines on biosafety and in our detailed guidance notes. These standards are binding and based on best practices. We regularly assess compliance through audits at sites conducting biological activities.

Be Healthy workplace health promotion

Launched in 2011, Be Healthy is our first companywide health and well-being initiative, and builds on a tradition of providing health and well-being programs for Novartis Group company associates. The health and well-being of associates is a top priority and a natural extension of our company mission to discover new ways to improve and extend people's lives. We place particular focus on prevention because statistics from the World Economic Forum show that workplace health and well-being programs addressing lifestyle changes can help prevent up to 40% of noncommunicable diseases such as cardiovascular disease, cancer and lung disorders.

Be Healthy aims to help associates around the world embrace healthy lifestyles by providing opportunities for them to take control of their personal health and help prevent future health issues. The initiative is based on four main pillars:

- Move: increase physical activity and decrease sedentary behavior
- Choose: eat healthy foods and appropriately to keep in top shape at work and at home
- Know your numbers: help associates know their key health numbers so that they can take control of their health
- Manage: provide support for associates with disabilities or illnesses to maintain or regain their ability to perform at home and at work

As part of Be Healthy, our health promotion focus at Novartis includes healthy living and screening activities, as well as support to associates within our affiliates who suffer from chronic illnesses. Novartis believes it is important to ensure active care management, which includes looking beyond lost-time cases, evaluating minor injuries or unsafe acts, and providing support to associates so they can return to work and perform in an environment that enables them to contribute optimally after an absence due to an illness or injury. In addition, as part of Be Healthy, Novartis Group locations are asked to provide their associates access to an Employee Assistance Program (EAP) offering psychological, social, legal and financial support services. In many locations – through the EAP or other services – we offer independent counseling services and helplines to help associates cope with stress, depression and anxiety.

Our 2016 Celebration Week was held September 19-23, and the theme was "healthy body, healthy mind." It highlighted the link between physical health and mental and psychological well-being, as well as the influence emotions, life events, and coping skills can have on one's health. The 2016 theme underlined that physical and mental resilience can support long-term health by increasing one's ability to adapt to or recover from challenges and stress.

In addition, as part of Be Healthy, Novartis again participated in the Global Corporate Challenge® (GCC) – an independent program through which teams of associates compete in a 100-day virtual race around the world. For the third year in a row, Novartis secured the No. 2 spot in the "World's Most Active" global rankings out of 1200 organizations participating worldwide. We were also named most active organization in the healthcare and medical sector. More than 18 000 associates from 65+ different countries signed up for the GCC in 2016; 15 000 never missed any step entry, and 17 437 successfully completed the GCC to the finish line.

G4 LA 8

Health and safety topics covered in formal agreements with trade unions

HSE is a fundamental component of our long-term business strategy. We consider HSE implications in every aspect of our worldwide healthcare activities, with the intent to protect associates, neighbors, patients, business assets, natural resources and the environment. This commitment is part of everything we do, from the moment a scientist begins research, through production and distribution, until our customers and patients use and dispose of the final product.

We provide our Group company associates with safe working conditions, and strive to protect them from potential health hazards and injuries. Our emphasis on the health and well-being of associates is a natural extension of our mission to discover new ways to improve and extend people's live.

All Novartis Group company associates are expected to adhere to the health and safety requirements outlined in the Novartis Global HSE Policy and the Novartis Code of Conduct. We do not cover health and safety topics in formal agreements with trade unions or Novartis Employee Representative Councils (NERCs), but we consult local trade unions and NERCs to understand the approach to implementing these requirements on a country-by-country basis. For instance, at sites in Basel and the Rhine Valley, Novartis holds consultation processes and sets up commissions with NERCs on various HSE topics.

We are committed to providing our associates with safe workplaces, fair working conditions, and assurance of mutual respect. We also strive to provide programs that help them maintain or improve their health, such as Be Healthy. See G4–LA7: workers with high incidence or high risk of diseases related to their occupation.

The Global HR Guideline on the promotion of health outlines our commitment to influencing positive behaviors and providing opportunities for improving personal health, both in and outside the workplace. It describes how programs promoting health in the workplace and beyond should be set up, executed and monitored.

Occupational health clinic strategy

On-site clinics provide convenient medical services to associates, as well as savings in regard to leveraging efficiency. They support the reduction of sickness absence and staff turnover, and increase employee satisfaction by contributing to a healthy, safe and attractive work experience. In addition, several studies show a return on investment of at least 2 (2-1 ratio for combined off-site costs versus on-site operational costs of clinics).

In 2015, a new global occupational health (OH) strategy was developed at Novartis to leverage the benefits of on-site medical services for associates. The strategy goes beyond legal compliance and is targeted to ensure the deployment of on-site services wherever there is a clear value proposition to do so, focusing on quality, reliability and efficiency of services. All Novartis sites with more than 100 employees were screened in regard to being eligible for on-site services. The process starts with the assessment of recommended on-site OH resources based on legal requirements, size, headcount, operations and risks (including emergency response), as well as additional business needs. Overall, 70 sites worldwide have been identified as being eligible for on-site clinics via third-party providers to standardize and simplify how clinical services are delivered. At the end of 2016, the new strategy was implemented at 89% of eligible sites – up from 78% at the beginning of 2016.

Implementation of the occupational health clinic strategy in the US

Before the rollout of the new OH clinic strategy, the situation in the US was not harmonized – with only 10 sites having OH clinical services, which were provided inconsistently by multiple contractors. Other sites and associates had little access to OH clinical services, and 24/7 phone support was not available for many US associates, including the field force.

As a result of the screening in the US, six sites were identified as ones that would benefit from an on-site clinic. The new strategy in the US was implemented while harmonizing the delivery of services through one provider to increase the level and quality of OH services in a cost-efficient way. The ultimate goal was to address gaps in access to clinical services, especially at small sites and for the field force.

At the end of 2016, 16 US sites had access to OH clinics (versus 10 in 2015), and a unique 24/7 telephone triage is now available for all US-based associates. In regard to caring for the health and well-being of our associates, this new OH strategy now reaches 26 000 associates in the US (up from 20 400 in 2015), including 18 800 with on-site clinic support (up from 16 600).

G4 LA 9

Average hours of training per year per employee by gender, and by employee category

In 2016, each user of our eLearning library spent four hours, on average, on learning activities in the area of personal effectiveness and leadership. Starting from a basis of 27.3 hours in 2015, associates increased their average time spent on these areas of learning to 27.8 hours in 2016 (this excludes sales and in-country programs, which we will be able to track with the unified talent and learning platform that is being rolled out across Novartis and will be available globally in 2019). Part of the increase is due to the fact that the library is accessible 24/7 to all Novartis associates across the globe, and targeted campaigns have created a significant push of self-paced learning activities.

G4 LA 10

Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings

A virtual learning penetration approach is in place globally to ensure all Novartis associates have access to relevant, self-paced learning at no individual cost, at any time, from anywhere and on any topic. More than 30 000 associates made use of this virtual offering in 2016 to keep up with the evolving demands of the internal and external job market. A portfolio of scalable programs for associates and first-line managers to satisfy demand are in place. A job center is also in place to support associates in times of restructuring. Special learning programs for such situations were designed.

G4 LA 11

Percentage of employees receiving regular performance and career development reviews, by gender and by employee category

The Novartis performance management process is conducted for all permanent Novartis Group company associates, and consists of objective-setting and development planning, and at least one review during the year and a formal year-end review. During the objective-setting and development planning discussion, managers and their direct reports agree on annual objectives and a development plan that includes short-term developmental activities to support the achievement of performance objectives, as well as a longer-term development plan to support the achievement of career aspirations.

In 2015, 95% of associates worldwide completed the process and received a year-end performance rating. We expect a similar completion rate for 2016. Due to the timing of our performance management cycle, data will only be available after finalization of this report. The process does not cover all associates because some employee groups subject to works council agreements do not participate in the performance management process.

The purpose of our performance management process is to harness the efforts of every associate toward serving and creating value for patients, customers and stakeholders. The process drives a culture of continuous improvement through ongoing feedback and coaching. It supports individuals to meet their development aspirations and strengthens organizational capabilities. It is an ongoing process for managing and improving individual, team and overall business performance while fostering ethical behavior. At Novartis, performance is measured based on two dimensions: achievement of individual objectives and demonstration of Novartis Values and Behaviors, reflecting our philosophy that what we achieve is as important as how we achieve it. We have introduced a revised set of Values and Behaviors, making the performance management process simpler and clearer. Our Values and Behaviors help guide the choices our associates make and the actions they take to help discover, develop and successfully market innovative products to prevent and cure diseases, ease suffering, and enhance the quality of life.

What we value

- **Innovation** by experimenting and delivering solutions
- **Quality** by taking pride in doing ordinary things extraordinarily well
- **Collaboration** by championing high-performing teams with diversity and inclusion
- **Performance** by prioritizing and making things happen with urgency
- **Courage** by speaking up, and giving and receiving feedback
- **Integrity** by advocating and applying high ethical standards every day

G4 LA 12

Composition of governance bodies and breakdown of employees per employee category according to gender, age group, minority group membership, and other indicators of diversity

At least 142 different nationalities are represented at Novartis.

BREAKDOWN BY GENDER IN 2016

Employee category	Female	Male
Overall	49%	51%
Management[1]	42%	58%
Novartis Top Leaders[2]	25%	75%

[1] Management defined locally
[2] Comprise the 356 most senior managers at Novartis, including the Executive Committee of Novartis

BREAKDOWN BY GENERATION GROUP[1] IN 2016

Employee category	Generation Y	Generation X	Baby boomers
Overall	41%	44%	15%
Management[2]	24%	57%	19%
Novartis Top Leaders[3]	1%	55%	44%

[1] Generations are defined as follows: Generation Y: born 1980-2000; Generation X: born 1965-1979; Baby boomers: born 1945-1964
[2] Management defined locally
[3] Comprise the 356 most senior managers at Novartis, including the Executive Committee of Novartis

G4 LA 13

Ratio of basic salary and remuneration of women to men by employee category, by significant locations of operation

Novartis Group company associates are located in numerous countries with different legal and socio-economic environments. It is our policy to offer our associates fair and competitive wages based on level of responsibility, performance and ethical conduct. We appreciate the diversity and individuality of our associates and do not discriminate based on personal characteristics such as gender. Novartis is continuously working with internationally recognized experts on processes and tools to ensure consistent and competitive terms of employment.

G4 LA 16

Number of grievances about labor practices filed, addressed and resolved through formal grievance mechanisms

Novartis Group companies employ about 123 000 associates around the world. While we do not have a misconduct category called “labor practices,” our “employee relations” misconduct category includes issues pertaining to labor practices such as discrimination, harassment, inappropriate behavior, performance management violations, retaliation, unfair dismissals, etc. In 2016, 1368 allegations of misconduct related to employee relations were reported, the majority of which were minor.

All 1368 allegations related to employee relations have been addressed and resolved locally, or investigated via the independent Business Practices Office (BPO) process:

- 837 allegations that were not related to misconduct were delegated to local management and/or HR for review and action outside the BPO investigative process.
- Investigations of 431 allegations were initiated by the BPO in 2016.
- Of these 431 investigated allegations, the investigations of 330 allegations were completed by December 31, and the rest are pending. 38% of those investigated allegations were substantiated. Overall, the investigated allegations resulted in 56 dismissals (for serious matters) or resignations, and in 37 written warnings. Other remedial actions such as training, coaching and implementing new controls are also widely implemented when deemed appropriate.

A new gas stove in San Lorenzo, Guatemala, attracts a crowd.

Human rights

G4 HR 1

Total number and percentage of significant investment agreements and contracts that include human rights clauses or that underwent human rights screening

All new employees have to acknowledge the Novartis Code of Conduct and all Group policies. The general obligation of each and every Novartis employee to adhere to human rights is defined in our Code of Conduct. Specific human rights issues are governed and managed by issue- and function-specific standards at Novartis (e.g., Novartis Supplier Code).

We respect and support the protection of human rights, as enshrined in the UN Universal Declaration of Human Rights. We are also committed to upholding the core labor standards set out by the ILO. Since 2001, Novartis has been a signatory to the UNGC, endorsing the 10 universal principles covering human rights, labor, the environment and anti-corruption. We also support the UN Guiding Principles on Business and Human Rights, and ensure appropriate implementation at Novartis.

G4 HR 2

Total hours of employee training on human rights policies or procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained

We seek to promote and protect the rights defined in the UN Universal Declaration of Human Rights within our sphere of influence.

In 2016, 112 502 associates were invited to complete the Code of Conduct course, which contains a topic on human rights. By December 31, 110 774 associates (including members of the Executive Committee of Novartis) completed the course. This represents 98% of the invited population. In 2013, we rolled out a new hire e-training module (updated in 2015) based on the Novartis Code of Conduct, which includes a reference to human rights. By December 31, 2016, 14 937 associates had been invited to undertake this training, and 13 585 (91% of the new hires invited) had completed it.

We also rolled out a new e-training module for contractors based on the Novartis Code of Conduct, which includes a reference to human rights. By December 31, 2016, 5 677 contractors had been invited to undertake this training, and 3 909 (69% of the new contractors invited) had completed it.

The e-training targets associates with an email address. All remaining associates are required to be trained face-to-face or through shared kiosks.

G4 HR 3

Total number of incidents of discrimination and corrective actions taken

Novartis reports on all cases of misconduct. For more information, see G4-LA16: number of grievances about labor practices, G4-HR12: number of grievances about human rights impacts, and G4-SO11: number of grievances about impacts on society. Complaints are investigated by the BPO, and substantiated cases are referred to senior management for appropriate disciplinary action.

Novartis Group companies encourage associates to address discrimination, harassment and retaliation appropriately. We have established a process to coordinate information and actions with Human Resources partners and managers.

HR function provides guidance to managers in taking supportive and/or corrective measures in cases where misconduct and inappropriate treatment are established. Global HR Guidelines regarding discrimination, harassment and retaliation – as well as disciplinary actions and dismissals – exist globally and are locally implemented as country HR standards in countries of operation according to local legal requirements and legislation. We do not specifically disclose the number of incidents related to discrimination, as this information is business confidential.

G4 HR 4

Operations and suppliers identified in which the right to exercise freedom of association and collective bargaining may be violated or at significant risk, and measures taken to support these rights

None of our operations are identified as being at significant risk of violating the right to exercise freedom of association and collective bargaining. As stated in our Code of Conduct, we support freedom of association and collective bargaining. These principles are included in the basic employment terms and contracts of Novartis associates.

The Novartis Global HR Principles Guideline outlines the standard applicable for all divisions across all countries: that Novartis fully respects the right of associates to choose to join a trade union or an employee association. In addition, a Global HR Guideline regarding the involvement of employee representative bodies (ERBs) confirms our commitment to have constructive dialogue with workforce representatives and to involve works councils or trade unions according to local laws and regulations.

Through the Corporate Citizenship Survey 2016, we gained insights from country operations that enable us to monitor the freedom of association in the organization, such as associates' opportunities to access internal or external employee representation and/or if associates are covered by a collective bargaining agreement, as allowed by local laws. Novartis supports the right to exercise freedom of association. In the course of reorganization projects (e.g., centralizing the Technical Operations organization and integrating the Global Drug Development organization, and the further operationalization of Novartis Business Services, etc.), the involvement of local employee representatives has been carefully considered, managed and monitored according to local legal requirements.

In addition to our commitment to human rights and to the right to freedom of association, we comply with regional and local legislation relating to employee consultation. In accordance with applicable European Commission directives regarding the implementation of European works councils, the Novartis Euroforum (NEF) has been implemented, and representatives have been nominated and elected in their countries. The terms of reference of the NEF outline its rights and duties, and confirm its constitution and consultation processes. Meetings with management take place regularly to provide information about transnational initiatives. Due to legal requirements or other obligations, ERBs such as the NEF must be involved in certain Novartis activities in the EU countries and Switzerland. The respective agreement (NEF agreement) – a legally binding document – and Global HR Guideline about the involvement of ERBs define the NEF's involvement in activities that could impact employees in more than one EU country. Activities that are strictly limited to one country follow local laws and legislation on communication and consultation with local ERBs.

During the reorganization projects in 2016, the views of the NEF delegates were considered by the project teams during implementation. This supported the local consultation process in all countries required.

Novartis expects its suppliers to aspire to the standards defined in its Supplier Code. Whenever a supplier is identified with a potential labor rights risk, the topic is discussed during an audit. If an issue surfaces, we address it by engaging with the supplier.

For more details on our approach to managing human rights and why we think it is important, see
→ our position on human rights.

G4 HR 5

Operations and suppliers identified as having significant risk for incidents of child labor, and measures taken to contribute to the effective abolition of child labor

The Novartis Code of Conduct, which specifies our position on forced or compulsory labor, is included in the basic employment terms or contracts of associates. Novartis protects associates from unfair and unethical working conditions, including child labor. We annually monitor the global workforce for any associates below the age of 15, and take corrective action when necessary. In 2016, monitoring showed no incidents of child labor at Novartis operations.

Our process to identify and monitor suppliers considered to have significant risk for incidents of child labor or young workers exposed to hazardous work is embedded in our RP program. In 2016, 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.

Please refer to
→ G4–12 for more details on the RP program and process.

G4 HR 6

Operations and suppliers identified as having significant risk for incidents of forced or compulsory labor, and measures to contribute to the elimination of all forms of forced or compulsory labor

None of our operations are identified as having a significant risk for incidents of forced or compulsory labor. The Novartis Code of Conduct, which specifies our position on forced or compulsory labor, is included in the basic employment terms or contracts of associates. Novartis protects associates from unfair and unethical working conditions, including bonded, forced and child labor, and any unsafe working conditions. Our HR Principles Guideline outlines how the Novartis 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. Novartis expects its suppliers to comply with the standards defined in its Supplier Code. Whenever a supplier is identified with a potential labor rights risk, the topic is discussed during an audit. If an issue surfaces, we address it by engaging with the supplier.

For more details on our approach to managing human rights and why we think it is important, see
→ our position on human rights.

G4 HR 7

Percentage of security personnel trained in the organization's human rights policies or procedures that are relevant to operations

According to our Code of Conduct, we strive to ensure that activities do not negatively impact fundamental human rights. 100% of Novartis investigators, operating under the Novartis Business Services organization, are trained on the Code of Conduct. Site security personnel contracted through external service providers are currently not trained on the Code of Conduct.

For more details on our approach to managing human rights and why we think it is important, see
→ our position on human rights.

G4 HR 8

Total number of incidents of violations involving rights of indigenous peoples and actions taken

In 2016, there were no incidents of violations involving rights of indigenous people.

Novartis uses natural sources for obtaining potential drugs or lead substances only in accordance with the UN Convention on Biological Diversity (CBD), the provision of the Nagoya Protocol, and local regulations. Novartis accepts the CBD provision whereby countries maintain sovereignty over their genetic resources and may limit access to them, and supports sharing the benefits derived from future products in accordance with the principles of the CBD, while ensuring compliance with intellectual property law. To drive CBD implementation and promote sustainable society development in less developed countries, we transfer know-how and the latest technologies to local partners to help them build capacity, and we work closely with local authorities.

Read our position on
→ biodiversity/bioprospecting.

G4 HR 9

Total number and percentage of operations that have been subject to human rights reviews or impact assessments

We respect and support the protection of human rights, as enshrined in the UN Universal Declaration of Human Rights. We are also committed to upholding the core labor standards set out by the ILO. Since 2001, Novartis has been a signatory to the UNGC, endorsing the 10 universal principles including those related to labor and human rights. We also support the UN Guiding Principles on Business and Human Rights, and ensure appropriate implementation at Novartis.

The protection and respect for human rights are relevant to all aspects of our business, from R&D and clinical trials to marketing and the pricing of medicines. In addition to the Novartis Code of Conduct, we have developed guidelines on fair working conditions, human rights, business conduct and third-party management that apply to all areas of our business.

In 2016, Novartis started working on a human rights impact assessment. We expect to be in a position to provide more details in our next report. We believe this will further strengthen our approach to monitoring human rights issues in line with the UN Guiding Principles on Business and Human Rights. In addition, we welcome the introduction of the UK Modern Slavery Act and will report all relevant requirements in 2017.

We follow an integrated approach to managing human rights and have processes in place that aim to avoid human rights-related violations, such as:

Responsible procurement: The Novartis Supplier Code defines the principles Novartis expects its suppliers to aspire to, including those related to labor rights. The code is based on the UNGC and other international standards or accepted good practices.

Novartis is also a member of the Pharmaceutical Supply Chain Initiative and supports its principles for responsible supply chain management, including for ethics and labor. These principles are incorporated into the Novartis Supplier Code.

Clinical trials in developing countries: Practices in the developing world are frequently scrutinized to ensure they are not used to "escape" regulations or ethical standards in Europe or the US. Novartis acknowledges that the situation of clinical study participants in developing nations is more complex than in the developed world. Novartis strives for the highest possible protection of all study participants and is globally committed to a single set of core principles that governs all studies sponsored by Novartis.

For more details, see
→ our position on clinical trials in developing countries.

Human resources: The HR Principles Guideline outlines how the Novartis 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.

Remediation: Our BPO provides a formal system for dealing with complaints of actual or suspected cases of misconduct, including those related to human rights. All complaints are investigated, and substantiated cases are escalated to management for appropriate action. In cases of acquisitions, all new employees have to acknowledge the Novartis Code of Conduct and all Group policies. The general obligation of each and every Novartis employee to respect human rights is defined in our Code of Conduct. Specific human rights issues are governed and managed by issue- and function-specific standards at Novartis (e.g., Novartis Supplier Code).

G4 HR 12

Number of grievances about human rights impacts filed, addressed, and resolved through formal grievance mechanisms

Novartis Group companies employ about 123 000 associates around the world. 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 would appear. In 2016, 853 allegations of misconduct related to human rights issues were reported. The BPO initiated investigations of 323 allegations in 2016.

Of these 323 investigated allegations, 249 investigations were completed by December 31, and the rest are pending. 46% of those investigated cases were substantiated. Overall, the investigated allegations resulted in 47 dismissals (for serious matters) or resignations, and in 36 written warnings. Other remedial actions such as training, coaching and implementing new controls are also widely used when deemed appropriate.

For more details on our approach to managing human rights and why we think it is important, see
→ our position on human rights.

Over the last 15 years, some family members have suffered from cardiovascular disease and diabetes, adding to the sense of urgency behind Ms. Allport-Anderson's research.

Society

G4 SO 1

Percentage of operations with implemented local community engagement, impact assessments and development programs

We are an integral part of the communities that host our operations, and we strive to contribute to their stability and prosperity. We engage with local communities where we have operations, and evaluate and assess relevant environmental impacts. Below are some highlights of these activities in 2016:

- Novartis started developing an approach to capture and measure positive and negative economic, environmental and social impacts created by our activities and related initiatives in the communities where we operate. This approach provides new insights into our operations and could help support decision-making and prioritize activities that create the biggest societal value. Further, it could enable Novartis to increase transparency in our disclosures by quantifying in financial terms key societal impacts. Country pilots covering economic and social aspects have been run in China and Kenya. These pilots demonstrate that the approach can be replicated in other countries and programs. Preliminary results in China and Kenya show that our activities have created substantial societal value. For example, in China, we estimate that in addition to the approximately 7 400 full-time equivalent associates, our activity in the country indirectly resulted in approximately 39 000 additional jobs. The pilot in China also revealed negative environmental impacts related to water, waste and greenhouse gases created by our own and supply chain activities. For both countries, we also calculated the contribution our activities make to their gross domestic product.
- In 2016, we also assessed the benefits of our forest carbon sink projects. For our project in Argentina, the results showed that 60% of its societal benefits arise from sequestration and 36% from ecosystem services. The project has a social return on investment (SROI) of 220% for the initial eight years. For the Mali jatropha initiative, 70% of the societal benefits arise from income generation for rural farmers and 18% from environmental benefits (including carbon sinks). This project has an SROI of 180% for the initial eight years.
- Sandoz further expanded New Life & New Hope, a program launched in 2015 in Ethiopia to improve maternal and child health and to reduce mortality associated with childbirth. The company supported a second wave of training for another 100 midwives in three new regions where the highest need to improve delivery skills was identified.
- In Kenya, Novartis Access joined forces with several nongovernmental organizations to build capacity to diagnose and manage chronic diseases in local facilities across the country. This includes plans to reach 1 million people through education campaigns on diabetes in the next two years. Other activities will include campaigns to screen and diagnose people with diabetes and hypertension, as well as training for healthcare workers.
- In 2010, we launched the Jian Kang Kuai Che initiative ("Health Express") in China's remote Xinjiang province to help improve local health education and healthcare standards there. Over the past six years, the program has covered more than 90% of Xinjiang's rural areas, and provided health education to 700 000 students, 260 000 residents and 20 000 doctors.

- More than 27 500 associates worldwide participated in the company's 20th annual Community Partnership Day (CPD), dedicating an estimated 220 000 hours to volunteer with charitable causes in their communities. CPD gives associates the opportunity to dedicate their work day to volunteer in the local communities where they live and work.
- We significantly expanded our corporate volunteering platform through which associates can register a potential corporate responsibility project idea or sign up to become a corporate volunteer. The platform launched in several markets, including low- and middle-income countries. The scope of projects is broad and includes partnerships with global charitable organizations, remote and on-the-ground capability building, one-time and recurring pro bono services, and local efforts to support smaller-scale foundations and institutions.

G4 SO 3

Total number and percentage of operations assessed for risks related to corruption and the significant risks identified

Our Code of Conduct and Anti-Bribery Policy clearly state our position on bribery and corruption. We do not tolerate any form of bribery or corruption. We do not bribe any public official or private person, and we do not accept any bribes. All operational reporting units (100%, approximately 250 units) undergo a financial risk assessment and have implemented the Novartis Financial Controls Manual requirements to ensure compliance with internal and relevant external financial standards and regulations. There are a number of significant risk areas and controls either directly or indirectly related to corruption, including the proper segregation of duties, competitive bidding and the supplier selection process; assurance on external service providers; our Code of Conduct and Anti-Bribery Policy; marketing and promotional activities; and relationships with third parties.

In 2016, a global project was launched to develop a standardized cross-divisional risk management and monitoring framework by harmonizing existing processes in the areas of professional practices, anti-bribery and third-party risk management. As part of this initiative, associated tools and templates have been developed to support the execution of these processes.

G4 SO 4

Communication and training on anti-corruption policies and procedures

In 2016, we launched a revised Anti-Bribery Policy that captures recent changes and regulations, and was promoted through a targeted communications campaign.

In September, we rolled out a new mandatory anti-bribery course to all functions in scope and to members of the Executive Committee of Novartis. As of December 31, 72 580 associates were invited to complete the course, and 70 029 had completed it (96% course completion). In 2016, 112 502 associates were invited to complete the Code of Conduct course, which contains anti-bribery topics. By December 31, 110 774 associates (including members of the Executive Committee of Novartis) had completed it. This represents 98% of the invited population.

14 937 new associates were invited to complete the new hire e-training module (which includes a section on anti-bribery and corruption), and 13 585 (91%) had completed it by December 31.

Also, we rolled out a new e-training module for contractors based on the Novartis Code of Conduct, which contains anti-bribery topics. By December 31, 5 677 contractors had been invited to undertake this training, and 3 909 (69% of the new contractors) had completed it.

The Novartis Group Integrity & Compliance function provides training tools such as educational PowerPoints, games and case study materials. These trainings are carried out at a local level to specific risk groups, and are not reported centrally. Novartis does not currently report data on the number and percentage of governance body members and business partners receiving training on anti-corruption policies and procedures. Anti-bribery is also part of the Novartis Supplier Code.

G4 SO 5

Confirmed incidents of corruption and actions taken

We ensure that our standards of ethical business conduct are put into practice through an integrated approach to decision-making, a robust system for handling complaints, and ongoing monitoring and reporting procedures.

We support an open culture in which Novartis Group company associates can speak up and raise concerns. In 2005, we established the BPO to provide a formalized system for dealing with complaints and to offer employees and external stakeholders a channel to report actual or suspected cases of misconduct, anonymously or not. Upon receipt of those messages, the BPO endeavors to respond within three working days.

We also have integrity telephone and web-based confidential hotlines in place covering more than 115 Novartis countries, through which employees have the option of reporting allegations in 40 languages.

As part of our commitment to a "speaking up" culture, we respect confidentiality and actively monitor potential retaliation. The BPO assesses all complaints in terms of severity of the case. When misconduct is suspected, the case is assigned to an investigator who establishes the facts and sends the investigation report back to the BPO. The BPO will review the report and will communicate it to the appropriate Business Head and the local Internal Review Committee (IRC) for review and action.

The local IRC – usually involving Integrity & Compliance, Legal and HR – then reviews the findings and recommends remedial measures and/or disciplinary actions, including dismissal, if appropriate. However, before any action is taken, the BPO calibrates the recommendations for consistency of misconduct handling across the organization. In this way, fairness and transparency are guaranteed. To prevent similar issues arising elsewhere in the future, the BPO also communicates root causes and lessons learned to the business and key stakeholders.

This program is key to deterring and preventing misconduct, and provides associates with the confidence that action is taken when cases are substantiated.

In 2016, the BPO received a total of 3 595 complaints of alleged misconduct, of which 1 888 were deemed not to be related to misconduct and were delegated for review and action outside the BPO investigative process. The BPO initiated 1 707 investigations related to misconduct; 893 were substantiated, including 401 that resulted in dismissals or resignations. Of those investigated allegations, 46% pertained to fraud, 32% to professional practices, and 6% to conflict of interest. "Corruption" cases can be found across these three categories.

Novartis does not currently report data on the nature of confirmed incidents of corruption, and on the termination or non-renewal of contracts with business partners due to violations related to corruption. We will evaluate the feasibility of reporting this data in the future.

Please refer to
→ the Ethics & Compliance section of the Novartis website for further details.

G4 SO 6

Total value of political contributions by country and recipient/beneficiary

In 2016, Novartis issued an internal guideline on responsible lobbying, describing the overarching principles of transparency in lobbying activities, available on the Public Policy & Advocacy section of the Novartis website.

Novartis makes financial contributions to support political dialogue on issues of relevance to the company.

Political contributions made by Novartis are not intended to give rise to any obligations of the party receiving it or with the expectation of a direct or immediate return for Novartis. Such contributions are fully compliant with applicable laws, regulations and industry codes, and are declared in commonly used voluntary lobbyist databases, where available, in addition to any mandatory registration.

Novartis only makes political contributions in countries where such contributions from corporations are considered to reflect good corporate citizenship. Moreover, Novartis only makes modest political contributions so as to not create any dependency from the political parties receiving these contributions.

In 2016, Novartis made political contributions totaling approximately USD 1.0 million, thereof approximately USD 620 000 in Switzerland, USD 250 000 in the US (to non-federal candidates), USD 110 000 in Australia, and USD 10 000 in the UK.

In addition, in the US, a political action committee (PAC) established by Novartis used funds received from Novartis employees (but not from the company) to make political contributions to US federal and state candidates totaling USD 240 000.

An up-to-date overview of the PAC disbursements/beneficiaries can be found at: https://beta.fec.gov/.

In Switzerland, Novartis supports political parties that have a political agenda and hold positions that support the strategic interests of Novartis, its shareholders and other stakeholders.

No in-kind contributions were identified, except that Novartis sometimes provided modest food and beverages when meeting political delegates, including during visits to Novartis premises.

Furthermore, Novartis Group companies contributed approximately USD 48 million to various major international, regional and country trade associations in 2016.

G4 SO 11

Number of grievances about impacts on society filed, addressed and resolved through formal grievance mechanisms

In 2016, 3 595 complaints of alleged misconduct with a total of 4 149 allegations[1] were made. These fall under eight categories:

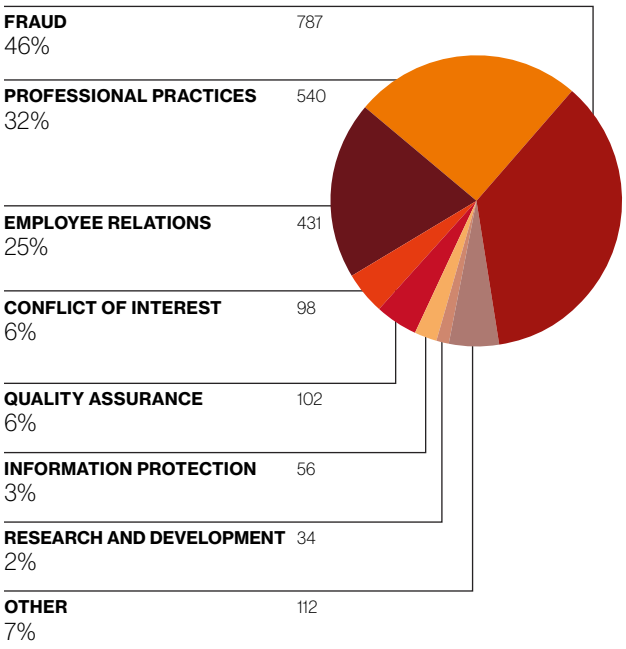
- Employee relations
- Fraud
- Professional practices/bribery
- Conflict of interest
- Information protection
- Quality assurance
- Research and development
- Other

All 3 595 complaints (4 149 allegations) have been investigated or addressed and resolved.

- 1 888 complaints (1 989 allegations) that were not related to misconduct were delegated to local management and/or HR for review and action outside the BPO investigative process.
- 1 707 investigations were initiated by the BPO. The investigations of 1 534 allegations were completed by December 31, and the rest are pending. Of those investigated allegations, 58% were substantiated across all misconduct categories. Overall, the investigated allegations resulted in 401 dismissals (for serious matters) or resignations, and in 190 written warnings. Other remedial actions such as training, coaching and implementing new controls are also widely used when deemed appropriate.

Misconduct cases[1] per category

A total of 1 707 cases of misconduct were reported to the BPO, of which 893 were substantiated, including 401 that resulted in 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.

Aurelia Mendez Pablo has blood drawn as part of research in Guatemala aimed at reducing the health impact of smoke from cooking fires.

Product responsibility

G4 PR 1

Percentage of significant product and service categories for which health and safety impacts are assessed for improvement

As a core part of its business, our Innovative Medicines Division has put processes in place for the continuous and systematic review of the benefit-risk profile of all products in its portfolio, including those that are on the market and those that are still in development. These processes are designed to ensure the best possible safety and therapeutic benefits for patients.

Two key sources of safety data are premarketing clinical trial data and post-marketing pharmacovigilance activities. Clinical trials are well-controlled studies seeking to answer questions about the safety and therapeutic benefit of a drug in a specific patient population. Together with preclinical safety data, the adverse events collected in these studies provide critical information for characterizing the safety profile of a drug. These safety data are closely scrutinized both internally and 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. 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 that product is approved for marketing and becomes available to a wider number of patients. With increasing frequency, we conduct specific studies after regulatory approval to address safety questions that could not be conclusively answered in pre-approval trials, and diligently collect the adverse events from these studies. In addition, in each country, qualified Novartis personnel are responsible for reporting and tracking adverse events for all of our products, investigating their causes, and communicating that information to the appropriate internal and external recipients in a timely manner.

The routine, continuous monitoring of the benefit-risk profile of each compound in the Novartis Innovative Medicines portfolio based on all the safety data collected is the primary responsibility of cross-functional safety management teams (SMTs) under the leadership of a dedicated safety physician. This process is supported by an internal data mining tool that screens all data in our safety database. We require the safety data of each marketed product to be reviewed at least annually by the Signal Detection Board (SigDet), which is a functional board chaired by the Global Head of Safety Science. Any changes in the safety profile must be reviewed and confirmed by this board on an ad hoc basis or during a regularly scheduled review. Confirmed changes in the safety profile of any marketed product are then incorporated in the product label, which is reviewed and approved by the cross-functional Global Labeling Committee (GLC).

The Novartis safety risk management process begins early in the development of new products. The 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. They are reviewed and approved by the Medical Safety Review Board (MSRB), which is chaired by the Global Head of Safety Science and consists of senior-level experts in drug safety, safety operations, clinical research, biostatistics, epidemiology, legal affairs and preclinical. This board ensures that all relevant safety risks have been identified, that they are being appropriately managed, and that risk minimization measures are in place whenever possible to ensure the best possible patient safety for as long as the product remains on the market.

Significant safety- and product-related risk issues identified by the SigDet, MSRB or GLC are escalated to the Portfolio Stewardship Board (PSB). The PSB ensures the continuous, systematic, proactive and timely identification of product-related safety risks, including risks to the company's reputation or legal position. It also drives the performance of benefit-risk assessments, the development of appropriate risk mitigation measures, and the monitoring of their implementation. The PSB is a standing, cross-functional senior executive board that is chaired by the Chief Medical Officer and that reports to senior management in the Innovative Medicines Division. Its recommendations are made independently of project teams and business franchises, with the intent to put patient safety first.

G4 PR 3

Type of product and service information required by the organization's procedures for product and service information and labeling, and percentage of significant product and service categories subject to such information requirements

Product information on pharmaceutical products is heavily regulated in each market and takes into account national medical practices, regulations, and the decisions of the competent health authorities. This applies to all pharmaceutical (patented or generic) products.

As required by law, labels of pharmaceutical products provide important safety and efficacy information as well as dosing and administration instructions. Novartis strives to ensure that information on a product that is known or believed to be supported by reasonable scientific proof – including information related to safety such as contraindications, warnings and precautions, drug-drug interactions, adverse drug reactions and preclinical safety data – is included as part of the local product information where the product is registered, and is updated or amended when appropriate.

G4 PR 4

Total number of incidents of noncompliance with regulations and voluntary codes concerning product and service information and labeling, by type of outcomes

Novartis does not currently report the number of incidents of noncompliance with regulations and voluntary codes concerning product and service information and labeling. We will evaluate the feasibility of collecting this information in the future.

G4 PR 5

Results of surveys measuring customer satisfaction

Many countries, divisions and business units run regular customer satisfaction surveys in their markets with their respective stakeholders, which often include physicians, the general public, government representatives, payors, other partners and future talent.

At the corporate level, we also regularly survey key stakeholder groups in 10 key countries. In 2016, we surveyed 5 266 stakeholders, including physicians, pharmacists and the engaged public. We measured key attributes of our reputation and analyzed how we are viewed based on the top trust drivers for our stakeholders.

We also conducted a comprehensive analysis of the major challenges facing our industry and Novartis, using data from social listening, public and proprietary reports, and other sources. We use these results, which identify reputational strengths and challenges, to guide our behavior and inform our decisions moving forward.

We do not disclose results for confidentiality reasons.

G4 PR 6

Sale of banned or disputed products

Novartis does not sell any products that are banned in a particular market. All Novartis products comply with drug regulatory and safety requirements. Yet, we are aware that certain practices inherent to research and development activities, such as animal research, can cause sensitivities and be a matter of public interest. We also recognize that scientific advances, such as stem cell research and organ transplantation, can raise ethical challenges and concerns.

Read Novartis positions
→ here.

G4 PR 7

Total number of incidents of noncompliance with regulations and voluntary codes concerning marketing communications, including advertising, promotion and sponsorship, by type of outcomes

In 2016, 952 allegations of misconduct related to professional practices, including both compliance with our company's own marketing codes and compliance with industry codes and regulations, were reported. The BPO initiated investigations of 540 allegations in 2016. The investigations of 390 allegations were completed by December 31, and the rest are pending. Of those investigated cases, 60% were substantiated. Overall, the investigated allegations resulted in 92 dismissals (for serious matters) or resignations, and in 58 written warnings. Other remedial actions such as training, coaching and implementing new controls are also widely used when deemed appropriate.

G4 PR 8

Total number of substantiated complaints regarding breaches of customer privacy and losses of customer data

Everyone expects their personal information to remain confidential. This includes anything that can identify them – name, work and home address, family information, employment and financial details, and more sensitive health information. We strongly condemn the disclosure of any information that could lead to any form of discrimination, as well as the use of identifiable genetic data without informed consent.

We adhere to all privacy laws and enforce clear policies on protecting personal information, including genetic data. Our data privacy program includes a global organization and infrastructure, as well as procedures and trainings to support local activities and ensure compliance.

The Novartis Binding Corporate Rules are a system of principles, rules and tools to ensure effective levels of data protection, in particular relating to transfers of personal information outside Europe. In 2016, Novartis had no substantiated complaints regarding breaches of customer privacy or the loss of customer data.

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). We report against Global Reporting Initiative (GRI) indicators relevant to each of the 10 UNGC principles, outlining our commitments and policies, management and monitoring systems, projects and activities, results and targets. See our GRI G4 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 (CR) 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 page 28.

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.

Through our core business, we focus our CR contributions on global health-related goals. We contributed to the Millennium Development Goals by researching and developing medicines for neglected diseases, improving access to healthcare, and building capacity to strengthen healthcare systems around the world.

Our commitment remains unchanged toward the SDGs, which are placing a new focus on noncommunicable diseases (NCDs). Testimony to this is the launch of Novartis Access, a social business program started in 2015 to support further access to our medicines in low- and lower-middle-income countries. Novartis Access offers a portfolio of 15 on- and off-patent medicines addressing key NCDs: cardiovascular diseases, type 2 diabetes, respiratory illnesses, and breast cancer. The Novartis Foundation is also developing innovative models to help low-income patients 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 on-the-ground projects in developing countries that 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 is through our forest carbon sink projects. An assessment conducted in 2016 to quantify the social return on investment for two of these projects in Mali and Argentina showed that besides carbon sequestration, they are improving sustainable livelihoods for local communities.

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. In May, during the World Health Assembly, we hosted a dialogue called “Partnering for Impact: Addressing the Burden of NCDs in Low-Income Countries.” The panel discussed how innovative partnerships can help expand quality healthcare for chronic patients living at the base of the pyramid – from disease awareness to screening, diagnosis and treatment, through to supply chain integrity.

With regard to our engagement on human rights, we welcome the introduction of the UK Modern Slavery Act and will report all relevant requirements in 2017.

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.

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.

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

Juergen Brokatzky-Geiger, Global Head of Corporate Responsibility at Novartis, participates in UNGC meetings and webinars, as does his staff. For example, Charlie Hough, Head of Corporate Responsibility Strategy and Stakeholder Engagement, participated in a UNGC roundtable meeting in 2016 on "Business, Good Health and Well-Being for All."

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.

Novartis contributed to the UN Development Program foundational report on The Role of the Private Sector in Inclusive Development.

4. Promotion and support of the UNGC

In 2016, Novartis sponsored and hosted an event at the Novartis Institutes for Biomedical Research called the Biopharma Sustainability Roundtable, attended by sustainability professionals from the pharmaceutical industry. At that event, the newly appointed executive director of the UNGC, Lise Kingo, gave a keynote speech to highlight UNGC priorities and encourage broader industry participation.

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.

Independent Assurance Report on the Novartis 2016 corporate responsibility reporting

To the Board of Directors of Novartis AG, Basel

INDEPENDENT ASSURANCE REPORT ON THE NOVARTIS CORPORATE RESPONSIBILITY REPORTING

We have been engaged to perform assurance procedures to provide limited assurance on the following aspects of the 2016 corporate responsibility (CR) reporting of Novartis AG and its consolidated subsidiaries (Novartis Group) included in the CR Performance Report 2016.

SCOPE AND SUBJECT MATTER

Our limited assurance engagement focused on the following data and information disclosed in the consolidated CR reporting of the Novartis Group for the year ended December 31, 2016:

- The "Novartis access approaches: key performance indicators 2016" on page 13, the "Ethics and compliance key performance indicators" on page 16, the "People key performance indicators" on page 24 and the "Environmental key performance indicators" on page 27 (CR indicators).
- The materiality determination and stakeholder engagement process of Novartis at the Group level according to the requirements of the GRI G4 guidelines and disclosed on pages 28-31 and 33-34
- Reporting processes and related controls in relation to data aggregation of CR indicators

CRITERIA

The management reporting processes with respect to the CR reporting and CR indicators were assessed against GRI G4 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 are 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 selection, preparation and presentation of the selected 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) 3000 (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.

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 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

We have not carried out any work on data other than outlined in the scope and subject matter section as defined above. 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 causing us to believe in all material respects that:

- The CR indicators outlined in the scope and subject matter section and disclosed in the 2016 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 G4.
- The reporting processes and related controls in relation to data aggregation of CR indicators are not functioning as designed.

PricewaterhouseCoopers AG

pwc

BRUNO ROSSI **RAPHAEL RUTISHAUSER**

Basel, January 24, 2017
