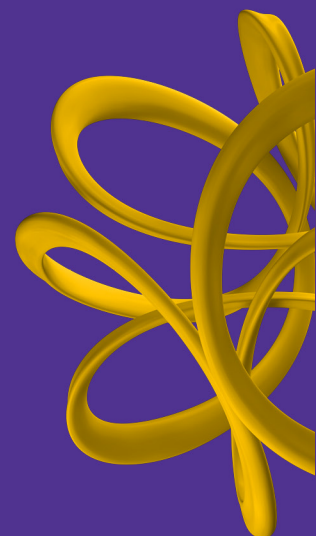


# Sustainability Report 2021



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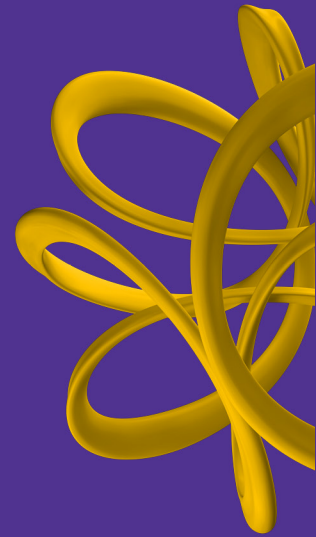
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# STRATEGY & MANAGEMENT

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# Company profile

We are Merck, a vibrant science and technology company. Science is at the heart of everything we do. It drives the discoveries we make and the technologies we create. We make a positive difference in the lives of millions of people every day.

The digital platform and the products and services in our Life Science business sector make precision research simpler and help speed up scientific breakthroughs. They enable quicker access to healthcare and ensure that analyses are accurate and medications are trustworthy. In the Healthcare business sector, we accompany people in every phase of their life and help them to shape, improve, and prolong it. We enable personalized treatments for serious illnesses and help many couples to realize their wish to have children. In our Electronics business sector, we are the company behind the companies, advancing digital living and changing the way we process information and make it available. Our innovations release the potential of data and open up possibilities for positively influencing the way we live.

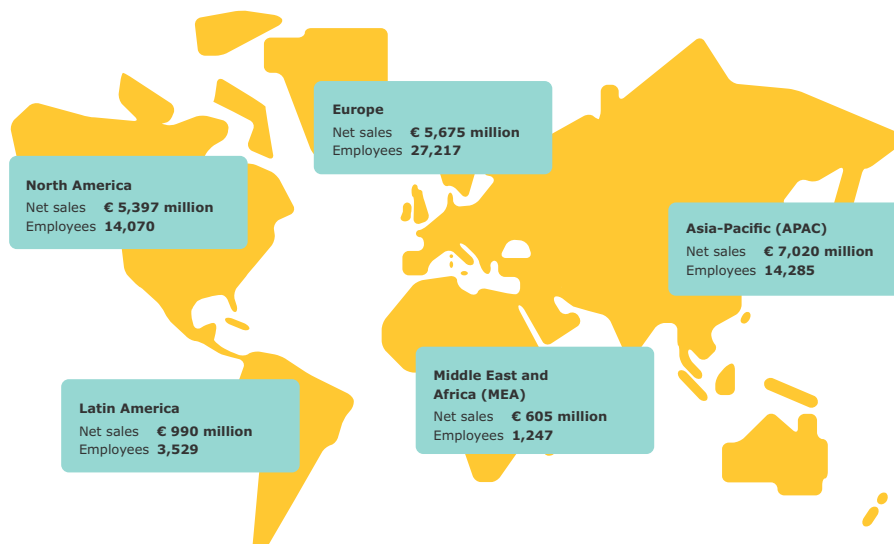
Everything we do is fueled by a belief in science and technology as a force for good. It is a belief that has driven our work since 1668 and will continue to inspire us to find more joyful and sustainable ways to live, because we are curious minds dedicated to human progress.

We hold the global rights to the Merck name and brand. The only exceptions are Canada and the United States. In these countries, we operate as EMD Serono in the healthcare business, as MilliporeSigma in the life science business, and as EMD Electronics in the electronics business.

Apart from our three business sectors, our financial reporting presents five regions: Europe, North America, Asia-Pacific, Latin America, and the Middle East and Africa. As of December 31, 2021, we had 60,348 employees worldwide. The figure as of December 31, 2020 was 58,127 employees.

In 2021, our 227 subsidiaries with employees in 66 countries generated sales of € 19.7 billion. Our 96 production sites are located across 20 countries.

## Employees and sales by region – 2021



## Group structure

Merck comprises three business sectors: Life Science, Healthcare and Electronics. The Performance Materials business sector was renamed Electronics in March 2021.

In **Life Science**, with our Research Solutions, Process Solutions, and Applied Solutions business units, we are a leading, global supplier of tools, research-grade chemicals, and equipment for academic labs, biotech and biopharmaceutical manufacturers, and the industrial sector. With a strong focus on innovation, we are committed to delivering the products, services, and digital platforms to create a sustainable future for generations to come. Our broad and deep portfolio comprises more than 300,000 products.

Research Solutions provides customer solutions to scientists in academic institutions, government labs, research hospitals, pharmaceutical, R&D, and biotech organizations, empowering their efforts to accelerate science. Process Solutions provides biopharmaceutical manufacturers with process development expertise and technologies, supporting them to develop and manufacture drugs safely, effectively, and cost efficiently. In Applied Solutions, we aim to improve health across many areas of daily life with diagnostic solutions to ensure the safety of vaccines and other life-saving therapies as well as provide testing services to identify contaminants in food, air and water. We supply products and workflow solutions that streamline processes, lower costs and deliver consistent, reliable results for diagnostic, testing and industrial customers.

We continued to engage in combating Covid-19 in 2021, including accelerating the supply of urgently needed lipids as part of our strategic partnership with BioNTech and comprehensively expanding our production capacities for technologies and solutions that are required for the manufacture of Covid-19 vaccines and treatments. To date, our products and services have supported more than 80 vaccine developers, more than 35 solutions for testing, and more than 50 monoclonal antibodies, plasma products, and antiviral drugs. You can find more information on our [website](#).

Our **Healthcare** business sector discovers, develops, manufactures, and markets innovative pharmaceutical and biological prescription drugs to treat cancer, Multiple Sclerosis (MS), infertility, growth disorders, and certain cardiovascular and metabolic diseases. Healthcare operates across four therapeutic areas: Neurology and Immunology, Oncology, Fertility, and Cardiology Metabolism & Endocrinology with a clear ambition to become a global specialty innovator. Our R&D pipeline positions us with a clear focus on strengthening our leadership positions in oncology, neurology, and immunology.

Since the start of the Covid-19 pandemic, we have been continuously making every effort to proactively handle the situation and minimize the impact of the pandemic on the supply of our medicines locally and globally through three main levers: the thorough implementation of our business continuity plans across our network, the active management of our stocks, and the assessment of alternative transportation routes to reach our customers and patients.

With our **Electronics** business sector we are the company behind the companies, advancing digital living. Our primary focus is on the electronics market with our materials and solutions changing the way we generate, access, store, process, and display information. In addition, our highly specialized, application-driven Surface Solutions business makes life more colorful. The business sector consists of three business units: Semiconductor Solutions, Display Solutions, and Surface Solutions. Comparing Electronics with a smartphone, Display Solutions represents the user interface, Semiconductor Solutions the intelligence, and Surface Solutions the aesthetics. We offer innovative solutions especially for the electronics industry – for microchips and displays – and for surfaces of every kind.

## Net sales by business sector – 2021



## Governance

Based in Darmstadt, Germany, the legal form of our company is a corporation with general partners (Kommanditgesellschaft auf Aktien – KGaA). The Merck family holds around 70% of the equity capital of Merck KGaA (equity interest) via the general partner E. Merck; the shareholders hold the remainder, which is divided into shares (subscribed capital). Our shares have been a constituent of the DAX®, the blue-chip index of the Deutsche Börse, since 2007. In September 2008, our company was added to the FTSE4Good Index, a sustainability index that assesses the social, ecological and ethical conduct of companies.

## Group strategy

We are curious minds dedicated to human progress. We believe that scientific exploration and **responsible entrepreneurship** are key to technological advances that benefit us all. As a company, we have a strong foundation. These fundamentals have been defined by the Merck family. We always take them into consideration when discussing and deciding on our Enterprise strategy.

- We follow a risk diversification strategy with three distinct business sectors, and we avoid overexposure to any single customer, industry, or geography. We ensure resilience against business disruption and deep crises.
- With our science and technology focus, we want to be leaders in our fields of expertise and markets, always pushing the boundaries to find new solutions and drive innovation. We aim to create value for our business and for society.
- We continue to operate under our current ownership with the Merck family as the majority owner.
- We deliver sustainable value, and we want to maintain an attractive financial profile (for example, a strong credit rating) while assessing and considering the ESG (environmental, social, governance) impact of our growth ambition.
- Mergers and acquisitions (M&A) are an important driver of our long-term value creation strategy with a focus on innovation-driven technology.

Our ambition is to become the global 21st century science and technology pioneer, and we have four key priorities to deliver on this ambition.

- Mobilizing for Efficient Growth
- Leveraging Innovation in the “Big 3” (Process Solutions & Life Science Services in Life Science, new Healthcare products and Semiconductor Solutions in Electronics)
- Driving Culture & Leadership
- Focusing on Sustainability

In all three business sectors – Life Science, Healthcare and Electronics – the course has been set for sustainable, profitable growth.

Additionally, we have made clear progress on our sustainability strategy, incorporating sustainability even more strongly as an essential component of our corporate strategy and all company processes.

You can find more information on our company strategy in our [Annual Report 2021](#). Details on the sustainability strategy can be found there and here in the [report](#).

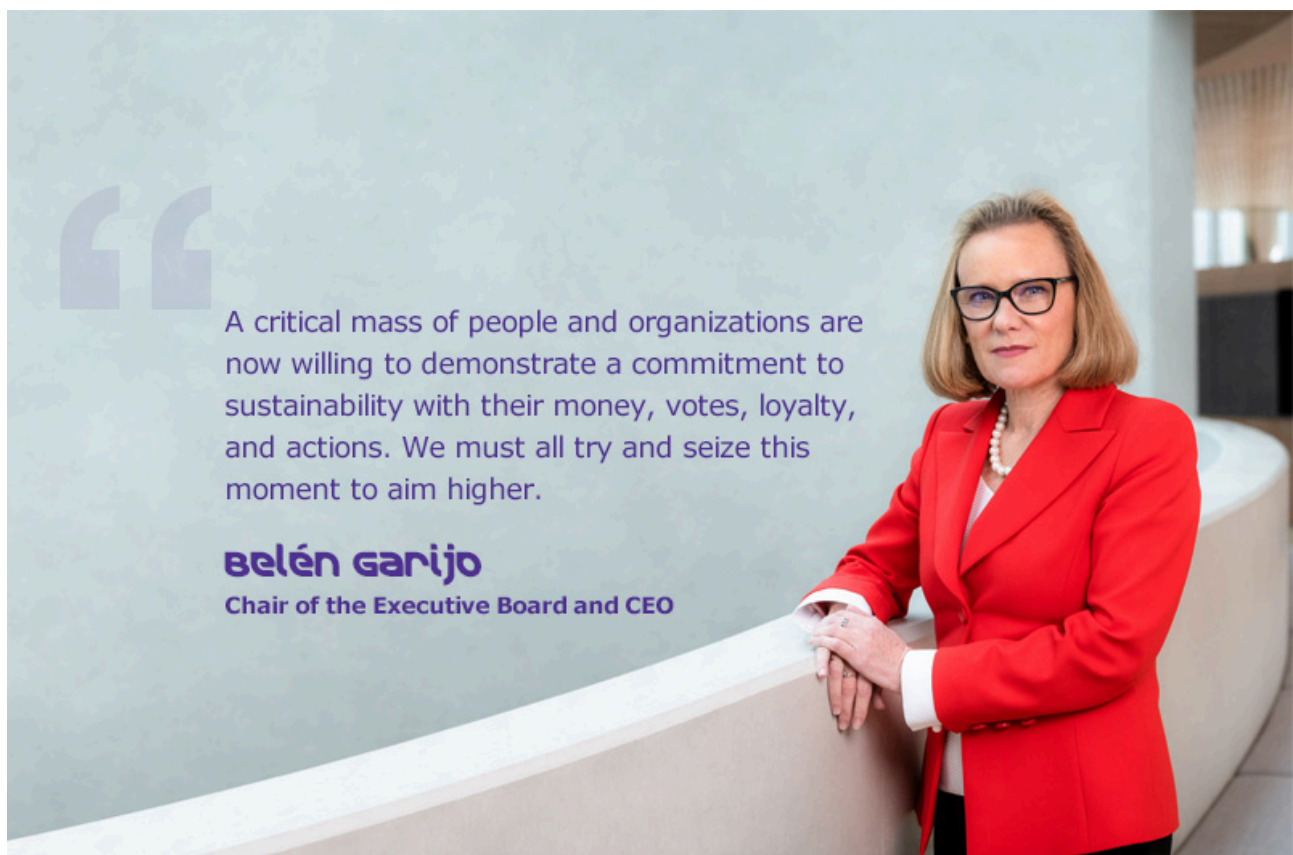
# Letter from the CEO

## Dear Readers,

Humanity made a bold commitment in 2015 to end poverty and hunger, protect the planet, and ensure healthy lives for all. The adoption of the U.N. 2030 Agenda for Sustainable Development was a call to action for governments, companies and citizens worldwide to contribute to 17 Sustainable Development Goals (SDGs) by 2030.

We are now at the halfway point for this historic 15-year initiative. Therefore, it is timely to reflect upon where things stand. Sadly, the Covid-19 pandemic has affected much more than our global health. The U.N. SDG 2021 report highlighted how progress on many other SDGs, including poverty, education, and gender equality, has stalled or reversed since 2020. Meanwhile, global CO<sub>2</sub> emissions are nearing record highs once again.

Fortunately, the global response to the pandemic has demonstrated that humanity can achieve tremendous things when science and technology are harnessed for the common good. There is a renewed sense of purpose within society and optimism that we can overcome other major challenges such as climate change. A critical mass of people and organizations are now willing to demonstrate this commitment to sustainability with their money, votes, loyalty, and actions. We must all try and seize this moment to aim higher.





That is why this Sustainability Report carries extra significance for Merck and me personally. The three core sustainability goals of Merck reflect our accountability to make an impact. First, we will achieve climate-neutral operations by 2040. Second, we will integrate sustainability into all value chains by 2030. And third, we will achieve human progress for more than one billion people through sustainable science and technology in 2030. We are on track to meet these goals.

Furthermore, we will continue to support the United Nations Global Compact. Its principles of human rights, labor standards, environmental protection, and anti-corruption are part of our social license to operate.

Here are just a few examples of our sustainable leadership during 2021.

Last year, we committed to a 50% reduction in our direct (Scope 1) and indirect (Scope 2) greenhouse gas (GHG) emissions by 2030 compared to 2020. In 2021, these GHG emissions decreased by 9% compared to the prior year.

Converting 80% of our purchased electricity to renewable sources by 2030 is one way we will achieve these GHG targets. Last year, our electricity purchased from renewable sources increased from 27% to 30%. And in Brazil, our sites were fully powered by renewables for the first time. The process to join the Science-Based Targets Initiative also began last November. This will commit us to help achieve the goals of the Paris Agreement through science-based emission reduction targets.

In global health, we provided 182 million praziquantel tablets – and our 1.5 billionth tablet overall – to the World Health Organization (WHO) to treat schistosomiasis in endemic African countries. The Lancet confirmed last December that the prevalence of this neglected tropical disease had already decreased by 60% between 2000 and 2019. We remain on track to helping achieve its elimination as a public health problem by 2030.

Regarding social governance, we are harnessing our workplace diversity and inclusive culture to help unlock tremendous value for patients, customers, colleagues, and partners. Last year, we announced our intention to achieve gender parity in all leadership positions worldwide by 2030. We have made good progress since 2020, increasing the percentage of females in leadership roles from 35% to 36%. Underrepresented racial and ethnic groups will also comprise 30% of all leadership positions in the United States, Asia, Latin America, the Middle East, and Africa by 2030.

These sustainability efforts represent some of the contributions being made *within* our organization. However, I believe we can make an even greater contribution *beyond* it – through science and technology innovations that enable others to achieve their sustainability targets faster. Accordingly, last year we agreed to make sustainability a cornerstone of future growth and innovation.

One early demonstration of our pioneering spirit is to create a more sustainable future for food that disconnects animals from the supply of meat and other proteins. Customer projects are underway to develop and commercialize cultured meats and other products. Last year, we also awarded the Future Insight Prize of € 1 million to the inventors of a process that transforms plastics and other non-edible biomass into food.

In this report, you will discover many other insights about how Merck is creating long-term sustainable value. Together with our committed global team of nearly 60,000 employees, we will continue raising the bar.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Belén Garijo', with a long horizontal stroke extending to the right.

**Belén Garijo**

Chair of the Executive Board and CEO

# Sustainability strategy & goals

Numerous global challenges such as climate change, resource scarcity and unequal access to health in various countries are also decisive for our company. In order to address them, we continuously seek solutions made possible by science and technology. At the same time, we are working to make our business models more resilient.

## Our approach: sustainable progress

Our ambition is to leverage science and technology to achieve progress for mankind. For us, sustainable entrepreneurship and profitable growth go hand in hand; we can remain competitive only by creating **added value for society**. Through our innovative and high-quality products, we want to help meet global challenges. At the same time, our products secure our financial performance capability.

**Responsible action** is an integral part of our company culture. This also includes respecting the interests of our employees, customers and investors, as well as society. For more than 350 years, our company has been shaped and **guided by strong values**. Our success is built on courage, achievement, responsibility, respect, integrity, and transparency – values that underpin our understanding of sustainable entrepreneurship.

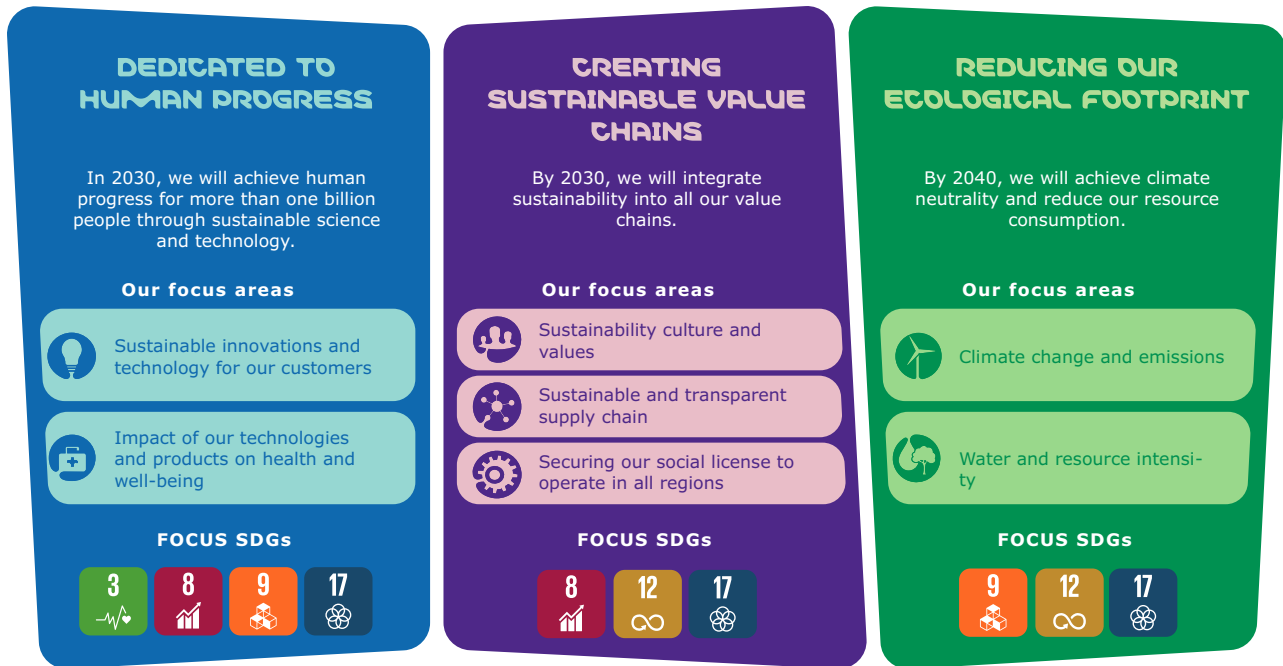
Safety and ethics matter just as much to us as business success. We **mitigate ethical, economic and social risks** as far as possible. During the manufacture of our products, we aim to keep our impact on the environment as low as possible, which is why safe production techniques, high environmental standards and strict quality management are of course so important to us. Furthermore, we aim to strengthen our company by recruiting, developing and motivating talented employees. We want to set an example for ethical conduct.

We closely monitor new **global trends and challenges**. For example, in order to clearly understand the complex nature of the expected changes, we make use of the so-called scenario technique, which enables us to identify and incorporate aspects of strategic relevance. We also participate in dialogues and initiatives, consult with other organizations in our industry and assess media and news coverage. This allows us to minimize risks while also leveraging **new business opportunities**.

## Implementing the strategy globally

The rapidly growing challenges facing society and the environment require a clear objective for the coming years. That is why we have integrated sustainability into our enterprise strategy as an essential component and have set ourselves three strategic sustainability goals.

## Our sustainability strategy



In order to achieve our sustainability goals, we have defined seven focus areas. Within these focus areas we are currently implementing numerous initiatives and projects and are measuring our progress.



## Measuring progress made with the sustainability strategy

In 2021, we defined various key indicators in order to record and measure progress made through our three sustainability goals.




As of 2022, we will be adding a sustainability factor to the Merck Long-Term Incentive Plan (LTIP). The 2021 Annual General Meeting approved a revised compensation system for the members of the Executive Board. For the sustainability factor, the company uses the three key indicators marked in the table. Details on how this sustainability factor is calculated can be found in the [Compensation Report](#).

## Our key indicators



**Goal 1:** In 2030, we will achieve human progress for more than one billion people through sustainable science and technology.

Focus area	Sustainability key indicators	Further details
Sustainability innovation and technology 	◆ Percentage of newly published patent families with positive sustainability impact	Sustainable innovation & technologies
Health and wellbeing impact 	◆ People treated with our Healthcare products <sup>1</sup>	SASB index

**Goal 2:** By 2030, we will integrate sustainability into all our value chains.

Focus area	Sustainability key indicators	Further details
Sustainability culture and values 	◆ Percentage of women in leadership positions	Diversity & inclusion
	◆ Percentage of employees trained on sustainability	Reporting as of 2022
Sustainable and transparent supply chain 	◆ Percentage of relevant suppliers (in terms of number and purchase volume) that are covered by a valid sustainability assessment <sup>1</sup>	Supply chain management
Securing our social license to operate in all regions 	◆ Environment, Health and Safety (EHS) Incident Rate	Process, plant & transport safety
	◆ Incidents related to Global Social and Labor Standards Policy"	Human rights
	◆ Lost Time Injury Rate (LTIR)	Health & safety

### Goal 3: By 2040, we will achieve climate neutrality and reduce our resource consumption.

Focus area	Sustainability key indicators	Further details
Climate change and emissions 	<ul style="list-style-type: none"> <li>◆ Greenhouse gas emissions (Scope 1+2)<sup>1</sup></li> <li>◆ Indirect greenhouse gas emissions (Scope 3)</li> <li>◆ Percentage of purchased electricity from renewable sources</li> </ul>	<ul style="list-style-type: none"> <li>Climate action</li> <li>Climate action</li> <li>Climate action</li> </ul>
Water and resource intensity 	<ul style="list-style-type: none"> <li>◆ Waste Score</li> <li>◆ Water Intensity Score</li> <li>◆ Water quality</li> </ul>	<ul style="list-style-type: none"> <li>Waste &amp; recycling</li> <li>Water management</li> <li>Reporting as of 2022</li> </ul>

1 The key indicator is used to determine the sustainability factor for the Merck Long-Term Incentive Plan (LTIP).

In order to assess the sustainability of our products, technologies and business activities, we developed the Sustainable Business Value ([SBV](#)) method. It enables us to evaluate the positive and negative **impacts of our activities** on society along our entire value chain. This gives rise to a monetary value that quantifies the societal benefits a product offers, for instance. In addition to ESG (Environmental, Social, Governance) parameters, SBV also incorporates economic and ethical aspects as well as digitalization and the benefits of the product itself. The data help us drive sustainability across our business operations and position ourselves for future success. At the end of 2021, we launched a computer app that enables us to further embed this Sustainability Impact Valuation method in the company. This provides employees with a structured process that they can use to assess the sustainable contribution to value made by their product or project.

## Our operational sustainability goals

Our three strategic goals make our long-term sustainability ambition clear. In order to achieve them, we have also defined [operational sustainability goals](#). These are more specific, may apply for a shorter time frame and are aligned with our current business activities.

## Roles and responsibilities

Our Executive Board has Group-wide responsibility for our sustainability strategy. It has adopted our three strategic goals (see above).

The Group Corporate Sustainability unit is responsible for developing and shaping the sustainability strategy and regularly informs the Executive Board about the progress made and the need for action. It is part of the [newly created Group function](#) “Corporate Sustainability, Quality and Trade Compliance”, which reports to the Chair of the Executive Board. Consequently, overarching Executive Board responsibility for Environment, Social, Governance (ESG) also lies with the Chair of the Executive Board.

Group Corporate Sustainability is also responsible for the Corporate Sustainability Council. The committee consists of representatives from our business sectors and from key Group functions, such as Procurement, HR and Strategy. Council members from various countries provide input on regional sustainability aspects. The Corporate Sustainability Council steers and monitors the Group-wide **implementation of the sustainability strategy**. It aligns the strategy with the individual business strategies, defines priorities, specifies globally applicable sustainable guidelines, and recommends corresponding initiatives to the Executive Board. With their respective area of responsibility, each Executive Board member is also responsible for sustainability.

Moreover, the Corporate Sustainability Council ensures that the initiatives of our various business sectors, Group functions and subsidiaries align with our Group-wide sustainability strategy. In 2021, the Corporate Sustainability Council met four times by video conference. The participants addressed the following topics: Implementing the sustainability strategy in the business sectors, key indicators for measuring and steering sustainability within the company, lowering greenhouse gas emissions, and developing reporting requirements.

The measures adopted by the Corporate Sustainability Council are implemented by our line managers as well as by interdisciplinary project teams. To achieve our operational sustainability goals and depending on the topic, responsibility is assigned to specific teams, functions and business units. Those responsible for implementation exchange ideas and coordinate actions in an overarching committee. They identify synergies between the projects and tailor their direction to our sustainability goals.

In November 2021, we established an **external expert committee for sustainability issues**. The Merck Sustainability Advisory Panel (MSAP) consists of six independent international experts on sustainability-related topics. They advise the company on selected issues and assess related sustainability aspects as well as the company's planned activities. Moreover, they apply their knowledge to help address societal and political challenges and developments that could have strategic relevance for our businesses. This panel is chaired by the Head of Group Corporate Sustainability.

### Members of our Sustainability Advisory Panel



#### Glynda Bathan-Baterina

Deputy Executive Director of Clean Air Asia



#### Michael Braungart

Founder and Scientific CEO of EPEA Internationale Umweltforschung, Professor at Erasmus University Rotterdam and Leuphana University Lüneburg



#### Todd Cort

Faculty Co-Director of both the Center for Business and Environment (CBEY) and the Initiative on Sustainable Finance (YISF) of the Yale School of Management



#### Maja Göpel

Scholar, speaker, author, advisor, Expert for sustainability policies and transformation research, Honorary Professor at Leuphana University Lüneburg



#### Ioannis Ioannou

Visiting Associate Professor of Management, Miami Herbert Business School, Associate Professor for strategy and entrepreneurship at the London Business School



#### Huiyao (Henry) Wang

Founder and President of Center for China and Globalization (CCG)



# Sustainable Development Goals

The United Nations (UN) 2030 Agenda is a global plan to promote sustainable peace and prosperity and to protect our planet. Since 2016, countries and organizations have been working to implement this agenda with its 17 Sustainable Development Goals (SDGs). Our aim is for our business activities to create shared value that is both measurable and makes a recognizable contribution to society. We rely on the power of science and technology to make a positive impact.

## Doing our part

As part of our [sustainability strategy](#), we focus on the five SDGs on which we have the strongest impact through our entrepreneurial actions.

Our contribution can be summarized as follows:

### SDG 3 – Good health and well-being

With our products, we positively impact the health and quality of life of people around the world. Through technological and scientific innovations, we are also helping to improve the health of underserved populations in low- and middle-income countries.

### SDG 8 – Decent work and economic growth

We see it as our responsibility to respect human rights both within our company and along our supply chain. That is why we are dedicated to upholding appropriate and fair labor and social standards. We want to drive sustainable economic growth through progressive resource efficiency.

### SDG 9 – Industry, innovation and infrastructure

We use our expertise in science and technology to make our products, processes and infrastructure sustainable. In addition, we want to promote the work of scientists worldwide with our innovations and support programs.

### SDG 12 – Responsible consumption and production

We use resources efficiently and reduce waste and emissions. We pay attention to this in our product development and in our manufacturing activities. We also help our customers to manufacture their products more sustainably and efficiently and to achieve their own sustainability goals.

### SDG 17 – Partnerships for the goals

We need strong partners in order to drive sustainable development within our company and beyond and to better meet societal challenges. We therefore collaborate with a wide range of organizations, companies, federations, and networks.



Through our sustainability strategy, we help **to solve challenges globally**, and not only within these five SDGs. Our management approaches and projects also support **SDG 4** (Quality education), **SDG 5** (Gender equality) – supplemented by diversity and inclusion, **SDG 6** (Clean water and sanitation), **SDG 7** (Affordable and clean energy), and **SDG 13** (Climate action).

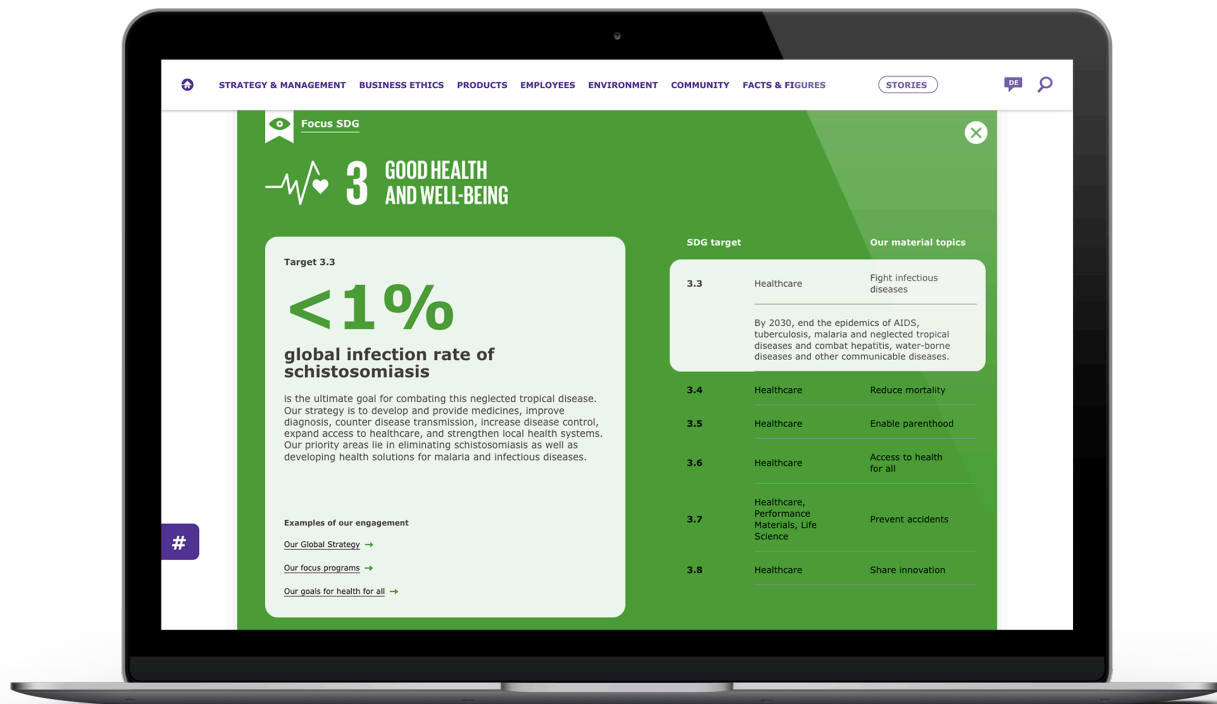
Detailed information on our quantitative and qualitative contributions to the SDGs is provided in our **interactive tool**.

## Our contribution in detail

In our online report, we offer an [interactive tool](#) to visualize how we contribute to the SDGs in qualitative and quantitative terms.



Clicking on one of the highlighted SDGs provides further information for each of the targets on how we specifically support them through our management approaches, initiatives and projects.



# Stakeholder dialogue

Engaging our various stakeholders is highly important to us. Through this dialogue, we communicate our decisions and actions transparently in order to secure our social license to operate. We aim to unite divergent interests, as well as build and sustain trust.

## Dialogue at various levels

Our key stakeholders include our employees, customers and business partners, patients, the Merck family as the majority owner of the company, shareholders, and our suppliers. We pursue a continuous dialogue with our stakeholders and use these exchanges to identify important trends and developments in society and in our business fields so as to incorporate these into our corporate responsibility endeavors.

### Our stakeholders

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We regularly conduct a systematic [materiality analysis](#) to learn about our **stakeholders' expectations**. In doing so, we identify the economic, social and environmental issues that are important to our stakeholders – and thus also to us.

We have established [guidelines and principles](#) for interactions with certain stakeholders, with a focus on compliance. For example, we have defined internal policies and review processes for [patient relationships](#), interactions with [healthcare stakeholders](#), and [business partnerships](#).

We communicate regularly with our stakeholders through a variety of channels. For instance, we conduct stakeholder surveys and organize topic-specific dialogues at regional, national and international level. We also participate in discussions and informational forums as well as through our advocacy work and industry coalitions. Here are some examples of the dialogue formats used:

## Employees

### Employee engagement surveys

- [Understanding our employees](#)
- [Our approach to preventing accidents and promoting health](#)

### Intranet “EVA”

- [Encouraging dialogue and rewarding ideas](#)

### Germany-wide ideation program

- [Encouraging dialogue and rewarding ideas](#)

### Career fairs

- [Attracting young generations to our company](#)

## Patients

### Patient Advisory Boards (PAB) to engage patient organizations in our clinical research

- [Close dialogue with patients and advocacy groups](#)

### Member of various initiatives on the quality and efficiency of clinical trials

- [Close dialogue with patients and advocacy groups](#)

## Employee representatives

### Involvement of local employee representatives in company decisions

- [Roles and responsibilities](#)
- [Performance-based pay and benefits](#)

## Scientists

### **Merck Ethics Advisory Panel (MEAP); Digital Ethics Advisory Panel (MDEAP)**

- [Merck Ethics Advisory Panel](#)
- [Digital Ethics Advisory Panel](#)

## Communities

### **Discussion and information forums for residents in the vicinity of our sites**

- [Roundtables and informational forums](#)

## Healthcare systems

### **Collaboration with health agencies and other stakeholders, network meetings**

- [Global Health: Engaging stakeholders](#)

## Industry coalitions/Advocacy groups

### **Collaboration in working groups**

- [Advocacy groups and industry coalitions](#)

## Suppliers

### **Supplier surveys**

- [Supply chain assessments and audits](#)

### **Knowledge sharing**

- [Ambassadors of sustainable procurement](#)

## Shareholders

### **Annual General Meeting**

- [Investor Relations](#)

### **Events for investors**

- [Capital market days](#)

## Public agencies

### **Subject-specific cooperation**

- [Pharmacovigilance in Access to Health](#)
- [Monitoring drug safety](#)

Further information on stakeholder dialogues can be found in the individual report chapters.

## Roundtables and informational forums

We hold roundtable discussions and informational forums for local residents at our major sites. Since 1994, we have been holding an annual public planning forum in Darmstadt to discuss the development of our site with members of the city council, local authorities and the community.

## Involvement in initiatives

We collaborate with an array of civic organizations such as the World Environment Center ([WEC](#)) and also participate in other [initiatives](#) that share our commitment to responsible corporate conduct, such as [Chemie<sup>3</sup>](#) and [Responsible Care®](#).

## Advocacy groups and industry coalitions

We actively participate in the **political process** and advocate our positions and views by engaging policymakers in a direct dialogue as well as through our work with industry coalitions. The major national and international industry associations in which we are members and also hold positions include:

- The German Federation of Chemical Employers' Associations ([BAVC](#))
- The European Federation of Pharmaceutical Industries and Associations ([EFPIA](#))
- The International Federation of Pharmaceutical Manufacturers & Associations ([IFPMA](#))
- The German Chemical Industry Association e. V. ([VCI](#))
- The European Chemical Industry Council ([Cefic](#))
- National Association of Manufacturers ([NAM](#))
- United States Chamber of Commerce ([USCC](#))
- Association of International Chemical Manufacturers ([AICM](#))

## Political contributions

Our interactions with actors in the political sphere focus on political dialogue, information exchange and open and transparent knowledge sharing. Our guidelines stipulate that our interactions and contributions must comply with all applicable laws and must never aim to inappropriately influence or compensate officials for political favors. Even if permitted by local law, we do not make contributions in the form of donations to or sponsorships of political parties or related organizations. Furthermore, we do not make donations to or sponsor holders of public office or candidates for such, nor do we make other types of financial contributions.

In the United States, political action committees (PACs) have been set up through which our employees can donate money to support political candidates and organizations. These are not donations made by our company, but rather contributions made by employees. The contributions donated are reported to the U.S. Federal Election Commission and are fully disclosed.

# Materiality analysis

By conducting an annual materiality analysis, we can ascertain the social, economic and environmental issues that matter most to our stakeholders – and thus to our long-term business success. This assessment also allows us to see whether we are helping achieve the UN Sustainable Development Goals (SDGs) and the areas in which we are doing so.

## Identifying the material issues

Materiality assessments help us define and verify the focus of our sustainability management efforts and the contents of our reporting. In 2021, we conducted a comprehensive analysis in order to meet the applicable reporting requirements of the Global Reporting Initiative ([GRI](#)). The analysis identified topics that our stakeholders view as impacting our business operations as well as influential external factors such as regulatory requirements. It also pinpointed areas that are in turn affected by our business activities.

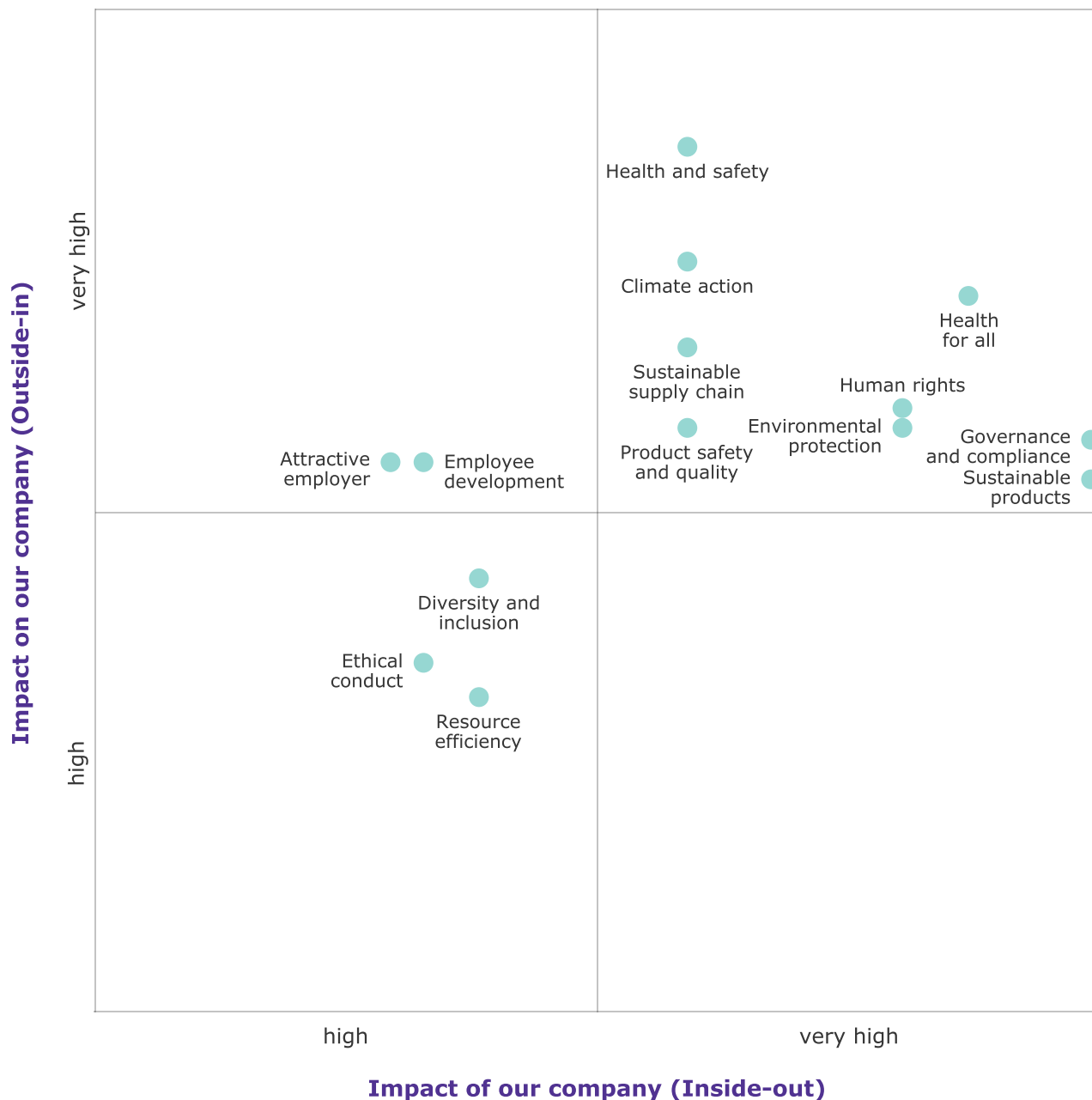
Our most recent analysis partially took a Big Data approach, and we also qualitatively assessed a variety of sources, such as scientific journals, sustainability reports and databases. We furthermore interviewed primarily external experts in order to substantiate the results of the analysis. These interviews focused on aspects such as **opportunities, risks and potential future developments** for our operations that could result from the material topics. Moreover, the findings were validated by an interdisciplinary sustainability work group.



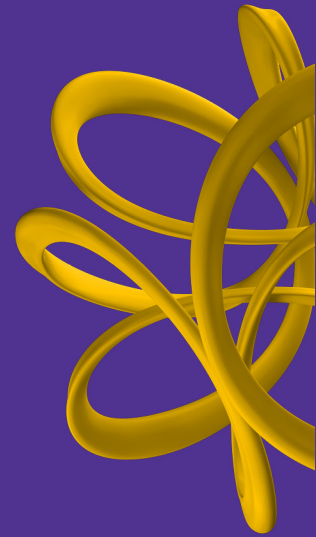
We consolidated the issues assessed in our materiality analysis into 14 topic clusters that are material to our company. Although “Tax Governance” and “Community engagement” fell below the materiality threshold, we have included information pertaining to these two issues in our report because we expect [tax matters](#) to become increasingly relevant to our stakeholders going forward. Furthermore, we have worked hard to help [support communities](#) worldwide over the years. We would like to continue playing an active role in these communities and to continue reporting on our outreach efforts.



### Our material topics in 2021



Section 289c(3) of the German Commercial Code requires us to report on topics of double materiality in a [non-financial statement](#). The principle of double materiality requires companies to disclose non-financial information when the following two criteria are met: First, the information makes it possible to understand how the company's business activities affect non-financial aspects, and secondly, the information is necessary to understand the company's business performance, business results and financial situation.



# BUSINESS ETHICS

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# Corporate governance

## Governance

For more than 350 years, responsibility has been an integral part of our corporate identity. It is one of our six company values, alongside courage, achievement, respect, integrity, and transparency. We seek **to balance environmental, social and governance aspects** – for patients, customers and business associates – and find solutions for the world of tomorrow.

### Our approach to responsible governance

The requirements we place on responsible corporate governance are derived from our [company values](#) on the one hand and from the regulations, external initiatives and international guidelines to which we are committed on the other hand. We have integrated these requirements into our [sustainability strategy](#) and our [Group-wide guidelines](#). These guidelines comprise **charters and principles** that are valid for the entire company as well as specific standards and procedures for individual business sectors and sites.

Some examples: Our [Human Rights Charter](#) aligns with the [UN Guiding Principles](#) for Business and Human Rights. Our Group-wide [Social and Labor Standards Policy](#) reflects the labor standards of the International Labour Organization ([ILO](#)). Our [EHS Policy](#) (Corporate Environment, Health and Safety Policy) for environmental impact mitigation and health and safety forms the basis for implementing the chemical industry's [Responsible Care® Global Charter](#) within our company. Our Regulatory Affairs Governance Policy for chemical products sets out the processes and management structures for [product safety](#).

We comply with all applicable laws as a matter of principle. Where necessary, we review our internal guidelines, standards and instruction manuals on compliant behavior and adapt them to reflect changes in the regulatory landscape.

### Roles and responsibilities

Based on the requirements set forth in charters, principles and policies, our internal standards give specific guidance for operational processes. They are constantly updated by the relevant departments and are available on our intranet. Our managers implement these standards in their respective areas of responsibility and ensure that they are adhered to. In addition, we educate and train our employees on all guidelines that apply to them.

We employ **management systems** to steer processes and define goals, actions and responsibilities. These systems are based on standards such as the internationally recognized quality management standard ISO 9001, good working practices (GxP) in the pharmaceutical industry and ISO 14001 for environmental management. Our company regularly undergoes [ISO 14001](#) and [ISO 9001](#) certification, which are conducted by an independent auditing firm. We hold group certificates for both standards.

We support the following responsible governance initiatives:

- We have been a participant in the [United Nations Global Compact](#) since 2005 and are committed to complying with its principles. Our [annual progress report](#) illustrates how we live our responsibility in our day-to-day actions.
- As a signatory to the chemical industry's [Responsible Care® Global Charter](#), we voluntarily go above and beyond what is required by law and have adopted mandatory standards for product responsibility, environmental impact mitigation and health and safety.
- As a member of the **Together for Sustainability (TfS)** network, we are dedicated to improving the supply chain with respect to environmental, compliance and social standards.
- We are a member of the Pharmaceutical Supply Chain Initiative ([PSCI](#)), which aims to continuously improve health, safety and environmental aspects throughout the supply chain.
- We are also a member of the Chemie<sup>3</sup> initiative, a collaboration between the German Chemical Industry Association ([VCI](#)), the Federal Employers' Association (BAVC) and the German Mining, Chemical and Energy Industrial Union ([IG BCE](#)). The partners involved in this globally unique alliance seek to make sustainability a core part of the chemical industry's guiding principles and to jointly drive the sector's position within the German economy as a key contributor to sustainable development.

# Compliance management

Responsible entrepreneurship starts with compliance. We take steps to ensure that all our activities adhere to relevant laws, regulations and ethical standards around the world. This also helps us to protect our reputation as an employer and business partner.

## Our approach to compliance

As global company, we have stringent requirements for effective compliance management. Importantly, we seek to emphasize compliance by acting in line with our [company values](#) and believe that profitable business operations should go hand in hand with the highest ethical standards.

## Roles and responsibilities

Our Group Compliance function is responsible for the policies on the following core topics: anti-corruption and anti-bribery (including healthcare compliance, third-party due diligence, transparency reporting), anti-money laundering, antitrust, conflict of interest, and dawn raid preparedness.

To cover these compliance topics, we have **Group-wide policies** and procedures in place that ensure our business activities align with the relevant laws, regulations and international ethical standards. Other compliance-related issues, including the respective internal regulations and guidelines, such as [Pharmacovigilance](#), Export and Import Controls, and [Environment, Health, Safety, Security, Quality](#), are managed by the responsible functions.

Our Group Compliance function is responsible for our **compliance portfolio**, which consists of the following elements:

- **Risk Assessment:** Identifying internal and external critical risks in regular business operations
- **Policies & Procedures:** Global policies, procedures and standards to mitigate identified risks (see the "[Our commitment: guidelines and standards](#)" section for more details)
- **Compliance Committee/Forums:** Platform for compliance-related discussion and decision making, including relevant key functions
- **Training & Awareness:** Appropriate training and additional measures to educate and keep awareness high
- **Programs & Tools:** Comprehensive compliance programs and supporting tools contributing to internal controls and overall governance
- **Monitoring & Reporting:** Tracking of compliance-related data; performing internal and external reporting
- **Case Management:** Timely response to reports of misconduct and implementation of corrective actions
- **Continuous Improvement:** Based on and applying to all compliance program elements

We continuously review our compliance portfolio and update our initiatives and programs where necessary. This approach reflects new requirements as well as internal and external risks, such as those resulting from amendments to legislation, relevant industry codes or changes affecting our company. We discuss current compliance matters, trends and goals with our stakeholders, both internally within our compliance organization and externally with our stakeholders and business partners. We keep the focus on **our people** by ensuring the availability of appropriate resources and skills, maintaining clear roles and responsibilities and based on

employee feedback, setting aligned and harmonized goals. We also ensure that our organizational structure is up to date and meets business needs.

Our Group Compliance Officer reports on the status of our compliance activities, potential risks and serious compliance violations to the Executive Board and Supervisory Board twice a year at a minimum. As part of our regular reporting processes, we compile a comprehensive **compliance and data privacy report** annually for the Executive Board. This includes the status of our compliance program, continuous improvement initiatives and key figures on compliance and data privacy cases. Additionally, we prepare a mid-year update to highlight ongoing developments and the status of relevant projects and initiatives.

Our Group Compliance Officer oversees approximately 94 Compliance Officers and Compliance experts around the world. The Compliance Officers implement our compliance program within their respective areas of responsibility (adapting to local legislation, if legally required) and receive guidance from our Group Compliance Center of Expertise. This is a centralized body that drives the design and evolution of our compliance program across all business sectors and Group functions.

As part of the Group Compliance Center of Expertise, our global team for coordinating transparency reporting is responsible for implementing current and upcoming transparency **reporting requirements in the Healthcare business sector** – including those of the European Federation of Pharmaceutical Industries and Associations ([EFPIA](#)) and the United States Physician Payments Sunshine Act. More information on our Healthcare governance and compliance activities can be found in the [Responsible interactions with health systems](#) section.

## Our commitment: Guidelines and standards

Our compliance program builds on our company values and integrates these into our compliance framework, which contains Group-wide **policies and procedures** for entrepreneurial conduct. The following are mandatory for all our employees:

- The [Merck Code of Conduct](#) guides our people in conducting business ethically – in line with our values and the law. It is available to all employees worldwide in 22 languages.
- Our [Human Rights Charter](#) supplements our Code of Conduct with globally recognized principles on human rights.
- Our **Anti-Corruption Policy** stipulates that all business activities must be conducted in line with legally applicable anti-corruption standards. All forms of bribery are strictly prohibited.
- Our global **Money Laundering Prevention Policy** defines and describes the internal global process and assurance measures to protect our company from being misused by third parties for money laundering activities.
- Our **Conflict of Interest Policy** sets a framework to explain the nature of a Conflict of Interest and the related risks. It explains how to prevent these kinds of situations or if prevention is not possible, sets rules for identifying, disclosing, mitigating and managing the risks that could arise from a conflict of interest situation.
- Our Group-wide **Antitrust and Competition Law Policy** states that all business activities across the Group must be conducted in compliance with applicable competition regulations at all times. We acknowledge the importance of fair competition and expect the same of partners acting on our behalf.
- Our **Compliance Reporting and Investigation Policy** includes the basic steps for an internal compliance investigation. Its purpose is to ensure an appropriate, timely and thorough response to compliance-related reports of potential misconduct relating to any kind of internal or external regulations or policies.
- Our **Dawn Raid Policy** defines courses of action, sets out general rules of conduct, and advises on rights and obligations during unannounced investigations, searches and seizures by authorities on our premises.

- Our **Healthcare Ethical Guiding Principles** provide our healthcare employees with ethical guidance for decision making and activities, while taking the particular challenges and responsibilities of this business sector into consideration. See the [Responsible interactions with health systems](#) section for more details.
- Our **Pharma Code** for prescription medicines as well as underlying policies and additional guideline documents define key principles for interactions with stakeholders in the health industry.
- Our **Standard on Local Compliance Standards** implements a review and approval process for local governance documents in areas under the responsibility of the Group Compliance function. This helps to ensure a uniform approach, while retaining sufficient flexibility to address stricter or more specific requirements and needs at a local level. In this way, our local teams can adhere to our compliance principles and guidance while implementing **specific local policies or procedures** that comply with local regulations.

## Risk assessment

Proper compliance risk management is crucial in order to identify undetected risks and keep our company protected. In 2021, we launched a global, redesigned risk identification process for all our business sectors. The new process enables objectivity and a more data-driven risk approach. We established a **comprehensive risk matrix** that focuses on bribery and corruption risks, which are illustrated through in-depth risk categorization and risk scenarios. The matrix consists of a questionnaire to detect the risk exposure level of the business sectors and another mitigation questionnaire that checks the implementation of the compliance program. These risk questionnaires are primarily answered by the business heads.

We are implementing the risk identification process in a staggered, top-down approach. We started the risk assessment with global functions in 2021. In a second step, we will conduct country-specific assessments in 2022.

## Conflicts of interest

We take all potential conflicts of interest seriously. Employees must avoid situations where their professional judgment may come into conflict with their personal interests. They must also disclose every potential conflict of interest to their manager and document the disclosure. Such issues are typically resolved directly between the employee and the manager but can also be routed to Human Resources, Legal, Compliance or other relevant functions.

In 2021, we further raised employees' awareness of conflicts of interest by establishing a **dedicated global interactive training program** and enhancing our communication.

In addition, as described in the Annual Report under "[Avoidance of conflicts of interest](#)", Executive Board and Supervisory Board members are exclusively committed to the interests of the company and neither pursue personal interests nor grant unjustified advantages to third parties.

## Management and requirements of our business partners

To be effective, compliance management must not be restricted to the boundaries of our own company. While our [supplier management processes](#) focus on vendor compliance with our standards, our **global Third Partner Risk Management** process governs interactions with sales partners, such as agents, distributors, and dealers. We expect our business partners worldwide to adhere to our compliance principles. We collaborate only with partners who pledge to comply with relevant laws, reject all forms of bribery and adhere to environmental, health and safety guidelines.

We apply a risk-based approach to selecting business partners. The greater the estimated risk regarding a certain country, region or type of service, the more in-depth we examine the company before entering into a business relationship. We also explore background information from various databases and information reported by our business partners.

If we encounter compliance concerns, we further analyze and verify the relevant information. Based on the outcome, we decide whether to reject the potential business partner, impose conditions to mitigate identified risks or terminate the existing relationship.

## Compliance training

We provide regular compliance classroom and online training courses on our Code of Conduct, anti-corruption, antitrust, data privacy, money laundering prevention, and healthcare compliance standards. We require employees to take these courses based on their exposure to risk. Some courses also apply to independent contractors and supervised workers, such as temporary employees.

In 2021, we launched two new versions of our antitrust **e-learning training courses**: a fundamental and an advanced course. Both courses are available in ten languages. 12,560 employees completed the fundamental training. In addition to the fundamental training, 6,057 employees with potentially higher risk exposure took the advanced training course. The mandatory training courses must be completed by all relevant employees.

We regularly update our training plan and adapt it to new developments to continuously educate our employees on existing and new compliance requirements, guidelines and projects.

## Anti-money laundering

We have implemented a global Anti-Money Laundering (AML) program consisting of a global policy, training and a dedicated process to report and investigate red flags as well as any high-risk transactions and report suspicious transactions to the German Financial Intelligence Unit.

It is our aim to continuously improve our **AML program**. In 2021, we conducted a worldwide risk analysis to identify jurisdictions that impose the strictest AML legal and regulatory framework applicable to our businesses, so that we can improve our AML program accordingly. Based on this analysis, we initiated in-depth AML risk assessments for high-risk jurisdictions, where we can implement a stricter AML program, if required.

## Reporting potential compliance violations

We encourage all employees worldwide to report potential compliance violations to their supervisors, Legal, HR or other relevant departments. Globally, they can also use our central whistleblowing “compliance hotline” **free of charge and anonymously** to report violations in their local language by telephone or via a web-based application. Reports of potential compliance violations that we receive via our “compliance hotline” are reviewed by the Compliance Investigations and Case Management team. Cases with a certain risk profile are presented to the Compliance Case Committee, which comprises senior representatives from our Compliance, Corporate Security, Data Privacy, Human Resources, Internal Auditing, and Legal departments.

The Committee’s duties include assessing and classifying ethical issues, investigating their background and addressing these issues using appropriate measures. Based on the investigation outcome and recommendations from the compliance investigation team or the Compliance Case Committee, appropriate disciplinary action may be taken against employees who have committed a compliance violation. If, during the investigation, a root cause is identified that could lead to further **compliance violations**, we take preventive and corrective actions.



The “compliance hotline” is also available to external stakeholders. The relevant information can be found in the Compliance and Ethics section of our [website](#).

Both the number of suspected compliance violations reported and the number of actual compliance cases were stable compared with the previous year. In 2021, we received 79 compliance-related reports via the “compliance hotline” and other channels that **led to investigations**. There were 42 confirmed cases of violations of the Code of Conduct or other internal and external rules.

## Compliance audits

Compliance is ensured by Group Compliance and Group Internal Auditing as the second and third lines of defense. As part of the audits, Group Internal Auditing regularly reviews functions, processes and legal entities worldwide. These reviews include an assessment of the **effectiveness of the respective compliance guidelines**, processes and structures in place. The unit also checks for violations of our Code of Conduct and our Anti-Corruption Policy. Moreover, they request and check a self-assessment of the workplace requirements set out in our Human Rights Charter.

Our audit planning aims to provide **comprehensive risk assurance** through the best possible audit coverage of our processes. We take a risk-based approach to our annual audit planning process, considering factors such as sales, employee headcount, systematic stakeholder feedback and the Corruption Perceptions Index ([CPI](#)) published by the non-governmental organization [Transparency International](#). If an internal audit gives rise to recommendations, Group Internal Auditing performs a systematic follow-up and monitors the implementation of the recommended corrective actions. In 2021, Group Internal Auditing conducted 84 internal audits that included bribery and corruption-related risks, thereof 55 operational and 28 IT audits as well as one special audit (for example incident specific internal investigations).

## Engaging stakeholders

We are members of various organizations, including the German Chemical Industry Association ([VCI](#)), the German Institute for Compliance ([DICO](#)), the European Federation of Pharmaceutical Industries and Associations ([EFPIA](#)), the German Association of Voluntary Self-Regulation for the Pharmaceutical Industry (FSA), the International Federation of Pharmaceutical Manufacturers and Associations ([IFPMA](#)), the [Alliance for Integrity](#), the German Association for Supply Chain Management, Procurement and Logistics ([BME](#)), and the International Association of Privacy Professionals ([IAPP](#)).

## Data protection & privacy

Compliant handling of information is highly important for a leading innovative, science- and technology-driven company. When using personal data, the individuals' rights must be appropriately protected. We strive to safeguard the rights of any person whose data we process, including but not limited to our employees, patients, customers, and healthcare professionals.

### Our approach to data privacy

The mandate and goal of our Group Data Privacy unit is to mitigate risks and create a global framework for data privacy-compliant business operations. This unit helps to train our employees to handle data responsibly and with clear accountability. It safeguards our company by providing data privacy risk assurance and compliance with relevant data privacy laws globally. Group Data Privacy also contributes to creating value for the development of digital business models.

## Roles and responsibilities

Group Data Privacy is part of our global Group Compliance and Data Privacy function. In addition, we have a Group Data Privacy Officer and a network of local Data Privacy Officers at various sites Group-wide. In line with external regulations, the Data Privacy Officers act independently. As part of our compliance reporting, Group Data Privacy regularly prepares **data privacy updates** as well as a comprehensive data privacy report. This report is part of the compliance report submitted to the Executive Board and the Supervisory Board.

### Our Data Privacy Management System

Our goal is to establish a global and consistent Data Privacy Management System (DPMS) by the end of 2022. It will be based on the following three pillars: Data Privacy portfolio, people and communication. The Data Privacy portfolio consists of eight key elements, covering all parts of a functioning DPMS, in line with legal requirements and industry standards. In 2021, we rolled out the revised Data Privacy Policy and Data Breach Standard and updated the e-learning environment amongst other deliverables.

Our DPMS applies similar elements as the [compliance portfolio](#) but adapted to the needs of data privacy. These include policies and procedures, risk assessment and documentation, training and awareness, programs and tools, individual requests, monitoring and reporting, incident management, and continuous improvement.

### Ensuring IT security

It is vital for our businesses that we protect our information systems, their contents and our communication channels against criminal or unwanted activities of any kind, such as e-crime and cyberattacks, including unauthorized access, information leakage and misuse of data or systems. Our Group Security and IT Security units maintain organizational, process-related and technical information security countermeasures based on recognized international standards. We employ **harmonized electronic and physical security controls** (e.g. access control, security monitoring) to bolster our ability to handle sensitive data, such as trade secrets.

## Our commitment: guidelines and standards

Our Data Privacy Policy and the corresponding standards and procedures define our principles for processing personal data. This approach allows us to achieve a **high level of data protection** for our employees, contract partners, customers and suppliers as well as patients and participants in clinical studies. Our Group-wide understanding of data privacy is based on European legislation, in particular the European Union General Data Protection Regulation (EU GDPR). We also take steps to meet local data privacy requirements, where these are stricter than our Group-wide standards.

### Data privacy training

In line with the EU GDPR and our global approach to data privacy, we regularly conduct e-learning training courses in ten languages. We launched a content update to this training course in May 2021. Additionally, Local Data Privacy Officers support the execution of our Group-wide training plan by conducting training for specific target groups, on request.

### IT tools for documentation

We maintain a central IT tool to provide a single source for data privacy processes, such as registering data processing activities and reporting potential data privacy incidents. In 2021, we began implementing a new, enhanced tool, which is expected to go live in 2022. Additionally, we use our corporate intranet for further communication, including answering data privacy questions and providing standardized templates. We registered no sanctioned complaints or incidents concerning breaches of customer privacy, data leaks, theft or loss of customer data in 2021. In three cases, minor personal data breaches were reported to the supervisory authority. These were not sanctioned.

## Responsible interactions with health systems

It is important that healthcare stakeholders, such as research institutes, healthcare professionals, and patient advocacy groups, have access to up-to-date information on diseases and treatments while safeguarding their independence at the same time. We help to facilitate this access. We also support cutting-edge research projects.

### Our approach to interacting with health systems

The well-being of patients is our primary consideration when promoting pharmaceutical products. We support health systems by providing information to our healthcare stakeholders, such as professional medical associations, patient advocacy groups, university clinics and other healthcare providing institutions. We follow clearly defined **internal approval requirements** and procedures for each type of interaction, in line with applicable laws and codes. In countries with statutory or industry obligations on the disclosure of transfers of value to healthcare stakeholders, we comply with these obligations.

We adhere to all regulations concerning the promotion of pharmaceutical products. In most markets, pharmaceutical companies are permitted to advertise prescription medicines only to healthcare professionals, such as physicians and pharmacists. These promotional activities must always disclose the active ingredient, potential adverse effects and contraindications of the medicine. Our internal governance documents on the promotion of pharmaceutical products are part of our Group-wide program, which requires us to conduct business in compliance with the law, industry obligations and **in line with the highest ethical standards**. Our internal governance documents and various voluntary commitments exceed the applicable statutory regulations in many cases. We regularly review all our internal governance documents and revise them as required in response to any new developments.

We clearly differentiate between information-sharing activities (where we share scientific information but not with the intention of promoting or increasing sales of pharmaceutical products) and promotional activities (activities with the clear intention of promoting or increasing sales of pharmaceutical products performed only by the Commercial organization), in line with industry standards. This differentiation implies various internal policies and standard operating procedures, responsible functions and review and approval levels, depending on the intention of the activity.

### Direct-to-consumer advertising only in certain countries

Direct-to-consumer (DTC) advertising for prescription medicines is permitted in some countries, such as the United States. In line with applicable local laws, we use DTC advertising in these countries to help increase people's awareness of certain diseases and the available therapies. In doing so, we empower patients to **make informed decisions** about their own treatment.

## Roles and responsibilities

For all engagements with healthcare stakeholders, we have established internal policies and **review processes and tools**, such as record-keeping systems, to ensure adherence to statutory requirements and transparency obligations.

Our Global Regulatory Affairs unit has established a dedicated standard and corresponding process document on the review and approval of our promotional materials. At the operational level, the relevant business and all employees involved in our sales and marketing activities must adhere to our internal policies, standards and procedures.

To ensure that all promotional materials meet our standards as well as local regulations end-to-end, we apply a harmonized **Group-wide review and approval system**. In our Healthcare business sector, we use a single global software tool. This has enabled us to unify, simplify and monitor the review and approval process for promotional materials and monitor that process in accordance with the dual-control principle. If the material has promotional intent and is product-related, a review is conducted by our Medical, Legal and Regulatory functions. This also helps us identify opportunities for improvement. All employees involved in creating, reviewing and approving promotional materials undergo training on the current process for reviewing, approving and decommissioning promotional materials based on our principles and standards.

## Our commitment: Group-wide guidelines and industry standards

In addition to applicable laws and our own internal standards, we comply with the codes of conduct of various international industry organizations, such as the [Code of Practice](#) published by the International Federation of Pharmaceutical Manufacturers & Associations ([IFPMA](#)) and the Code of Practice of the European Federation of Pharmaceutical Industries and Associations ([EFPIA](#)).

We are also members of various local industry associations, such as the German Association of Voluntary Self-Regulation for the Pharmaceutical Industry (FSA) and the U.S. Pharmaceutical Research and Manufacturers of America ([PhRMA](#)). Our activities adhere to the associations' codes for collaboration between healthcare professionals and the pharmaceutical industry.

Our Group-wide Pharma Code for Conducting Pharmaceutical Business and Pharmaceutical Operations (Pharma Code) defines the general compliance for our activities in the Healthcare sector. It provides high-level and overarching principles that govern our interactions with physicians, medical institutions, and patient advocacy groups, along with our promotional practices.

Our **Healthcare Ethical Guiding Principles**, introduced in October 2020, supplement the Pharma Code and provide our Healthcare employees with six ethical guiding principles for decisions and activities specific to the particular challenges and responsibilities of this business sector. In 2021, we rolled out an e-learning course for Healthcare employees worldwide. The course introduced the principles and showed how they provide quick and efficient guidance in relevant situations.

Under the umbrella of our Pharma Code and Healthcare Ethical Guiding Principles, we have specific governance documents, procedures and tools for different types of interactions with healthcare stakeholders, covering topics such as service engagements, hospitality, payments (at fair market value) and sponsorships to participate in events.

Our **Standard on Medical Activities** provides the general principles and requirements that must be respected in all medical activities, including interactions with healthcare providers. The specific governance for the different types of activities and interactions is detailed in further policies and standards, standard operational procedures and other governance documents.

## Collaborating with patient advocacy groups

Our Policy on Interactions with Patients, Patient Opinion Leaders and Patient Organizations provides a comprehensive framework for our interactions with these key stakeholders. Our guideline entitled Good Practice and Process Guidance: Engagement with Patients, Patient Opinion Leaders and Patient Organizations provides additional guidance for our interactions with these stakeholders. It reflects our commitment to prioritizing patient well-being. Through this policy, the supplementary guideline and specific local policies, we provide a robust guidance structure to support our employees in remaining compliant throughout their interactions with patients, patient opinion leaders and patient organizations.

We seek to improve patients' quality of life, which is why we support the work of patient advocacy groups. These groups in turn provide patients, family members and caregivers with information on disease management.

## Supporting medical education

In order to contribute to medical advances that benefit patients, we organize non-promotional global medical education programs worldwide through our Global Medical Education and Academic Organization Relations department. We offer an Integrated Medical Education Portfolio comprising company-led or independent and continuing medical education programs funded by third-party organizations (medical education providers, medical societies, academic organizations, etc). We take an **ethical, transparent and responsible approach** aimed at providing fair, balanced and objective content. This is designed to allow the expression of a diverse range of theories and recognized opinions.

All requests for medical education funding are channeled through an approval process that falls under our R&D and Compliance functions, in line with our Standard on Medical Education Funding and our Company-led Programs Policy. This process ensures that all funds available for medical education programs are granted according to established internal guidelines and criteria, while also complying with all applicable laws and industry codes.

We also partner with industry associations, such as Global Alliance for Medical Education ([GAME](#)), International Alliance for Continuing Medical Education, ([iPACME](#)), European Federation of Pharmaceutical Industries and Associations ([EFPIA](#)) and Medical Affairs Professional Society ([MAPS](#)). Together with these associations, we discuss how to improve and harmonize quality standards for medical education.

## Transparent reporting

In 2021, we continued to publish financial and non-financial contributions that we made to healthcare stakeholders in the healthcare industry, such as healthcare professionals and healthcare organizations, as appropriate and in accordance with local laws and codes. The published information includes the names of individual recipients and their addresses as well as the purpose and amount of the transfer, as required by the applicable laws and codes. Before publishing, we secured all necessary informed consent forms, as required by the applicable data privacy regulations.

In addition to disclosing monetary transfers of value on an individual level, we continue to **publish overall spending** on our [research and development](#) activities, as required.

Apart from disclosing transfers of value to healthcare professionals and healthcare organizations as required, we ensure transparency on our voluntary unsolicited donations to European patient organizations by publishing the contribution details on our [website](#). The report is updated annually and includes all amounts, recipients and the purpose of each transfer of value, thus also meeting **our obligation** as an [EFPIA](#) member.

## Regular employee training

In 2021, we continued with the international roll-out of our Code of Conduct-related training curriculum on dealing with **dilemmas in healthcare-specific situations**. This is a comprehensive and interactive training course that seeks to improve participants' awareness and understanding of such dilemmas, for example when overhearing a conversation that may or may not constitute attempted bribery. We plan to further implement this training program in all countries where our Healthcare business sector operates. The success of this program has prompted us to introduce a similar program in our Life Science and Electronics business sectors.

Employees who are responsible for the promotion of our pharmaceutical products receive regular training on current guidelines. This applies to individuals in sales, marketing and functions who work directly with healthcare providers. We conduct these seminars either locally in a classroom setting or as e-learning courses.

New employees participate in **onboarding training** dealing with the review and approval of promotional materials. Additionally, employees in charge of marketing and promotion of pharmaceutical products can also access our respective guidelines via our corporate intranet.

Based on their roles and responsibilities and in order to remain up to date, employees participate in mandatory e-learning courses and classroom trainings on our policies and guidelines as well as important changes to the reporting requirements of transfers of value.

## Tax governance

Our company operates in a complex legal environment and is subject to various tax obligations due to its domestic and foreign business activities. It is our responsibility to ensure compliance with tax legislation in all countries in which we operate and to be transparent. To this end, we have a tax organization in place that clearly defines responsibilities, processes and controls.

### Our approach to taxes

We believe that fair taxation serves as a backbone of any functioning society. Therefore, we expect public authorities to take transparency, predictability and non-discrimination into consideration when implementing taxation measures. We understand that tax is embedded in almost every aspect of commercial operations and our company therefore acts as a **responsible taxpayer** with respect to the following objectives:

- Ensuring timely and proper execution of tax obligations;
- Securing material correctness of tax positions determined in the annual financial statements and tax declarations;
- Ensuring effective tax **risk management** and tax monitoring;
- Avoiding inappropriate structuring leading to benefits not provided for by tax law.

### Roles and responsibilities

Taxes are managed in different units within Merck KGaA. Group Tax is generally responsible for tax matters of Merck KGaA and provides tax standards for the Merck Group – with the exception of customs, consumption tax and wage tax. The Export Control and Customs Regulations unit within the Corporate Sustainability, Quality and Trade Compliance (SQ) function is responsible for customs and consumption tax. Human Resources is responsible for wage tax. Certain tax tasks are managed by other units of Merck KGaA or Merck Business Services (MBS).

The Group Chief Financial Officer (CFO) is responsible for the Group Tax function. He delegates his tasks related to tax matters to the Head of Group Tax. The Head of Group Tax is also responsible for defining the organizational structure of the function, for monitoring it on an ongoing basis and for adapting it if necessary. In addition, the local tax unit in the United States reports directly to the Head of Group Tax.

At the subsidiary level, the local CFO is generally responsible for tax matters, managed either by local tax units, by external advisors, or, for Germany and our U.S. subsidiaries, by Group Tax. The local CFOs report to the regional CFO. The regional CFO ultimately reports to the Head of MBS, who reports to the Group CFO. If no local CFO is assigned, the tasks are undertaken by a designated employee in the Finance unit.

Tax-related topics can also be reported through our [compliance hotline](#), our Group-wide whistleblowing system.



## Our commitment: a tax principle

Our **Tax Principle** is part of our tax **internal control system**. It represents the framework and minimum requirements for all tax-relevant processes, methods and structures within our company. This principle

- outlines the tax compliance culture within the Group;
- defines our tax compliance objectives;
- specifies the organizational framework for tasks, roles and responsibilities, which ensures compliance with tax rules within the Group;
- establishes basic rules for the exchange of tax-relevant information.

The Tax Principle was issued by the Executive Board and applies to the entire Group. We review it at least once a year and modify it if necessary. In the event of extraordinary events, such as changes to the business strategy, organizational structures or risk management processes, the principle is reviewed on an ad hoc basis and adapted as appropriate. The Head of Group Tax is responsible for annual and ad hoc reviews, as well as modifications to the principle. Any modifications are discussed and coordinated with the Group CFO.

# Suppliers

## Sustainable supply chain management

Our company procures many raw and packaging materials, technical products, components, and services from around the world. We aim to promote supply chain stability while providing our customers with high quality products and services. We expect our suppliers to share our ethical, social and compliance standards and apply these within their own supply chains.

### Our approach to sustainable procurement

One of the goals of our supplier management endeavors is **compliance with fundamental environmental and social standards**, in addition to high-quality, reliable delivery and competitive prices. We have introduced relevant strategies, processes and guidelines that we are continuously improving in order to prevent violations of supply chain standards and improve our sustainability performance.

To achieve our corporate [sustainability goals](#), our Group Procurement team is working closely with our suppliers. We aim to create transparency in all our sourcing regions and fully integrate sustainability into all our value chains.

Therefore, we have set two new key indicators that will measure our journey towards increasing this transparency by evaluating the **sustainability performance of our relevant suppliers** with valid sustainability assessments. Our definition of valid sustainability assessment includes assessments carried out over the last three years and performed by a reliable, approved source. Relevant suppliers either indicate a specific country and industry risk or contribute to a major part (50% minimum) of our purchase volume. For the risk evaluation, we apply the risk data provided by [EcoVadis](#) for almost our complete purchase volume (98%). For the calculation of our purchase volume, we consider sourcing-relevant third parties (excluding expenses such as taxes and customs, as well as fees and memberships). We measure these key indicators using two equally weighted metrics: coverage in terms of purchase volume (2021: 65%) and the number of suppliers (2021: 21%).

We view our approach to supply chain sustainability as a journey and are continuously working to improve and further develop our policies and processes. While doing so, we ensure that all legal requirements are taken into account and that corresponding measures are initiated where necessary. For this purpose, in 2021 we set up an internal working group tasked with ensuring that we are compliant with the [German Supply Chain Due Diligence Act](#).

### Supplier Decarbonization Program

Our Supplier Decarbonization Program is a key element contributing to reduce our emissions in line with our decision to join the Science Based Targets initiative. Through the program, we aim to **reduce greenhouse gas emissions** associated with purchased goods and services as well as capital goods.

We set up a cross-functional Supplier Decarbonization Program team within Group Procurement to define our strategy and drive the execution of a ten-year program plan. We also started to provide training sessions and materials for procurement managers and sourcing teams. We intend to approach our suppliers in waves and contacted the first target group with a letter from our Chief Procurement Officer, information about our aspirations and a questionnaire to assess their current decarbonization status. Our sourcing managers collect relevant supplier data in a global monitoring database.

We are developing an automated carbon accounting tool to manage the large quantities of data on the CO<sub>2</sub> emissions of our suppliers. It will be available by end of 2022.

More information on our climate-related targets can be found [here](#).

### Risk management process

To ensure supply security, we select our suppliers based on various criteria, such as country risk, material risk and supplier risk, and their strategic importance to the business. This helps our sourcing managers to identify potential mitigation actions with relevant suppliers and support them in making improvements. The approach towards our **strategic suppliers**, which account for approximately 53% of our total spend, includes the identification, monitoring and assessment of supply security risks. It comprises four main elements:

- **Supplier Risk Assessments:** to capture the overarching risks at supplier legal entity level, including multiple risk domains.
- **Alert system:** to notify our Procurement Organization in the event of a risk or production issue arising with any of our suppliers.
- **Material Risk Assessments:** to determine the risks of relevant materials used in our most significant finished products.
- **Risk Response Tracker:** to create and monitor risk mitigation activities.

We calculate risk factors for suppliers and raw materials by multiplying risk probability and risk impact. For the supplier evaluation, we consider 29 risk titles, including, but not limited to economic freedom, social unrest, unfair business practices, and poor labor practices. We have also included criteria for identifying supplier relationships impacted by **key sustainability risks**, such as mineral sourcing or animal welfare. In 2021, we further developed our supplier risk assessment, focusing on the more relevant risk titles and thus sharpening our approach.

### Due diligence process for responsible sourcing of minerals

Merck sources and sells products that contain minerals commonly summarized under the term “3TG” (tin, tungsten, tantalum, gold – collectively also known as conflict minerals). Minerals can be extracted, traded, handled, and exported from conflict-affected and high-risk areas (CAHRAs) associated with the risk that these minerals could originate from mines or smelters controlled by armed militia contributing to human rights violations.

Our overall aim is to source materials in a **responsible and conflict-free manner** and not to contribute to adverse impacts through our sourcing activities. Therefore, we developed a comprehensive due diligence program and respective practices to address minerals originating from CAHRAs. Our program framework is in alignment with applicable laws and international standards.

Our [Responsible Minerals Sourcing Charter](#) forms the basis of our due diligence program. It clearly communicates our company’s expectations regarding responsible sourcing to our suppliers and promotes responsible sourcing of minerals. We are continuously working to improve our due diligence practices and ensure conflict-free sourcing of 3TG.

Our company operates in global and complex supply chains, in many cases with several tiers of suppliers between us and the original sources of the minerals used in our products. In order to address this complexity, we are a member of the Responsible Minerals Initiative ([RMI](#)). RMI provides us with tools and resources to make sourcing decisions that improve regulatory compliance and support responsible sourcing of minerals from CAHRAs. RMI uses third-party auditors to audit smelters and refiners and to investigate working conditions as well as environmental, health and safety issues. In the event that sufficient RMI-based information is not obtained, we conduct further research to determine whether an appropriate level of due diligence is ensured.

## Roles and responsibilities

Group Procurement is responsible for integrating sustainability requirements into the relevant stages of our sourcing and supplier management processes. Our Center of Excellence for Supply Security coordinates the relevant measures, such as updating our guidelines where necessary, examining processes and coordinating our participation in external initiatives. Sourcing managers responsible for selecting and contracting suppliers are made aware of and regularly updated on our **guidelines and sustainability requirements** through internal communication channels and training.

## Our commitment: Guidelines and standards

We expect all our suppliers and service providers to comply with our environmental and social standards, which are primarily derived from the [core labor standards](#) of the International Labour Organization ([ILO](#)) and the [UN Global Compact](#). These are defined in our [Responsible Sourcing Principles](#). We expect our suppliers to ensure that their subcontractors respect the same rules.

Our Responsible Minerals Sourcing Charter demonstrates our commitment to responsible sourcing of minerals from conflict-affected and high-risk areas. It applies to all our legal entities and subsidiaries worldwide, all our employees as well as any third party acting on our behalf. The charter complements the requirements set out in our Responsible Sourcing Principles.

Moreover, we support the Compliance Initiative of the German Association for Supply Chain Management, Procurement and Logistics ([BME](#)) and have endorsed the BME Code of Conduct. In particular, this code sets out rules for combating corruption, antitrust violations and child labor, upholding human rights, protecting the environment and public health, and promoting fair working conditions.

To ensure that we work based on industry standards and can rely on comparable data analytics and expert analysis, we collaborate with our peer companies in industry initiatives. We are a member of both Together for Sustainability ([TfS](#)) and the Pharma Supply Chain Initiative ([PSCI](#)).

We invite our suppliers to let us or trusted partners conduct assessments or audits to increase our supply chain transparency and identify fields of activity in order to improve sustainability performance or mitigate infringement risks. Regarding our [mica supply chain](#), we engage with a global consultancy to conduct audits and with the Indian organization [IGEP](#) to conduct inspections. Further information can be found in the corresponding [chapter](#).

Further information on assessments and audits conducted in the reporting year can be found [here](#).

## Supply chain assessments and audits

### Together for Sustainability supplier assessments and audits

Through the TFS initiative, suppliers are assessed either based on information obtained during audits or based on self-reported and publicly accessible information provided by [EcoVadis](#), an independent rating agency. EcoVadis assesses suppliers from more than 160 countries and 200 sectors across the four categories of **Environment, Labor and Human Rights, Ethics, and Sustainable Procurement**. The results are shared among TFS member companies in compliance with all restrictions stipulated by antitrust law.

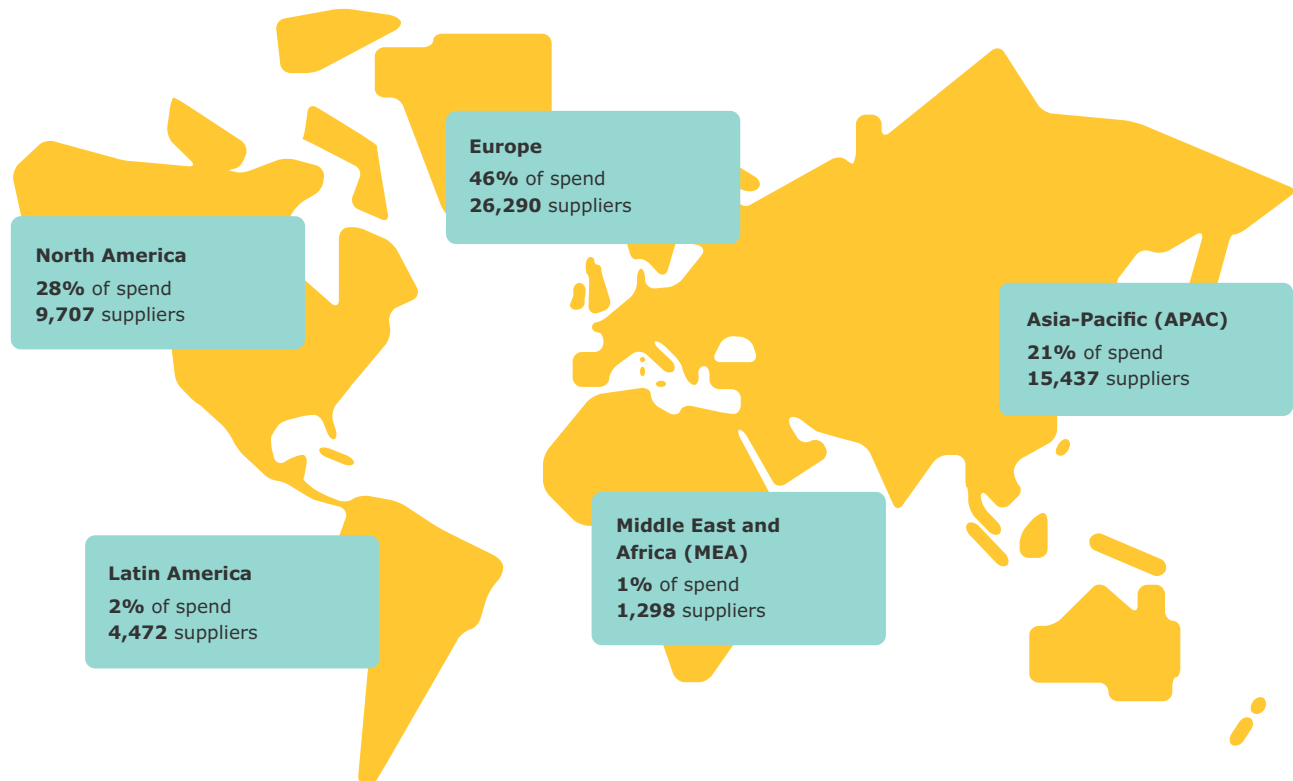
Through the TFS initiative, we have access to more than 1,460 valid scorecards on the assessment of our suppliers, 882 of which completed a new assessment or re-assessment in 2021. In some cases, these were initiated by us and in other cases by other TFS members.

In the context of “Grow & Deliver”, the strategic framework set by TFS for the period 2020-2025, we collaborated closely with member companies to drive **capacity building within our supply chain**. In 2021, we thus conducted several webinars on sustainability assessments and audits and on how to improve supply chain transparency and sustainability performance. These webinars were prepared and hosted in collaboration with TFS and EcoVadis and offered to our sourcing managers and suppliers in all regions. We also contributed to the new best practice sharing session series “TFS Talks”. As part of our contribution as a TFS member, we supported the development of a capability-building concept and implemented a training platform for sustainability knowledge and related skills. This platform will be available in several languages and for all our sourcing managers and suppliers of the 33 TFS member companies from 2022 onwards.

## Global Procurement

The total value of the goods and services we purchased in 2021 from approximately **57,000 suppliers** in more than 140 countries amounted to around € 8.6 billion, compared with approximately € 7.9 billion in 2020, representing an increase of 8.9%. Of these (including R&D services), we purchased 28% from suppliers based in North America, 46% from suppliers based in Europe, 21% from suppliers based in the Asia-Pacific region, 1% from suppliers in the Middle East and Africa, and 2% from suppliers in Latin America.

### Purchase volume and suppliers per region – 2021<sup>1</sup>



<sup>1)</sup> For data processing reasons, 3% of our purchase volume (1,245 suppliers) is currently not assigned to any purchase region.

## Supplier diversity

In the United States, we have specific supplier diversity programs in place to comply with local legislation. We are focusing our efforts in the United States on enhancing our current supplier locator tool by broadening the rollout among sourcing managers to improve our ability to connect with and potentially award business to a wide range of vendors. Additionally, we are continuing to work on internal awareness campaigns and training seminars for our sourcing managers and are investing in tools to expand our database of small and diverse vendors.

## Ambassadors for sustainable procurement

Since becoming established on the social network LinkedIn in 2019, the [Sustainable Procurement Pledge](#) (a TfS initiative) has evolved to become a knowledge exchange platform for procurement professionals, academics and other stakeholders. The platform has hosted various online best practice exchange events. We actively participate in the Sustainable Procurement Pledge.

## Mica supply chain

Mica is an important raw material for our effect pigments, which are used in automotive, cosmetic and industrial coatings as well as plastics. We procure the majority of our mica from the Indian states of Jharkhand and Bihar. We have taken special measures to comply with high social and environmental standards in our mica supply chain.

### Our approach to responsibility in the mica supply chain

By procuring mica from the Indian states of Jharkhand and Bihar, where political instability, poverty and child labor are widespread, we are supporting this region by safeguarding local employment and livelihoods. We source the raw material only from suppliers acting in formal working environments and monitor compliance with our standards, including the prohibition of child labor.

Our mica suppliers are informed of our standards and have confirmed that they adhere to the principles of our [Human Rights Charter](#) as well as the requirements of our [Responsible Sourcing Principles](#). In the event of non-compliance with our standards, we work with suppliers to ensure the appropriate implementation of corrective measures.

**We do not tolerate child labor** and contractually prohibit our suppliers from employing children. If one of our suppliers were found to be using child labor, Merck would terminate the business relationship immediately. We are driving initiatives and taking measures to improve the conditions of mica sourcing based on our high standards. We continuously review our monitoring processes to improve their effectiveness.

## Roles and responsibilities

Group Procurement has overall responsibility for sourcing mica. A steering committee is in place to involve the relevant functions and inform the respective Board members about significant developments.

We have established direct business relationships with suppliers that handle the mica supply chain in India. Our procurement unit is in direct contact with suppliers to reiterate the importance we place on ethical, social and environmental standards.

## Our commitment: Compliance with guidelines and standards

As a signatory to the [United Nations Global Compact](#), we are actively involved in working to abolish child labor. Our [Human Rights Charter](#) underscores this commitment. In our [Responsible Sourcing Principles](#), we set out our expectations for our suppliers in terms of sustainability and human rights, including prohibition of child labor. Our Responsible Sourcing Principles are also an integral part of our supplier contracts.

## Auditing our mica supply chain

We have implemented a series of oversight mechanisms using a system that monitors and audits conformity with our social and environmental standards. In addition to visits by Merck employees, regular inspections are conducted by third parties, who conduct comprehensive announced audits as well as frequent, unannounced verification visits.

### External audits

Environmental Resources Management ([ERM](#)), a leading global provider of environmental, health, safety, risk, and social consulting services, conducts external audits of mines and processing plants, investigating working conditions as well as **environmental, health and safety issues**. The audit reports document any identified shortcomings in this respect and propose corrective actions. Our employees in Kolkata (India) and Darmstadt (Germany) take action to address any identified issues. If the corrective measures are not respected, we may suspend or even terminate our business relationship.

### Unannounced inspections

Since 2013, IGEP Consult, an Indian non-governmental organization, has conducted regular unannounced inspections to review labor standards throughout our supply chain. During these visits, IGEP officials monitor occupational safety as well as **compliance with laws preventing child labor**. In 2021, its inspections focused on medical check-ups for workers as well as the implementation of health and risk assessment concepts and safety training. In addition, IGEP has revised and improved the escalation process: Biweekly review meetings are now held with Merck representatives to assess suppliers. These meetings help identify any required actions, which our sourcing teams then discuss and implement with our suppliers. Our suppliers have successfully improved the working conditions on the sites.

## Evaluating and tracking mica sources

We use a tracking system to help ensure that the mica we purchase is derived from sources **qualified by our company** and to monitor their productivity. Based on written records of the daily extraction quantities, we review the volumes of mica reported and supplied to the processing facilities.

Our processes undergo constant review and improvement. We are also evaluating other sources for mica in accordance with our quality, social and environmental standards both in India and in other regions. In 2021, we obtained a considerable amount of our mica from Brazil, where we have also established oversight mechanisms to monitor and audit adherence to these standards. In addition, we manufacture effect pigments based on synthetic substrates as an alternative to pigments based on natural mica.

## Community outreach in the mica supply chain

We are working to improve the **living conditions of the families** in mica mining areas. Our educational efforts in Jharkhand include funding three schools with nearly 500 students as well as five vocational training centers, all run by our local partner, the NGO IGEP. At a fourth school operated by one of our mica suppliers, we provide scholarships for 200 children out of 450 enrolled at the school.

In addition to our support for education, we are also helping to improve **access to healthcare**. We are fully funding an IGEP-operated health center that serves approximately 20,000 residents in the local region.



## Stronger together: Joint action in the mica supply chain

We are also a founding member of the multi-stakeholder group Responsible Mica Initiative ([RMI](#)). In 2021, we retained the presidency of the organization. The initiative aims to eradicate child labor and unacceptable working conditions in the Indian mica supply chain by **joining forces across industries**.

During the reporting year, we continued to support the RMI's work on its three main program pillars:

- **Responsible workplace standards:** In 2021, the RMI developed and issued an updated version of the workplace standards, supplemented by training for local mica processors.
- **Community empowerment:** Building on the first community empowerment program in 2018, the RMI has expanded its programs to cover 130 villages, reaching more than 11,000 households in 2021. The goal is to address the root causes of child labor and improve livelihoods within the local community.
- **Advocacy:** Through continuous advocacy work, the RMI is recognized as an important partner for drafting future policies to help ensure sustainable mica mining, while eradicating the root causes of child labor.

# Human rights

As an international corporate group, we have a duty to respect human rights worldwide within our sphere of influence and to ensure that our business activities do not infringe upon them. By fulfilling our human rights due diligence obligations, we meet the increasing expectations of our shareholders. This enables us to remain competitive over the long term.

## Our approach to human rights due diligence

We are committed to upholding human rights, which is why we became a signatory to the UN [Global Compact](#) back in 2005. We endeavor to prevent the risk of human rights violations, not only at our own sites but also along our entire supply chain. That is why we integrate human rights due diligence into our business processes. Our approach to human rights due diligence encompasses six main components.

### Our human rights due diligence process

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We view our human rights due diligence as a **continuous process**, which we constantly adapt and improve. This also prompts us to continually review our approach. We closely monitor regulatory developments – for example, the German Supply Chain Due Diligence Act and the planned EU directive on human rights due diligence.

## Roles and responsibilities

Our Executive Board has ultimate responsibility for human rights within our sphere of influence. The Executive Board exercises this responsibility by requiring our Managing Directors to comply with human rights.

Our Group Corporate Sustainability unit is responsible for coordinating all human rights due diligence activities. The persons responsible for these issues in the respective Group functions, business sectors and local units implement the specific measures, for instance by integrating human rights due diligence into existing processes.

The interdisciplinary human rights working group (HRWG) is developing **cross-functional measures** that we are using to meet our responsibility to respect human rights. In addition, it discusses activities and current developments regarding business and human rights. The HRWG meets three to four times per year.

Within the [German Global Compact Network](#), we are a member of the [Business & Human Rights Peer Learning Group](#), a working group in which we engage in dialogue with other companies to discuss challenges, current issues, experiences and successful approaches in exercising human rights due diligence.

## Our commitment: Guiding principles, charters and laws

Our [Human Rights Charter](#) aligns with the [UN Guiding Principles on Business and Human Rights](#). It is our overarching human rights directive and defines the relevant requirements for our company. We expect our employees as well as our suppliers and business partners to comply with this charter.

The charter interlinks and complements our existing rules and regulations pertaining to human rights, including our [Code of Conduct](#), [Social and Labor Standards Policy](#), [EHS Policy](#) (Corporate Environment, Health and Safety Policy), [Responsible Sourcing Principles](#), [Responsible Minerals Sourcing Charter](#), and the [Charter on Access to Health in Developing Countries](#). Our standards cover a broad range of topics related to human rights. These include, for instance, product safety, occupational health and safety, equal opportunity, fair pay, freedom of association and collective bargaining as well as the exclusion of child and forced labor.

## Identifying actual and potential impacts on human rights

We perform **risk assessments** to understand the potential impacts our operations and business relationships could have on human rights. For instance, we investigate human rights risks at our sites as well as risks related to product and service sourcing. These risk assessments enable us to derive the corresponding strategies and measures.

Furthermore, we also track human rights risks through our strategic supplier risk process. More information on how we engage with suppliers can be found under [Sustainable supply chain management](#).

We also meet our human rights due diligence obligations when **deploying new technologies**. In 2021, we adopted the [Code of Digital Ethics](#). This defines digital ethics principles and forms the basis for the work of the Digital Ethics Advisory Panel. More information can be found under [Digital ethics](#).

In the reporting period, we analyzed our activities designed to implement human rights due diligence in order to identify **potential for improvement**. We took both stakeholder and regulatory requirements into consideration. The analysis showed that we need a uniform, Group-wide process in order to better evaluate the effectiveness of our human rights due diligence. Above and beyond this, we want to further strengthen the HRWG, for instance by involving our business sectors more intensively.

## Measures to protect human rights

### Auditing our suppliers and sites

We use [internal audits](#) to check whether the workplace requirements of our Human Rights Charter are being observed at our sites. More information on internal audits can be found under [Compliance management](#).

In addition, we review human rights aspects at our sites through site security risk assessments. In 2021, we formalized the assessments as security audits, which will be implemented at regular intervals in line with the audit plan in the future. The audits are one control mechanism of our security governance framework. Increased risk transparency and centralized CAPA tracking allows us to ensure that our sites meet **security-relevant human rights aspects**.

Through the [Together for Sustainability](#) (TfS) initiative, we determine whether our strategic suppliers comply with human rights standards.

### Human rights and investment decisions

When projects exceed a certain cost threshold, our Investment Committee must approve the expenditure. In its decision, the committee considers various aspects related to the project, including environmental impact and health and safety. Furthermore, our Code of Conduct is binding where investment decisions are concerned. In 2021, we integrated human rights topics into the decision-making process for mergers and acquisitions.

### Creating awareness among our employees

To embed respect for human rights even more strongly throughout the company, we are continuously expanding our internal communication and awareness training on human rights and modern slavery.

To train our Managing Directors and senior leaders reporting directly to the Executive Board, we offer an e-learning course on the requirements of our Human Rights Charter and our Social and Labor Standards Policy and the implementation thereof in their areas of responsibility. In addition, the onboarding course for all new EHS managers covers the topics of human rights and modern slavery. Furthermore, during the reporting period the regional Security Academy meetings elaborated on current developments in the areas of human rights and modern slavery. The Security Academy is a training platform for our local, national and regional Security functions. It addresses security-relevant topics and is coordinated by our Corporate Security Group function.

## Training courses for our suppliers

As part of our membership of TfS, in 2021 we helped develop a concept for a sustainability management training platform, which is scheduled for rollout in 2022. It will be available globally, in multiple languages to all buyers and suppliers of the 31 TfS member companies.

We also participated in the #TfSTalks by sharing our conflict minerals approach, among other things. This new, interactive webinar format allows companies to exchange and discuss best practice approaches.

## Our reporting practices

We inform the public about our approaches, measures and results of human rights due diligence. We provide information on this annually in our Sustainability Report. Additionally, legislation in Australia and the United Kingdom requires us to publish the steps we are taking to counter forced labor and human trafficking. Apart from the [UK Modern Slavery Statement](#) we also published our first [Merck Australia Modern Slavery Statement](#) in 2021. Both have been signed by our Executive Board Chair.

## Our complaint mechanisms

Our compliance hotline is the most important channel for reporting complaints about potential human rights violations. Our employees as well as external stakeholders can report suspected cases in their respective national language, free of charge and anonymously, either by telephone or a web-based application through our [compliance hotline](#), our Group-wide whistleblowing system. We thoroughly investigate all complaints that we receive and take countermeasures if necessary. In 2021, **we noted no violations**, either with respect to child or forced labor or with respect to the right to collective bargaining or freedom of association. More information on the compliance hotline can be found under [Compliance Management](#).

# Clinical studies

Before obtaining regulatory approval for our medicines, we conduct clinical studies with patients and, if necessary, also with healthy volunteers to investigate the safety and effectiveness of our products. We also perform extensive preclinical research, including animal testing, to demonstrate that our treatments pose no unacceptable risks to humans.

## Our approach to safe and transparent clinical studies

We conduct high-caliber clinical research that always complies with applicable laws and regulations. When performing clinical studies, we adhere to the **highest ethical and scientific standards** worldwide.

We only conduct clinical studies to investigate issues that are relevant to patients, healthcare professionals or society, and only when the medicines being tested show significant therapeutic promise and have a **positive benefit-risk ratio**. In addition, a sound, established scientific methodology must be available to investigate these scientific or medical questions. We only enroll the specific number of participants required to answer each of these questions.

Protecting the safety, well-being, dignity and rights of the patients and healthy volunteers participating in our clinical studies is of utmost importance to us. We do not intentionally expose study subjects to undue risk or irreversible harm. **Personal data privacy** is also very important to us, and we maintain a strong focus on data protection and confidentiality in compliance with statutory regulations.

We assure that no subject enrolling in a clinical study is discriminated against on the basis of ethnic origin, gender or socio-economic status.

## Patient-focused drug development

We are improving our approach to research and development by committing to patient-focused drug development (PFDD) that more actively involves patients, caregivers, and their advocates in our work. Their **valuable insights into disease and treatment management** will help us make more informed decisions at each stage of the medicine development process. We aim to make our studies easy for patients to understand while ensuring all participants have positive experiences as they contribute to our understanding of the particular disease and its treatment. We are also working to further develop the way in which our research work is communicated and how it can improve the healthcare people receive. At every level of our organization, we are additionally educating staff about the value of a close, more consistent patient interaction and the requirements to protect our patients' independence and privacy.

## Clinical studies in low- and middle-income countries

We conduct all our clinical studies in accordance with local laws and regulations, and we adhere to all relevant international scientific and ethical standards, irrespective of the region or country. We are deliberately expanding our medicinal product development to more diverse markets in order to address pressing healthcare needs in low- and middle-income countries and support the development of their healthcare systems.

When performing clinical studies in low- and middle-income countries, where there is usually a lower level of healthcare and limited healthcare infrastructure, the following also applies:

- We only do so in an environment in which the principles of Good Clinical Practice can be upheld.
- We only investigate diseases and innovative medicines that are relevant to the local population.
- We only conduct clinical studies in countries where we expect that the drug being tested will be submitted for marketing authorization and made available to patients after we have proven its efficacy and safety.

## Roles and responsibilities

Clinical drug development, including clinical studies and the related governance process, are the responsibility of the Global Development unit. The Head of Global Development reports to the CEO Healthcare, who is a member of the Executive Board.

We review the progress of new drug development at defined milestones, and make decisions about the continuation, modification or discontinuation of development, depending on the results of clinical studies.

We have established two internal committees to oversee our clinical studies. The Development Studies Committee is responsible for the studies performed by the company on medicines that are under clinical development, while the Global Medical Decision Board is responsible for our own studies with approved medicines, as well as for all studies performed by independent investigators and supported by us (so-called investigator-sponsored studies). Both bodies consist of medical-scientific **experts and executives with long-standing experience** in clinical research. Our development and study teams present clinical study concepts to the appropriate committee. Each committee meets regularly to conduct a comprehensive review of the proposed concepts and ascertains that our studies are scientifically sound, have a legitimate scientific purpose, and are performed in accordance with the latest standards and best practices.

Before administering a new drug to humans, there must be sufficient evidence that it offers a potential **therapeutic benefit**, is sufficiently safe for use in humans and has a positive benefit-risk ratio. We only take the critical step of a first-in-human clinical trial after diligently conducting extensive preclinical testing. The decision lies with a separate committee, the Human Exposure Group, chaired by our Global Chief Medical Officer.

We continuously analyze potential **risks for study participants** before and during our clinical studies. Our Medical Safety and Ethics Board (MSEB) oversees the safety of subjects participating in our clinical studies and, as necessary, reviews the benefit-risk profiles of investigational drugs. You can find further information on the MSEB under [Patient safety](#).

Issues may be submitted to the relevant committees by product teams or other committees (as defined in relevant standard operating procedures or committee charters). If individual employees wish to seek advice or report concerns on ethical questions, they can contact the chairperson or a permanent member of a committee directly.

## Our commitment: International guidelines and requirements

Our Human Subjects Research and Development Policy provides the framework for conducting clinical studies and helps ensure that we adhere to all applicable **legal, ethical and scientific standards**. In addition to the relevant national laws and regulations, these standards also include:

- The [Good Clinical Practice](#) (GCP) guidelines of the International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use ([ICH](#))
- [The Declaration of Helsinki](#), published by the World Medical Association
- [The Belmont Report](#) by the U.S. [Office for Human Research Protections](#)
- Good Pharmacovigilance/Laboratory/Manufacturing/Distribution Practices (GVP/GLP/GMP/GDP)
- The [International Ethical Guidelines for Health-related Research Involving Humans](#), published by the Council for International Organizations of Medical Sciences ([CIOMS](#))
- The [Joint Position on the Disclosure of Clinical Trial Information via Clinical Trial Registries and Databases](#) and the [Joint Position on the Publication of Clinical Trial Results in the Scientific Literature](#), published by the International Federation of Pharmaceutical Manufacturers & Associations ([IFPMA](#)), the European Federation of Pharmaceutical Industries and Associations ([EFPIA](#)), the Japan Pharmaceutical Manufacturers Association ([JPMA](#)), and the Pharmaceutical Research and Manufacturers of America ([PhRMA](#))
- The [Principles for Responsible Clinical Trial Data Sharing](#), published by EFPIA and PhRMA, and the IFPMA Principles for Responsible Clinical Trial Data Sharing

## Regular supervision of clinical studies

Our clinical study processes and procedures are regularly inspected by relevant regulatory authorities to verify their compliance with applicable laws and guidelines.

The Research & Development Quality unit applies a risk-based identification strategy to determine areas that need to be audited. **Quality assurance audits** are performed internally within Healthcare R&D (for example, process audits) and externally (for example, at vendors' sites and investigational sites). We respond immediately to observations during audits by investigating their root causes and, according to their criticality, defining and implementing corrective and preventive actions to improve processes, prevent reoccurrence of irregularities and ensure compliance.

Due to the Covid-19 pandemic, we postponed some audits from 2020 to 2021. However, for all audit types we successfully implemented a remote audit approach. As a result, we were able to largely implement the audit plan for 2021, shifting only a small number of audits to 2022.

## Conducting clinical studies responsibly

Prior to enrolling subjects, every clinical trial must first be assessed and approved by a qualified **independent ethics committee**. Furthermore, all regulatory authorizations required in the respective country must be obtained. In accordance with Good Clinical Practice guidelines (ICH-GCP), all study participants must give their explicit informed consent before enrolling in a clinical study. Participants are fully informed about all aspects of the clinical trial in a language that they understand. This includes the potential risks and benefits from participating in the study and the opportunity to enquire about details. As far as possible, non-interventional (observational) studies are also assessed by an ethics committee.

Every clinical study follows defined procedures to ensure it is conducted to the **highest quality standards** in line with good working practices (GxP) for the development and manufacturing of drugs, the ethical principles of the [Declaration of Helsinki](#) and other international guidelines and regulations. In 2021, regulatory authority inspections did not unveil significant issues which had any impact on patient rights, patient safety, or the data integrity of a study.



We continuously collect and communicate **safety data on our investigational drugs** and promptly provide clinical investigators with important new findings relevant to the safety of the study participants. In this way, we help to ensure the safe use of our medicines. Potential adverse effects and risks are taken into consideration to evaluate the benefit-risk ratio of our products and manage any risk. Product information, including the Investigator's Brochure and Information for study participants, is updated accordingly. More information is available under [Patient safety](#).

## Conducting clinical trials in vulnerable populations

The implementation of clinical studies in vulnerable populations, such as children or people with disabilities, requires **special attention and care** to comply with the highest ethical and scientific standards. The well-being of the individual is our highest priority. For this reason, we only conduct studies with participants from vulnerable population groups if scientifically justified and if there is no other way to achieve conclusive results. When performing such studies, especially when informing study participants and obtaining their consent, we comply strictly with all statutory regulations.

## Teaming up to get results

The clinical trial investigators participating in our clinical studies by enrolling and caring for patients are critical to the successful development of new medicines. Furthermore, in order to achieve a broad, in-depth basis for the development of new treatments, we seek advice from medical-scientific advisory boards and frequently conduct clinical studies in collaboration with external **partners in academia and industry**. We also rely on the support of contract research organizations (CROs) and other service providers and vendors. We expect all our partners to abide by the same set of high standards in terms of ethical conduct and quality in clinical research.

As a member of [TransCelerate](#), a consortium of 21 pharmaceutical companies, we are currently collaborating on several initiatives to drive the **efficient, effective and high-quality delivery of new medicines**.

## Close dialogue with patients and advocacy groups

We want to ensure that the voices and **needs of patients and their caregivers** are adequately heard and taken into consideration when developing and conducting clinical studies. That is why we have established the Patient Advisory Boards (PAB) as one of our crucial communication channels. Our PAB Charter describes how to involve patient advocacy groups in our clinical research process. During Advisory Board meetings, patients, caregivers and representatives from patient advocacy groups are invited to share their experiences and perspectives related to clinical trials. We use this opportunity to discuss multiple aspects of the drug development process, including but not limited to protocol design, educational materials, technology and innovative approaches to clinical trials.

Furthermore, we are involved in multiple activities that focus on this relevant aspect of **patient centricity in clinical studies**. For example, in the United States, we are an active member of the Clinical Trials Transformation Initiative ([CTTI](#)), which focuses on quality and efficiency in clinical trials.

## Responsible data sharing

We support professional circles in advancing **medical and scientific knowledge**, thereby enabling informed healthcare decisions for the benefit of patients. Upon request, we provide qualified researchers with study protocols, anonymized individual patient data, study data, and clinical study reports. We share data and information in a manner that is consistent with the joint [Principles for Responsible Clinical Trial Data Sharing](#) of the [EFPIA](#) and [PhRMA](#):

- Safeguarding the privacy of patients
- Respecting the integrity of national regulatory systems
- Maintaining incentives for investment in biomedical research

## Disclosure of clinical studies and publication of results

We are obligated to disclose findings from our clinical studies. We do this publicly in a complete, accurate, balanced, transparent, and timely manner as laid out in our Clinical Trial Disclosure Policy. Our clinical study designs and results are made public in the international [ClinicalTrials.gov](#) database run by the U.S. National Institutes of Health ([NIH](#)), which can also be accessed via the World Health Organization's International Clinical Trials Registry Platform ([ICTRP](#)). Furthermore, in accordance with EU regulations, we publish results from our clinical studies in the EU Drug Regulating Authorities Clinical Trials ([EudraCT](#)) database, which is run by the European Medicines Agency ([EMA](#)). If required by local laws and regulations, we publish study results on other publicly accessible platforms. We provide clinical study report synopses and summaries of study results in plain language on our [clinical trials website](#).

We publish results from our clinical studies in **medical journals** in line with applicable laws and industry codes. In this way, we adhere in particular to the current version of the Good Publication Practice ([GPP3](#)) and follow the recommendations of the International Committee of Medical Journal Editors ([ICMJE](#)). Our Medical Publications Policy ensures compliance with all relevant standards, and we use defined standard procedures for scientific publications on our products. In addition, we reference our clinical trial publications on our [website](#). Our [Standard on Clinical Trial Data Transparency](#) underscores our strong commitment in this matter.

These ongoing efforts to increase the transparency of our clinical studies have received credit from [Bioethics International](#). The organization ranks bio-pharmaceutical companies and new drugs based on ethics and public health performance criteria, focusing on issues that are critical to patients. In 2021, we ranked in equal first place among seven of the 42 pharmaceutical companies that were rated.

## Enabling early access to new medicines

Not all patients have the opportunity to take part in a clinical study and must therefore wait for a new pharmaceutical product to be approved. Through our Early Access Program, we can, under specific circumstances, enable patients to gain early access to new, potentially life-saving medicines. The offer is aimed at people with serious conditions who have already received all available therapies without success. It allows them to be treated with medicines that have already been clinically tested but have not yet been approved. Furthermore, we offer patients who participated in one of our clinical studies post-study access to the investigational product, provided that certain conditions are met. Here, too, we meet stringent statutory, ethical and scientific standards. By performing a thorough assessment of all available data, we ensure that the potential benefits outweigh the potential risks for patients. [Position papers](#) on [early access](#) and [post-study access](#) are available on our website.

## Supporting independent human subject research

In addition to conducting our own clinical research programs and studies, we also support studies proposed by independent investigators, so-called investigator-sponsored studies (ISS). Our [ISS Principle](#) defines an ISS as “an unsolicited request for funding and/or supply of an investigational or marketed product by a third-party investigator/institution that initiates and conducts an independent scientific investigation as the regulatory sponsor”. By granting **financial or material support** for independent human subject research, we seek to stimulate the advancement of clinical and medical knowledge and patient care in our therapeutic areas of interest and support the safe and effective use of our products. We give priority to research that is innovative and has the potential to address specific unmet medical or scientific needs. Our principles, framework and standards for granting support for ISS and our collaboration with independent investigators are specified in our ISS Principle, which is available on our [website](#) and in our corresponding policy and standard operating procedure.

# Animal welfare

International and national legislation mandate animal testing of medicinal compounds and chemicals during their development and prior to their approval for commercial use. In addition, from an ethical and scientific perspective, animal research is indispensable based on the current state of knowledge. We perform animal using activities in all three of our business sectors.

## Our approach to animal welfare

Our long-term aspiration is to be a pioneer in phasing out animal use and replacing animal work by better, cutting-edge alternatives. We aim to outperform as the leader in non-animal-derived products and testing in the life science and healthcare industries. Our business sectors develop individual strategic roadmaps, priorities and timelines towards this aspiration.

Animal testing will be an unavoidable necessity for many more years, especially in drug development to ensure the safety and efficacy of medical devices, medicines and vaccines. As long as animal usage cannot be completely avoided, we are committed to applying the **highest ethical and animal welfare standards** related to the housing, husbandry and veterinary care of all animals involved in our work. We ensure comprehensive **transparency** and ongoing assessment, monitoring, auditing, and improvement of all work involving the use of animals by our company and by trusted third parties. We continuously improve our animal testing processes, striving to enhance the animals' quality of life. We always use as few animals as possible and replace their use whenever feasible with alternative methods. In addition, we advocate for the global acceptance of replacement methods. To this end, we join forces with industry and academia.

We subscribe to the internationally recognized **3Rs for animal-based research** and have added **Responsibility** as our fourth animal welfare principle in line with the ethical considerations published in 2019 by David DeGrazia and Tom Beauchamp in [Principles of Animal Research Ethics](#):

- **Replacement** – replacing animal studies with non-animal systems
- **Reduction** – using the minimum number of animals required
- **Refinement** – minimizing distress or discomfort before, during and after testing
- **Responsibility** – accepting responsibility for all animals in our reach internally and among our business partners

Within our **Life Science** business sector, animal activities include required regulatory safety testing of our own products and on behalf of customers. The Life Science product portfolio also includes various materials needed for research that are derived from animals or by-products from food production, such as blood, plasma, or serum, or items specifically produced in animals, such as antibodies. Our **Healthcare** business sector conducts animal testing as mandatory part of the drug and medical devices development process and conducts biological quality control in animals. Our **Electronics** business sector conducts animal tests as required by applicable chemical regulations. In line with the EU Cosmetics Regulation, no animal tests are conducted for cosmetic ingredients.

## Roles and responsibilities

Our Corporate Animal Affairs unit governs the implementation of the Corporate Animal Welfare strategy. The unit acts globally and locally, setting and overseeing guardrails for the use of laboratory animals based on four pillars:

- Animal Welfare
- Animal Using Vendor Management
- Merck Vivarium Oversight
- The 4R principle

Our **Group Animal Welfare Council**, sponsored by the CEO of Merck, comprises representatives from all business sectors and meets quarterly. The council acts as sounding and advisory board, assessing which of our services and product innovations can help to avoid animal testing in the future. Moreover, it consults on business-critical issues, adopts key indicators and serves as an escalation body.

In 2021, we established **multidisciplinary boards** in Europe and the United Kingdom that review and approve all work conducted by or on behalf of our company involving the use of animals. They are known as Merck Animal Usage Review Boards. In the United States and Israel, these boards already exist as Institutional Animal Care and Use Committees (IACUC, in accordance with the [U.S. ILAR Guide](#)).

Global and local **animal welfare officers** from the business report directly to Corporate Animal Affairs and are advocates of the animals. Their tasks entail animal science and welfare management as well as acknowledging the individual skills and abilities of the animal caretakers. Furthermore, they regularly inspect the animal facilities as well as review and approve protocols.

The Animal Using Vendor Management unit qualifies our suppliers with regard to animal science and welfare. The group also continuously monitors our contract research organizations, suppliers and business partners.

If employees identify an issue regarding animal welfare, they can report it directly to Corporate Animal Affairs, to local and global animal welfare officers or via our compliance hotline.

We set up a **4R team** and cross-functional workstreams for each of the 4Rs. They develop and guide projects to implement our 4R principles. The 4R team regularly reports progress made with the 4Rs to the Group Animal Welfare Council. It also coordinates the 4R Award, with which we recognize contributions to the Replacement, Reduction, Refinement of, and Responsibility for our animal work.

## Comprehensive employee training

With our new Animal Affairs Academy we will define training specifications and oversee and provide staff training on practical work, rules, and regulations.

Our employees also regularly participate in external **continuing education** programs.

## Work with committees and associations

As part of our efforts to improve animal welfare, we are involved in several organizations and industry initiatives, including the European Federation of Pharmaceutical Industries and Associations ([EFPIA](#)) and [Interpharma](#), a federation of research-based pharmaceutical companies in Switzerland. Interpharma conducts audits at contract research organizations and animal breeders together with selected member companies.

## Our commitment: Group-wide standards

Beyond compliance with all applicable laws and regulations, we are committed to our own set of internal guidelines. Our **Animal Affairs Policy**, our Group animal welfare standards and our procedures for animal testing conducted internally and by trusted third parties corroborate a comprehensive and stringent governance framework based on our four pillars of animal use governance.

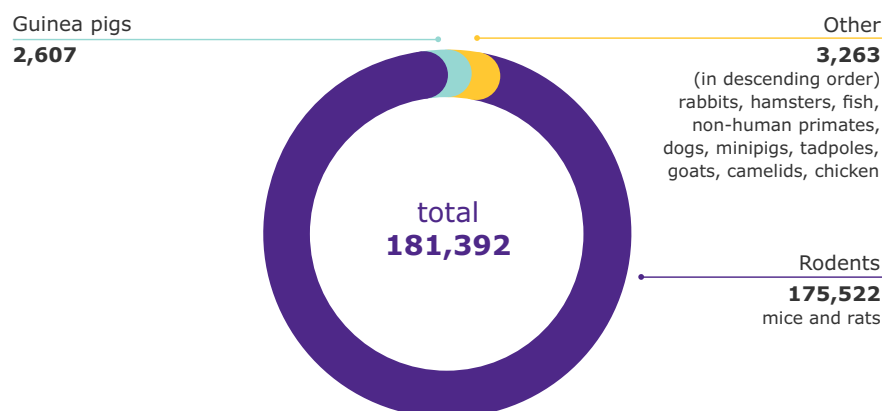
Our standards and procedures entail, for example, the housing and husbandry standards that also apply to external partners, and how we monitor them, including audit procedures. The Animal Using Vendor Management standard describes the requirements for the approval of contract research organizations and suppliers. Further documents, including guidance for our 4R efforts, incident reporting, and risk management, augment the governance framework.

We are convinced that the right level of **transparency** has the potential to improve the scientific outcome and value of animal testing and to create benefit for society, for patients, and for animal well-being. We committed ourselves to transparency by signing the [German Transparency Initiative](#) in 2021. The objective of this initiative is to drive forward an open discussion on animal research. It aims to provide easily accessible information and insights into husbandry and animal testing techniques and facilitates sharing of experiences.

## Number of laboratory animals used for medical study purposes

In 2021, a total of 181,392 animals were used within the scope of our business activities, either in our own vivaria or on the premises of organizations contracted on our behalf. This represents an overall increase of 1% compared with 2020. Rodents (mice or rats) comprised 97% of all animals used in 2021, compared with 95% in 2020. Regulatory agencies sometimes require studies of the safety of investigational drugs in non-rodent species. This allows researchers to identify potential adverse effects accurately and include them in the [risk assessment](#) of a substance.

### Animal types



## Collaborating with partners and suppliers

We perform the majority (87%) of our animal studies ourselves and procure the required animals from specialized breeders. We also hire contract research organizations to conduct animal studies on our behalf. Furthermore, we work with academic institutions. Whenever collaborating with such organizations, we require them to abide by our standards.

## Conducting animal welfare audits

Corporate Animal Affairs conducts an audit of each of our vivaria every three years. In 2021, two vivaria were audited. Furthermore, we **improved Corporate Animal Affairs' oversight** of internal animal work with regards to aspects such as animal usage, purpose and incidents. In the reporting year we selected a digital solution that will promote this and further support the monitoring of our key indicators. We aim to implement this IT tool in 2022.

An integral part of our strategy is the qualification of all animal-using vendors we conduct business with. We completed the implementation of an auditing strategy and developed procedures to identify and train auditors. In 2021, a total of 58 vendor audits were performed, 19 of them on-site, 39 virtually due to the pandemic.

## 4R Award for animal welfare

We want to motivate all our employees to contribute to the 4R principle. With the biannual 4R Award, we recognize best practices in animal work as well as pioneering mindset to **Reduce, Replace or Refine** or leading by example in proving **Responsibility**.

To further promote the 4R principle throughout Merck, we initiated an annual 4R Day. The 2021 event focused on the new Corporate Animal Welfare Strategy and gave an overview of current 4R activities.

# Bioethics

Scientific advances can spark controversy over bioethical issues. We want to responsibly bring to bear the growing potential of the life sciences to create maximum benefit for both humankind and other living beings. For us, it is important to clarify our own position on bioethical approaches.

## Our approach to ethical business conduct

As a global company, it is crucial for us to identify and take up new bioethical trends and issues early on so that we can define our own position on such matters. Although we align all our operations with international and national laws, many discussions on bioethics pose questions that go far beyond the framework set forth by current legislation. We therefore also seek advice from external experts.

In our work, we encounter various bioethical issues, including animal testing and clinical research, stem cell use, the use of genetically modified microorganisms, and the potential impact of new genome editing techniques such as CRISPR/Cas. Our goal is to conduct this research in an ethical manner. We develop frameworks that guide us in making informed decisions to meet the most rigorous ethical standards. **Patient benefit and well-being** is always our top priority, whether in clinical studies, treatment with our medicines, or the distribution of our products to academic researchers and the biopharmaceutical industry. We carefully evaluate our position when it comes to controversial topics.

## Roles and responsibilities

For around ten years, the Merck Bioethics Advisory Panel (MBAP), appointed by the Executive Board, provided guidance on bioethical questions. To tackle a broader array of topics going forward, in May 2021 we transformed this body into the Merck Ethics Advisory Panel for Science and Technology (MEAP). The new committee provides clear recommendations on science and technology topics and issues that go beyond pure bioethics. Co-chaired by two of our leading scientific experts, the MEAP provides recommendations that guide our actions and business activities. In addition to renowned international specialists from the fields of **bioethics, theology, law, and science**, the panel also features **technology and sustainability** experts.

The MEAP meets multiple times a year and can also be convened on an ad-hoc basis in response to emerging urgent bioethical issues. The meeting minutes can be accessed on our intranet, along with the guidance resulting from each meeting. Our employees can submit topics for the MEAP to discuss and can furthermore report bioethical concerns through our [compliance hotline](#) or by reaching out to our Bioethics team.

Our dedicated committees on genome editing and stem cell research operate under the overarching MEAP. Using our internal guidelines as a basis, they make recommendations on issues relating to specific topics. Our Stem Cell Research Oversight Committee (SCROC) verifies all internal research proposals that employ **human stem cells**, ensuring compliance with legal requirements as well as our ethical guidelines. This also includes joint projects with external partners.



## Our commitment: Guidelines and standards

Our [Genome Editing Principle](#) provides a mandatory ethical and operational framework for our employees. It sets clear boundaries for us both as a supplier of customized nucleases and genetically modified cell lines, and as a user of genome editing technologies for scientific research. This principle includes background information on the topic and explains our position on genome editing. Moreover, it specifically addresses the subject of human germline editing.
















Our Genome Editing Principle is complemented by additional guidelines that shape our approach to ethically conducted research and business. Our [Stem Cell Principle](#) sets the ethical boundaries for the use of human stem cells in our research. Our [Fertility Principle](#) guides our research in fertility treatment and in-vitro-fertilization by setting a clear framework for practices that reflect the most rigorous ethical standards. Our principles for disseminating information on the off-label use of our products are set out in corresponding policies that apply Group-wide.

Biological samples obtained from patients during clinical studies are indispensable to the development of new targeted treatments and advanced diagnostic methods. We have a guideline (our Fertility Principle) and standard operating procedures in place that define our approach to managing human biospecimens. Accordingly, we handle these samples in a responsible and ethical manner; in doing so, we adhere to all regulatory requirements and abide by the consent given by patients for the use of their samples. This may include an optional consent that provides permission to use the biospecimens for **further medical research beyond the clinical study**.

## Topics currently being discussed by the MEAP

The MEAP last convened in October 2021 and dealt with topics such as the animal welfare strategy we adopted in 2020 as well as our approach to vaccinating and testing employees for Covid-19. Panel members also addressed our ethical duty to go beyond the statutory requirements in terms of transparency on animal studies. In addition, the MEAP discussed our ethical responsibility with regard to the non-intended use of our products, especially those in our Life Science portfolio.

### Merck Ethics Advisory Panel members

 <b>Yimtubezinash Woldeamanuel Mulate</b> <b>Microbiology</b>  Addis Ababa University Board member and Secretary of Pan-African Bioethics Initiative	 <b>Jeremy Sugarman</b> <b>Bioethics, Medicine</b>  Johns Hopkins University	 <b>Jochen Taupitz</b> <b>Medical law, bioethics</b>  Former Vice-Chair German Ethics Council
 <b>Jeanne Loring</b> <b>Molecular Biology, Stem Cells</b>  Formerly Scripps Research Institute La Jolla (Advisor)	 <b>Nikolaus Knoepffler</b> <b>Philosophy, Theology, Ethics</b>  University Jena	 <b>Daniel Fu-Chang Tsai</b> <b>Bioethics, Medicine</b>  National Taiwan University
 <b>Christoph Rehmann-Sutter</b> <b>Philosophy, Ethics, Biology</b>  University Lübeck Former Chair Swiss National Advisory  Commission on Biomedical Ethics		

## Biotechnology and genetic engineering

Throughout the Group, we manufacture our biotech products in accordance with rigorous standards at all sites. All these activities are subject to strict statutory regulations worldwide, and compliance with these regulations is monitored by our **biological safety officers**. We continuously track local regulatory changes that relate to biotech products and adapt our processes accordingly, thus ensuring compliance with all statutory requirements.

### Using genome-editing techniques

We are a leading supplier of technologies such as CRISPR/Cas9, which can be used to target and modify specific genes, a process known as **genome editing**. CRISPR/Cas9 opens up new possibilities in genetic engineering research that could bring about major advances in the treatment of serious diseases or in “green genetic engineering”, which is the use of genome editing techniques in plant cultivation. Laws in different countries allow for a varying degree of latitude in applying this technique. Bioethical views on germline editing have been evolving for years through academic and social discourse. Our position on human germline editing is as follows:

*“Merck KGaA, Darmstadt, Germany does not support the use of genome editing in human embryos and clinical applications of germline interventions in humans in accordance with the German Embryo Protection Act. Our company recognizes that there may be value in responsibly conducted related research.”*

## Stem cell research

At the present time, we neither participate in clinical programs that utilize human embryonic stem cells or cloned **human cells** for the treatment of diseases, nor do we pursue such approaches ourselves. However, we use human embryonic stem cells in our research and offer our customers several select stem cell lines. In both applications, we only allow the use of human embryonic stem cells if clearly defined conditions have been met. For instance, we only utilize stem cells for research purposes if our Stem Cell Research Oversight Committee (SCROC) has reviewed the respective project and given approval. We exclusively make use of cell lines that have been approved by the United States National Institutes of Health ([NIH](#)) and are allowed under the German Embryo Protection Act as well as the German Stem Cell Law. At its October 2021 meeting, the SCROC revised our Stem Cell Principle to align it with the new guidelines published by the International Society for Stem Cell Research (ISSCR) in 2021.

# Digital ethics

People, machines, data, and processes are becoming increasingly interlinked, with technological advances transforming our society and posing new ethical challenges. Digital ethics provides us with a framework for responsibly handling data, algorithms and artificial intelligence.

## Our approach to corporate digital responsibility

Having made it our mission to develop **new digital technologies** responsibly, we identify at an early stage any ethical issues that may arise from either using this technology or from applying algorithm-driven and data-based business models.

Established in 2021, the new **Merck Digital Ethics Advisory Panel (DEAP)** focuses on complex ethical issues surrounding digital technologies. Ensuring that our digital business model follows a holistic, ethical approach, its efforts complement the work of our [Merck Ethics Advisory Panel for Science and Technology \(MEAP\)](#). Launched in 2010, the MEAP provides guidance on ethical issues pertaining to our business activities and research.

## Roles and responsibilities

The DEAP deals with all **ethical issues arising from our digital businesses**, especially digital health. It plays a pivotal role in ensuring that we develop digital innovations responsibly and address potential digital ethics questions that could result from the use of these digital technologies. Making recommendations on our actions as a company, the panel consists of external U.S. and European science and industry experts from the following fields: digital ethics, law, Big Data technologies, digital health, medicine, and data governance. Furthermore, if necessary, we draw on bioethics experts as well as representatives from patient organizations. As with the MEAP, the DEAP is appointed by the Executive Board. All employees may submit topics for the panel to discuss. The minutes from DEAP meetings as well as their recommendations can be accessed on our intranet. The panel held four meetings in 2021. One DEAP session focused on our company's role and responsibility in terms of how (patient) data is collected and handled by customers who utilize our digital products and services.

## Our commitment: Guidelines and standards

We aim to position ourselves as the “digital ethics company”, meeting rigorous ethical standards in critical areas such as health data handling.

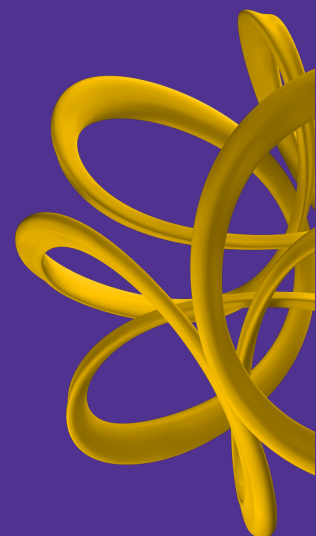
In 2021, we worked with the DEAP and other partners from academia and science to draft our Code of Digital Ethics [CoDE](#), a document that governs our approach to the **ethical management of data and algorithms**. The CoDE serves as a guideline for our digital business models, a tool for analyzing ethical challenges, and a basis for practical DEAP guidance. In March 2021, the Executive Board decided to classify the CoDE as a charter; this is our company’s highest category for quality control documents and one that also includes our Code of Conduct and our company values. As such, the CoDE applies to all employees, is publicly accessible, and will become part of the employee training curricula.

The CoDE consists of five core principles: autonomy, justice, beneficence, non-maleficence, and transparency. These principles in turn provide a clear structure for assessing ethical issues and moreover guide our business sectors and individual employees through sensitive situations that are not (yet) covered by laws or other types of regulations. The CoDE not only serves as the basis for assessing the ethical risks posed by existing activities, but also enables us to evaluate the ethical aspects of newly emerging digital solutions. We are currently rolling out the code in the first batch of areas.

In December 2021, the German Association for the Digital Economy (BVDW) and the Bavarian company Bayern Innovative presented us with the Corporate Digital Responsibility Award in recognition of our Code of Digital Ethics. We took first place in the “New Business Models” category.

## Strategic partnership for innovative therapeutic solutions

Since 2021, the DEAP has also been addressing questions arising from [Syntropy](#), a digital joint venture between [Palantir Technologies](#) and our company. This partnership aims to leverage data to advance the discovery of medicines to treat cancer and other diseases. Syntropy enables us to collect data, collaborate and develop new discoveries in a safe, trust-based environment while also ensuring that the institutions that provide the data retain ownership of it. This partnership will facilitate new types of collaboration within the global scientific community in order to drive innovation in cancer research.



# PRODUCTS

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# Sustainable innovation & technology

We are committed to creating solutions that positively impact people and the environment. To this end, we are determined to make discoveries that change the landscape of entire industries and drive technological as well as scientific innovation to solve the most critical issues of today and tomorrow. Customers, investors and regulators across our markets are increasingly seeking sustainable product solutions.

## Our approach to creating sustainable innovation and technology

The sustainable innovation that we envision or drive forward must align with and support the [three goals](#) of our sustainability strategy. We define sustainable innovation as new or improved products, services, technologies, or processes that generate economic benefits and have positive environmental and social impacts. Therefore, we develop **long-term solutions** for our innovation and research activities that consider the entire value chain and evaluate each product's impact over its lifecycle.

Research and development (R&D) play an essential role in further improving our sustainability performance. They are critical elements that determine the sustainability impact of our products, from their initial conception to market launch. Our business sectors create tailored sustainability strategies to develop products that benefit patients and customers. We are also improving the way we measure our progress, which includes the introduction of [sustainability criteria](#) within our product development processes.

In 2021, we partnered with the well-established patent information platform LexisNexis® PatentSight® to assess the sustainability impact of our intellectual property. Building on this, we will start disclosing the share of newly published sustainability-related patent families as of the reporting year 2022.

To develop pioneering solutions that have a positive impact on society and foster organic growth, we are exploring transformative technologies beyond our core products and markets. At the same time, we maintain strategic proximity to our business sectors in order to leverage our existing assets and capabilities. Business model innovation, including digital business models, is one approach we use to generate value for our business and stakeholders.

We fuel transformative technologies through internal incubation, partnerships or strategic investments and collaboration with academia. In addition, we continually seek to foster and encourage [open innovation](#).

## Roles and responsibilities

The organizational set-up of our R&D activities reflects the overall structure of our company. All three of our business sectors operate independent R&D units that pursue their own innovation strategies. **Group Corporate Sustainability** supports our business sectors and group functions to advance and integrate sustainability within our R&D and innovation processes in line with our shared goals.

Our new **Group Science & Technology Office** leads the implementation of our combined strategy for innovation and “data & digital”, enabling innovation across our business sectors while harnessing the power of highly advanced data and digital capacities. It aims to identify and integrate transformative technology trends into our business sectors while maintaining a company-wide view of our tech roadmap and innovation portfolio. In addition, it ensures the strategic fit of our innovation fields. Fostering data & digital is key to accelerating sustainable innovation and enabling rapid action and personalized offerings. Innovation projects are incubated either through our corporate innovation teams or in the business sectors.

Lastly, we are also investing in sustainable solutions via **M Ventures**, our strategic corporate venture capital fund. It complements our Life Science, Healthcare and Electronics business sectors by focusing on investments in two areas of high strategic relevance to our company: digital technology and sustainability.

M Ventures’ sustainability investment strategy follows two fundamental approaches. Firstly, investments that offer sustainable solutions relevant to our three business sectors may include novel solutions for reducing emissions or waste, green life science technologies or green electronics technologies. These solutions may be more energy- or resource-efficient or may create a product that has a lower carbon footprint or is designed for circularity.

Secondly, investments that leverage our core competencies to drive sustainability in other markets may include start-ups addressing sustainable foods, biomaterials or even hydrogen technology. An investment in these kinds of industries or markets would aim to use competencies within our company, such as how our life science technologies can be leveraged for sustainable foods.

## Our commitment: Aiming for circularity

Within our R&D processes, we continuously improve and integrate sustainability KPIs to measure the **sustainability performance of our products and portfolio**. For example, our Life Science business sector developed Design for Sustainability (**DfS**) as well as the **DOZN™** tool to enable the creation of more sustainable products for our customers. In addition, several circular economy initiatives are underway throughout the organization, some of which are in collaboration with external partners.

More information on sustainable product design can be found in the “[Sustainable products & packaging](#)” chapter.

## Accelerating the future of food: Cultured meat

Our Cultured Meat Innovation Field focuses on the biotechnology required to produce genuine meat grown in vitro. This research aims to enable animal protein production that is healthier, more ethical and environmentally sustainable. As a **technology enabler**, we are leveraging our vast life science expertise to realize our vision of providing fit-for-purpose bioprocessing products and services for cultured meat production. In addition to building strong connections and partnerships with start-ups, academia and leading organizations, we are working on innovation projects to address specific technology challenges.



One major hurdle and cost driver in cultured meat production is cell culture media. To achieve production at scale, the media must be cost-efficient, suitable for effective growth and differentiation into specific cell types and free of any animal-derived material such as fetal bovine serum. Our flagship project [MeatDia](#) aims to launch suitable media formulations. We have established multiple **partnerships with leading start-ups** that are developing pilot-scale manufacturing facilities. Our goal is to supply these start-ups with both off-the-shelf basal media formulations and custom-developed species-specific complete media formulations.

Another technological challenge is the need for suitable bioreactor designs for efficient production of the required biomass. To accelerate our innovation projects in this space, we are collaborating with [two leading academic labs](#). Together with a team at Tufts University, Massachusetts, USA, we aim to enable the production of whole-muscle cultured meat through textile bioengineering. At the same time, we will apply industrial printing technology to create of textured meat in collaboration with a team at the Technical University of Darmstadt, Germany.

Our M Ventures portfolio includes Mosa Meat, a pioneer in clean meat movement, and Formo, a company focused on making clean cheeses (such as mozzarella and ricotta) using recombinant protein synthesis.

## Fruitful strategic partnership

We have been engaged in a strategic research partnership with the Technical University (TU) of Darmstadt for more than 15 years. With the realignment of this strategic research partnership in 2021, sustainability is now a fostered focus area of our collaborations. Together, we established the **“Sustainability Hub”** joint research platform. The hub focuses on research topics, including digitalization, alternatives to animal testing and recycling to support our [Sustainability Strategy](#).

## New approaches to life cycle modelling

The detailed life cycle assessment (LCA) of a product and the systematic evaluation of its environmental impact and energy balance from concept to end-of-life is an essential yet challenging process. When successfully implemented, it enables product improvements and contributes to our corporate sustainability goals.

The project **“Faster, easier, better? Life Cycle Modelling in the Information Age”** takes an interdisciplinary approach to addressing the challenges associated with life cycle assessment. This includes data collection and modeling using latest IT-technology for data collection and evaluation. This will be done in the context of political demands for new data, reporting and monitoring.

## Simulation of energy-saving neuromorphic computer architectures

Modern computer centers consume large amounts of energy, but developments around neuromorphic computing have the potential to significantly reduce their energy requirements. Therefore, the project team of **“Energy Efficient Simulation of Energy Efficient Storage (EES)<sup>2</sup> for Neuromorphic Computing”** has set itself the goal of developing energy-efficient simulation tools that predict material properties in energy-saving neuromorphic computer architectures. Successful simulation helps to shorten product development cycles and increase energy efficiency.

## Using 3D bioprinting to create cell culture models

During the development of new drugs and in toxicological studies, a wide variety of in vitro cell culture models as well as [animal experiments](#) are indispensable in order to evaluate the efficacy and safety of active ingredients. However, the use of cell culture models and organ-like structures is currently limited as the systems are not connected to a vascular system that supplies them with oxygen. Therefore, the project team at TU Darmstadt, “**Generation of vascularized human liver tissue by integrating 3D-bioprinting and cellular self-assembly**” is working to create a 3D human liver model that can be supplied with oxygen. Within the scope of efficacy and toxicological studies, these models will behave significantly more like real human organs compared with the existing 3D cell culture models. Therefore, the project makes a valuable contribution to our [4R principles](#) (Reduction, Replacement, Refinement, Responsibility) for reducing or avoiding animal experiments in the future.

## Enabling the enzymatic degradation of plastics

The largest classes of commodity plastics used today, namely PP (polypropylene), PE (polyethylene) and PS (polystyrene), consist of carbon-carbon backbones, making enzymatic degradation very challenging. The project team at TU Darmstadt “**Sustainable Platform Technology for Enzyme-Mediated Recycling of Plastic (EnzyMe RoP)**” aims to enable the degradation of plastics with carbon-carbon backbones by creating novel enzymes tailored to these specific requirements. This is to be achieved by combining rational design and directed evolution technologies. The project will also form valuable synergies with our projects addressing plastic recycling from a whole value chain perspective.

## Promoting visionary research

The 2021 [Future Insight Prize](#) in the Food Generator category focused on food technologies that could help secure sources of nutrition for growing global population. It was awarded during the Merck-sponsored Future Insight Virtual Event to the groups led by Ting Lu, Professor for Bioengineering at the University of Illinois Urbana-Champaign, USA, and Stephen Techtmann, Associate Professor for Biosciences at the Michigan Technological University, USA, for their work on transforming non-edible biomass or plastics into food using microbial consortia. The 2022 Future Insight Prize will recognize achievements in energy technologies that help reverse the effects of climate change.

In 2021, for the first time, we offered sustainability **research grants** to the scientific community to stimulate innovative research on four key aspects of sustainability: circular economy, digitizing sustainability, new bio routes, and responsible & new resources. In total, we received more than 400 research proposals from around the world. Selected projects will receive funding in 2022.

## Synergizing external ideas

Together with **M Ventures**, we reached out to the start-up community with our “**Sustainability Startup Initiative – SuStaIn**” campaign and through active scouting efforts in 2021. The aim was to collaborate with early-stage innovators and leverage the latest technologies to support our company in becoming more sustainable.

# Sustainable products & packaging

We believe it is our duty to not only conserve resources when developing our products, but also to help our customers increase the sustainability of theirs. Packaging protects our products from external influences and ensures they reach our customers undamaged. Therefore, we are optimizing the size, weight and recyclability of our packaging while keeping our products safe and secure.

## Our approach to sustainable product design

Our individual business sectors take different approaches to sustainable product design.

### Life Science

In our Life Science business sector, we aim to reduce adverse impacts of our products on health and the environment. This applies to **the entire life cycle**, from manufacture and use to end of life. At the same time, we seek to make our products more efficient and user-friendly, asking ourselves from the start of product development how to best reconcile these requirements.

Through our Design for Sustainability (DfS) framework, we follow a comprehensive approach to increasing the sustainability of our Life Science products. The “DfS: Development” pillar provides our product developers with a **range of tools** that enable them to analyze product impacts in terms of materials used, energy and emissions, water, packaging, usability, innovation, circular economy as well as supplier- and manufacturing-related issues. We have developed sustainability criteria that can be used to rank a product’s performance in each of these areas. When developing a new product, our aim is to improve on as many of these criteria scores as possible.

To understand the potential environmental impacts throughout the product life cycle, we conduct streamlined product life cycle analyses. The findings from these analyses help us to improve our products and are incorporated into subsequent development stages. Experts from Research and Development (R&D), Product Management, Quality, Procurement, and other departments collaborate along every step of the process.

In 2021, we piloted a **new version** of our “DfS: Development” pillar across various projects and prepared for its official implementation into our product development process, which will begin in 2022. The framework comprises additional criteria and a scorecard system that helps our development teams address and minimize any negative product- and supply chain-related factors and enables us to improve our communication of product sustainability credentials to our customers.

### Healthcare

In our Healthcare business sector, we aim to reduce any adverse impacts our medicines may have on the environment during their development, manufacture, transportation, use, and disposal. We are developing an overarching strategy to make our medicines, our medical devices and their packaging more ecologically sustainable and user-friendly.

At the same time, we are working on advancing environmental compatibility in different phases of the healthcare value chain. For example, in the field of pharmaceutical research, we are working on a project to identify chemical synthesis routes for new drug substances that consume less resources than conventional solutions. In the area of pharmaceutical development, we have defined an ecotoxicological testing strategy that

involves identifying environmental properties of drug candidates early in development. Ideally, we can then use this knowledge to avoid emissions into the air and water.

## Electronics

In our Electronics business sector, we aim to reduce any adverse environmental impacts our products may have during their manufacture, packaging, transportation, use, and disposal.

We view sustainability as a competitive advantage, and we proactively engage in partnerships with our customers to collectively drive more sustainable value creation.

We have complemented our product development process with the principle that it should avoid highly hazardous materials wherever possible. Therefore, we have also prioritized new green and innovative materials that deliver sustainable value to our customers. We are committed to a holistic approach in which we strive to ensure our products are:

- **Sourced responsibly:** We use our membership in the [Responsible Minerals Initiative](#) to support the responsible sourcing of minerals, such as tantalum, tin, tungsten, gold, and cobalt, so that these supply chains make positive contributions to global, social and economic development.
- **Supplied and used** in a manner that minimizes safety and environmental risks: As new products progress through their development cycles, their product sustainability requirements also evolve, including the identification of any physical, health or environmental hazards. We also define the practices for managing these hazards so that our products can be used safely and have a minimal ecological impact.
- **Contributing** to the sustainability goals of our customers: We seek to establish partnerships with our customers so that we can best understand how our activities and products can contribute to their sustainability goals.
- **Reviewed** to determine if more effective greener chemistry alternatives are available: Within this development cycle, a multi-functional team is working to establish a process that increases the emphasis on sustainability and green chemistry aspects.

In 2021, we launched a [project to integrate the assessment of ESG criteria](#) into our R&D portfolio management.

## Our approaches to sustainable packaging

We aim to deliver our products in packaging that is safe and easy for customers to handle, while also working to make it as sustainable as possible.

### Life Science

With more than 300,000 products in our Life Science portfolio – ranging from biochemicals and lab chemicals to filter materials and systems as well as instruments – we face a variety of challenges when it comes to packaging. We strive to improve the sustainability of this packaging to help us and our customers to reduce the environmental impact. Our [SMASH](#) Packaging strategy for Life Science is built upon three pillars: optimizing resources, using more sustainable materials and designing for a **circular economy**. We have set four goals that support these pillars:

- **Shrink:** reduce amount of packaging
- **Secure:** achieve zero deforestation
- **Switch:** improve plastic sustainability
- **Save:** maximize recycling

Based on these goals, we defined targets up to the end of 2022, which address the development of new product packaging and the improvement of existing product and distribution packaging.

New product packaging is where we can achieve the greatest impact. Our approach consists of implementing **new standards and guidelines** that development teams can apply to create more sustainable packaging. Going forward, we will assess the sustainability characteristics of new product packaging based on our [Design for Sustainability](#) scorecard, which was redesigned in 2020.

## Electronics

When introducing new packaging, we use a process that includes a safety review, evaluating package specifications and sizes, shipment frequency, route, carriers, emergency response capabilities, and elements of safety in the supply chain. All product containers undergo a review for chemical compatibility, purity, leak-tightness, and regulatory compliance. The presence of specific hazards and specific container sizes can necessitate a more detailed risk assessment. A packaging reduction and sustainability project for the thin films business offers new opportunities to advance our future sustainability goals. Furthermore, in our specialty gas and thin films businesses, for example, we focus on product packaging that performs well in terms of transportation and handling safety.

## Roles and responsibilities

### Life Science

The Life Science business sector works across its business units to drive holistic sustainability of operations, products and culture. Our structure helps us to implement an ambitious and coordinated sustainability strategy to formalize our processes, governance and goals – helping to embed the strategy into our business and becoming a sustainability multiplier for our customers.

Our sustainability governance structures are as follows:

The Sustainability and Social Business Innovation team within Life Science coordinates the setting of targets as well as monitoring and reporting activities in accordance with our sustainability strategy. This dedicated sustainability team is integrated into and engaged with the business units and their functions. Its role is to reflect and realize business-related activities. We are also creating targeted working groups within the business units that are responsible for aligning their work in accordance with the Life Science sustainability strategy.

### Healthcare

Our Healthcare business sector has integrated sustainability across its R&D and operating units. The implementation of its sustainability strategy is steered by the Healthcare Executive Committee. Any decisions made regarding sustainability objectives are cascaded to the corresponding units, which are responsible for implementing measures to achieve these objectives.

## Electronics

In 2020, we started the process of structuring the sustainability governance of our Electronics business sector. This structure helps us to implement a coordinated sustainability strategy across the business units, manage goals and processes, strengthen our customer relations, and ensure overall accountability within our ESG approaches.

Our sustainability governance structures are as follows:

A new organizational structure within Electronics ensures that our sustainability strategy is being implemented within this business sector. The Electronics Sustainability Council plays a key role as a cross-functional executive committee that oversees and signs off on relevant initiatives within Electronics sustainability programs. A dedicated team coordinates business-related sustainability activities. It includes a monitoring role and drives initiatives that contribute to the scope and targets of our sustainability strategy. Furthermore, dedicated working groups within the business units are responsible for developing individual targets for the business units and implementing corresponding projects.

## Our commitment: Chemicals and product policies

In order to meet the product safety regulations relevant to our company, our Regulatory Affairs Group Policy details **Group-wide processes** for managing and implementing [product safety](#), including the necessary management structures.

## Life Science

Within our Life Science business sector, our strategic platform is founded on a **data-driven approach** to help our experts drive sustainability improvement during the development of products and packaging. Our Design for Sustainability ([DfS](#)) framework is a comprehensive approach aimed at increasing the sustainability of our products, focusing on three areas:

- Our **DfS: Development** pillar focuses on embedding sustainability at the beginning of the R&D process.
- Our **DfS: Consulting** pillar focuses on working with our customers to solve specific sustainability and/or Green Chemistry challenges they face.
- Our **DfS: Re-Engineering** pillar focuses on our established portfolio of products and evaluating how we can quantify and improve the environmental footprint of these products by applying the 12 Principles of Green Chemistry in our process. As of December 2021, more than 1,400 Greener Alternative Products had been made available on our platform.

## Healthcare

Within our Healthcare business sector, chemical product safety is a key sustainability aspect when developing, producing and distributing products. We comply with all relevant legal requirements regarding chemicals regulations, hazard communication and local and regional chemical registration activities.

Our Group-wide policy also incorporates legal norms concerning the transport of hazardous chemicals, biocides, cosmetic ingredients, and products used in food and animal feed. Our Group Label Standard provides a consistent framework for labeling products according to GHS requirements.

More information can be found under [Chemical product safety](#).

## Electronics

Product safety is one of our highest priorities. Starting at the development stage, we investigate the potential adverse impacts chemical substances may have. We meet all statutory requirements along the entire value chain for our chemicals, with our Regulatory Affairs organization ensuring regulatory compliance.

Within our Surface Solutions business unit, our raw materials for the cosmetics industry meet the strict standards of the EU Cosmetics Regulation and are produced in line with Good Manufacturing Practices for Cosmetic Ingredients ([EFFCI](#) GMP).

## Adhering to the Convention on Biological Diversity

We support the general principles laid out in the Convention on Biological Diversity, especially the third objective: the fair and equitable sharing of benefits arising from the use of genetic resources and traditional knowledge in accordance with the terms and conditions of the Nagoya Protocol. This is an international supplementary agreement to the CBD. A key element of this principle is access and benefit-sharing, which ensures that countries providing genetic resources and traditional knowledge also benefit from their use.

We employ a Group-wide standard entitled Access to Genetic Resources. Its objective is to define **requirements, roles and responsibilities** to ensure compliance with the Nagoya Protocol under applicable national legislation. We conduct comprehensive training on this standard across relevant units. In addition, each business sector defines specific procedures to help ensure they meet the requirements of our Group-wide standard.

In 2021, we continued our internal exchange within the Group to ensure cross-business alignment and to deliver ongoing training. These initiatives keep the relevant units informed of any changes to access and benefit-sharing.

## Wide range of solutions

### Life Science: Green chemistry assessment tool

Our proprietary, web-based tool, [DOZN™](#), enables us to evaluate various products and/or processes to identify opportunities for sustainability improvements and provide transparency to our customers. DOZN™ industrializes the 12 Principles of Green Chemistry, a previously theoretical framework, and **rates our products** in three stewardship categories of “Improved resource use”, “Increased energy efficiency”, and “Reduced human and environmental hazards”. DOZN™ 2.0 is the tool’s external interface, allowing our customers and other scientists to make **more ecologically sustainable choices** in their development processes.

In 2021, we established partnerships with universities in Canada, France, India, Switzerland, and the United States to apply the DOZN™ tool in both virtual and in-lab chemistry curricula. Using DOZN™ in an academic setting yields many benefits. Firstly, it increases the overall accessibility and tangibility of Green Chemistry and its principles. Secondly, it provides a practical opportunity to calculate scores for chemical products and processes and further reinforce learning while highlighting the importance of sustainability in the minds of future scientists.

## Life Science: Greener solvents

Switching to bio-based solvents helps our customers reduce their carbon footprint – for example, through our alternative, more environmentally compatible solvent Cyrene™. We are a member of the EU Horizon 2020 project, ReSolute, which started the construction of a new [Cyrene™](#) production facility in 2021. Located in France, the site will help us meet the growing demand for greener solvents.

In 2021, we introduced a large selection of bio-based laboratory chemicals through the USDA BioPreferred® program. These chemicals are certified by the U.S. Department of Agriculture to be derived from plants and other renewable agricultural, marine and forestry materials and to provide an alternative to conventional petroleum-derived products. Such products include sustainable solvents like bio-renewable acetone.

## Life Science: Sustainable laboratory water use

Our Milli-Q® IQ 7000, IQ 7003, and IQ 7010 ultrapure and pure water purification systems use innovative, mercury-free UV oxidation lamps. Thanks to optimized components and processes, and a hibernation mode, they reduce electricity consumption by 22% to 35% compared with previous systems while preserving system water quality. The systems also reduce water consumption between 7% and 13%. Our innovative IQnano® ion-exchange media has reduced plastic consumption by 33% in the purification cartridges for the Milli-Q® IQ7000 and IQ7003 systems.

## Life Science: Less plastic in cell culture creation

Our greener alternative to our Stericup® sterile filtration system, the Stericup® E, allows our customers to connect the bottle containing the sample being filtered directly to the Stericup® E filtration unit, thus avoiding the use of a plastic funnel. Depending on the product version, the Stericup® E can **reduce the amount of plastic** used by up to 48% and the volume and weight of plastic and corrugated packaging by up to 69%. The unit of sale is then lighter and smaller, which leads to a reduction of CO<sub>2</sub> emissions during transportation. It also takes less space to store the product at our distribution centers or at customers' facilities, while further reducing the volume and cost of waste disposal (including biohazardous waste) for our customers. Taking the entire life cycle into consideration, this approach can reduce the global warming potential of the sterile filtration unit by up to 46%. Across all product versions since their launch, we have prevented 1.9 metric tons of plastic and corrugated cardboard from entering our customers' laboratories.

## Life Science: Expanding product recycling

We continue to expand our biopharma recycling program, where we collect product waste from research labs and biopharmaceutical manufacturing operations and **recycle it into plastic lumber**. This material can be used in many industries, such as landscaping, transportation and marine construction. The program now serves 16 major biopharma manufacturing customers and since its launch in 2015, has recycled more than 6,700 metric tons of plastic waste, which has reduced emission of CO<sub>2</sub>eq by approximately 4,400 metric tons.

We are continuing to expand this program throughout the United States, while exploring new options and recycling technologies in other regions, such as Europe and Asia. By assessing advanced recycling technologies and collaborating across multiple industries we will develop innovative **circular economy** programs.



## Electronics: Sustainability in product design

In 2021 we started to systematically incorporate sustainability into our portfolio management process.

In one project, for example, sustainability criteria are developed and incorporated into the product development process from the outset. All ESG-relevant aspects of our materials and solutions will be identified and taken into account at each and every stage. The collection and evaluation of research, development and manufacturing metrics and their application within an ESG context are also in focus as they provide facts and information that can be used for the sustainable design of new manufacturing processes.

## Electronics: Colloidal silica

Over the past decade, our semiconductor materials customers have increased their efforts to use more environmentally sustainable materials in their chip manufacturing and improve the performance of their computer chips while lowering costs. We have responded to this challenge by developing **next-generation colloidal silica products** using at least 30% less colloidal silica. This advancement reduces the volume of product needed, which in turn shrinks our environmental footprint. Customer feedback on the products is promising. Together, we are working to improve production efficiencies and reduce the use of colloidal silica even further.

## Electronics: NMP-free removers

The production process for semiconductor devices requires numerous cleaning steps to remove the photoresists used to pattern the circuit design. These cleaning methods require complex solvent chemistries that selectively remove these photoresists without damaging the sensitive electronic components.

However, the most effective solvents pose a significant environmental hazard. For example, NMP, a mainstream solvent common in wafer cleaning processes, is highly toxic and is classified as an SVHC (Substance of Very High Concern) under the European Union's REACH regulation. Therefore, we are continuously working to develop new cleaning chemistries. We are launching a series of **green cleaning solvents** that are TMAH- and DMSO-free while still being effective in removing thick photoresist (both liquid and dry) film plus AZ Remover 910 and Dynastrip 5008, Dynastrip 8889 and Dynastrip 8070T.

## Electronics: PFAS replacement program

PFAS (per- and polyfluoroalkyl substances) feature unique chemical properties and are widely used in our daily lives. However, there is strong evidence that exposure to PFAS can lead to adverse health outcomes in humans. Therefore, over the last decade, international regulations have started focusing on PFAS as chemicals of concern. They have become known as "forever chemicals" due to their extremely long lifespans.

Chemical products containing PFAS are essential in today's electronics manufacturing processes. Therefore, PFAS pose a serious dilemma for the electronics industry as emerging global regulations trend towards restricting the use of PFAS in the future.

We are committed to intensifying our R&D efforts to actively drive a PFAS-related substance replacement program. As a trusted partner in the electronics industry, we are working closely with our customers and providing information throughout this process.

## Electronics: Dynamic liquid crystal glazing

Liquid crystal dynamic window glazing adjusts its tint level within seconds according to the weather conditions. The self-darkening glazing regulates glare and solar heat gain effectively without blocking the view. As a result, it increases the occupants' visual and thermal comfort while simultaneously lowering air conditioning and lighting energy consumption by up to 10% compared with conventional shading. We offer these products under the [eyrise®](#) brand. A [Sustainable Business Value study](#) found building occupants have higher productivity and take less sick leave where [eyrise®](#) products are installed.

## Electronics: Shifting to more natural cosmetic ingredients

We are working closely with our partners in the cosmetics industry to find solutions for more naturally based cosmetic ingredients. The resulting cosmetic formulations comply with strict criteria. At the end of 2021, 77 of our cosmetic pigments and active ingredients had been confirmed to comply with Ecocert's COSMOS standard for organic and natural cosmetics. We have also obtained **halal certificates** for all our cosmetic ingredients.

## Electronics: Vegan cosmetic products

A growing number of consumers view the use of non-animal and non-animal derived ingredients, vegan and plant-based raw materials as a critical product attribute. Therefore, more than 90% of our cosmetic raw materials, including our special effect pigments and functional fillers, contain no components of animal origin, by-products or derivatives, and are thus suitable for vegan cosmetics.

# Making product packaging more sustainable: Life Science

Within the scope of our SMASH Packaging sustainable packaging strategy, we are pursuing a number of projects for the Life Science business sector:

## How product design affects packaging: ZooMAb®

Most traditional antibody products need to be shipped at temperatures between 2 °C and 8 °C, using specific insulated shipping containers with wet ice bricks. This results in high packaging material consumption and transport emissions. Our [ZooMAb®](#) antibodies were developed as a freeze-dried product, giving them improved storage stability and allowing them to be shipped at ambient temperatures. This makes it possible to eliminate the use of expanded polystyrene (EPS) coolers and ice bricks, resulting in significant packaging weight reductions for product shipments. In 2021, it allowed us to avoid the emissions of 9 metric tons of CO<sub>2</sub>eq.

## Shrink: How we minimize the amount of packaging

We seek **eco-friendly alternatives** for shipping our products safely, which is why we have partnered with a biotech company and jointly developed a more sustainable bulk packaging design for the transport of our [Millistak+®](#) Pod Disposable Depth Filters. A life cycle assessment showed that we achieved a 24% reduction in the corrugated cardboard used, which translates to a 17% decrease in greenhouse gas (GHG) emissions throughout the life cycle of the packaging materials. In 2021, we saved around 12 metric tons of corrugated cardboard, and our customers now spend 70% less time opening and disposing of the packaging.

In 2021, we launched new bulk packaging designs for a subset of our Durapore® and Millipore Express® filter cartridges. Dedicated to high-volume clients, these solutions deliver both environmental and economic benefits to our customers compared with traditional individual or multipack packaging. As an example, changing from 3-pack to new bulk packaging for our 10" filter cartridges reduce the amount of corrugated cardboard by 55%. This translates to a 49% decrease in GHG emissions throughout the life cycle of these packaging materials. In addition, our customers spend approximately 50% less time unpacking, providing additional economic savings.

In 2021, we also initiated a pilot project to eliminate the use of transparent plastic envelopes that store packing slips on the outside of shipping boxes. While this seems like only a small change, it can deliver significant environmental and operational savings, from the plastic envelope itself to the time needed to attach it to the box. Our estimates suggest that once we implement this practice globally, eliminating these plastic envelopes could save 20 metric tons of plastic waste and over 80 metric tons of CO<sub>2</sub>eq per year.

## Secure: How we are moving towards zero deforestation

A large proportion of our packaging consists of fiber derived from wood. As part of our SMASH Packaging strategy, we have set the goal of ensuring none of our wood or fiber-based packaging materials contribute to deforestation.

We assess the practices of our suppliers and the characteristics of our packaging annually in order to measure our progress towards our zero deforestation ambitions. This also enables us to identify opportunities to increase the volume of recycled material and the percentage of packaging we use with **sustainable forestry certifications**, which are awarded in line with sustainability standards developed by the Forest Stewardship Council ([FSC](#)), the Program for the Endorsement of Forest Certification Schemes ([PEFC](#)) and the Sustainable Forestry Initiative ([SFI](#)).

In 2021, we collected information from our strategic suppliers who represent about 85% of our fiber-based packaging materials spending. Overall, by volume, around 80% of corrugated packaging supplied by these companies is certified by at least one of the three sustainable forestry standards or is made of recycled material.

## Switch: How we substitute plastics

In the past, we used insulated containers made of expanded polystyrene (EPS) for the shipment of our chemicals in glass bottles and our temperature-controlled products. While EPS offers good insulation and cushioning properties, it is a petroleum-based material that takes hundreds of years to decompose. As the options for recycling EPS are limited, it is generally incinerated or sent to landfill. Our goal is to **reduce our use of EPS by 20% by end of 2022**.

Wherever possible, we are replacing EPS with molded components made of cellulose and recycled paper pulp. Our molded pulp components can be easily recycled with other paper materials and **compacted together** for storage and transport. We use molded pulp inserts to pack a variety of liter bottle configurations in shipping boxes, thereby replacing around three million EPS parts per year.

In 2020, we began implementing an alternative cooler at one of our distribution centers in the United States to replace EPS in our cold-chain shipments. The Greener Cooler is made from renewable resources and is certified recyclable with corrugated materials. While the results of the pilot implementation were positive, in 2021 we re-analyzed the characteristics and requirements of the various insulated shipping containers used in our main U.S. sites to define a comprehensive validation plan.

Aqueous solutions are usually supplied in plastic bottles. We use Titripac® because it offers an ecologically sustainable alternative. The cardboard carton and plastic liner with an integrated withdrawal tap have made the packaging lighter and more recyclable. Since the withdrawal tap protects the product against contamination, customers can now use the entire contents and reduce chemical waste. In 2021, our products sold in Titripac® 10L packaging configurations avoided non-renewable packaging materials by 15.5 metric tons, resulting in a reduction of 73 metric tons of CO<sub>2</sub>eq emissions across the life cycle of the packaging compared with 1L plastic bottles.

## Save: How we maximize recycling of packaging

Many of our Life Science products need to be kept cool during shipping and are therefore packaged in special EPS boxes. To **mitigate waste**, we offer our customers in the United States the option of returning these boxes to us, and if they are still fully functional, we reuse them. In 2021, this amounted to approximately 9,000 boxes that were reused at least once, making it possible to save 2 metric tons of EPS.

## Making product packaging more sustainable: Healthcare

We are in the process of developing a sustainable packaging strategy for our Healthcare business. The solutions we offer will ensure the safe and secure delivery of products to our customers while decreasing the environmental footprint of our packaging.

### Slim packaging solutions

In 2021, we launched new slim packaging for Pergoveris®, Gonal-f® and Ovidrel® fertility pens, which is smaller in size and **free of single-use plastics**. With this new packaging, we have reduced the environmental footprint of these products by using fewer raw materials and reducing transport volumes. We project this new packaging can reduce transport-related emissions by approximately one third, or the equivalent of 360 metric tons of CO<sub>2</sub>eq (WTW) per year.

Additionally, in 2021, we initiated several studies to investigate the reduction of packaging materials and develop reuse options for medical devices.

## Making product packaging more sustainable: Electronics

Our Electronics business sector uses a variety of packaging types, each tailored to the specific needs of the individual business fields and with its own unique sustainability characteristics.

### Reusable packaging

Packaging for our specialty gas and thin films products is designed to be reused. Reusable packaging types include various sizes of cylinders and tube trailers for bulk specialty gases, along with smaller stainless steel and quartz containers for thin films. Once our customers have used the product within the container, the used containers are returned to our production facility for cleaning, refurbishment and refilling. This cycle greatly reduces the number of containers to be disposed of. It reduces the demand for construction of new containers and the associated resource requirements, thus moving us **closer to a circular economy**.

### Recyclable packaging

For large quantities of products in our planarization business, we use totes for packaging. Totes are typically made of high-density polyethylene. One of our main tote suppliers has a recycling program in place that our customers can also use. Each tote from this supplier has a return ticket attached to it, and the supplier picks up the used tote so that its parts can be reused or recycled.

### Redesign packaging labeling approach

Plastic packaging generates almost half of the world's plastic waste. With Iriotec® 8000 pigments, we enable inkless printing with contact-free and durable laser marking technology, making it possible to label plastics which can be traced and recycled more easily afterwards and restores value to the used plastic packaging.

The laser marking provides a unique identifier and serves as a "digital product passport" as the link between product and database. It can replace ink and labels, thus enabling even better recyclability. Laser marking is a unique, sustainable, reliable, durable, and economic way to achieve an individual mark for any plastic product and can be used for plastic packaging, automotive components, cables, or electronic devices.

# Health for all

## Global health

At least half of the world's population does not have adequate access to health. Therefore, we are striving to innovate, make health solutions affordable and accessible, raise awareness about diseases, and help people learn how to manage them. We work with partners to tackle these complex challenges.

### Our approach to improving health for all

Our overarching aim is to create a healthier future for all. We are committed to advancing global health and to using our scientific and technological innovation to improve the health of underserved populations in low- and middle-income countries.

Our [Global Health strategy](#) focuses on diseases that disproportionately impact underserved populations. These include neglected tropical diseases (NTDs) that are largely unknown in industrialized nations and attract little attention or funding. Our strategy also aims to improve patient access to medicine in low- and middle-income countries, including for non-communicable diseases. The goals of our Global Health strategy are:

- To eliminate **schistosomiasis** as a public health problem.
- To prevent and control **malaria** to the point of elimination.
- To prevent and control **high-burden non-communicable diseases** (NCDs), such as diabetes and hypertension, in low- and middle-income countries.

Our strategy is designed to improve health and overcome access barriers in an economically viable and sustainable way, thereby creating shared value for patients, society and our company. For us, this means developing business models that increase our company's value and competitiveness by **solving unmet health needs** and strengthening local health systems.

We follow three core operating principles:

- **Developing innovative solutions:** We develop new medicines, diagnostics, and vector control solutions for schistosomiasis and malaria through an integrated science and technology approach.
- **Engaging with cross-sector partners:** We participate in multi-stakeholder global health platforms to help achieve our goals and support the UN Sustainable Development Goals. We define partnerships for the implementation of treatment programs on the ground, for research and development programs and use access alliances.
- **Creating sustainable business models and opportunities via a shared value approach:** We strive to ensure that investments reach underserved populations. We leverage our portfolio from across our three business sectors to help sustainably improve health.

We also engage in [building capacity and expertise](#) across the value chain, with the intent of strengthening health systems and making them more resilient to health crises.

## Eliminating schistosomiasis as a public health problem

Schistosomiasis, also known as bilharzia, is a tropical disease caused by parasitic worms. It is one of the most prevalent parasitic infections in sub-Saharan Africa and places a significant burden on public health systems and local economies. The disease affects [almost 240 million people](#) worldwide, with more than 90% of cases occurring in sub-Saharan Africa. It **kills an estimated 200,000 people** every year.

The ultimate aim of our schistosomiasis-related work is to eliminate the disease as a public health problem in accordance with the [WHO NTD roadmap 2021-2030](#). We remain committed to the objectives of the London Declaration and support its successor, the [Kigali Declaration](#) on NTDs, through which participating companies, governments and private organizations commit to helping control and ultimately eliminate the twenty most prevalent NTDs, including schistosomiasis.

To achieve this goal, we adopted an integrated schistosomiasis strategy, which we are implementing in close collaboration with multiple partners worldwide. The approach focuses on five pillars:

- **Treatment:** We donate up to 250 million tablets of praziquantel to endemic countries every year in partnership with [WHO](#). Nearly 50 years after its development, praziquantel remains the standard of care for the effective treatment of schistosomiasis around the world.
- **Research and Development (R&D):** We advance R&D to support the global fight against schistosomiasis. In particular, we drive collaborative R&D programs for innovative health solutions, new drug discovery activities, the development of new treatment options for children under the age of six, and new and more sensitive diagnostics. We are also strengthening [research expertise and capacity](#) through our collaborations with institutions in endemic countries.
- **WASH** (Water, sanitation and hygiene): Since schistosomiasis is transmitted through contaminated water sources, we also support WASH projects that aim to prevent transmission of the disease by providing a sanitary infrastructure and new access-to- water technologies.
- **Health education:** We believe prevention is the most effective health intervention. Therefore, we invest in education and behavior change initiatives to raise awareness of the causes and dangers of schistosomiasis and teach people how to prevent it.
- **Advocacy and partnerships:** We are accelerating the progress towards schistosomiasis elimination by collaborating with partner organizations for our programs and initiatives as well as with the wider stakeholder community through the Global Schistosomiasis Alliance ([GSA](#)).

## Preventing and fighting malaria to support elimination

According to World Health Organization (WHO) estimates, nearly half of the world's population is at risk of contracting malaria. More than [200 million cases of malaria](#) and over 400,000 related deaths are recorded every year, with almost 70% occurring in children under the age of five. Over 90% of cases and deaths occur in Africa. Around the world, a child dies from the disease every [two minutes](#).

There is a need for new products to overcome the problem of increasing drug resistance and to achieve the goal of elimination. Through our **"As One Against Malaria" program**, we are helping to deliver integrated and sustainable health solutions involving treatments, diagnostics and preventive measures to fight malaria in endemic countries.

## Our Access to Medicine approach

We implement and support global health partnerships and shared value initiatives that improve access to our health solutions in low- and middle-income countries. By delivering quality health solutions, our Access to Medicine approach **addresses local needs** and helps to create long-term value for patients, our business and our stakeholders.

We continually seek to create sustainable business model opportunities that address gaps in public health systems. We recognize that we cannot eliminate the complex barriers to health access in emerging markets alone, which is why we form and enter partnerships for initiatives that complement our strategy. We apply this approach to neglected diseases, such as schistosomiasis and malaria, as well as to NCDs with high prevalence in these countries, such as diabetes and hypertension.

## Roles and responsibilities

Our Global Health organization leads the implementation of our strategy regarding innovative solutions for infectious diseases and access to health in underserved populations. This unit is also responsible for Group-wide initiatives, programs and sponsorships relating to global health topics. Our experts collaborate closely with the Life Science, Healthcare and Electronics business sectors to leverage their strengths and competencies effectively.

Our [Schistosomiasis Elimination Program](#) guides our efforts to eliminate schistosomiasis in **close collaboration with external partners**, such as the World Health Organization (WHO).

Our [Global Health Institute](#) translates science, technology and digital approaches into integrated solutions to strengthen health systems. It uses a portfolio of projects for transformative treatments, diagnostics, technologies, and preventive measures against neglected tropical diseases, focusing on schistosomiasis and malaria.

Our [Access to Health](#) unit enables access to our company's health portfolio in low- and middle-income countries through shared value initiatives that it implements in collaboration with our country teams.

## Our commitment: Providing a solid basis for access to health

Our commitment to expanding health access is summarized in our [Access to Health Charter](#). It sets out the following guidelines on:

- [Our approach](#)
- [Pharmaceutical product donations and philanthropic activities](#)
- [Falsified medicines](#)
- [R&D for infectious diseases](#)
- [Equitable pricing in low- and middle-income countries](#)
- [Intellectual property rights](#)
- [Sustainable supply chains](#)



Every two years, the [Access to Medicine Foundation](#) publishes the [Access to Medicine \(ATM\) Index](#). It benchmarks 20 of the world's largest research-based pharmaceutical companies on activities and initiatives that experts consider most relevant for access to medicine in low- and middle-income countries, ranging from research & development and intellectual property sharing to capacity building and donations. We use this ranking system to inform and guide our access to health strategy.

The latest Index was published in January 2021. We ranked eighth and remain among the top ten companies, confirming our commitment to continuously improving sustainable access to high-quality health solutions for all. In addition, the ATM Index for 2021 **recognized us for our performance in research & development**, where we ranked fifth. The index also acknowledged our leading role in intellectual property sharing.

## Fighting the global Covid-19 pandemic

Our Global Health unit is spearheading a wide range of initiatives to combat the SARS-CoV-2 virus and its impact on the world's most vulnerable countries. These efforts include direct measures, such as donating masks and protective equipment to Ethiopia and Zimbabwe, as well as more long-term sustainable initiatives (such as in Ghana) that **strengthen the overall resilience of health systems** against current and future health crises.

Read more about our contribution to this global challenge [here](#).

## Eliminating schistosomiasis: Five pillars

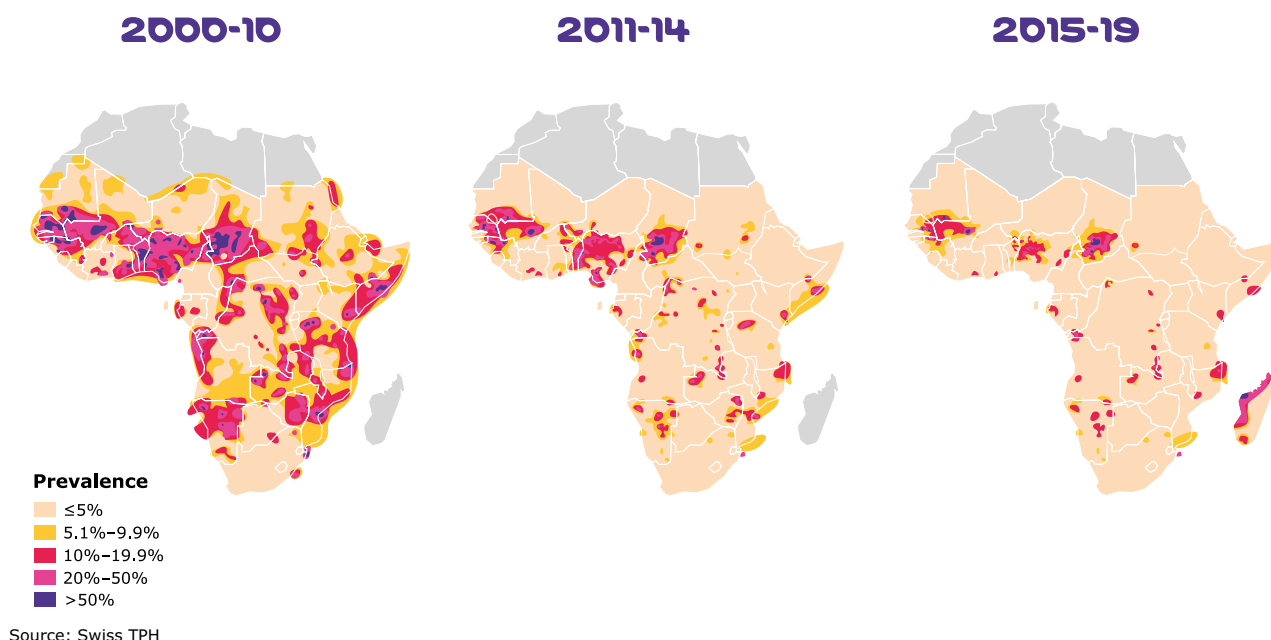
To contribute to the elimination of schistosomiasis, we adopted an integrated approach based on five pillars: Treatment, Research & Development, WASH, Health Education, and Advocacy & Partnerships.

### Treatment

As part of our long-standing partnership with WHO, we are committed to donating up to 250 million praziquantel tablets every year. The donation is a major part of the integrated and coordinated approach we have adopted towards treating and eliminating schistosomiasis. Since 2007, we have provided **more than 1.5 billion tablets** to WHO for the treatment of schistosomiasis. To date, our tablets have been **distributed in 47 endemic African countries** to treat school-aged children. In 2021, we donated around 182 million tablets for distribution in 32 countries, 30 of which are in sub-Saharan Africa. Moreover, we maintain our commitment by ensuring we have sufficient production capacity to manufacture up to 250 million tablets per year.

Our efforts are showing very promising results. Data published by the Swiss Tropical and Public Health Institute ([Swiss TPH](#)) in December 2021 show that the estimated prevalence of schistosomiasis in school-aged children in sub-Saharan Africa decreased by almost 60% between 2000 and 2019.

## Decreasing estimated prevalence of schistosomiasis on the African continent



## Research and development

Working in partnership with the [Pediatric Praziquantel Consortium](#), we developed a **potential new schistosomiasis treatment** option for pre-school-aged children called arpraziquantel. The pivotal clinical [Phase III trial](#) was successfully completed in Côte d'Ivoire and Kenya and the program has now proceeded to the regulatory filing stage. In 2021, we signed a [manufacturing agreement](#) with Universal, a contract manufacturer in Kenya, for the large-scale production of the treatment upon its registration. The consortium has also launched an access initiative to prepare for deliveries of the new medicine to young patients in need.

In 2021, we also made progress on investigating a new generation of drugs to prevent and cure schistosomiasis. We identified a new candidate, which entered early drug development. In addition, together with researchers from the Medical College of Wisconsin (USA), we [described for the first time](#) the presumed mode of action of praziquantel. We also signed a memorandum of understanding with our partners, the Drugs for Neglected Diseases initiative ([DNDi](#)) and the Swiss Tropical and Public Health Institute ([Swiss TPH](#)), with the aim of combining our efforts on drug discovery, development and access activities.

More **sensitive diagnostics** to detect cases in low-endemicity settings are needed for the effective management and surveillance of schistosomiasis and are critical for the elimination of this disease. We continued our collaboration with the Foundation for Innovative New Diagnostics ([FIND](#)) and a [consortium of partners](#) to develop a sensitive rapid diagnostic test to improve schistosomiasis mapping and case detection. In 2021, our [strategic partnership](#) with Janssen Pharmaceuticals evolved into a new consortium of partners to accelerate the development of an artificial intelligence-based diagnostic tool for the diagnosis and surveillance of schistosomiasis and soil-transmitted helminthiasis.

Our research & development programs integrate and invest in scientific, educational and training initiatives as well as activities that enhance capacity in low- and middle-income countries.

More information can be found in the chapter [Building health capacity and awareness](#).

## WASH

In 2021, we started a collaborative access to water program in Ghana. It encompasses an implementation research study to analyze water, sanitation and hygiene in 200 healthcare facilities as well as the quality of water in selected districts. Moreover, it aims to improve the healthcare infrastructure to provide safe water services to health centers as well as to train health workers on schistosomiasis case management.

## Health education

In 2020, we extended our partnership with the [NALA](#) Foundation by an additional three years. This joint health education project – including WASH activities – focuses on southwestern Ethiopia. It aims to promote **long-term sustainable behavioral changes** via a community-based approach in the drive to eliminate schistosomiasis and other neglected tropical diseases.

Despite the challenges, including the Covid-19 pandemic, security issues and political instability, the reopening of schools enabled NALA to resume regular activities in 2021. These included the implementation of school-, community- and WASH-based interventions. An impact evaluation in two of the target districts showed a meaningful decrease in the prevalence of schistosomiasis since the start of the program in 2017: It decreased from 28% to 11% in Mizan Aman, and from 11% to 8% in the southern Bench zone.

More information can be found in the chapter [Building health capacity and awareness](#).

## Advocacy and partnerships

We work with international and local partners to advance the agenda for schistosomiasis control and elimination. For example, the Global Schistosomiasis Alliance ([GSA](#)) is a coordinated, multi-sectoral effort to combat the complex disease schistosomiasis. In early 2021, WHO released its new NTD roadmap, which sets global targets and milestones to prevent, control, eliminate or eradicate 20 neglected tropical diseases and disease groups between 2021 and 2030. The GSA contributed to WHO consultations during the roadmap conception phase.

## Malaria: Treatment and prevention

### Developing new therapeutic solutions

As part of our “As One Against Malaria” program, we are developing a new drug (M5717) for the prevention and treatment of malaria. In 2021, we completed a Phase Ib clinical trial to test the compound’s ability to prevent the disease and [published the data](#). The project is now progressing to Phase II (proof of concept) for both the treatment and prevention of malaria. In addition to our clinical program, our collaborative drug discovery activities are delivering promising candidates that are progressing into the preclinical stage.

### Preventing and controlling malaria transmission

Preventive methods such as the use of insect repellents form part of the strategic toolkit to combat malaria. We are testing our insect repellent IR3535® for malaria. It is already used for protection against insect and tick bites that can transmit diseases such as [Lyme disease](#), [Zika](#), [dengue fever](#) and [chikungunya](#).

Through laboratory tests conducted in Ghana, we are evaluating the efficacy and acceptance of a **new formulation of IR3535®** that is expected to provide longer-lasting protection. Positive results would enable IR3535® to serve as a preventive measure for personal use and a large-scale vector control method to support population-based national malaria control programs.

In partnership with local institutions in Africa, we have established PAVON (Pan-African Vivax and Ovale Network), a network of centers of excellence for the epidemiological surveillance and scientific research on malaria.

## Sustainable access to medicines in low- and middle-income countries

To prevent and control high-burden non-communicable diseases (NCDs), we invest in access initiatives that address health system gaps in low- and middle-income countries. We adopt a partnership approach to maximize our impact within this complex and challenging environment.

One initiative supports our country teams in low- and middle-income countries to create and accelerate innovative business models that improve medicine access. The “India Fights Back for Head & Neck Cancer” public-private partnership between our company, the Indian Employees’ State Insurance Corporation and India Railways was established in 2021 as part of this initiative. It enables patients to receive faster access to early diagnosis and the right care and treatment.

Our **collaborations in Africa** to establish robust and sustainable supply chains are also crucial for ensuring safe, effective and continuous healthcare delivery. Our Access Mentorship program, in which expert volunteers from our Global Supply Network Organization share their knowledge with local African distributors, demonstrates our commitment to improving supply chain operations and increasing access to health.

We have also developed an evaluation ecosystem to track the impact of our access programs on patients, healthcare providers and health systems. It enables us to monitor our progress over time and to integrate recommendations from ESG ratings, such as the Access to Medicine Index, into our strategy.

## Engaging stakeholders

Partnerships and dialogue are critical to addressing global health challenges and to improving access to health. Our partners include multinational organizations, government agencies and NGOs as well as academic institutions, health industry associations, private companies, and independent global health experts.

In 2021, we continued to engage with our partners and key stakeholders, including [WHO](#), to advance global health discussions and address shared challenges, such as neglected tropical diseases. We collaborate with partners such as [WIPO](#) and [DNDi](#) as well as with academia in African countries. We engage in consortiums of partners, such as the [Pediatric Praziquantel Consortium](#), alliances, including the [Swiss Malaria Group](#), and advocacy groups, such as [Uniting to Combat NTDs](#) and [GSA](#). In addition, we closely interact with foundations that support scientific research and health access, including the [Bill & Melinda Gates Foundation](#) and the [Access to Medicine Foundation](#).

We also strengthened our **collaborations with the scientific community** through publications, patents and taking on active roles at international events. In 2021, we attended meetings of the Coalition for Operational Research on Neglected Tropical Diseases ([COR-NTD](#)) to address the spread of misinformation about NTDs. We also took part in the 12th European Congress on Tropical Medicine and International Health (ECTMIH), which discussed the current state of R&D in NTDs. We also presented our collaborative research and development projects on schistosomiasis at the 10th European and Developing Countries Clinical Trials Partnership ([EDCTP](#)) Forum.

## Open innovation sharing

We consider it our responsibility to improve global access to health through our technological advances. We support a reliable and transparent legal framework for intellectual property that enables sustainable investment in research and development.

### Our approach to sharing and protecting intellectual property

The responsible treatment of intellectual property is not a barrier to health, but rather ensures **safety and high quality** for patients worldwide. Almost none of the medicines that address the highest burden of disease in low- and middle-income countries are protected by patents. Studies indicate that between 90% and 95% of the pharmaceutical products on the [WHO Model List of Essential Medicines](#) are off-patent.

We support a sustainable [approach to intellectual property](#) that drives innovation and enables access to health. We are committed to **refraining from enforcing patents** in a majority of low- and middle-income countries. In markets where we do register product patents, we are transparent and committed to sharing data to the greatest possible extent and improving public access to clinical study data. We report on the patent status of our products via the publicly accessible database [Pat-INFORMED](#). Furthermore, we support voluntary licensing agreements of all kinds, including non-exclusive voluntary licenses, legally binding non-assertion covenants and clauses that aim to widen access to health.

Moreover, we support the concept of patent pools and believe that these should be structured to improve access to medicines, prevent anti-competitive behavior and overcome geographic limitations. We consider joining **patent pools** that are relevant to our portfolio and meet all our efficacy, quality and safety requirements.

We provide access to patent information via our initiatives and partnerships. Through our [open innovation research projects](#) for global health, we grant access to small sections of our chemical compound libraries. In doing so, we aim to accelerate collaborative research programs that develop novel R&D platforms in search of new active ingredients for infectious diseases.

## Roles and responsibilities

Our Open [Innovation](#) initiatives are collaborative and cross-functional efforts that serve the exchange of intellectual property. We aim to catalyze and accelerate early discovery in diseases with high unmet needs through intellectual property sharing. We hope to foster the discovery of new generations of health solutions that will address the needs of the most vulnerable populations, with a primary focus on the neglected tropical disease schistosomiasis and on malaria.

## Our commitment: supporting transparent and reliable frameworks

We support [TRIPS](#), an international agreement administered by the World Trade Organization ([WTO](#)), which addresses trade-related aspects of intellectual property rights, as well as TRIPS addenda, such as the Special Declaration on the TRIPS Agreement and Public Health. This agreement extends the deadline for least developed countries to apply TRIPS provisions to pharmaceutical patents until 2033.

### Initiative improves access to patent information

We are a founding member of the Patent Information Initiative for Medicines ([Pat-INFORMED](#)), a global gateway to medicine patent information. Pat-INFORMED features patent information on **small-molecule drugs** for cardiovascular diseases, diabetes, hepatitis C, HIV, cancer, and respiratory disorders as well as any products on the [WHO Model List of Essential Medicines](#) that are not within these therapeutic areas.

### Open innovation collaboration through WIPO Re:Search

We are member of the [WIPO Re:Search](#) Consortium. The initiative aims to create **new solutions** for people affected by neglected tropical diseases, malaria and tuberculosis. It also enables the **transfer of knowledge** and expertise to institutions in low- and middle-income countries.

### Creating research opportunities

Our [Open Global Health Library](#) publicly shares 250 compounds from our proprietary chemical library that may be used for infectious diseases research. In 2021, the library was accessed 20 times for screening in 17 indications.

### Schistosomiasis research grants

We are dedicated to accelerating innovation and advancing science for the most neglected populations. That is why we catalyze research in an open innovation spirit and with the intention of reducing financial hurdles. Through our [Schistosomiasis Research Grant Initiative](#) established in 2021, we awarded 15 research projects with € 30,000 each. More than 70% of the participants came from low- and middle-income countries.

### Drugs for Neglected Diseases initiative

Under the leadership of the Drugs for Neglected Diseases initiative ([DNDi](#)), we, along with other pharmaceutical companies, are involved in the [Drug Discovery Booster](#) project to discover novel medicines against neglected tropical diseases. In October 2021, we signed a memorandum of understanding with DNDi and the Swiss Tropical and Public Health Institute. It covers the areas of drug discovery and development as well as access activities in the field of schistosomiasis.

More information on our collaborations regarding open innovation for global health can be found on our [website](#).

## Prices of medicines

In 2019, pharmaceuticals accounted for between 7% and 34% of total health spending by OECD countries. However, advances in the research and development of innovative medicines are significantly transforming the healthcare landscape, allowing chronic diseases – the greatest cost drivers – to be treated more effectively and affordably.

### Our approach to pricing medicines

To help ensure that all patients have access to the most effective medicines for their needs, we are working to prevent cost from becoming a barrier to treatment. Therefore, we adapt our medicine prices according to people's ability to pay in different geographical or socioeconomic segments.

We are committed to **fair, flexible and sustainable pricing** – both within and across countries. We therefore adapt our prices based on local market considerations, such as unmet medical and treatment needs, health system capacity, infrastructure, and education standards. This approach involves working closely with governments and other stakeholders. In addition, we continuously monitor dynamic healthcare environments and markets, pricing and reimbursement systems as well as legal and regulatory guidelines, adjusting our prices as necessary.

We conduct price analyses annually to validate price thresholds and provide guidance on local pricing to our subsidiaries for the following year to ensure they meet patient access needs, taking a **consistent, data-driven approach**. We also make our products affordable to patients in low- and middle-income countries with an equitable value and access strategy that includes participating in government tenders, providing flexible pricing, establishing high-quality affordable brands or branded generics, and operating patient access programs.

Furthermore, we support innovative risk-sharing agreements and are working to improve data efficiency in health systems in order to achieve an optimal distribution of funds and resources.

## Roles and responsibilities

Our Global Market Access and Pricing unit evaluates market launch prices in coordination with the respective franchises. The team reports directly to a member of our Healthcare Executive Committee. The GMAP unit systematically evaluates and applies our medicines portfolios for equal access initiatives. Our local affiliates are responsible for managing prices and adapting them to evolving local conditions in compliance with our pricing governance and the defined price approval process.

## Our commitment: Medicine price guidelines and principles

The affordability of our health solutions is part of our broader patient value proposition. Our medicine pricing adheres to the stipulations of our overarching [Access to Health Charter](#) and is defined in detail in an internal guideline. Additionally, our Patient Access Programs Policy sets out standards for offering medicines at affordable prices.

## Value-based contracting models

We are committed to advancing value-based healthcare through pricing and contracting mechanisms that fully comply with all applicable local laws and regulations. In collaboration with payers, such as health insurance companies, we have developed various product- and market-specific reimbursement and contracting models. These help to provide patients with prompt **access to our innovations**.

In Germany, Ireland and the United Kingdom, we continued in 2021 with innovative risk-sharing agreements that provide immediate access to Mavenclad® for patients with multiple sclerosis (MS). In addition, we expanded the value-based contracting model for Mavenclad® to ten more countries in Asia, Europe, Latin America, and the Middle East.

## Equitable value and access approaches to serve low- and-middle-income patients

We work in close partnership with governments and other stakeholders on innovative, **differential medicine pricing schemes**. In addition, we supply products at affordable prices to certain countries in Africa, Asia, Latin America, and the Middle East. In India, for example, we collaborate with public sector representatives across the oil and gas, energy, and railway sectors to offer certain general medicine and endocrinology products to underprivileged patients at discounted prices.

## Strategic tender activities

Our Biopharma tender excellence initiative offers a strategic tender framework. This includes a web-based system that helps country teams increase **quality and agility** in tender decisions, while improving performance tracking and collaboration. We regularly participate in government tenders for products used in public hospitals serving low-income patients. Many of these tenders take place in low- to middle-income countries.

## High-quality, affordable second brands

For some of our existing high-quality products, we have created second brands at affordable prices, particularly in countries with a large percentage of patients with very low incomes. For example, second brands for the betablocker bisoprolol (Concor®) are available at affordable prices in Brazil, Chile, Poland, and South Africa.

## Patient access programs

We operate patient access programs that enable us to offer certain products at affordable prices in several countries. In India, we offer a program for our cancer drug Erbitux®, for example, to provide financial assistance to eligible underprivileged patients – in line with local laws and regulations. We have reached over 500 patients through this program every year since 2017.

We have been collaborating with national pharmacy chains in Mexico to provide patients with adherence support, discounts on blood tests and education on prediabetes and diabetes, thyroid and cardiovascular disorders. To improve adherence, in Central America (Costa Rica, the Dominican Republic, Guatemala, Honduras, Nicaragua, and Panama), we offer a digital loyalty program for the conditions mentioned above.



## Building health capacity & awareness

We believe that in order to achieve health for all, it is imperative to help health professionals and patients make informed decisions about treatment paths. This support includes building health capacity as well as awareness. As a prerequisite, health systems need to be strong and benefit from solid collaborations to build resilience against crises and emergencies.

### Our approach to building health capacity and awareness

Capacity and awareness-building play key roles in our approach to improving [access to health](#). We empower patients, communities, scientists, and healthcare professionals by providing appropriate tools, information and skills so that they can drive innovation and make **informed decisions** about prevention, diagnosis, treatment, care, and disease management.

The private sector is a crucial partner in responding to global health threats. Beyond developing innovative health solutions, we must also ensure that health systems are prepared to address emergencies effectively and deliver care to people in need. We aim to sustainably strengthen the prevention, preparedness and resilience capabilities of health systems in low- and middle-income countries. Our efforts include the following aspects:

- **Using science and technology innovation** to improve local health-related capabilities.
- **Increasing country preparedness** by enhancing scientific and healthcare workforce competencies and capacities through a network of experts.
- **Forming partnerships to enhance disease awareness and address the challenge of enabling consistent access to medicines for all patients in need.**
- **Optimizing the monitoring and evaluation** of health initiatives at country level through data processing and digitalization.

We apply this approach throughout the entire value chain in our collaborative programs and in our health education initiatives with our local partners in low- and middle-income countries.

Beyond our engagement in these countries, we also collaborate with committed global partners to conduct educational campaigns for prevention, early diagnosis and awareness. We focus primarily on the diseases in which we have the greatest expertise and direct our attention towards the patients and specific groups we believe will benefit most from the information. Our activities include specific initiatives that promote awareness for [carers](#) as well as [women's health and economic empowerment](#) to expand their access to health.

## Roles and responsibilities

Our Global Health organization leads collaborative capacity strengthening initiatives in low- and middle-income countries to support our mission of improving the health of the most vulnerable populations.

Our awareness initiatives are aligned with our Group strategic direction and planned by the various businesses. They are implemented either on global and/or local levels, with projects organized according to the **specific needs of the relevant community**. Our subsidiaries are also responsible for mobilizing our global campaigns locally.

## Our commitment: access to health through awareness and education

Our strategy for addressing access to health incorporates the topic of awareness and education as detailed in our [Access to Health Charter](#). Our campaigns and initiatives are also subject to the respective marketing principles set out in guidelines such as our Pharma Code for Conducting Pharmaceutical Business and Pharmaceutical Operations. In addition, our campaigns are governed by internal policies that guide our [interactions with health systems](#) and by communication material review processes that ensure we comply with global, regional and local rules and regulations.

### Working with partners to achieve more

Our Global Health portfolio consists of collaborative initiatives that aim to strengthen the capacity and effectiveness of health systems in low- and middle-income countries. We support work in these four key areas:

#### Local research and development

We build scientific capacity through our **R&D programs** and focus primarily on schistosomiasis and malaria. Some examples include:

- The implementation of clinical trials in African health centers to test arpraziquantel as a potential new treatment option for pre-school age children infected with schistosomiasis. These trials have enabled local healthcare professionals to acquire valuable experience in Good Clinical Practice in preparation for future studies.
- Our partnership with the University of Cape Town for malaria drug discovery activities that transfer expertise and support the employment and training of talented young scientists.
- [PAVON](#) (Pan-African Vivax and Ovale Network), a network of centers for excellence to strengthen malaria surveillance and pandemic preparedness implemented in more than ten African countries.

## Manufacturing and supply chains

We manufacture some of our products directly in the regions where they are needed. At the same time, we strengthen local manufacturing and supply chain capacities through **technology and best practice transfers**. Our aim is to increase service quality while ensuring safe, effective and reliable access to medicines where they are needed most.

- We apply this local production approach in our work with the [Pediatric Praziquantel Consortium](#) to enable countries to become self-sufficient with respect to serving populations in need. In 2021, we signed a [manufacturing agreement](#) with Universal, a contract manufacturer in Kenya, for the large-scale production of the new pediatric treatment upon registration.
- We partner with Business for Health Solutions ([BHS](#)) to build sustainable supply chains of local distributors in Africa through our [Access Delivery Mentorship program](#). This program engages with our volunteer pool of supply chain experts and was piloted in Tanzania with three distributors and one manufacturer in 2021.
- We are collaborating with the East African Community (EAC) [Regional Centre of Excellence for Vaccines, Immunization and Health Supply Chain Management](#) at the University of Rwanda to build a professional supply chain curriculum tailored to local needs and challenges.

## Education and awareness raising

We invest in **education and behavioral change initiatives** that raise disease awareness.

- In Ethiopia, we operate a joint health education and WASH project in partnership with the [NALA Foundation](#) and the Ethiopian Ministry of Health. We are aiming to reach 50,000 community members in 8,000 households and more than 170,000 school-age children in districts with the highest prevalence of schistosomiasis.
- We are partnering with Foresight Global Health ([FGH](#)) to raise awareness about non-communicable diseases, with an initial focus on thyroid disorders, cardiovascular disease and prediabetes.
- In partnership with the Cardiological Society of India ([CSI](#)), the country's largest professional cardiology association, we launched an initiative that raises awareness in populations with a high risk of cardiovascular diseases. This project was conceived in 2021 as part of an employee initiative. The aim is to foster shared value projects by crowdsourcing innovative proposals from business teams in low- and middle-income countries.

## Health infrastructure and training

We **build infrastructure and support training** with a strong focus on African countries. In 2021, we

- supported the creation of a new clinical ward in Côte d'Ivoire that enabled Phase II and III trials as part of the [Pediatric Praziquantel Consortium program](#).
- helped set up integrated mobile health units in Cameroon for the diagnosis and treatment of female genital schistosomiasis ([FGS](#)), [HIV](#), [HPV](#), and [cervical cancer](#) for women aged 14-30. This initiative is also intended to improve the training and experience of local health professionals.
- supported the FAST (FGS Accelerated Scale Together) program to train more than 300 health professionals in sub-Saharan Africa, which resulted in over 200 action plans in 20 countries to address FGS.
- set up microscopy stations in Ghana and provided training sessions to improve local health workers' ability to detect cases of malaria and other diseases that can be diagnosed via blood samples.

## Global awareness campaigns

We regularly conduct campaigns to raise awareness of various diseases across the globe, often in collaboration with patient advocacy and carer groups. We focus on diseases that are aligned with **our core competencies**, expertise and experience along the health value chain. These diseases include cancer (specifically colorectal cancer, head and neck cancer and bladder cancer), thyroid disorders, diabetes, infertility, and multiple sclerosis. Throughout the year, we also conduct awareness campaigns that focus on tropical diseases, such as schistosomiasis and malaria.

We actively participated in several awareness days:

### **January 30: World NTD Day**

World NTD Day brings together civil society advocates, community leaders, global health experts, and policymakers working across the diverse landscape to control and eliminate neglected tropical diseases.

### **February 4: World Cancer Day**

February 4 marks [World Cancer Day](#), an annual initiative led by the Union for International Cancer Control (UICC). It aims to raise cancer awareness and improve its prevention, detection and treatment. In 2021, the theme was “I Am and I Will”.

### **March 22: World Water Day**

World Water Day focuses on the importance of fresh water and raises awareness of the 2.2 billion people living without access to safe water. World Water Day supports the achievement of Sustainable Development Goal 6: Clean water and sanitation.

### **April 7: World Health Day**

World Health Day creates awareness about a specific health theme each year to highlight a priority area of concern for the World Health Organization. In 2021, the theme was “Building a fairer, healthier world”.

### **April 25: World Malaria Day**

World Malaria Day highlights the need for continued investment in and sustained political commitment for malaria prevention and control.

### **May 25-31: Thyroid Awareness Week**

In collaboration with the Thyroid Federation International ([TFI](#)), the annual awareness campaign – which, in 2021, took place with the slogan “Spread Your Wings – Be Thyroid Aware” – aims to highlight some of the lesser-known aspects of thyroid disorders.

### **May 30: World Multiple Sclerosis Day**

[World Multiple Sclerosis Day](#) is an annual awareness day by the MS International Federation ([MSIF](#)). It brings the global MS community together to share stories, raise awareness and campaign with everyone affected by multiple sclerosis. In 2021, the day was promoted via “#MSConnections”.

**August 20: World Mosquito Day**

World Mosquito Day is a global commemoration of the discovery in 1897 that female *Anopheles* mosquitoes transmit malaria between humans. It aims to shine an international spotlight on the ongoing efforts to fight against mosquito-transmitted diseases.

**November 1-7: European Fertility Week**

[European Fertility Week](#) raises awareness about infertility and conveys the issues faced by people with infertility. It also aims to remove the stigma around infertility and to amplify the issue of unequal access to treatment in Europe. This year's topic was "Challenge the Odds".

**November 10: World Science Day**

World Science Day for Peace and Development highlights the important role of science in society and the need to engage the wider public in debates on emerging scientific issues. By linking science more closely with society, World Science Day for Peace and Development aims to ensure that citizens are kept informed about important scientific developments.

**November 14: World Diabetes Day**

[World Diabetes Day](#) was created in response to growing concerns about the escalating health threat posed by diabetes. The campaign, which was themed "Access to Diabetes Care" in 2021, aims to keep diabetes in both the public and political spotlight.

**December 12: Universal Health Coverage Day**

International Universal Health Coverage Day aims to raise awareness of the need for strong and resilient health systems and universal health coverage.

## Purpose-driven initiatives

[Healthy Women, Healthy Economies](#) and [Embracing Carers®](#) are two initiatives we are using to promote awareness of public health issues extending beyond patients. The interconnectedness of both initiatives is rooted in shared themes and goals. The majority of unpaid and underpaid caregiving hours globally are provided by women and girls. Effective caregiving is intrinsically linked to the health, well-being and prosperity of women. Through these initiatives, we aim to both promote and support women's health and economic empowerment and expand access to health.

## Healthy Women, Healthy Economies

To empower women to overcome the challenges of communicable and non-communicable diseases and reach their economic potential, we are committed to the [Healthy Women, Healthy Economies](#) initiative – a public-private partnership founded within the Asia-Pacific Economic Cooperation ([APEC](#)). As the founding private-sector partner, we collaborate with representatives from several APEC governments to promote activities and policies that support women's economic empowerment.

Since 2019, the APEC Healthy Women, Healthy Economies [Research Prize](#) has spotlighted sex-disaggregated research that enables policy makers, business leaders and other stakeholders to identify and implement measures that improve women's health in APEC economies. This year's prize money of US\$ 20,000 was awarded to a team of scientists for their research into the impacts of care work on women's economic participation.

## Embracing Carers

[Embracing Carers](#)<sup>®</sup> is our global initiative led in collaboration with prominent caregiving organizations from around the world. Embracing Carers<sup>®</sup> is designed to increase awareness, action and discussion around the frequently overlooked needs of unpaid caregivers.

In 2021, we published a [global report](#) on the unmet physical, financial and emotional well-being challenges that unpaid carers face amid the Covid-19 crisis. Covering 12 countries on five continents, the report explained how these challenges differ by gender, socio-economic status, country, and the level of care needed. From this data we produced a series of policy recommendations for governments to create better support and protection for caregivers. We also looked at how employers can create caregiver-friendly workplaces and launched an internal campaign to raise awareness and provide support to our own employees with caregiver responsibilities.

# Product safety & quality

## Chemical product safety

Many of our chemical products have intrinsic hazardous properties. Therefore, we are working to minimize the potential risks to both human health and the environment resulting from their use. We continuously strive to improve our product safety and reduce the environmental impact of our business through innovative solutions and digital communication tools.

### Our approach to safe chemical products

Product safety is one of our top priorities. Starting at the product launch stage, we investigate the potential adverse impacts that chemical substances may have. Along the entire value chain of our products – **from raw materials to manufacture and commercialization** – we provide relevant information on their hazardous properties and how to deal with them. These instructions facilitate the safe handling and use of our products in line with all regulatory requirements. We publish this information primarily on the relevant digital channels. Paper safety data sheets are still common in some countries and we can therefore also provide these upon request through our customer service.

We support the implementation of the [European Green Deal](#) and are preparing to integrate the relevant chemicals sustainability aspects into our business strategies. We are currently evaluating portfolio sustainability assessment concepts, which we will use to measure our adherence to existing and upcoming external and internal sustainability criteria. These concepts will also help us to create greater transparency regarding the most important aspects for improving sustainability.

## Roles and responsibilities

Our Life Science, Healthcare and Electronics business sectors have organizational structures in place to implement our product safety strategy taking into account respective business requirements and customer needs. This approach includes registering chemicals, classifying hazardous substances and highlighting risks via the use of safety data sheets, labels and digital communications.

Our **Group standards** provide a framework for governing the set-up of effective operational processes for product safety, hazard communication and chemicals regulatory compliance throughout our business sectors. Our Group Chemicals Regulations Council monitors relevant regulatory developments.

This approach also applies to innovative fields of development such as nanomaterials, which we use with the greatest care in line with the precautionary principle. Furthermore, our Group-wide [Policy for Use and Handling of Nanomaterials](#) provides the necessary guidance on the use of these materials.

## Legal requirements and internal guidelines

Our internal guidelines define the roles, responsibilities and basic processes required to comply with national and international regulations. In addition, we have also endorsed **voluntary commitments** of the chemical industry such as the [Responsible Care® Global Charter](#).

The legal requirements relevant to compliance with chemicals regulations are mainly related to hazard communication as well as local and regional chemical registration activities. These requirements are expanding globally, with a growing number of countries adapting their local rules in line with existing regulatory frameworks such as [REACH](#). We are well placed to comply with regulations of this kind in important markets, such as China, India, Japan, Korea, and Taiwan. Using the Globally Harmonized System for Classification and Labelling of Chemicals ([GHS](#)) for hazard communication allows us to streamline our internal processes and provide consistent, harmonized and high-quality information to our customers.

Our **worldwide network of regulatory experts** in all three business sectors continuously monitors changes to legal requirements and scientific developments in order to stay ahead of trends and best practices.

In 2021, there were no incidents of non-compliance with regulations, specifically concerning potential health and safety impacts and the labeling of our chemical products.

## Safety analysis during product launch

Safe and sustainable by design implies that product safety starts with development. Therefore, at an early stage in our product launch process, we analyze innovations in terms of their impacts on human health and the environment. We also evaluate the intrinsic hazards of both our existing and new products to create relevant product safety information in line with all applicable rules.

## Product safety information

Chemical product safety is all about protecting human health and the environment from adverse impacts resulting from the use of chemical products throughout their life cycle. To achieve this, we provide **all relevant information** to our customers and the public, which helps raise awareness of the hazards and build a greater understanding of how to mitigate risks and use the products safely.

To obtain all the relevant information on hazard profiles, we use industry-standard **digital tools** that gather all information available on the substances we use. We then cross-reference this data with local and regional rules to establish the relevant hazard classifications. We publish this information digitally on **country-specific safety data sheets** in multiple languages and on the labels of our products. The data sheets are maintained electronically and updated if there are relevant changes or during an internally agreed three-year review cycle. We have automated and standardized the majority of our hazard communication processes.

For products with little available information, we are investigating the feasibility of using alternative predictive, **non-animal testing methods**, such as read-across and (Q)SAR. For third-party products, we expect robust product safety documentation from our suppliers, which we feed into our processes or share directly with our customers.



## Helping customers access safety information

We employ the latest digital tools and continuously explore new technologies to share information with our product users.

Our Life Science customers and all interested stakeholders can access product safety information in their respective language and according to country-specific regulations through a dedicated **mobile app called “My M Safety”** ([Android](#) and [iOS](#)). Customers can retrieve this information by scanning a barcode on the product label or entering identifiers such as material numbers, names or CAS numbers.

Through our [SciDeEx™](#) web tool, anyone can check whether using a particular chemical is safe within the boundaries specified in the EU REACH exposure scenarios. SciDeEx™ is based on a full implementation of the [ECETOC TRA 3 model](#) for human exposure assessments in industrial and professional settings.

## Patient safety

The safety of patients treated with our medicines is our top priority. Our pharmaceutical products must be effective in treating the respective disease while posing the lowest possible risk to patients. That is why we continuously monitor any risks or adverse effects that may arise and take the necessary actions to minimize them.

### Our approach to ensuring patient safety

Through a rigorous benefit-risk management process, we help to ensure that the benefits of our medicinal products always outweigh the risks for patients. Every new medicine goes through a series of precisely defined development stages. Before any medicinal product is administered to human subjects, we conduct extensive preclinical testing both in vitro and in vivo. Through toxicological testing, we determine whether an active pharmaceutical ingredient is toxic to living organisms and, if so, at which dosage. This testing also helps us determine the dose that humans can safely tolerate. Only when this is complete do we perform [clinical studies](#) to investigate the safety and efficacy of the medicinal product when used in humans. During clinical development, we diligently use all the collected data to continuously evaluate the medical product's **benefit-risk profile**. If we consider the medical product's benefit-risk profile to be positive, we then submit an application for marketing authorization to the relevant regulatory authorities.

### Continual monitoring

Once we launch a new medicinal product, the number of patients being treated with it increases significantly. In rare circumstances, there may be adverse and potentially serious effects that were not detected during clinical development, which is why we continuously monitor and manage the benefit-risk profiles after its market release. Pharmacovigilance includes the process of monitoring a medical product on an ongoing basis to detect and assess safety signals as part of signal management activities. Continuous monitoring of adverse effects allows us to proactively and transparently minimize and communicate any risks. In addition, we always provide healthcare professionals and patients with the **latest information on the safety** of all our marketed medicinal products. The scope of continuous safety monitoring includes the entire life cycle of a product, ranging from development, market launch and commercialization to expiration of the marketing authorization.

Capabilities that we have developed and strengthened in this area include:

- Advanced benefit-risk management
- Big Data analytics (using real-world data)
- Advanced signal detection methodology
- Patient-centric adverse effects collection methods, such as our agReporter app

Based on regulatory approval conditions for newly approved medicinal products, we develop and update educational materials for patients and healthcare providers in accordance with the requirement to communicate any known and potential risks and ways to minimize them. We assess the effectiveness of these materials in close collaboration with our Benefit-Risk Action team. If required, we adjust the contents of the materials and their distribution and describe the results from the effectiveness analysis in our periodic safety reports and risk management plans. We then submit these to the relevant health authorities for evaluation.

## Roles and responsibilities

Our Global Patient Safety unit is responsible for pharmacovigilance. It continuously collects **current safety data** from a wide variety of sources across the globe, including clinical studies, early access programs, spontaneous reports on adverse effects, patient support programs, and articles published in medical and scientific journals.

Our experts help to ensure all information on the risks and adverse effects of our medical products is properly documented, tracked and reported to the respective health authorities in accordance with regulatory requirements. Our Global Patient Safety unit analyzes all data and reassesses the benefit-risk profile based on these data, where required. We then inform regulatory authorities, healthcare professionals and patients about new risks, additional risk mitigation measures and potential changes **in the benefit-risk profile**.

In order to implement our R&D Strategy 2023, our Global Patient Safety unit is on a journey of transformation. Our vision is to embed a deep knowledge of safety into early decision-making as we evolve **to practice predictive safety**. In 2021 we continued to refine our approach to benefit-risk assessments. For example, we applied a scoring system based on safety aspects and used it to determine the prioritization levels of our products. We also redesigned our pharmacovigilance processes using a business process management model that ensures cross-functional alignment between our corporate functions. We expect to complete the implementation of these processes in 2022.

Our **Healthcare Quality** unit processes quality complaints related to our products. Whenever quality defects could have an impact on patient safety or lead to adverse effects, Global Patient Safety becomes involved.

Our Global Patient Safety unit hosts a Pharmacovigilance Intelligence Council that focuses on changes in pharmacovigilance legislation and its impacts on our global and local pharmacovigilance systems. This initiative enables us to make strategic decisions and govern changes in pharmacovigilance requirements, ensuring continuous compliance with regulatory requirements.

### Our Medical Safety and Ethics Board

Our Medical Safety and Ethics Board (MSEB) oversees the safety and benefit-risk assessments of our medicinal products throughout their clinical development and commercialization. It endorses appropriate **measures to minimize risks**, such as updates to product information. This board is chaired by our Chief Medical Officer and comprises experienced physicians, scientists and experts from our company. Throughout a medicinal product's entire life cycle, the MSEB reviews and assesses important medical safety risks and benefit-risk issues and reviews human-related ethical matters as appropriate.

Within the Global Patient Safety unit, the Benefit Risk Action team is responsible for signal management, benefit-risk assessment, risk management and all topics related to product safety and the benefit-risk profile of our medicinal products. Recommendations from the Benefit Risk Action team are endorsed by the Pharmacovigilance Advisory Board, chaired by the Global Patient Safety unit. Important issues may be submitted to the MSEB for final assessment.

## Our commitment: Guidelines and statutory requirements

We follow international guidance and standard procedures, such as the International Council for Harmonisation ([ICH](#)) guidelines and the Good Pharmacovigilance Practices (GVP) established by the European Medicines Agency ([EMA](#)) and national health authorities. In addition, we comply with and implement all new statutory pharmacovigilance regulations in the countries where we market our products.

### Monitoring drug safety

Regulatory authorities conduct periodic inspections to verify that we comply with statutory requirements as well as our own internal pharmacovigilance standards. We follow up on the findings of health authority inspections and take necessary actions to ensure the ongoing compliance of our pharmacovigilance system. In 2021, we had eight pharmacovigilance inspections.

Furthermore, we perform audits to ensure that all our units and subsidiaries involved in pharmacovigilance consistently meet all global requirements. In 2021, we conducted a total of 18 pharmacovigilance audits and found no significant deviations in our pharmacovigilance systems from these requirements and standards. We also audit our vendors and licensing partners involved in pharmacovigilance, which helps us improve our pharmacovigilance processes and comply with regulatory requirements. In light of the ongoing Covid-19 pandemic, we had to adjust our audit plan and methods by postponing several audits and conducting others remotely.

### Redefining our approach to benefit-risk assessments

We have developed an improved benefit-risk strategy to help us transform from a reactive and compliance-driven organization into a proactive and benefit-risk-focused organization. By truly understanding the benefit-risk profiles of our products, we can enable early decision-making within the organization to protect the safety of patients. Ultimately, the aim is to be able to provide **the right medicine to the right patient at the right time**. As part of this initiative, we have also developed the concepts and principles for conducting benefit-risk assessments at each stage of product development and post-marketing.

We have concluded the pilot phase of our new benefit-risk strategy and are now following up with incremental implementation by the end of 2022.

### Assessing the safety of our products

We have redesigned our pharmacovigilance processes, including elements that make up our Patient Safety product prioritization strategy. A product prioritization tool as a means to objectively score the safety-profile of our products has been used as a basis to define the product prioritization strategy. The scores categorize our products into a high-, medium- or low-risk category, thereby impacting the methodology for benefit-risk activities. These include individual case safety report (ICSR) management, signal management, our new benefit-risk strategy, and aggregate safety reporting. The new processes ensure the safety of our medicinal products throughout their lifecycles and enable us to focus our resources and expertise on high-priority assets. The drafts of these redesigned processes will be reviewed and finalized by the end of 2022.

## Innovative safety signal detection

Through our tool for safety signal detection, we analyze and manage large amounts of global data, such as scientific studies and news about adverse effects. This tool helps us comply with regulatory timelines for safety signals and other safety-related factors and ensures that all signal data, documentation and decisions are captured in one place. It also enables easy access to and analysis of our data as well as cross-functional collaboration between the Global Patient Safety unit and other internal and external stakeholders.

## Up-to-date labeling and product information

Our product information explains to healthcare professionals and patients how to correctly use the respective product and make informed treatment decisions. In accordance with statutory regulations, the **package leaflet** contains all relevant information such as indication(s) and ingredients as well as dosage, storage, mode of action, instructions for use, warnings, precautions, and possible adverse effects. In addition, should the medicine contain ingredients that could impact the environment, the package leaflet may also contain information about how to dispose of the product correctly. We review and update all product information documents, such as package leaflets, to ensure our medicinal products contain the latest information on safety, efficacy and pharmaceutical formulation. In accordance with regulatory requirements, we submit all modifications to our leaflets to the respective regulatory authorities for approval. In 2021, there were no incidents of non-compliance with regulations concerning the labeling of our medicinal products.

## Internal and external training

Our pharmacovigilance experts are regularly trained so that they gain the required experience and knowledge to carry out their activities. We manage our training via a global learning platform and verify compliance with training our requirements by producing training completion reports.

All our approximately 23,000 Healthcare employees receive **basic pharmacovigilance training** once a year that covers the procedure for reporting adverse effects or special circumstances associated with the use of our products. In addition, other training courses keep employees up to date with respect to their professional expertise as well as internal standard operating procedures and other relevant requirements. These continuing education and training efforts help ensure adherence to pharmacovigilance requirements.

## Enhancing patient safety and sharing expertise with other countries

### Reporting side effects with the agReporter app

In line with our goal to enhance patient safety, in 2020 we implemented a user-friendly mobile and web application called agReporter. The application was created for use by field nurses, sales representatives, healthcare professionals, pharmacists as well as non-medically trained users to **report any suspected side effects** or adverse events arising from the use of our medicinal products. Our application continues to reach more users through ongoing promotion and is now being used in approximately 50 countries in 14 different languages.

## Pharmacovigilance in Access to Health

We endeavor to continue expanding pharmacovigilance expertise worldwide, especially in countries where healthcare workers need to build their pharmacovigilance expertise.

We want to increase the contribution of pharmacovigilance in our [Access to Health](#) strategy. The key aspects of this strategy include fostering pharmacovigilance initiatives in safety data-sharing with health authorities and sustainably building pharmacovigilance capacity with reputable partners in underserved countries.

In 2021, we [took part in several projects](#) to improve patient safety in low- and middle-income countries. For example, we collaborated with the health authorities of Cameroon to discuss and align good pharmacovigilance practice needs and actions in the country, resulting in an agreement to set up new guidelines. An initial draft was proposed to the relevant health authorities in April 2021.

## Off-label use

We may receive inquiries about the therapeutic use of our **products beyond the marketing authorization**, also referred to as off-label use. For example, while each medicine is authorized for use in specific indications, a physician may wish to administer a product to a patient suffering from a disease for which it is not approved.

We promote our medicines strictly within the scope of their specific marketing approval. Any medical-scientific information about the use of our products beyond their existing marketing authorization is provided by qualified medical personnel in response to unsolicited inquiries. The information shared must be backed by scientific evidence and be factually balanced, clearly stating that it applies to unapproved use. In addition, we do not permit our employees to give any recommendations regarding individual patient care or treatment.

## Product-related crime

In low- and middle-income countries as well as industrialized countries, illegal, counterfeit and substandard medicines pose a significant risk to public health. In addition, chemicals may be misused for criminal purposes, such as the manufacture of illicit drugs. We take resolute action against both of these criminal activities.

### Our approach to product-related crime

Our company develops and manufactures pharmaceutical and chemical products of the highest quality. We take resolute action against product-related crime in order to protect our patients and customers from the harm caused by illegal products. For this purpose, we have implemented a Group-wide strategy, which focuses on identifying and responding to the availability of counterfeit medicines as well as ensuring the integrity of our products and supply chains. Moreover, we are committed to collaborating both with government authorities and with national and international organizations. Together, we want to tackle product-related crime and raise awareness of the issue among stakeholders as well as the wider public.

#### How we define product-related crime

1. **Counterfeit products:** In line with the relevant [WHO](#) standard, we define a counterfeit product as “a product that is deliberately and fraudulently produced and/or mislabeled with respect to its identity and/or source to make it appear to be a genuine product”.
2. **Illegal diversion of products:** This term refers to the diversion of either pharmaceuticals or chemical substances from within the legitimate supply chain either to sell or export them through illegal channels to produce narcotics, weapons or explosives, or to use them for other illegitimate purposes.
3. **Misappropriation of products:** This refers to theft from production sites and warehouses, or while in transit.

## Roles and responsibilities

The Corporate Security unit coordinates our approach to tackling product-related crime on the strategic level. A cross-functional team supports the operational implementation of the strategy. The team comprises experts from various units, including Legal/Trademarks, Product Security, Export Control, Supply Chain, Patient Safety, Regulatory Affairs, and Quality Assurance. Furthermore, all our sites have product crime officers who serve as central, local points of contact and act as the interface between both local and global stakeholders, internal and external alike.

## Our commitment: Group-wide guidelines and standards

Globally applicable regulations are a key part of our approach to effectively and efficiently tackling product-related crime. The Group-wide guideline entitled “Illicit Trade & Product Crime Prevention” describes our goals and measures for reducing product-related crime and minimizing its impact. Our Group-wide Product Crime Incident Management standard sets out mandatory requirements for effectively managing incidents of product-related crime.

## How we are tackling product-related crime

### 1. Detecting counterfeit medicines and taking them out of circulation

A team of experts examines, evaluates and processes every notification we receive regarding suspected counterfeit medicines. Our response always complies with both the regulatory requirements and our own wider objectives for tackling counterfeit products.. We pro-actively conduct investigations both online and offline in order to identify and disrupt the availability of illicit products in legitimate and illegitimate channels. We document all incidents using a central, Group-wide reporting system. Moreover, we support the prosecution of criminals by working closely with the authorities. As a member of the Pharmaceutical Security Institute ([PSI](#)), we routinely share intelligence about product crime with other pharmaceutical companies.

In 2021, our internal experts examined and pursued numerous incidents including **counterfeits identified within the legitimate and illegitimate supply chains** as well as theft and illegal diversion.

### 2. Tracking system for chemical substances

We monitor chemicals that could be misused to produce illegal weapons, explosives or narcotics, tracking through an **internal system** that flags suspicious orders or orders of sensitive products. These are released only once we have confirmed the existence of a verified end-user declaration.

In addition to fulfilling the duties defined in the **statutory provisions on export control**, we also report suspicious orders and inquiries to the competent authorities. Through these efforts, we are honoring a voluntary commitment of the German Chemical Industry Association ([VCI](#)) and meeting the terms of the Guideline for Operators published by the European Commission. In 2021, we reported 745 orders placed for relevant substances. In addition, we received seven inquiries from authorities regarding specific suspected cases that we helped to resolve. We evaluate the effectiveness of our measures for avoiding product misuse based on, among other things, the number of incidents suggested to us by the authorities and solved.

### 3. Protecting the integrity of our products and supply chains

We intend to ensure the integrity of our supply chains on the one hand and reduce the likelihood of illegal medicines circulating on the other hand. For this reason, we have introduced robust security measures for products and supply chains.

We fulfill the regulatory requirements on product serialization and the implementation of track-and-trace technologies as prescribed in many countries and regions. This includes clear bar coding of individual and collectively packaged products for transport so that they can be traced in the supply chain.

Using a risk-based approach, we apply our own product security features on certain products. This enables the rapid and reliable authentication of our products.

We monitor our supply chain closely and we regularly **audit our distributors and contract manufacturers** to ensure that they comply with our GMP and GDP standards (good manufacturing practice/good distribution practice). Moreover, we carry out special risk-based safety tests on suppliers of pharmaceutical packaging and contract manufacturers.

The security measures at some of our most important global sites are certified externally in accordance with internationally recognized standards, including requirements of the U.S. customs authority's C-TPAT (Customs-Trade Partnership Against Terrorism) initiative, the AEO-C/S (Authorized Economic Operator) certificate of the European Union, approval as a "recognized shipper" (bV) by the Luftfahrt-Bundesamt (German Federal Aviation Office) as well as the ISO standards 28000 and 28001 regarding supply chain security management.

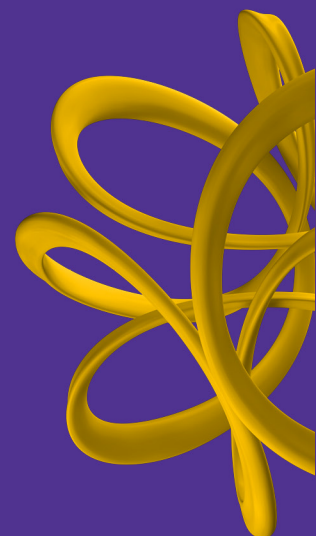


In addition, we are introducing a Group-wide security audit management program, which is intended to further increase transparency and the security level performance within our organization and prove our compliance with security requirements. For this purpose, we are developing key figures to support this process. These key figures will be supplemented by the existing audit management tool.

Furthermore, we sponsor global initiatives to protect patients. For instance, we support the non-profit “Global Pharma Health Fund” (GPHF), which supplies the GPHF-Minilab®, a compact laboratory used mainly in countries with inadequate access to health solutions, to test the quality of 102 different active ingredients quickly and effectively. In connection with Covid-19, two additional active ingredients were added to the Minilab’s range of methods. Currently, a total of 933 Minilabs are in use. In 2021, 41 Minilabs were delivered, all but one went to 22 countries in sub-Saharan Africa.

#### 4. Raising awareness of product-related crime

We aim to continuously raise awareness of product-related crime among our business partners and employees, educating and training our people Group-wide on the subject to strengthen their competencies. All staff involved in security, such as product crime officers, participate in appropriate **training programs**. We are continuously evolving these programs and adapting them to new trends.



# EMPLOYEES

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# Attractive employer

A culture that gives employees a strong sense of belonging is a driving force of our business. Our workplace embeds our values, balances flexibility and focuses on performance, trust and empowerment. This not only increases our employees' productivity, but also creates a competitive advantage to attract potential candidates to join our company while retaining our existing talent.

## Our approach to being an attractive employer

### Attracting and retaining talent

We believe that curiosity can make great things happen. We therefore aim to provide an environment that gives our employees plenty of **scope for creativity** and sparks their desire to innovate. Our [employer brand](#) communicates this mindset to the outside world. Through our slogan "Bring Your Curiosity to Life", we show applicants what they can expect and what they can contribute when they join our company.

Diversity, equity and inclusion are integrated in our attraction and selection activities. We train our recruiters to avoid unconscious bias during interviews and ensure that all new employer branding campaigns follow diversity criteria.

In 2021, we started using a new technology to support gender-neutral language, for example when creating job advertisements. Additionally, we included a dedicated "diversity" section in our interview guide, helping hiring managers to keep inclusivity top of-mind.

We work across countries to understand cultural norms that allow our colleagues to bring their best self to work. Attracting applicants with diverse backgrounds remains a top priority for us because we believe this gives us a competitive advantage as we expand our employee base.

### Employee engagement

We seek to understand the needs of the people and therefore regularly conduct **employee surveys**, both Group-wide and within selected countries, individual business sectors or specific projects. These surveys are an integral component of our corporate feedback culture. They facilitate open communication between managers and employees to identify improvement opportunities and showcase areas where we have listened, learned and evolved.

### Work and life in balance

We understand the importance of balancing the demands of work and personal life to ensure a productive and motivated workforce. We focus on creating the best possible working conditions for our people. This includes physical, mental and financial well-being, combined with flexible working options. In many countries, our employees can already set their own working hours by making use of **part-time working models adapted to local requirements**. In Brazil, Germany, India, and the United States, where around 53% of our workforce is based, we offer parental leave conditions that exceed the respective minimum statutory requirements.

## Roles and responsibilities

The Human Resources (HR) department is responsible for advising all business sectors and Group functions on matters concerning our human capital. The HR team addresses the needs of our employees, organizational topics and company culture. Across all our sites, HR employees work together with leaders from various functions and business sectors to employ strategies to engage our people in line with Group-wide HR guidelines and requirements, including attractive compensation models and benefits. Every two to three years, we carry out internal audits to check that the guidelines are being implemented.

The Chair of the Executive Board and CEO is responsible for Group Human Resources. Our Chief HR Officer, who leads the HR function and oversees all our HR activities, including Diversity, Equity & Inclusion (DE&I), reports directly to her. Our Business Services unit oversees the operational tasks of human resources work, such as drafting contracts and payroll accounting. The Chief Financial Officer has responsibility for this unit.

The Engagement and Inclusion unit within our HR organization is responsible for employee engagement, diversity, equity, and inclusion and also develops and manages our employee surveys.

We include **local employee representatives** in our company's decision-making processes. In Germany, ten of our subsidiaries have works councils and 26 of our subsidiaries across eight other European countries have employee representative bodies (Austria, Belgium, France, Ireland, Italy, the Netherlands, Spain, and Switzerland). In Germany, 58% of all employees are covered by collective agreements (13% of our workforce).

In Germany, local works councils and the Group works council represent our employees, regularly discussing topics such as compensation, working hours and organizational realignments. The Senior Executives Committee promotes the interests of our senior leaders in Germany and meets on a monthly basis. The Euroforum represents our employees at the European level. Focusing on the economic situation, employment rates and significant changes within our Group, this body covers all EU countries, as well as Switzerland, Norway and the United Kingdom, although not all countries have their own delegates. A regular exchange and an annual meeting of the Euroforum delegates also take place.

## Our commitment: Group-wide policies and guidelines

We are dedicated to upholding the appropriate and **fair labor and social standards** stipulated in our Group-wide [Social and Labor Standards Policy](#). It complements the provisions of our [Human Rights Charter](#) and our [Code of Conduct](#) with respect to labor and social standards. These include the fundamental Conventions of the International Labour Organization ([ILO](#)), which cover freedom of association and collective bargaining, forced labor, child labor, anti-discrimination, equal opportunity, equal pay, working hours, occupational health and safety, and the prevention of abuse and harassment. The Social and Labor Standards Policy outlines that we do not tolerate any form of discrimination, physical or verbal harassment or intolerance in the workplace. In this way, it creates the framework for fair and respectful interaction. We conduct internal audits to ensure that our local subsidiaries comply with these principles.

We are continuously evolving our approach to when, where and how we perform our work. Our focus is on flexible hours, remote working, job sharing, and part-time working models.

In the majority of the countries in which we operate, local flexible working policies are being rolled out. These policies reflect both legal requirements as well as agreements with works councils, if applicable. Depending on the area of activity and in agreement with their supervisors, employees will be able to adopt a hybrid working model in line with their local flexible work policy. This enables them to divide their work time in a balanced way between designated workplaces and other locations, such as home offices. In addition, we offer our staff alternatives to full-time employment via part-time or job-sharing models, where legally possible. We are also creating location-independent roles with defined job requirements to attract and recruit talent from around the world.

## Attracting young generations to our company

It is crucial that we are able to attract the next generation of scientists, engineers and data specialists. Our GOglobal trainee program **enables university graduates to join our company as trainees**. Within 24 months, they gain an understanding of various departments and functions. Centered on China, Germany and the United States, the program offers international assignments, individual continuing education, mentoring and coaching. Additionally, our Life Science business sector has a similar training program with comparable benefits. Its focus is on production and logistics.

To cultivate **young academic talent**, we also offer internships in all departments to university students. Interns who perform exceptionally well are enrolled in our talent-retention program.

In addition, we regularly organize events in order to give students an insight into our company. We also take part in job fairs in Germany and abroad. University graduates can apply for a position with our company directly or complete one of our trainee programs. In addition to recruiting talented students, we also provide financial assistance. For instance, in Germany we support the scholarships granted by Deutschlandstipendium, an educational initiative of the German federal government.

## Understanding our employees

Every year, we conduct Group-wide confidential and voluntary employee surveys. The **regular exchange** between our employees, managers and leaders provides valuable information for improving the working environment and business processes. In 2021, around 50,800 people (85%) took part, and 77% of respondents are highly engaged with our company.

In addition to our annual Employee Engagement Survey, we developed and conducted pulse surveys to encourage dialogue in specific areas or units within our businesses and functions. These initiatives include monthly mood checks on employee well-being and surveys about specific areas for improvement such as our working conditions, systems and processes.

## Encouraging dialogue and rewarding ideas

We keep our employees throughout the Group up-to-date and encourage **exchange** through a number of formats tailored to specific target groups. Examples include our intranet and our international employee magazine. There are also local editions in some countries.

Our company has a long tradition of rewarding ideas. In 1853, we became the first industrial company in the world to contractually stipulate **bonuses for successful employee implemented suggestions for improvement**, and approximately 60 years ago we laid out principles and rules for our ideation efforts. Our idea management program seeks to inspire our employees to think creatively and encourage them to contribute to the continuous improvement of our company procedures and processes.

Every year, we present **awards** to our employees in recognition of outstanding ideas, teamwork and projects.

## Performance-based pay and social benefits

We reward the performance of our employees in order to maintain a competitive edge in attracting qualified professionals. Within our Group, compensation is based on the requirements of each position as well as each employee's respective performance.

To ensure a **competitive compensation structure**, we regularly review our compensation policy based on data analyses and benchmarks. In doing so, we take internal factors and market requirements equally into account. Before adapting our compensation structure, we consult with key stakeholders, such as [employee representatives](#). The pay structures within our company are based on defined criteria, such as job requirements and performance. We make no distinctions based on gender or other diversity criteria.

In addition to competitive pay, we offer attractive benefits. Our "benefits4me" package consists of three pillars. The pillar "Company Benefits" contains offerings primarily funded by the company (i.e. company pension plans, U.S. healthcare, etc.). The two other pillars ("Health and Well-being" and "Services for Life") cater for prevention and health-related benefits as well as other services (i.e. leasing offers for bicycle or IT hardware) in order to meet the multifaceted and individual life-cycle-related needs of our workforce.

## Balancing work and life

### Supporting parents

We want to make it easier for our employees to return to work after parental leave and offer a corresponding program for parents in Darmstadt and Gernsheim (Germany). In addition, employees can make use of various related **training and networking opportunities**. We have established a similar program in the United States.

Moreover, we offer female employees in the United States eight weeks of paid maternity leave. We have also introduced five weeks of paid paternity or adoption leave there. By contrast, the statutory minimum requirement is only 12 weeks of unpaid parental leave per year. In the case of an adoption, we also reimburse up to US\$ 5,000 in adoption fees.

In 2021, 617 employees of Merck KGaA (around 13% of our workforce) were on parental leave, around 55% of whom were men. In other key countries, we grant additional support benefits that **exceed the legal requirements**, such as unpaid parental leave for employees in Brazil. In India, too, we offer additional benefits with five days of paid paternity leave, although this is not legally required.

In offering these benefits, we do not differentiate between full- and part-time staff or employees with fixed-term contracts. The latter may apply for and take parental leave until the end of their employment contract.

## Making sabbaticals possible

In principle, all employees of Merck KGaA, Merck Healthcare KGaA and Merck Real Estate GmbH in Germany (around 19% of our workforce) can apply for a **sabbatical**, which gives them up to one year off from work. In 2021, 61 employees were on sabbatical. For personal emergencies in which an employee needs an immediate leave of absence, we offer an emergency sabbatical of up to three months. Following the example of Germany, other countries have also introduced sabbatical options (e.g. Brazil, United Kingdom) in an effort to create a better work-life balance.

## Saving for retirement through a long-term account

We enable our employees in Germany to reduce their working hours before retirement or retire earlier by drawing on a **long-term account**. For instance, they can deposit salary components or time into the account. Moreover, our company provides subsidies to encourage the use of these long-term accounts. Employees can then use the accrued balance to stop working up to three years before regular retirement or reduce their working hours by 50% for up to six years. In 2021, more than 10,300 employees made use of this option.

In addition, representatives from the German statutory pension insurance system regularly visit our premises to inform interested employees about statutory pension matters.

# Diversity, equity & inclusion

At our company, diversity drives progress. It strengthens our ability to innovate and contributes to our success in science and technology. We encourage employees, patients and customers to be their individual, curious and unique selves. The more diverse our people, the better we can succeed in business while making a difference in people's lives.

## Our approach to diversity, equity and inclusion

In 2021, we strengthened and expanded our commitment to **diversity**. While we have always been a diverse organization – today spanning 66 countries, with more than 60,000 employees – we recognize that the success of our organization depends on our ability to foster an environment that promotes **equity** and cultivates **inclusion**.

Together, we are building **one culture in which we care** about one another and are solidifying a sense of belonging for all so that our different voices are heard to drive better business outcomes. Ultimately, we are creating opportunity and enabling advancement for employees around the globe.

To reflect our expanded DE&I commitment, we are focused on three critical priority areas:

### Gender

We are aiming for **gender parity in leadership positions by 2030**. In 2021, we increased the share of women in leadership roles to 36% (2020: 35%) and maintained a stable 43% proportion of women in the global workforce.

#### Women in leadership

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## Culture and ethnicity

By 2030, we plan to increase the proportion of colleagues in our United States leadership teams who are members of underrepresented racial and ethnic groups from 21% to 30%. We continue to pursue self-identification efforts to help us further understand our **organizational structure as regards culture and ethnic representation**.

With 23% of our employees based in the United States, it is crucial that we become an **employer of choice among racial and ethnic minorities** in this market. We continually listen and learn from our colleagues in the market to ensure our workforce reflects the talent currently available in the marketplace.

### Share of underrepresented racial and ethnical groups in US leadership



Additionally, due to our current performance and future growth in Asia, Latin America and the Middle East and Africa (MEA), accounting for 40% of our Group sales, we aim to increase the global share of nationals from Asia, Latin America, and MEA in leadership positions from 16% to 30% by 2030.

### Global share of nationals from Asia, Latin America, Middle East & Africa in leadership



## Inclusion

For us, inclusion means creating a culture and environment where everyone can **reach their full potential** and is able to add value. Our leaders are key to achieving this. In 2021, we began rolling out a Group-wide program to help leaders reflect on how they can lead more inclusively. All leaders, including new ones, are required to actively participate. In the reporting period, 37% of our leaders participated in this inclusion training. We also monitor progress using our Employee Engagement Survey inclusion score. Additionally, countries and sectors can focus on further diversity dimensions such as LGBTQI+, different abilities, age diversity, or veteran/military status.

A cornerstone of our DE&I strategy is to foster an inclusive culture in partnership with **over 40 employee resource groups** (ERGs) across the globe. With nearly 4,500 employees involved in one or more ERGs, we are able to build awareness of matters impacting our diverse workforce through programs and open dialogue. Our ERGs range from Women in Leadership to our Black Leaders Network and our Leaders of Ethnicity Allies and Faith.

We take action against all forms of discrimination, aspire to build teams with a balanced age structure, diverse educational backgrounds and experience and create an international working environment. As part of our DE&I strategy, we also encourage our managers to actively build diverse teams by considering training opportunities to raise awareness and working to have diverse candidates in the selection process when interviewing for roles. Diversity figures are part of compensation-related corporate goals. In 2021, we developed a prediction algorithm to support the modeling and tracking of our DE&I KPIs.

We integrate our inclusion concept into all Human Resources programs, training offerings and processes. The inclusion concept is embedded in our [Merck behaviors](#) and explicitly calls for open and supportive collaboration.

We advocate for **openness and diversity**. For this purpose, we work on recognizing unconscious bias and its impact on everyday work. We use training courses to raise awareness among managers and employees and show how these biases can be actively addressed, both in interpersonal relations and decision-making processes.

## Roles and responsibilities

Our Chief Diversity, Equity and Inclusion Officer is responsible for our global Diversity, Equity and Inclusion (DE&I) strategy and steering related activities. In this role, she reports directly to the Chair of the Executive Board, whose responsibilities include Group Human Resources.

In addition, we have a centralized Diversity Council that consists of **high-ranking executives** from all our business sectors and select Group functions. The Diversity Council members:

- Visibly and actively support equity and inclusion across a corporate strategy and related activities.
- Act as ambassadors and advisors to the Executive Board and managing directors in country organizations.
- Propose strategic goals, initiating measures and ensuring within their respective units that line managers meet their responsibilities.
- Exchange information, discuss the latest challenges, share best practices, and align on next steps.
- Act as role models within their business units and among our workforce.
- Work across businesses, functions and countries to integrate DE&I within our daily work for the benefit of our employees and customers.

In addition, all business sectors and major Group functions have various working groups at management level that implement the Diversity, Equity and Inclusion strategy in their area of responsibility.

## Our commitment: Industry-wide initiatives and regulations

Our [Social and Labor Standards Policy](#) spells out that we **do not tolerate any form of discrimination**, physical or verbal harassment or intolerance. To underscore our commitment to equality, fairness, inclusion, and tolerance in the workplace, we also participate in industry-wide initiatives.

- The “[Women’s Empowerment Principles](#)”, an initiative of UN Women and the UN Global Compact network, help to promote gender equality and women’s empowerment in the workplace. In 2021, we joined the “UN Target Gender Equality Programme”, which supports companies in achieving gender balance in business.
- The “Inclusion Action Plan” of the German Mining, Chemical and Energy Industrial Union ([IG BCE](#)) defines concrete measures to create a more inclusive workforce for employees with disabilities. In endorsing this plan, we are meeting the requirements of the United Nations Convention on the Rights of Persons with Disabilities.
- The “Equal Opportunity Charter”, through which we promise to do everything in our power to achieve gender equality within our company.
- The German “Diversity Charter” a corporate initiative with over 4,500 signatories to promote diversity in companies and institutions; we signed their Charter back in 2013 and became a full member of the association [Charta der Vielfalt e. V.](#)

Moreover, we are a signatory to the [Business Coalition](#) for the Equality Act, an alliance of leading companies in the United States. Additionally, we participate in various causes near our sites. Thereby, our employees can support our efforts towards an inclusive workplace and community. In 2021, we **partnered with [Disability:IN](#)** to promote the full inclusion of people with disabilities.

### Meeting statutory requirements

The German Law for the Equal Participation of Women and Men in Leadership Positions in the Public and Private Sector has been in effect in Germany since 2015. Owing to our legal form as a KGaA (corporation with general partners), this law also applies in part to us.

With a 37.5% share of women (six out of 16 members), our Supervisory Board already meets the stipulations of German gender quota legislation. As a KGaA, we are not required to set targets for our Executive Board. Our Executive Board currently has a 20% share of women (1 out of 5). Detailed information can be found in the [Statement on Corporate Governance](#) in our Annual Report.

## Rooting out unconscious bias

We seek to raise awareness of **unconscious bias** among our managers and employees, also through Group-wide training courses on this topic. Since 2021, we have been using new technologies in the context of recruitment in order to support the use of **gender-neutral language**, for example when creating job advertisements. This is intended to reduce unconscious bias in the hiring process and ensures that our job advertisements are attractive to diverse talent.

## Pay Equity Analysis

Our commitment to pay equity is an important aspect of our DE&I strategy. In order to create transparency on unexplained pay gaps and their underlying root causes, we conducted a pay equity analysis in 2021. In this first step, we analyzed our top ten countries covering roughly 80% of our employees. The focus of the analysis was on pay gaps based on gender. The detailed data analysis had not yet been completed at the end of 2021. Based on the initial findings, we continue to create a detailed action plan and work on business alignment to ensure fair pay for all our employees.

## Inclusive leadership

We provide a framework for DE&I education and empowerment to support inclusive leadership strategies and tactics. To maximize the impact of our leaders in building diverse and inclusive teams, our Executive Board approved the launch of the **Inclusive Leadership Program (ILP)** as part of our global inclusion KPI. The ILP combines global leadership interactions, peer coaching, continuous self-reflection, and leadership accountability. It is mandatory for all our leaders, including new leaders. In 2021, 37% of our leaders took part in the course.

## Fostering diverse talent

HR supports our business units in fostering talent of various origins and increasing the proportion of women in leadership roles. At the end of 2021, 36% of leadership roles were held by women and we are on track to achieve gender parity by 2030.

We continue to create a strong internal female talent pipeline and promote women into leadership positions while also actively sourcing female talent externally. We focus on internal development and external sourcing of international and underrepresented ethnic talent. In an effort to improve balance referrals, in the reporting year we piloted a 25% increase in bonuses for employees in the United States for successful referrals of qualified diverse candidates. We monitor diversity in succession planning, particularly for senior positions. To help understand demographics, we conducted self-identification campaigns in certain regions to encourage employees to voluntarily provide information on ethnicity, different ability or veteran status in 2021. To help promote diversity in hiring for internal roles, we also offered numerous **mentoring, sponsoring and talent programs** for women and other target groups, such as underrepresented ethnic groups.

We are convinced that our talent programs and open discussions about unconscious bias contribute to further increasing inclusivity and sense of belonging among our workforce.

Our employees have the option to flexibly calibrate their working time and to work remotely, which also contributes to greater professional and personal opportunities for more colleagues. Additionally, we offer our employees information on remote working and mental health, for example, in order to support their lifestyles, well-being and personal circumstances.

## Integrating international employees

Our company is becoming increasingly international. We currently employ people from 142 nations. Our leadership includes representatives of 79 nationalities. As of the end of 2021, 10% of our workforce worked outside their home countries.

To best facilitate this international collaboration, we offer **intercultural training** for all employees along with appropriate digital tools. For instance, our Cultural Navigator helps prepare our staff for international projects and business trips abroad. To help employees transferred abroad to adjust more quickly, we offer language training and international networks. For instance, more than 700 expatriate employees are members of the International Community, which meets regularly in Darmstadt.

## Networks strengthen diversity, equity and inclusion

We support more than 40 local and global **employee resource groups (ERGs) and action networks**, including our internal women's networks and networks that advocate for the LGBTQI+ community, employees of various ethnic origins, international employees, and employees with care responsibilities. In 2021, we created new networks for people with different abilities and veterans. In collaboration with our networks in North America, we established **24 Site Inclusion Teams** across our locations, focusing on driving inclusion at our manufacturing sites.

Involvement in area-specific or interdisciplinary networks is an opportunity for all employees to acquire leadership competencies. At the same time, these employees bring their experience and perspectives to our company. We therefore ensure frequent touch points and communication with these groups.

## Our networks drive inclusion



### CAREGIVERS

Focus on improving carers' health and wellbeing, while increasing awareness and support for them within healthcare systems around the globe



### MULTI-ETHNIC NETWORKS

Help propose solutions to support the attraction, retention, and development of our employees of color as well as other cultural and ethnic minorities



### GENERATIONAL NETWORKS

Raise awareness, drive development, and encourage a culture where everyone has the same career opportunities regardless of their age and stage of life



### RAINBOW NETWORKS

Promote a safe and inclusive network environment and foster a community where LGBTQI+ employees and their allies are recognized and valued



### I'M ABLE

A community for people with disabilities, and their allies and help break the stigma surrounding disabilities topics and instead, provide resources and support



### WOMEN NETWORKS

Create an inclusive workplace that recognizes, develops, and advocates for the promotion of qualified women to achieve gender balance and thus long-term business success



### INTERNATIONAL COMMUNITY

A community of open-minded individuals who connect, and exchange resources, knowledge, and information to support a soft landing at our local sites in Darmstadt, Germany and Switzerland



### ADDITIONAL INCLUSION NETWORKS

Veterans, Flexibility, and Responsibility with the Community are employee networks that focus on local specific needs for the respective target groups

## Tapping into external networks

For more than ten years, our company has been a corporate partner of the Healthcare Businesswomen's Association ([HBA](#)). We are represented both in global and European advisory boards. The HBA advocates for women in the healthcare industry almost exclusively through volunteer work. We explicitly support employees who want to volunteer for the HBA and sponsor various events. In 2021, employees in Belgium, France, Germany, the Netherlands, Switzerland, and the United Kingdom volunteered for the HBA – some as members of the European Regional Council, some as chairpersons or chapter president and some as leaders or committee members of regional or local HBA teams.

## Taking action against discrimination

We do not tolerate any kind of discrimination in our company. This is stipulated with binding effect in our [Code of Conduct](#) and our [Social and Labor Standards Policy](#). Should employees experience harassment or discrimination in the workplace, they can report the issue via various channels. Their first points of contact are either their supervisor or our Human Resources (HR) or [Compliance](#) teams. Alternatively, employees throughout the Group have the possibility to call our [Compliance hotline](#) anonymously. As part of our "Group Compliance Case Committee", HR coordinates suspected cases relating to human resources topics. In 2021, seven suspected cases of discrimination were reported via the compliance hotline and other channels. Of these reports, six incidents were confirmed.

## Solid ranking in diversity, equity and inclusion indices

We continue to make progress on integrating diversity, equity and inclusion within our business.

The American [Human Rights Campaign Foundation](#) rated our LGBTQI+ activities. We scored 100% in the "Corporate Equality Index" ([CEI](#)) 2022, which measured the equality and inclusion of LGBTQI+ employees.

We ranked seventh in the "[World's Top Female Friendly Companies 21](#)" list by Forbes, which identifies the companies leading the way when it comes to supporting women inside and outside their workforces.

In the Financial Times [ranking](#), we were selected as one of the leading 150 (out of over 15,000) companies on diversity.

We scored sixth in the "[German Diversity Index](#)" published in June 2021 by BeyondGenderAgenda. The index reflects the transparency of the diversity commitment of the DAX 30 (as of September 2021: DAX 40) companies in their annual and sustainability reports of 2020.

We ranked eighth in the 2021 "[BCG Gender Diversity Study](#)" by the Boston Consulting Group and the Technical University of Munich. This study rated management board and supervisory board gender diversity among Germany's largest publicly listed companies.

# Leading & developing employees

Good leaders are crucial for the development of employees and the success of our company. That's why we place great importance on the continuing education and development of our managers. Many of our teams work across sites and national borders, which is why fostering global collaboration is a central theme in the professional training and growth of our employees and leaders.

## Our approach to leading and developing employees

Our [People Strategy](#) serves as a basis for our continuous efforts to attract, retain and develop our leaders and talent. It highlights the importance of curious talent and empowered leaders as well as results-oriented teams and networks.

We place special focus on actively engaging and challenging our leaders to become "leaders of people". By participating in [employee surveys](#), our people can also assess various factors such as leadership quality within the company.

Our **strategic competency model** describes the core competencies that underpin the conduct of our employees at all levels of the hierarchy (please see diagram).

Based on the introduction of our high-impact culture and new Merck behaviors in late 2021, the competency model will be refreshed in 2022 to reflect these updates.



## Our competency model

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In our day-to-day work, these core competencies play an important role in our success. The competency model is incorporated into our Human Resources programs and processes. Employees and supervisors discuss specific growth and development needs as well as the progress made with development measures already introduced.

Based on our current competency model, we have six **leadership behaviors**, which summarize our expectations towards leaders, who play a key role in embedding the competencies across the organization.

However, since our culture is constantly evolving and to support our business growth ambition, we need a culture that is consistent, complementary to our scale and relevant to our organization and the environment we are operating in. This is why we aim to establish an inclusive high-impact culture that is understood and supported by our diverse workforce of more than 60,000 employees.

In order to bring our high-impact culture to life, we have defined a new set of standards that we should all aspire to every day: our Merck behaviors.

With our six new Merck behaviors, in October 2021, we began moving from multiple frames to one simplified framework. The new behaviors represent an evolution towards what is needed in the future. They are as follows:

- Obsessed with customers and patients
- Act as the owner
- Be curious and innovate boldly
- Simplify and act with urgency
- Raise the bar
- Disagree openly, decide and deliver (3Ds)

From October 2021 onwards, our high-impact culture along with the Merck behaviors are being embedded in the foundations of Human Resources programs and processes to be implemented throughout 2022 and beyond.

We support the personal and professional development of all employees in line with their strengths, ambitions and competencies, laying the groundwork for an enriching and challenging career with our company.

In addition to dual education programs, we consider vocational training to be crucial in order to meet the **current and future need for qualified professionals**.

As competition for young talent grows, job security and marketable professional qualifications are vital, which is why we continuously invest in [new technologies](#) and integrate these into our vocational training programs. If, after completing their apprenticeship, our young employees in Germany wish to continue studying while working, we will cover 75% of the costs and grant them special leave.

## Roles and responsibilities

Group Human Resources (HR) supports and advises all business sectors and Group functions within our organization around our human capital, in particular on topics related to recruiting, vocational training and advanced training. Moreover, we develop strategies to advance our employees, organization and company culture.

We expect our leaders to understand the needs of their diverse teams and provide support in the form of resources and data. Additionally, the ability to have access to **transparent feedback through specially developed tools**, allows leaders the opportunity to gain further insight into the impact of their behavior on their teams. We work with external providers to train our leaders on science-based, proven approaches to good leadership.

Every employee can access their personal data via our **HR4You digital platform**, which globally harmonizes basic HR processes. For instance, the platform also enables employees to initiate and steer their Performance Management Process themselves, participate in online training courses or apply internally for vacant positions.

## Our commitment: Structured development

Our six Merck behaviors form the basis of our high-impact culture. They describe good leadership in our Group and are based on our corporate strategy and our company values. We regularly inform executives and employees through global campaigns about the Merck behaviors. We integrate these behaviors into all HR processes, such as training, recruitment and feedback processes.

Our People Development and Learning Policy provides a Group-wide framework within which employees can manage their professional growth. It defines requirements for our development opportunities, roles and responsibilities. The associated processes are described in our People Development and Learning Standards.

## Providing feedback and supporting development

We regularly provide feedback to our employees. The **Performance Management Process** ensures that in addition to this regular feedback, a meeting is held once a year to evaluate employees' overall performance. This process is consistently applied across our company. Our people managers and their employees agree on **individual annual goals**. The annual bonus depends on individual performance and achievement. Additionally, the bonus calculation also reflects the company's overall performance, which we determine using various company key indicators.

Once the development direction is defined, our managers and their staff create a **detailed development plan**. To help create this, all employees have access to the Development Advisor. Building on the Merck competencies and Merck leadership behaviors, this digital tool provides a selection of development opportunities that employees can tailor to their own needs. Every employee can therefore rapidly and easily create their development plan, which displays the respective areas of focus via our HR4You digital platform. It is coordinated in line with the company's strategic priorities. 98% of our employees took part in the Performance Management Process in 2021 and 74% set up an approved development plan.

Our employees can additionally collect feedback from selected colleagues and external partners on their personal development. This **360-degree feedback** helps to identify personal strengths and advancement opportunities. Moreover, our people have access to a real-time feedback tool that they can access via their PC or smartphone, making it even easier to give and receive feedback. With this tool, we intend to help promote a cross-hierarchical feedback culture.

## Employee learning and education

Our Group-wide advanced training and continuing education program ensures that our employees develop the skills and abilities needed to help us realize our company strategy. As part of their **individual development plan**, our employees can use our learning management system to register for seminars and e-learning courses. For example, we offer **Group-wide training courses** on “Virtual Leadership”, “Employee Welfare” and “Working Remotely”. In 2021, 100% of our employees took part in a training. Overall, more than 6.5 million training courses were completed. Additionally, our employees can participate in special courses on the career platform LinkedIn Learning.

In professional training, we use virtual learning formats. This strengthens us when it comes to integrating topics such as robotics, Big Data or **artificial intelligence** into our curricula.

We continuously adapt our offers to meet the individual learning needs of our employees and the strategic priorities of our company. This will help our employees to develop the relevant competencies and skills we need for our business, while contributing to their personal and professional development.

## Vocational training and dual education programs

In Germany, we offer apprenticeships across 30 occupations, primarily in production, infrastructure, laboratory work, and office administration. Furthermore, we enable young adults to pursue a dual education program in the fields of business administration, business IT, process engineering (chemical engineering) and mechanical engineering. Apprentices in the Laboratory group begin their training as chemistry or biology lab technicians and, subject to suitability, may receive the opportunity to begin a dual education program after six months. Since 2014, we have been offering permanent employment contracts to all **apprentices and graduates of dual education programs** in occupations for which we have long-term demand. In 2021, we had a 95% hiring rate for graduates of these programs (including those who chose to leave the company).

Digitalization and virtual learning continue to play an increasing role in vocational training. To learn how to operate plants, machines or lab equipment, our apprentices also use virtual reality environments. For example, in process engineering, they practice operating the systems using a virtual reality display before applying and furthering their new skills in the actual operating environment.

### Special vocational training opportunities

In Darmstadt, our “Start in die Ausbildung” program helps prepare young people for the labor market. We offer them the opportunity to complete an 11-month program with our company, **gaining insight into the world of work and improving their qualifications for vocational training**. On the one hand, we support young people who have earned a high school diploma and searched for an apprenticeship for at least one year without success. On the other hand, we help refugees who had to leave their countries of origin and would like to build a new life in Germany. Participants of our “Start in die Ausbildung” program can learn and benefit from each another with regard to cultural and language skills. In 2021, we hired 20 participants between the ages of 15 and 33.

## Management and talent programs for leaders

To **enhance the skills of our people managers**, we offer three different programs:

- The Managerial Foundation Program imparts the basics of leadership, such as communication techniques, leadership styles, conflict management, motivation, and emotional intelligence.
- The Advanced Management Program covers topics such as change management, self-reflection and resilience.
- Our Global Leadership program focuses on the competencies needed to ensure successful international collaboration.

The rapidly changing environment has led us to overhaul our leadership program landscape, including virtual and purposeful leadership. We tested two new programs in the second half of 2021. Both newly developed programs cover the same core cultural topics to create a joint understanding of leadership on all organizational levels. The program “Empower Your Team” provides an introduction to our leadership culture, along with basics of leadership, such as decision-making, feedback, motivation, and emotional intelligence. “Empower Your Organization” aims at more experienced leaders and focuses on the capabilities needed to shape our future culture, covering topics such as inclusiveness, psychological safety and transformation.

Based on a pilot project in 2021, we developed the Group-wide Inclusive Leadership Workshop. In line with our communicated KPIs on inclusion, we aim to have 100% of our leaders participate in the Inclusive Leadership Workshop by 2026.

For 22 years, we have been partnering with top international universities to offer the **Merck University** program. Over a one-year period, senior leaders complete learning modules on management techniques and strategic business development, with 552 senior leaders having participated to date.

We also offer promising leaders our long-standing International Management Program. Through this, participants work on an interdisciplinary project over a period of eight months. They present the results of their efforts to the Executive Board. In 2021, 26 of our employees took part in such a project.

In addition to these various programs, we partner with universities across the globe to enable our employees to obtain qualifications such as an Executive MBA.

Our Expert Foundation Program teaches participants the fundamentals of their role as experts in interdisciplinary project groups.

## Tapping potential in growth markets

In January 2022, seven participants successfully completed “[Afrika kommt!](#)”, an eight-month program offered by the German Society for International Cooperation ([GIZ](#)). The program **trains experts and leaders from Africa**. In supporting this initiative, we are helping to build a pool of regional partners to encourage economic cooperation between Germany and Africa. 34 former scholarship recipients have taken on a specialist or leadership position, some of them in African countries and others in Darmstadt. We have selected ten new candidates for the tenth intake of “Afrika kommt!” starting in February 2022.

# Health & safety

We take responsibility for the health and safety of our employees every single day, especially when faced with unexpected challenges such as the Covid-19 pandemic. Because we want to prevent health issues from even arising in the first place, we do a great deal to safeguard our people against both accidents and work-related illnesses.

## Our approach to preventing accidents and promoting health

We seek to promote the health and well-being of our employees and sustain their ability to perform over the long term, which necessitates a safe workplace. We are therefore constantly working to take our **health and safety culture** to the next level.

The lost time injury rate (LTIR) is the indicator used to gauge the success of our occupational safety efforts. This figure is a global measure of the number of accidents resulting in at least one day of missed work per one million hours worked. We track the LTIR globally for both employees and supervised temporary staff. In 2021, we set a new workplace accident reduction target, specifically to bring our LTIR below 1.0 by 2025.

Before starting any activity worldwide, we perform a hazard assessment to identify risks and do everything possible to eliminate them before commencing the activity or commissioning a plant. If this is not feasible, we put measures in place to minimize the chances of problems arising and their potential impacts. Such hazard assessments are the responsibility of our individual sites and are therefore conducted by them.

Through the efforts of our **Health Management (HM) unit**, we are bolstering our company and health culture at Darmstadt and Gernsheim. To verify the efficacy of Health Management initiatives and programs, we have developed a **performance indicator system** based on data such as the health-related responses from our annual anonymous [Employee Engagement Survey](#). We use this survey to calculate our work-balance index and our healthiness index, which should reflect the general state of health of our workforce worldwide and their ability to manage the demands of their professional and personal lives. These indices allow us to assess the data at team level (groups of at least ten), a minimum threshold that enables us to protect people's anonymity. In 2021, we introduced an overarching health question to the survey to document and track our company's health culture and its development in the coming years.

Besides the health-related responses from our employee survey, Health Management at our Darmstadt site also makes use of the findings from our company insurance fund's health report, along with evaluations from our Site Medical Center. We utilize all of this input both to create **target group-specific or unit-specific prevention programs** as well as to advise local leadership. When specific indicators such as workplace stress start rising, Health Management meets with the respective units to discuss ways to rectify the situation.

In the coming years, we will continue to focus particularly on shift work, mental health issues and demographic change. In addition, we plan to identify areas in which certain illnesses occur frequently so that we can take targeted steps to eliminate the root causes.

## Roles and responsibilities

Our Environment, Health and Safety (EHS) management system is the responsibility of Corporate Sustainability, Quality and Trade Compliance, which reports to the Chair of the Executive Board. This Group function sets objectives, globally oversees the respective initiatives, and conducts internal EHS audits, while **local EHS managers** and their teams see to it that our individual sites comply with all occupational health and safety laws and regulations. They are also responsible for local projects, campaigns and programs.

Employees worried about their health or safety are permitted to temporarily step back from their work until the issue has been resolved. Across the Group, they are encouraged to report such concerns via our [compliance hotline](#).

At our Darmstadt site, we also have safety councils and committees that convene to address health and safety issues, discussing strategy and focus areas with senior leaders, health and safety experts, and employees.

At our Darmstadt and Gernsheim sites, our Health Management unit helps embed health awareness in our company culture. After implementing each measure, the Health Management team asks all participants for their anonymous feedback and suggestions for improvement, which help shape the evolution and growth of the initiatives.

At both of these sites, our **interdisciplinary Mental Health Team** is working to tackle the growing challenges surrounding mental health in an effort to protect our workforce against psychological stress. Our Mental Health Team provides our people with interdisciplinary support from a single source. In addition to this service, we offer a telephone hotline in all 66 countries in which we operate, giving our employees and their relatives access to confidential counseling services around the clock.

## Safety delegates and health partners

At our sites worldwide, we have safety delegates who, in addition to their usual duties, help their supervisors ensure compliance with safety regulations and requirements. At the same time, they also act as points of contact for their colleagues regarding safety-related matters.

At our Darmstadt and Gernsheim sites as well as several other German facilities, we also have health partners in place who are the interface between our employees and Health Management. They function as a health-related liaison for their colleagues while also informing their teams about the health programs and services on offer. They furthermore make recommendations to Health Management regarding employee needs. Our employees undergo training before taking up their role as a safety delegate or health partner.

## Our commitment: Policies and company agreements

Defining our principles and strategies for environment, health and safety (EHS), our Corporate [EHS Policy](#) is an integral part of our EHS management system, which undergoes an external ISO 45001 audit every year.

Our Group Health Policy details our approach to ensuring workplace safety for our employees while also promoting their health and well-being. This document sets out our **Group-wide approach to health and safety management**, which is aimed at preventing workplace accidents and occupational illnesses.

To complement this policy, our Contractor EHS Management standard helps us ensure that our contractors adhere to environment, health and safety requirements throughout the entire process, from starting a job to completion.

At our sites in Germany, we abide by **company agreements** on occupational health and safety that have been drawn up in partnership with employee representatives. For instance, our Occupational Integration Management company agreement, which applies to all our sites in Germany, governs the procedure for employees who have been on extended sick leave. This document aims to retain an employee's position while also helping to prevent adverse health impacts after the respective employee returns to work.

We also have occupational health and safety company agreements in place at 13 other sites in Europe. These cover all those activities required to comply with national occupational safety regulations, such as workplace hazard assessments and regular occupational safety surveys. These company agreements also include local health services and programs for our employees.

## Safety certification at our sites

As part of a [group certificate](#), our occupational health and safety management system was ISO 45001-certified at 46 sites at the end of 2021. At 45 of these facilities, 100% of employees are covered by this certified system. At our global headquarters in Darmstadt, ISO 45001 covers around 70% of the workforce; the occupational health and safety of the remaining 30% of employees, who do not work in operating units, as well as all other non-certified sites are safeguarded by our company's global integrated management system, which covers EHS requirements. The certification process helps us pinpoint weak areas and identify scope for improvement, allowing us to take the necessary steps in a timely fashion to ensure the health and safety of our employees going forward. Other sites are also urged to apply this standard.

## Accident rates

Our employees are required to immediately report any relevant occupational accidents to Corporate Sustainability, Quality and Trade Compliance, where the incidents are assessed. If necessary, we then implement additional safety measures at our sites. This procedure is an integral practice across all of our production facilities around the world.

We track the following occupational safety data across our sites worldwide:

- The LTIR measures the accidents resulting in at least one day of missed work per one million hours worked. In 2021, our LTIR was 1.2, an improvement over 2020 (1.3). The majority of incidents resulting in lost time were slips, trips and falls, along with contusions and lacerations from the operation of machinery and equipment. In 2021, we once more recorded no fatal accidents.
- We use our Environment, Health and Safety Incident Rate (EHS IR) to [track accidents](#).
- Alongside this indicator, we also use the Occupational Illness Rate in the United States to monitor work-related illnesses and their long-term effects.



## Clear rules of conduct

Experience shows that most workplace accidents can be prevented by proper conduct. For our occupational health and safety, it is therefore essential that our employees have the relevant EHS training and certification. We not only educate our employees on occupational health and safety, but actively engage them in our efforts. For instance, we invite them to participate in inspections and involve them in selecting personal protective gear. This involvement is crucial because our people best understand their actual working conditions and what is needed, enabling us to constantly improve our occupational health and safety practices and performance.

Group-wide, all new EHS managers must complete a three-day EHS onboarding that covers topics such as occupational health and safety as well as our **BeSafe! safety culture program**. Through this initiative, we raise employee awareness of workplace dangers and teach them rules for safe behavior. Despite the ongoing pandemic, in 2021 we managed to integrate four legacy Versum sites into “BeSafe!”, conducting the training online. In addition, we regularly provide occupational safety training at our sites covering both legal requirements as well as the specific local risks.

## Promoting employee health

For employees at our sites in Darmstadt and Gernsheim, our Health Management unit offers specific health services such as mindfulness courses and workplace ergonomics consultation. Moreover, we have a standard operating procedure in place to continuously assess the working conditions and environment of our employees and improve these in line with the latest scientific findings. We publish a health catalog in both English and German detailing all our Health Management services, which cover topics such as ergonomics, nutrition, stress, and mental health issues. In addition, we are tackling demographic change by utilizing a tool to assess various age-related stressors, which in turn enables us to **adapt our workplaces to suit the needs of older individuals**.

## Protective measures and vaccination campaigns

Our measures to protect our employees against Covid-19 at our sites in Darmstadt and Gernsheim are based on three pillars:

- **Testing:** By the end of December 2021, we had performed approximately 35,000 antigen rapid tests at our in-house company testing centers.
- **Walk-in clinic for cold symptoms:** Since November 2020, employees with unclear complaints and symptoms have been able to consult the walk-in clinic for cold symptoms for advice on how to best protect themselves and colleagues and to prevent infection.
- **Vaccinating:** In February 2021, our Site Medical Center initiated a Covid-19 vaccination campaign at the Darmstadt and Gernsheim sites. It started with personnel involved in the production of lipids, which are an important component of mRNA vaccines. Over the summer, we expanded the vaccination campaign initially to all other employees and later to their family members. By the end of December 2021, we had administered more than 17,800 vaccine doses to our employees in Darmstadt and Gernsheim as well as their families.

We also offered vaccinations to employees at other sites, such as those in India and Indonesia.

In addition to Covid-19 vaccinations, we also offered flu shots to employees at our Darmstadt and Gernsheim sites in autumn 2021, vaccinating more than 2,600 employees.

## Fitness initiatives

Across Germany, our people can take advantage of offerings such as our company fitness program, which encompasses a range of **health prevention courses** that are subsidized by our company. Additionally, in Darmstadt and Gernsheim, we have a company sports program that currently features 33 different athletic activities.

## Step-counter fitness campaign and health app

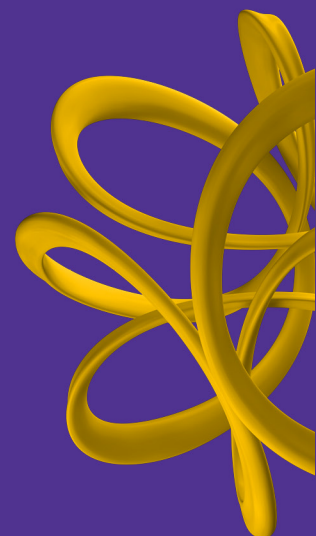
We want to encourage our employees across all our sites to maintain an active, healthy lifestyle and, especially in the era of Covid-19, to promote social interaction with one another. Approximately 16,000 employees have downloaded a health app that offers a variety of health-related information on topics such as stress, nutrition and social contact. In 2021, we also held **two step counter races** that motivated around 13,300 employees to get physically active together. Using the health app, team participants tracked their physical performance based on their step count. As an additional incentive, we tied the number of steps taken in the second pedometer race to donations to charities. Altogether, participants walked their way to € 100,000, € 70,000 of which went to Save the Children and € 30,000 of which went to local charitable causes chosen by the winning teams.

## Boosting well-being

In March 2021, our Global Healthcare Operations (GHO) unit kicked off its “Feel well” initiative. Over a period of seven months, GHO staff participated in webinars in which experts advised them on how to enhance their well-being and eliminate stress. They also took a closer look at topics such as personal habits, sleep and slowing down. In total, more than 1,000 GHO employees participated in the events. Afterwards, the materials were posted on the intranet so that the participants and all other employees could access them and take steps to prevent stress-induced illnesses.

## Examinations and support for our employees

Our Physical Ability Test and Health Preservation process allows us to ensure that all employees meet the health requirements for their particular tasks and duties. Depending on the job profile, some of our employees undergo **pre-hiring physicals and physical aptitude examinations**. Our Travel Health & Medical Advisory Service assists employees who spend time abroad, providing them with recommendations on necessary vaccinations and advice on hygiene risks.



# ENVIRONMENT

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# Environmental stewardship

Our business activities generate greenhouse gas emissions, wastewater and waste. In addition, we use materials that can adversely affect the environment if not handled properly. At all our production sites, we meet a strict set of environmental regulations and continually adapt our processes to new regulatory requirements. We also aim to make the most efficient use of increasingly scarce resources.

## Our approach to environmental stewardship

Minimizing negative environmental impacts and taking meaningful climate action requires a holistic approach while also constantly monitoring practices and performance. Our goal is to avoid harmful emissions into the air, water and soil as far as possible. Our production sites are located in established industrial and commercial zones. Before acquiring a company – and thus its facilities – we first conduct an environmental risk assessment, taking into consideration information from publicly accessible sources such as local residents and non-governmental organizations (NGOs).

## Roles and responsibilities

The Chair of the Executive Board and CEO of Merck is responsible for environmental stewardship, which also covers climate action, water management waste and recycling, biodiversity, and plant and process safety. Her duties include the approval of overarching Group-wide guidelines such as our EHS Policy.

The Group function Corporate Sustainability, Quality and Trade Compliance ([SQ](#)) is responsible for steering all the related measures globally. SQ senior leadership approves operational standards and regularly reports on environmental stewardship to the Executive Board. Every year, Corporate Sustainability, Quality and Trade Compliance (SQ) prepares an environment, health and safety report that covers topics such as climate action, water management, waste and recycling, and plant and process safety. The Executive Board uses this report to steer the strategic direction and as verification for our ISO 14001 certifications.

At our individual sites, each site director is responsible for environmental stewardship as well as occupational health and safety at the operational level. At larger facilities, the site directors receive support and advice from EHS managers, with EHS coordinators performing this role at smaller sites. These local EHS units report to the corresponding business sectors, working in close collaboration with them. As of December 31, 2021 we employed **more than 280 EHS managers**, supported at the local level by further staff members.

Within our business sectors, the Operations Leadership Committee (OLC) makes strategic decisions on issues pertaining to [emissions](#), [energy](#), [water](#) and [waste topics](#). This body consists of representatives from Life Science, Healthcare and Electronics as well as from Corporate Sustainability, Quality and Trade Compliance (SQ). Decisions made by the OLC and any resulting actions are implemented by the respective business sector. Once per quarter, the OLC members update their leaders on matters relating to environmental stewardship.

Whenever designing new sites or plants, we always involve Corporate Sustainability, Quality and Trade Compliance (SQ), which is responsible for reviewing the ecological aspects of a project and advising our sites. Additionally, SQ performs detailed environmental impact assessments for large-scale projects. In 2021, we worked to integrate sustainability criteria more strongly into the investment process.

## Our commitment: Standards and standard operating procedures

Our approach to environmental management is founded on our **Group EHS (Environment, Health and Safety) Policy**, which has been approved by our Executive Board. Aligned with the requirements of the chemical industry's [Responsible Care® Global Charter](#) and the ISO 14001 environmental management standard, this policy underscores our leaders' responsibility for environmental stewardship and [health and safety](#). It is also aimed at our [suppliers](#), calling on them to likewise adopt higher standards of environmental sustainability and safety. Our EHS policy thus complements the [Responsible Sourcing Principles](#) of our Group Procurement function. In addition, through our Contractor EHS Management Standard, we ensure that our contract partners also take environment, health and safety aspects into account.

Internal guidelines, standards and standard operating procedures define how we put the principles of our EHS Policy into practice, **structure our environmental stewardship efforts and implement occupational safety Group-wide**. In addition, we also have in place a number of other internal environmental stewardship standards such as our [Air Emissions Standard](#), [Waste Management Standard](#), [sustainable water management standards](#), and [Energy Management Standard](#).

Potential EHS risks posed by acquisitions, divestments or site closures are assessed within the scope of due diligence, a process defined in our EHS Due Diligence and Post Merger Transaction Standard. We prioritize new sites when performing audits.

## Material investments in environmental impact mitigation

Efforts to prevent and monitor air, water and soil emissions entail significant expense on our part, as does proper waste disposal. Moreover, we set up provisions for **groundwater and soil remediation** to ensure that we can execute all the necessary measures. As of December 31, 2021, our [provisions for environmental protection](#) totaled € 153 million, 94% of which was attributable to Merck KGaA, Darmstadt, Germany.

## Assessing environmental impacts

As a matter of principle, we conduct risk-based assessments along with audits on all our production facilities every three years with the goal of analyzing and minimizing our environmental footprint. Conducted by Corporate Sustainability, Quality and Trade Compliance (SQ), these assessments serve to ensure that our requirements are being met, with appropriate corrective measures being implemented as needed. In our Group EHS audits, we assess our sites' performance on a five-tier scale ("excellent", "good", "satisfactory", "poor", and "critical"), which in turn determines how frequently audits are conducted. If the findings are deemed to be good, we audit the facility less often, while significant violations can increase the frequency. In 2021, we commissioned a **total of 51 audits**, which were conducted either virtually or on site (in 2020, only 10 audits were conducted because of Covid-19). All audited sites received either a "good" or "satisfactory" rating and no site was rated as "critical".

## Reporting incidents and violations

To review critical situations, near misses and environmental incidents as quickly as possible and take countermeasures, we have a set of **reporting procedures** in place that allow us to track the respective incident, its degree of severity and all risk mitigation efforts. We record all incidents Group-wide and report them to the Executive Board on an annual basis.

In the event of a major occurrence, our digital **Rapid Incident Report System** (RIRS) promptly notifies the Executive Board as well as Corporate Sustainability, Quality and Trade Compliance (SQ) and Group Communications functions. Major incidents could include fatalities, accidents with multiple casualties, incidents that impact neighboring communities, or natural disasters such as earthquakes and flooding. Through the RIRS, we can quickly coordinate with all those involved and inform the other sites immediately of the respective event. In addition, employees can report any violations of our standards to Group Compliance.

As in 2020, we recorded **no significant violations** of environmental laws or regulations Group-wide in 2021.

## Environmental training and continuing education

All new EHS managers are required to complete a three-day orientation course at our global headquarters in Darmstadt. The seminar covers [energy efficiency and climate action](#), [water management](#), [occupational safety](#), and [process and plant safety](#) along with our Rapid Incident Report System (RIRS). In 2021, we conducted EHS onboarding online.

## ISO 14001:2015 Group certificate

Since 2009, our company has held an ISO 14001 Group certificate that requires all production sites with more than 50 employees to implement an **environmental management system with predefined indicators** such as greenhouse gas emissions and water consumption. Other facilities are not obligated to undergo certification. The annual internal audit reports and management reviews carried out under the Group certificate give us a better overview of how all our sites are performing. In 2021, 90 of our sites worldwide were covered by the [ISO 14001](#) certificate.

Every year we contract a third party to perform a certification audit. In 2021, a sampling of eight sites underwent an audit for our Group certificate, with all audited facilities passing. Beyond undergoing external inspections, we also conduct internal audits to ensure Group-wide compliance with our requirements.

## Biodiversity at our sites

Unsealed surfaces represent an important habitat for plants and animals. At our facilities, however, we are required to seal certain surfaces to minimize the risk of chemicals entering the ecosystem. When safety requirements permit, we increase the amount of surfaces that are unsealed. In 2021, we conducted a species conservation assessment for the Darmstadt site. This documented the species present along with the protected nesting areas and refuges located on our premises.

# Climate action

Climate change is one of the major challenges facing us in the 21st century. In 2015, 195 nations collectively agreed to take action to significantly limit the rise in global temperatures. Because climate action and energy efficiency will pay off in the long run – for both the environment and our business – we have also made it our mission to help stem the tide of climate change.

## How we are taking climate action

We want to do our part to preserve the climate and achieve the Paris Agreement on Climate Change. In 2020, we therefore drew up new objectives:

**By 2030**, we intend to lower our direct (Scope 1) and indirect (Scope 2) greenhouse gas **emissions by 50% compared with 2020**. This is to be achieved by reducing process-related emissions, implementing energy efficiency measures, and purchasing more electricity from renewable sources. We are also aiming to cover **80% of our purchased electricity with renewables** by 2030.

Moreover, we plan to lower our indirect emissions along our entire value chain (Scope 3) by 1,500 metric kilotons of CO<sub>2</sub> equivalents (CO<sub>2</sub>eq) by 2030. By 2040, we intend to have achieved **climate-neutral operations** throughout our entire value chain, a target that covers our Scope 1, 2 and 3 emissions.

In November 2021, our company decided to join the Science Based Targets initiative. In becoming part of this effort, we have committed ourselves to taking concrete steps to reach the Paris Agreement targets.

## Roles and responsibilities

Corporate Sustainability, Quality and Trade Compliance ([SQ](#)), is responsible for overseeing all climate action efforts throughout the Group, with our individual sites and business units worldwide implementing the necessary measures at the local level. You can find more information under "[Environmental Stewardship](#)".

## Our commitment: Standards and legal frameworks

We have three EHS standards in place to manage energy and process-related emissions consistently across the Group, specifically "Energy Management", "Emissions" and "Emissions of Refrigerants". We utilize an internal audit process to randomly check compliance with all EHS standards.

In addition to our own standards, **we are subject to a wide array of national and international energy and climate regulations**. At European level, for instance, we are required to comply with the EU Energy Efficiency Directive 2012/27/EU, which stipulates that companies must conduct regular energy audits or implement an ISO 50001-certified energy management system. The sites subject to these requirements are responsible for taking the requisite actions and furthermore undergo audits conducted by internal and external experts. In total, 14 sites have been certified to ISO 50001 thus far.

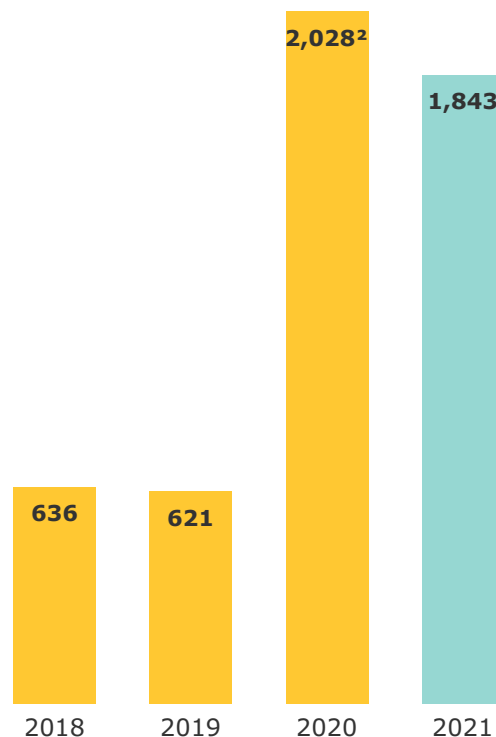
Our co-generation plant in Darmstadt and heating plant in Gernsheim (both in Germany) have made it necessary for us to participate in EU emissions trading since 2005. The EU's 2030 Climate and Energy Framework is designed to achieve the objectives of the 2015 Paris Agreement, with **EU emissions trading** playing a key role in reaching the greenhouse gas reduction targets. The amended EU Emissions Trading Directive (2003/87/EC) took effect in April 2018, thereby updating the legal framework for the fourth phase of the EU emissions trading program (2021-2030) and tightening the rules for free CO<sub>2</sub> allowances. Going forward, we will therefore increasingly have to purchase CO<sub>2</sub> emission allowances.

## Emissions Reduced

In 2021, we emitted approximately 1,843,000 metric tons of CO<sub>2</sub> equivalents (CO<sub>2</sub>eq) (2020: 2,028,000 metric tons). Our direct emissions (Scope 1) totaled 1,522,000 metric tons of CO<sub>2</sub>eq, with process-related emissions accounting for 1,261,000 metric tons of CO<sub>2</sub>eq and fuel use accounting for the remainder. Indirect emissions (Scope 2) totaled roughly 321,000 metric tons calculated according to the market-based method, (approximately 385,000 metric tons according to the location-based method, which does not specifically take renewable energy sources into account). Greenhouse gas emission intensity (Scope 1 and 2) amounted to 0.09 kg of CO<sub>2</sub>eq per € of net sales in this period.

In 2020 and 2021, we focused on creating more transparency on our Scope 3 emissions. The Greenhouse Gas Protocol defines 15 categories for Scope 3 emissions from upstream and downstream activities. In 2021, our emissions totaled 5,716,000 metric tons of CO<sub>2</sub>eq. Categories 1 and 2 (Purchased Goods and Services and Capital Goods) accounted for the lion's share, representing 68% of our total Scope 3 emissions in this period.

### Greenhouse gas emissions in metric kilotons of CO<sub>2</sub> equivalents, Scope 1 & 2<sup>1</sup>

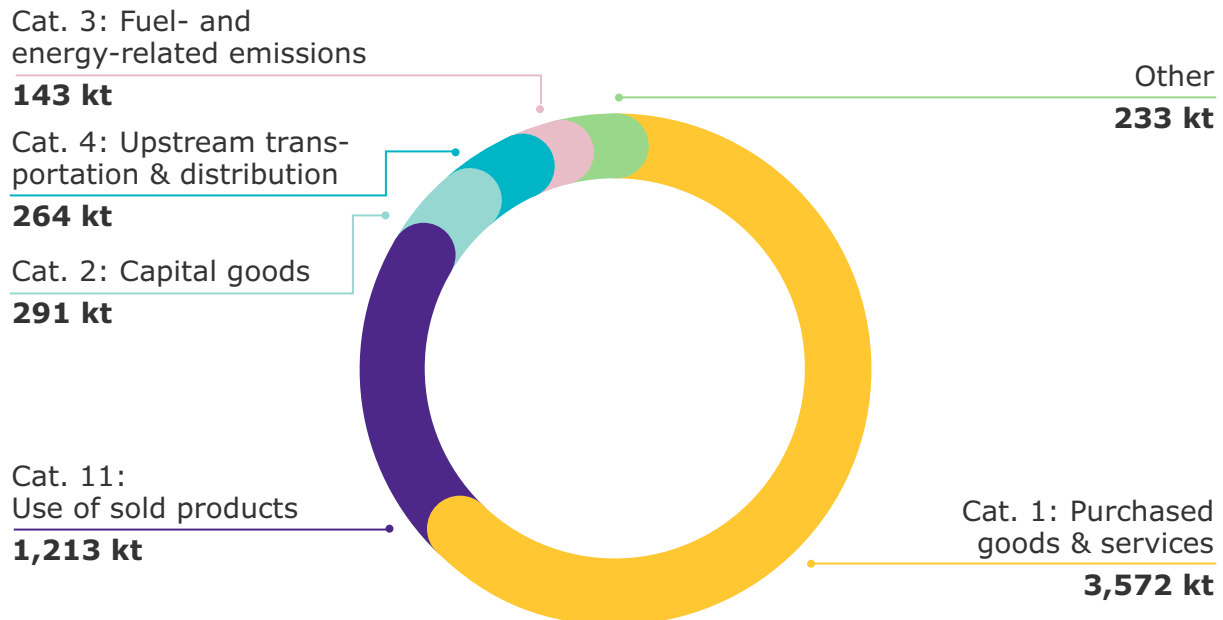


1) In line with the Greenhouse Gas Protocol, for all previous years greenhouse gas emissions were calculated based on the current corporate structure as of Dec. 31 of the reporting year and retroactively adjusted for acquisitions or divestments of (parts of) companies, or for changes in emission factors (portfolio-adjusted).

2) The increase in greenhouse gas emissions as of 2020 is attributable to the acquisition of Versum in 2019.



### Greenhouse gas emissions 2021 in metric kilotons of CO<sub>2</sub> equivalents, Scope 3



## Reducing process-related emission

With the integration of Versum Materials, acquired in 2019, into the Electronics business sector, our process-related emissions increased sharply – mainly in the production of special chemicals for the electronics industry. In 2021, we continued the investigations into reduction measures that we had begun in the previous year. In the process, we found new solutions for process optimization and for waste gas purification. We launched an initial pilot project for the thermal treatment of waste gas streams at the end of 2020.

In our Life Science business sector, we are recording process-related emissions primarily from the release of perfluorinated hydrocarbons (PFCs). In response, we have already replaced some emission-intensive production lines with equipment that does not emit PFCs.

## Reducing emissions within our supply chain

You can find more information on the Supplier Decarbonisation Program under "[Sustainable supply chain](#)".

### Shifting to ocean freight

In 2019, our Healthcare business unit initiated a major transformation of its means of transport, which is expected to significantly reduce not only our CO<sub>2</sub> emissions but also our logistics expenses. As part of the "Spezzatino" initiative, we reduced greenhouse gas emissions by switching all our products **from air to sea transport wherever possible**. We set ourselves the goal of transporting less than 10% of our healthcare products by air by 2023, thereby reducing our annual CO<sub>2</sub> emissions by 10,000 metric tons. We already achieved this target by the end of 2021 and structurally reduced our transport-related emissions by 10,000 metric tons of CO<sub>2</sub>.

## Transparency on CO<sub>2</sub> emissions and energy consumption

We report to the Carbon Disclosure Project (CDP) on an annual basis. This organization assesses the ways in which companies are working to lower greenhouse gas emissions and minimize the risks and consequences of climate change, along with their success and strategy for doing so. Companies are rated from A to D-, with A being the top score. As in 2020, we received a B for 2021.

## Green mobility

We aim to transition our car fleet primarily to lower emission engines by 2025 and are working to reduce the average emissions of our vehicles by approximately 50% relative to 2020 levels. Through our Green Fleet pilot, we are seeking to conserve resources and help employees at our German sites make the change to electric vehicles. Our employees can recharge their company, department or personal cars at 66 charging stations across six sites in Germany. We intend to double the number of charging stations by 2022. We also provide our employees in other countries with access to charging facilities, such as France, Switzerland, the United Kingdom, and the United States.

For those on the road, we offer the “Laden@road” program, which allows our employees to charge their company cars or personal vehicles at roughly 160,000 stations across Europe.

Through “Laden@home”, an initiative launched in Germany in April 2021, we provide € 1,700 to help cover the use of home wall charging stations and also pay for the resulting electricity costs.

## Energy efficiency

In 2021, a variety of **energy efficiency initiatives** helped us save around 1,700 metric tons of CO<sub>2</sub>eq at our global headquarters in Darmstadt. For instance, we updated heating, ventilation and air conditioning systems, implemented energy-saving lighting concepts.

As part of the energy and water efficiency program of our Life Science business sector, we rolled out new tools in 2021 to help us assess projects for saving energy and water. In addition, we trained 40 employees from sites outside of Germany on energy management.

## Slight rise in energy consumption

We consumed 2,454 gigawatt hours of energy in 2021, versus 2,374 gigawatt hours in 2020. Our [energy intensity](#) relative to sales totaled 0.12 kWh/€ in 2021.

## Purchasing electricity from renewable sources

In 2021 we increased our focus on purchasing **electricity from renewable sources**. In this period, we sourced 30% of our purchased electricity from renewable energies (2020: 27%). Renewables represented 13% of our total energy consumption.

In 2021, we announced our lead role in one of the world's largest buyer-organized aggregated procurements for renewable electricity to-date. We joined three other companies to sign 12-year Virtual Power Purchase Agreements (VPPAs) – bringing new renewable electricity to the grid. Construction of the 350-megawatt Azure Sky Wind and Storage project, which is located in the United States, is on-schedule with commercial operation planned for April 2022. We contracted for 68 megawatts of the 111 megawatts of capacity purchased by our buyers' consortium. The Renewable Energy Certificates received through this agreement will match 65% of our total electricity consumption across all business sectors in the United States – and 100% of our Life Science sector in the United States. Starting in 2021, we also covered the power needs of our Brazil sites entirely through renewables. In line with our renewable energy strategy, we completed an assessment of the European renewable electricity markets to determine our best path forward. This assessment will guide our renewable electricity purchasing strategy in the coming years.

## Employee incentives

We encourage our people to do their part to preserve the climate. Aside from regularly reporting on our **Group-wide climate actions** in our EHS newsletters, we also provide all employees with helpful information and tips on our Intranet. Moreover, we support members of our workforce who are seeking greener modes of transportation.

- At our German subsidiaries, we offer a subsidy of € 150 towards monthly lease payments to employees who opt for a **greener car model**.
- At our German sites, we also encourage workers to use climate-friendly forms of transportation through "bike4me", a program enabling them to **lease a bike** at discounted rates with payments coming out of their pre-tax income.

# Resource efficiency

## Water management

Water is becoming increasingly scarce globally. Since our company also depends on the availability of water, sustainable water management is an important part of our environmental stewardship. Our wastewater may also contain trace substances, such as heavy metals. We conscientiously observe water protection laws and immediately adapt our practices and processes if these laws are tightened.

### Our approach to sustainable water management

To us, sustainable water management means obtaining freshwater or discharging treated wastewater without negatively impacting aquatic ecosystems.

We are also concerned with addressing water scarcity. To determine whether a site is located in a water-stressed area, we use the [Aqueduct Water Risk Atlas](#) of the World Resources Institute ([WRI](#)). A water-stressed area is created when the water withdrawn exceeds the amount of water renewed.

We want to reduce the environmental impact of our wastewater and make our processes more water efficient. In the medium term, we will also take into account water-related risks that exist in our supply chain when purchasing important raw materials. In the long term, we intend to transparently map out the water use and environmental impacts throughout the entire life cycle of our products.

Our regular [EHS audits](#) at our production and development facilities also review **site-specific water management practices**.

Our water management efforts focus more heavily on our manufacturing sites than our administrative facilities because production generally poses a higher risk to aquatic ecosystems.

## Roles and responsibilities

The Group function Corporate Sustainability, Quality and Trade Compliance (SQ) is responsible for water management. At our sites, engineers work in close collaboration with our EHS managers to lower water consumption and treat wastewater.

Further information can be found under [Environmental stewardship](#).

## Our commitment: Standards and procedures

Our Group-wide “Sustainable Water Management Part 1 – Wastewater”, “Sustainable Water Management Part 2 – Water Use” and “Sustainable Management Part 3 – Water Risk Management” standards detail the way we integrate **mechanisms of sustainable water management** into our management system. All three standards are based on the commitments we made under the [Responsible Care®](#) initiative. At the same time, our “[Sustainable water management principles](#)”, which were published in 2021, set the framework for the three

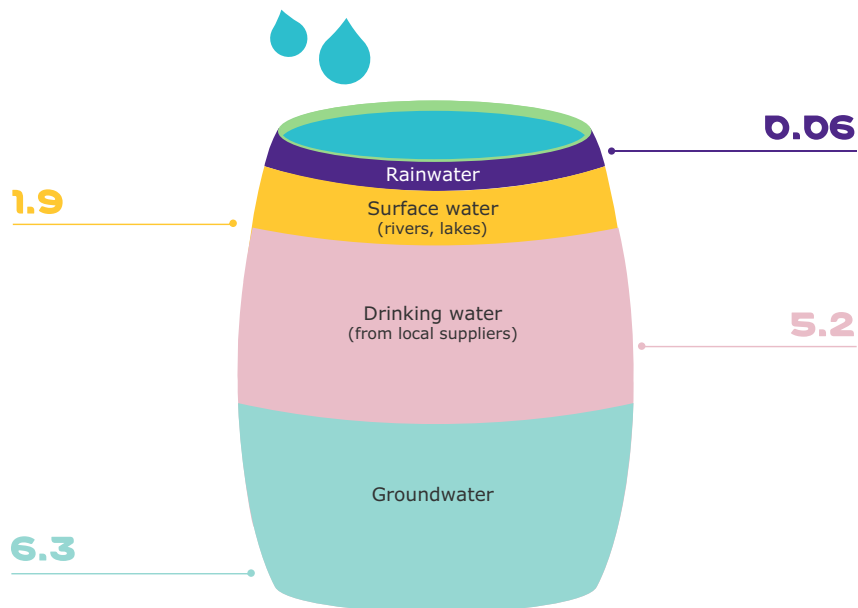
aforementioned standards. Our “Wastewater” standard defines criteria for assessing our wastewater discharges into the ecosystem. It also helps us to achieve our target as regards trace substances in wastewater from our operations.

The “Water Use” standard sets out mandatory Group-wide requirements for the responsible consumption of water. The “Water Risk Management” standard establishes a way for us to manage the risks that arise from direct or indirect water extraction and also covers risks such as contaminated rainwater and flooding. We perform internal [EHS audits](#) to verify that our sites comply with our three standards. They are all required to measure and assess the risks and impacts of the hazardous substances in their wastewater. Moreover, they must also analyze withdrawal and wastewater risks and comply with the respective requirements of the local authorities.

### Water withdrawn from our own sources

For the most part, we draw water used for our production processes from our own wells and source drinking water from local suppliers. In doing so, we do not want to impair any protected areas, sensitive ecosystems or habitats. Nevertheless, we keep an eye on trends that could potentially lead to sources being reclassified in the future.

#### Water withdrawals (millions of m<sup>3</sup>) – 2021



The cooling water used for our production processes generally runs in a circular system. Depending on regulatory standards and the energy footprint, we sometimes use freshwater for cooling in a once-through system. For certain applications, we treat production wastewater and reuse it. In 2021, we recycled a total of 23,5 million cubic meters of water.

## Using water more efficiently

We seek to minimize our impact on the water situation in the vicinity of our sites. In 2021, we withdrew 13,4 million cubic meters of water in total. In the reporting year, we carried out a water recirculation project at our site in Rio de Janeiro. This project contributed to saving around 30000 cubic meters of groundwater - 29% more than in the previous year.

Local conditions determine whether a sufficient supply of water is available. In our water conservation efforts, we are particularly concerned with sites in water-scarce areas. To improve our water efficiency, we therefore defined an intensity score – the "Merck Water Intensity Score". The score relates the amount of water purchased at a site to the number of hours worked, while taking the local availability of water into account. To calculate this, we use the local water stress factor according to the "[Aqueduct Water Risk Atlas](#)" of the World Resources Institute ([WRI](#)). We aim to lower our water intensity score by 10% by 2025 compared with 2020. We changed the baseline year from 2019 to 2020 in order to align it with our climate action target, thus also seamlessly connecting to our previous target. Since our water consumption already decreased from 2019 to 2020, our adapted target is even more ambitious.

## Our wastewater

In 2021, we generated a total of 13,3 million cubic meters of wastewater. This consisted of around 9,5 million cubic meters of freshwater, which we discharged into surface waters. 3,8 million cubic meters was classified as other water and was treated at external treatment plants or disposed of in an ecologically sustainable manner. When directly discharging wastewater into aquatic ecosystems, we comply with the respective legal requirements. Before we obtain a discharge permit, the local authorities review the profile of the local aquatic ecosystems on site to ensure that they will not be compromised by our activities. 57% of our total wastewater was discharged by three of our sites. Our Gernsheim (Germany) discharges its treated wastewater into the Rhine and our Onahama site (Japan) into the Pacific Ocean. The wastewater generated at our Darmstadt site in Germany is treated in our own treatment plants before being released into the Schwarzbach/Ried Creek, a tributary of the Rhine River. The volume of treated wastewater we discharge represents approximately 3,3% of the average annual water volume of the Schwarzbach/Ried Creek, which complies with all statutory regulations. We are preparing for a potential tightening of the statutory requirements on discharging treated wastewater.

Since November 2021, we have been expanding our central wastewater treatment plant in Darmstadt by adding a fourth purification stage. Its current treatment performance of up to 98% is to be further increased in the future thanks to activated carbon filters. We are planning to commission the improved plant at the end of 2023.

## Residues in wastewater

We continuously work to optimize our production streams and purification processes in order to conserve water and minimize residues. An expert has been appointed for each of our business sectors to provide guidance for our sites. At our pharmaceutical production sites, our top priority is to prevent or reduce **pharmaceutical active ingredient residues** in our wastewater. All such sites have their own wastewater treatment plants and regularly analyze their wastewater to check for harmful substances.

We also process antibiotic active ingredients on a small scale. To prevent adverse effects on people and the environment, the wastewater generated from these activities undergoes an additional purification process. Only then do we discharge it into the ecosystem, thereby minimizing remaining antibiotic residues.

When it comes to discharging wastewater, we strictly adhere to government regulations. However, even though we meet all applicable requirements, slight amounts of trace substances still end up in the ecosystem. Our target therefore goes beyond the stipulations of legal requirements: By 2030, we plan to reduce potentially harmful residues in our wastewater to **below the no-effect threshold**, a scientifically defined limit below which no negative environmental impacts are to be expected.

## Assessing our water management practices

In addition to reporting on our [climate action efforts](#), we also report water-related data to the [CDP](#), which collects environmental data from companies once a year, evaluating their processes and performance on a scale from A to D-. In 2021, we were awarded a "A-" for our water management practices (2020: B).

## Waste & recycling

Although waste contains valuable raw materials that can be reused in the production stream, it can also pose a wide range of risks to the environment. We therefore consider it essential to either prevent or recycle as much of our waste as possible.

### Our approach to waste and recycling

We aim to both limit the loss of raw materials and reduce the impact of our waste disposal practices on ecosystems. To this end, we are working to lower our Waste Score, our key waste management indicator, by 5% by 2025 (2016 baseline).

We prevent the generation of waste by, for instance, developing new production processes or optimizing existing ones. When prevention is not feasible, we do our best to recover materials or energy from the waste we create. Our waste scoring system helps us support a circular economy. Waste separation makes it possible to **recover and recycle raw materials**, while unrecyclable waste is disposed of in an environmentally sustainable manner in line with the strictest waste disposal standards. In doing so, we comply with local legal regulations and take into account the available disposal options.

### Responsibility for the waste disposal process

As a generator of waste, we are responsible for the ultimate disposal of our waste products and therefore choose our service providers with the utmost care, contractually stipulating disposal requirements. We conduct random audits to verify their **compliance with our disposal standards**, especially when it comes to hazardous waste.

## Roles and responsibilities

Our Corporate Sustainability, Quality and Trade Compliance (SQ) function bears overall responsibility for our waste management and recycling practices, while our EHS managers are in charge of implementing our requirements at our individual sites. We have a Group-wide committee consisting of experts from SQ and our business sectors to coordinate our approach to waste management.

Waste management forms part of our Group-wide environmental management system, with 90 sites certified to ISO 14001. In addition to undergoing external certification, we also conduct internal EHS audits to review our waste management practices. Moreover, we regularly host activities such as EHS forums and conferences to keep our local EHS managers and site directors up to date on the topic and to raise awareness. Unfortunately, no such events took place in 2021 due to the Covid-19 pandemic.

Further information can be found under [Environmental stewardship](#).

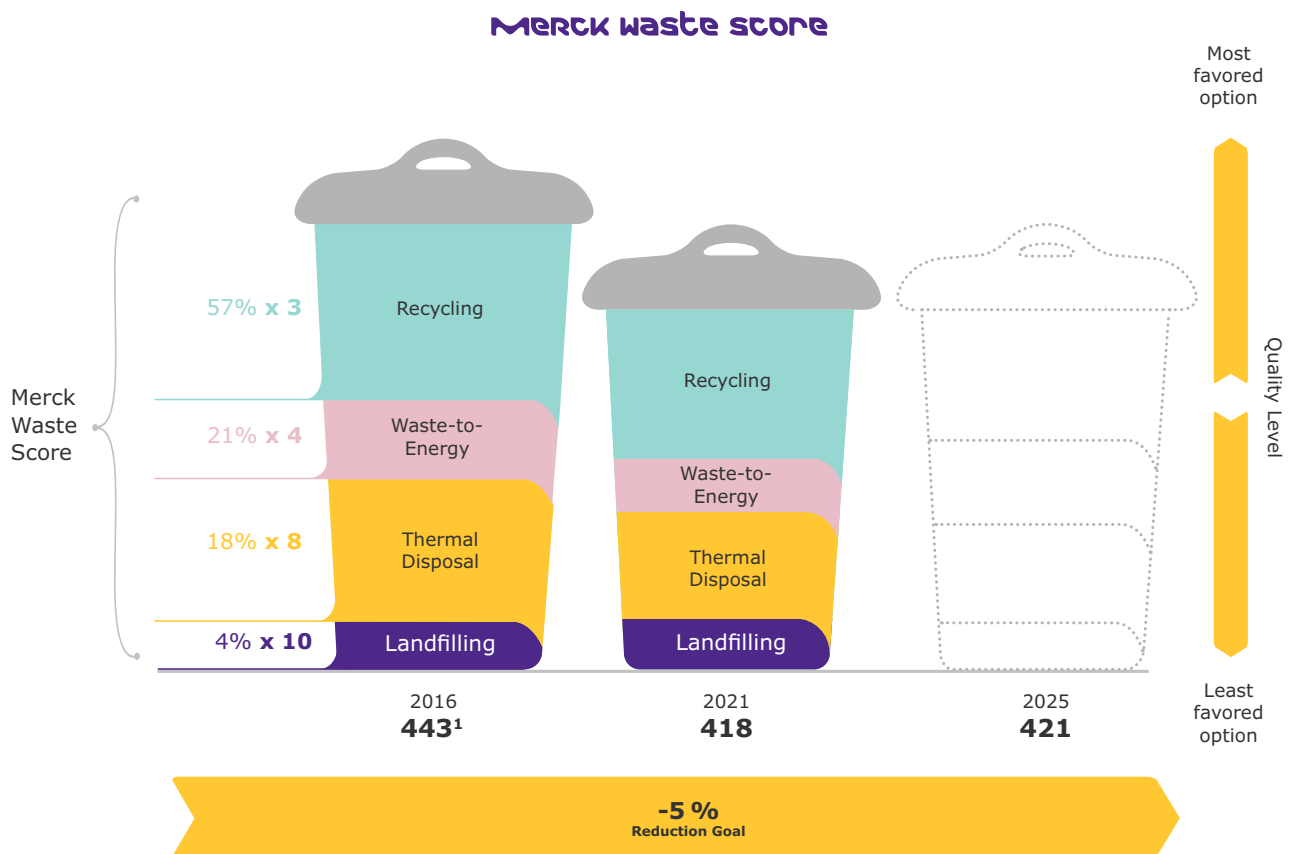


## Our commitment: Group-wide EHS standards

Our Group-wide EHS Waste Management Standard provides a **consistent framework for waste management across all our sites**, defining organizational structures and minimum requirements. This standard also stipulates that all facilities document their waste by type and quantity and report this data to our Group SQ function.

### Systematic waste reduction

We use a variety of methods for recycling, recovering and disposing of the waste we generate, each of which has a different impact on the environment. To systematically account for these effects, we have put in place a waste scoring system that allows us to compare the amount of waste our individual sites generate and track our various waste streams. Under this system, our waste streams are broken down into five categories by percentage: landfilling, thermal disposal, waste-to-energy, recycling, and prevention. This percentage is then multiplied by a factor that increases based on the disposal method's environmental impact. The total from each category is added together to yield our total Waste Score. Prevented waste is multiplied by a factor of zero, thus lowering the overall score.



<sup>1)</sup> The base was retroactively adjusted owing to subsequent data corrections.

## Reducing the environmental impacts of waste

We use the Merck Waste Score to systematically track the environmental footprint of our waste disposal activities. We are aiming to reduce this score by 5% by 2025 compared with 2016. To achieve this goal, we continually examine our production processes and disposal methods to identify potential areas for improvement, an endeavor supported by the EHS units of the business sectors at each respective site. They regularly discuss best practices, share lessons learned across our sites, and drive the transition to greener disposal methods. In 2021, we succeeded in reducing our total Waste Score by 5.6% relative to 2016.

Year on year, the amount of waste we generated in 2021 decreased slightly, totaling 213 metric kilotons (2020: 231 metric kilotons). Soil, construction and demolition waste accounted for 20% of our total waste in 2021 (2020: 21%). Our Waste Score does not factor in this type of waste, which can rarely be avoided and must be discarded in accordance with clearly prescribed methods.

## Promoting the circular economy

Through our ProMec (Progressive Material Economy) initiative at the Darmstadt site, we are promoting a **sustainable, resource-efficient circular economy**. We are refining our [solvent recycling](#) practices, thereby minimizing the adverse environmental impacts from the disposal of our production waste. In 2021, we expanded our solvent recycling program to include a variety of solvents from Organics production, which has allowed us to recycle an additional 985 metric tons of solvents in 2021. This move has sustainably boosted the recycling rate of our production waste in Darmstadt from 8.6% to 16.4%.

Together with the Technical University of Darmstadt (TU Darmstadt), we began developing a **digital platform for the optimum use of waste** in April 2021. The project aims to bring together waste generators and specialized waste recyclers in Darmstadt.

We have been working on an innovative **information management system for the circular economy** since 2021. The circular economy makes a key contribution to sustainability and resource efficiency by re-introducing high-quality secondary raw materials back into production. The new system connects all the participants in a network and offers the trustworthy, safe exchange of data.

## Shifting from landfill to waste-to-energy

At our site in St. Louis, Missouri (USA) we employ **waste-to-energy recovery for vast portions** of our waste instead of landfilling it. By the end of 2021, this applied to 626 metric tons. This disposal channel has an 89% lower CO<sub>2</sub> emission rate than landfill. Avoiding landfill will help us reduce our emissions from waste at St. Louis by 120 metric tons of CO<sub>2</sub> per year. In 2022, the site is planning to shift further waste streams from landfill to waste-to-energy recovery.

# Plant, process & transport safety

Avoiding harm to human health and the environment has top priority for us. We have management systems in place to help ensure the safety of our plants and processes and to protect our employees and the environment. In addition, we do everything in our power to ensure that our chemical and pharmaceutical compounds are transported and stored properly.

## Our approach to plant, process and transport safety

We seek to **minimize manufacturing process hazards** wherever possible in order to avoid workplace accidents, production outages and chemical spills, which is why we regularly review our approach to plant and process safety and continuously gauge it using our EHS performance indicators.

Moreover, all our shipments are to reach our customers and sites safely, undamaged and with the required safety information. Several of the materials we store and transport are classified as hazardous. The storage of such dangerous goods and the transport thereof – whether by road, rail, air, or water – are governed by global regulations. To minimize risks to people and the environment, we apply **strict safety requirements across the Group** that also comply with applicable laws. We conduct regular reviews to ensure our own warehouses as well as those of third parties comply with these regulations.

We train our employees regularly in an effort to prevent human error and also to detect technical defects before they can cause harm.

## Roles and responsibilities

Overriding responsibility for plant, process and transport safety lies with Corporate Sustainability, Quality and Trade Compliance (SQ), which coordinates plant and process safety for the company and defines Group-wide EHS standards and regulations. In addition, our individual sites are subject to national and international regulations governing environmental stewardship and public safety. At the local level, the **respective site directors** are responsible for ensuring compliance with all safety requirements.

We have appointed an EHS manager for each of our sites as well as a **dangerous goods manager** for every site with logistics activities. The role of the dangerous good manager corresponds to the EU regulations pertaining to the “Dangerous Goods Safety Advisor”. Both individuals advise the site manager on plant, process and transport safety and regularly monitor compliance with safety requirements.

## Our commitment: Internal standards and international rules

To ensure safe operation throughout the lifetime of a plant, our Group-wide EHS standards contain specific rules for production plants and processes. These include specifications that determine how special risk analyses and hazard assessments are to be carried out. We have also defined measures for the event of accidental release of chemical substances and for fire protection.

Our Group-wide EHS standards stipulate the safety levels for the storage of hazardous materials at our sites. Along with supplementary standard operating procedures and best practice documents, these EHS standards describe the technology, equipment and organizational infrastructure needed to achieve the appropriate safety levels. Contract warehouses must also adhere to our strict safety requirements. Before we sign a contract with an operator, they must submit a statement detailing how they meet our prerequisites. Our Group-wide EHS standards also define the **technical and organizational requirements** for such warehouses.

Our Group Transport Safety Standard is based on the United Nations Recommendations on the Transport of Dangerous Goods. This guideline is especially important for sites in countries with insufficient local regulations covering the conveyance of hazardous materials.

## Assessing potential risks

Before commissioning a plant, we draft a safety concept and that is subject to continuous review throughout the entire lifetime of the facility and, when necessary, updated until the facility is decommissioned. This safety concept contains an overview of potential risks and specifies corresponding protective measures. After any alterations are made to a plant, we also reassess the hazard and risk situation.

Our Risk Management Process guides all our sites in **identifying and assessing risks** and is used to devise further measures to minimize them.

We use internal **EHS audits** to complement the inspections conducted by our EHS and dangerous goods managers in order to ensure that our sites comply with process, plant, transport and storage safety regulations. Normally, these audits are conducted every three years at production sites and every four years at warehouse and distribution sites. If major shortcomings are identified, we re-audit the respective site the following year. Conversely, we may decide to extend the period between audits at facilities where, based on the findings from previous audits, we deem the potential risk to be low. Our sites are required to rectify any deficiencies discovered during the audit, with the auditor subsequently checking whether the specified corrective actions have been taken.

In 2021, we conducted 51 EHS audits in accordance with our Group-wide EHS standards. Our own warehouse locations accounted for 19 of these audits and interfaces to third-party warehouses for a further 7. Due to the Covid 19 situation, all audits were conducted remotely.

We report transportation incidents and accidents in accordance with the Recommendations on the Transport of Dangerous Goods – Model Regulations (UN Orange Book, 9.9) in conjunction with the criteria of the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR, 1.8.5.). There were two reportable events in the reporting period. In both cases, the reporting obligation did not lie with Merck.

## Keeping a close eye on safety

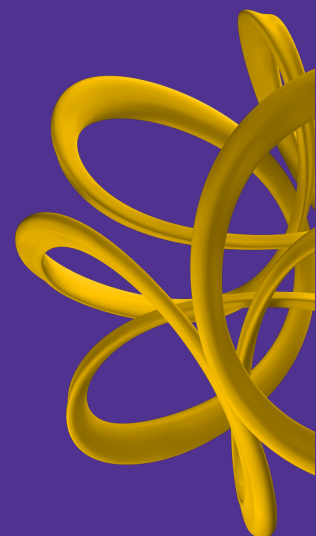
We track **EHS performance indicators** at all production and warehouse facilities, as well as at major research sites, including both accidents and near misses. We investigate each individual incident and then devise appropriate countermeasures in an effort to reduce the likelihood of such events reoccurring in the future. EHS performance indicator data are reported once a month within each business sector, with the Executive Board receiving reports on the topic once a year. Four indicators are particularly important to us here:

- Under our EHS Incident Rate (EHS IR), we track and evaluate all major and minor accidents and incidents as well as further EHS-relevant incidents. The EHS IR covers both our own employees as well as those of contractors. To calculate it, we put the number of incidents and the severity of the event in proportion to the number of hours worked. The lower the EHS Incident Rate, the safer the site is. Our EHS IR of 3.9 in 2021 was slightly lower than the year-earlier figure of 3.4.
- The EHS IR also includes our Loss of Primary Containment (LoPC) indicator. In 2021, we recorded no significant incident-related spills at any of our production, research or warehouse sites Group-wide.
- A further important indicator is the EHS Leading Rate (EHS LR), which reflects the number and the results of the analyses of near misses and critical situations. Some of our individual business sectors have also defined their own annual targets for EHS IR and EHS LR.
- In 2021, we set ourselves a new goal for the [Lost Time Injury Rate](#) (LTIR) (number of accidents Group-wide resulting in at least one missed day of work per million hours worked). We aim to bring our LTIR below 1.0 Group-wide by 2025. In 2021, our LTIR was 1.2 (2020: 1.3).

## Employee training and best-practice sharing

In line with their specific tasks and responsibilities, our employees undergo regular training that is conducted by either their respective supervisor or our EHS managers. They present EHS standards applicable Group-wide, site-specific standards and processes, address changes to international requirements and explain the proper procedures for dealing with incidents. In addition, all newly hired EHS managers complete introductory courses on plant and process safety during their EHStart-up! onboarding.

In the interest of improving safety, we consider it extremely important to continuously **share best practices and lessons learned**. We want all our production sites to be able to learn from incidents at other facilities and implement preventive measures. Once a month, for instance, site directors and EHS managers participate in safety leadership calls to share new lessons learned. Additionally, the EHS managers of the individual sites regularly hold sessions to discuss matters.



# COMMUNITY

**159** Community engagement

# Community engagement

We see ourselves as part of society – both at our individual sites as well as worldwide. Our aspiration is to help shape society – through our products, technologies and community engagement. That is why we work with our employees to promote a diverse range of social initiatives that help tackle challenges at the local level.

## Our approach to community engagement

Worldwide, we are deeply committed to supporting the communities in which our sites are located. In this context, we focus on health, education and culture as well as environmental stewardship. Moreover, we provide disaster relief and offer support to people in need in the vicinity of our sites.

In particular, we advocate to make **health more accessible** to people worldwide. We do this by getting involved in numerous healthcare projects and purposefully contributing our experience in all aspects of healthcare.

We also **promote culture and science education**. This has a long tradition within our company. As a science and technology company, we champion creativity, the joy of discovery and curiosity as well as the courage to push boundaries. That is why we award scholarships and literary prizes and promote practice-oriented curricula, for example.

Protecting the environment and using natural resources responsibly is a task for us all. Therefore, we support various initiatives around the world that help raise **environmental awareness**.

We regularly evaluate the achievement of objectives and the impact of our projects. Our analysis is based on the so-called [iooi method](#) (input – output – outcome – impact) developed by the Bertelsmann Foundation. In the first step, we measure our **input** based on the product or monetary donations made and the time our employees invest in volunteer projects, for instance. In the second step, we record the immediate **output**, for example the number of organized training programs that were made possible thanks to our financial donations. We are also interested in the impact achieved for the specific target group. Our goal is to ensure that our community engagement continues to have a positive impact on society. For this reason, we are constantly working to make the sustainable **impact of our projects (outcome and impact)** measurable for the respective target groups.

The impact of our projects is particularly important to us, which is why we mainly initiate projects that aim to improve specific social situations or solve societal problems. 76% of our project spending goes towards this. We also support short-term and one-time charitable activities as well as initiatives that are beneficial to our business (e.g. in recruiting staff) and can help the community at the same time.

Together with reliable partners, we support many long-term projects and form long-term **strategic partnerships**. This enables us to strengthen our relationship with our stakeholders and helps reinforce our social license to operate.

## Roles and responsibilities

The Group function “Corporate Sustainability, Quality and Trade Compliance” sets the framework and records data on our Group-wide community engagement. The coordination of the [Deutsche Philharmonie Merck](#) is also among its responsibilities. The Global Health unit within the Healthcare business sector steers the [Merck Schistosomiasis Elimination Program](#) and the Global Pharma Health Fund (GPHF). Furthermore, the Global Strategic Partnership unit, which is also part of Healthcare, coordinates [Embracing Carers](#). In addition, our business sectors are launching their own projects, such as the educational program [SPARK™](#). Our local subsidiaries are responsible for planning and implementing **local activities on a decentralized basis**. They decide for themselves in which focus areas they want to get involved. Some of our health initiatives in low- and middle-income countries are included within the scope of part of the [Merck Foundation](#).

The Merck family of entrepreneurs also has a long history of supporting charitable causes. Their activities are organized via the [Merck Family Foundation](#) and the Merck’sche Gesellschaft für Kunst und Wissenschaft e. V. (Merck Society for Art and Science).

## Our commitment: The principles of our community engagement

In designing our projects, we are guided by our Group-wide “Group Policy on Contributions to Society”, which defines what community engagement means for our company and what objectives we are pursuing. This policy gives our business sectors and subsidiaries abroad a framework for structuring their respective activities themselves and also stipulates roles and responsibilities.

Health initiatives are also governed by guidelines from our Healthcare business sector and our [Access to Health Charter](#). We calculate the value of our pharmaceutical donations in accordance with the [Guidelines for Medicine Donations](#) issued by the World Health Organization ([WHO](#)).

With our Corporate Volunteering Guideline, we want to strengthen and encourage **volunteering initiatives by our employees**. They are granted up to two days of paid leave per year to take part in volunteering activities that are either run or supported by our company.



## Our Good Deeds

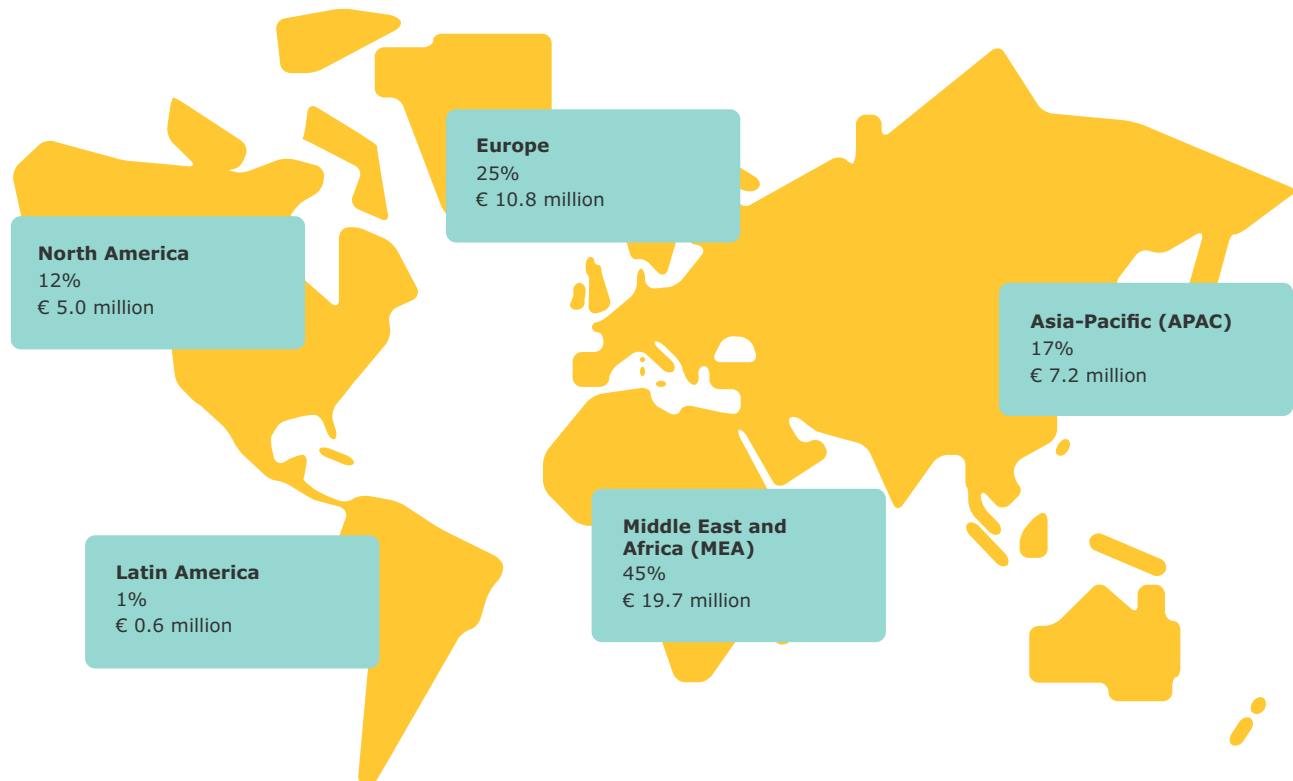
Our community engagement activities are collectively referred to as “[Our Good Deeds](#)”. In 2021, we supported **255 projects in 99 countries** in the fields of “Health”, “Education and Culture” and “Environment”. In addition, we supported people in need in our local communities and provided disaster relief.

### Our community engagement activities – 2021



Our projects include **volunteering initiatives as well as monetary and product donations**. In 2021, we spent a total of around € 43 Mio on community engagement. Product and in-kind donations accounted for 48% and cash donations for 50% of this amount. Our employees actively participated in 26% of the projects, either through monetary donations or volunteer work. As part of the volunteering initiatives, more than 1100 employees volunteered around 5300 hours during their working hours. The amount contributed by the [Merck Foundation](#) is not included in this figure. Nor are initiatives that primarily serve to market our products.

### Spending on community engagement by target region



## Support for health projects

We use our expertise to support health initiatives around the world. In particular, we focus on providing basic and advanced training for health workers, promoting local healthcare infrastructure and educating people on health issues.

We are dedicated to **improving medical care** around the world. We organize medical education programs through our Global Medical Education and Academic Organization Relations department, either directly or by providing grants to third-party medical education providers. In doing so, we foster advanced medical education programs designed to broaden the scientific knowledge and competence of scientists and healthcare professionals and, ultimately, improve patient outcomes.

In 2021, we digitalized all our medical education programs across selected therapeutic areas in order to continue delivering them despite the Covid-19 pandemic. In particular, we supported 290 Independent/Continuing Medical Education (IME/CME) programs and designed 65 new company-led Medical Education programs. More than 425,500 healthcare professionals participated via e-learning platforms.

As part of our Schistosomiasis Elimination Program ([MSEP](#)) and in partnership with WHO we donate praziquantel for the prevention and treatment of the neglected tropical disease schistosomiasis in school-aged children in sub-Saharan Africa. In 2021, we supplied 182 million praziquantel tablets. Nearly 50 years after its development, this medicine remains the standard of care for the effective treatment of schistosomiasis around the world. More information about our MSEP program can be found under "[Global Health](#)".

We also officially acknowledge and reward scientific breakthroughs in healthcare. Since 2019, we have awarded the annual **Future Insight Prize**, which is worth € 1 million. The prize recognizes and promotes groundbreaking scientific and technological innovations for the benefit of humanity in the fields of health, nutrition and energy. In 2021, we awarded a prize worth € 1 million in the “Food Generation” category to Ting Lu, Professor of Bioengineering at the University of Illinois at Urbana-Champaign (USA) and Stephen Techtmann, Associate Professor of Biological Sciences at the Technological University of Michigan (USA). Their research project uses microbes to decompose plastic waste and then produce food from the resulting material.

More information on our health projects can be found on the [Our Good Deeds](#) website.

## Promoting cultural and educational projects

Our projects in the field of education help to improve **school and university education**. In order to spark young people’s interest in science, we organize competitions, recognize special achievements and offer opportunities for hands-on learning.

For example, we support and hold the following **STEM competitions**: As the host of the competition in the German federal state of Hesse, we have been supporting the “[Jugend forscht](#)” (Young Researchers) competition for more than 35 years. The event took place virtually in 2021. In addition, we support the one-week “[Erfinderlabor](#)” (Inventors’ Lab) for secondary school students as well as the Germany-wide “[Tag der Mathematik](#)” (Mathematics Day).

In October 2021, we celebrated 20 years of school partnerships. To mark this occasion, we raffled off cash prizes worth a total of € 10,000 for 20 schools in Darmstadt and the surrounding area. In addition, we honored the 67 best students in advanced STEM courses for outstanding high school graduation achievements.

As part of these school partnerships, we also recognize teachers for their special teaching concepts. In November 2021, together with the German journal “Chemie in unserer Zeit”, we awarded the Julius Adolph Stöckhardt Prize to a Wiesbaden school’s teaching concept for the quantitative observation of diffusion processes in experimental chemistry lessons.

Since 2021, we have been actively promoting knowledge transfer through new digital educational formats. In our junior labs, which we run together with the Technical University of Darmstadt, we conducted virtual workshops for the first time. One of the topics was “Tracking down viruses – Insights into diagnostics”. In addition, we jointly collected ideas for sustainable energy generation in the digital “Design Thinking” course.

As part of our [SPARK™](#) global volunteer program, employees from our Life Science business sector share their skills and experience with students in order to **spark their curiosity in science** and inspire them to consider a STEM career.

As an extension of our flagship [Curiosity Labs™](#) program, we have also developed virtual programming to engage students regardless of time or location. Our Curiosity Labs™ at Home program features 20 simple and educational hands-on science experiments. Each experiment comes with a video, recipe card and lab report worksheet. The program has generated nearly 40,000 video views on social media. Our “Day in the Life” video series, which features our own scientists and experts from around the world, highlights the breadth and depth of opportunities in STEM careers within the life science industry and the diversity of the people within them. In 2021, we created 7 videos that garnered nearly 55,000 views.

Apart from our educational projects, we promote music and literature. We are convinced that **culture inspires people** – and that inspiration can lead to progress. We also help to strengthen inclusion and tolerance by sparking young people’s interest in culture.

We support the [Deutsche Philharmonie Merck](#), a professional symphony orchestra established back in 1966. It is an integral part of cultural life in Darmstadt and the surrounding region and regularly tours internationally. In 2021, it was possible to hold seven concerts in front of live audiences in compliance with Covid-19 regulations. Moreover, the orchestra realized several digital video projects, for example it performed in two livestream concerts, posted an interactive music box online with over 30 chamber music pieces and published a musical Advent calendar.

Like music, literature is an important mediator between cultures. We therefore award **five literary prizes worldwide**: in Germany, Italy, India, Japan, and Russia. These awards mainly recognize authors who build bridges between cultures as well as between literature and science.

More information about our cultural and educational projects can be found on our website [Our Good Deeds](#).

## Supporting environmental initiatives

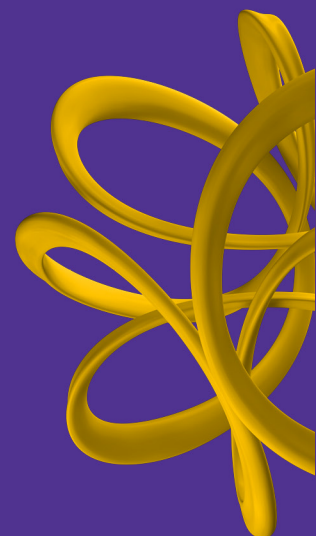
We are involved in various environmental initiatives and promote **environmental awareness among our employees** through group activities. Our engagement ranges from joint litter collection and tree planting campaigns to supporting organizations that improve access to clean water in remote areas.

On the occasion of World Cleanup Day in 2021, we organized litter collecting activities with our employees. These took place at our sites in Darmstadt, Gernsheim (Germany) and Belgrade (Serbia). More than 100 employees took part.

More information about the environmental initiatives that we support can be found on our website [Our Good Deeds](#).

## Disaster relief

In August 2021, we initiated a donation campaign for those affected by the catastrophic flooding that occurred in western Germany. More than 1,200 employees participated and donated around € 143,000 via a dedicated donation platform run by the German Red Cross. The company increased this amount to € 300,000 in total. We thus contributed to immediate aid, support and reconstruction programs.



# FACTS & FIGURES

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## Report profile

For us, sustainable entrepreneurship and profitable growth go hand in hand. Through our business, we want to create sustainable value for our company, our stakeholders and society while balancing ecological, social and business aspects. In doing so, we are helping tackle the great challenges facing today's world, such as disease, poverty, hunger, and climate change. Our ambition is to leverage science and technology to achieve progress for humankind. In this report, we comprehensively present our understanding of sustainable entrepreneurship.

We have a long-standing history of embracing corporate responsibility, which is also reflected in our reporting practices. We have been detailing our efforts to live up to our corporate responsibility since 1993, focusing initially on environmental topics. In 2003, we began reporting on sustainability topics every two years. Since 2016, we have been publishing a report annually.

In this report, we describe the [strategic direction](#) of our sustainable entrepreneurship as well as the focus areas in which we intend to achieve our sustainability goals. We want to inform our [stakeholders](#) transparently and comprehensively about our activities and successes as well as the challenges we face.

Moreover, in 2021, we integrated our disclosures pursuant to the [SASB](#) standards (Sustainability Accounting Standards Board) and the requirements of the Task Force on Climate-Related Financial Disclosures ([TCFD](#)) into the Sustainability Report. Through this step, we aim to meet the increasing transparency expectations of our investors and other stakeholders.

In addition, this Sustainability Report documents the progress we have made in implementing the principles of the United Nations Global Compact ([Communication on Progress](#)).

## Reporting framework

This report covers fiscal 2021 and pertains to our entire Group, including its 227 companies in 66 countries. Any deviations from this reporting framework are indicated on a case-by-case basis.

## Transformation of the Electronics business sector

In 2018, we commenced a transformation in order to reposition the Performance Materials business sector and to develop it into a leading company in the global market for electronic materials. With the acquisitions of Versum Materials, Inc. and Intermolecular, Inc. in 2019, we achieved two important milestones. In 2021, we renamed the Performance Materials business sector Electronics. The new name is the visible result of the strategic realignment of previous years.

## Determining report content

We align the content of our report with the internationally recognized guidelines of the Global Reporting Initiative ([GRI](#)) and the principles of completeness and materiality as well as input from our stakeholders. This report has been prepared in accordance with the [GRI Standards: Comprehensive option](#). Furthermore, we have taken into consideration the requirements of the capital market for assessing companies' sustainability performance.

Every year, we carry out a materiality analysis to determine the sustainability topics of relevance to our Group. We have derived the content of this Sustainability Report from the results of the materiality analysis, which can be found together with the materiality matrix under [Materiality analysis](#).

Our Executive Board has reviewed and approved the Sustainability Report for 2021.

## Data collection and consolidation systems

The 2021 Sustainability Report generally provides non-financial indicators for the entire Group. The majority of the figures we publish reflect the status as of December 31, 2021. We explicitly state when, in individual cases, the information provided deviates from these parameters.

Since 2005, we have been using a Group-wide electronic data collection system to collect environmental and occupational health and safety data, which are tracked locally at our individual sites and approved following review. To improve the quality of this data, we support the sites in optimizing their collection processes and their corresponding quality assurance measures. Moreover, our Corporate Sustainability, Quality and Trade Compliance function takes measures, such as internal EHS audits to review both the processes and the data provided.

We collect environmental performance indicators across all our production sites. We also record these indicators for the warehouse, research and office locations that are relevant in terms of their environmental impact. This report's scope of consolidation therefore covers all Group sites that have relevant impacts on the environment.

All employee master data is continually updated in an SAP database. Some employee data is only disclosed for select sites or countries, which is accordingly indicated in the respective text passages.

We use community data management software to track data pertaining to our community outreach activities.

## Non-financial statement pursuant to the German Commercial Code

The combined management report of Merck KGaA and the Merck Group for fiscal 2021 includes for the first time a combined non-financial statement in accordance with sections 315b and 315c in conjunction with 289b to 289e of the German Commercial Code (HGB) in the form of a separate chapter. Our non-financial statement orients towards the requirements of the Global Reporting Initiative (GRI) standards. It also includes our reporting in accordance with the EU taxonomy regulation. The content of this non-financial statement has also been reviewed by the Supervisory Board in accordance with section 111 (2) of the German Stock Corporation Act (AktG).

## External audit

KPMG AG Wirtschaftsprüfungsgesellschaft has audited the annual financial statements and management report of our company for the fiscal year spanning January 1 to December 31, 2021 and has issued an unqualified opinion. The non-financial statement contained in the management report underwent a limited assurance by KPMG AG Wirtschaftsprüfungsgesellschaft.

Furthermore, after undergoing a limited assurance, our company also received an [independent audit certificate](#) for this Sustainability Report for 2021.

The additional content provided on both the company's websites as well as external web pages that are linked in this report are not part of the information assured by KPMG. This also applies to the voluntary information contained in the [SASB](#) and the [TCFD](#) indices.

## Contacts:

We welcome your feedback and are happy to answer any questions.

### **Merck KGaA**

Corporate Sustainability, Quality and Trade Compliance  
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We published the previous Sustainability Report in April 2021. Our next Sustainability Report is scheduled for publication in April 2023.



# Indicators

## Economics

### Net sales, operating result (EBIT) and research and development costs, by business sector<sup>1</sup>

€ million	Life Science	Healthcare	Electronics	Group
2020				
Net sales	7,515	6,639	3,380	17,534
Operating result (EBIT)	1,599	1,804	240	2,985
R&D costs <sup>2</sup>	313	1,640	274	2,288
2021				
Net sales	8,990	7,089	3,608	19,687
Operating result (EBIT)	2,479	1,823	509	4,179
R&D costs <sup>2</sup>	351	1,712	278	2,408

1 As a non-operating segment, Corporate and Other is not shown here as a separate item, but rather under Segment Reporting in our [2021 Annual Report](#) (p. 246-250).

2 Not presented: research and development costs of € 67 million (2020: € 62 million) allocated to Corporate and Other.

## Business ethics

### Compliance training

	2018	2019 <sup>1</sup>	2020 <sup>2</sup>	2021 Merck Group	2021 thereof Merck KGaA
Total number of persons trained on anti-corruption guidelines <sup>3</sup>	11,404	36,109	28,827	5,790	509
Total number of employees trained on anti-corruption guidelines	11,155	35,673	28,805	5,772	508
% of employees trained on anti-corruption	22	63	50	10	6
by employee category <sup>4</sup>					
Number of Role 2+ employees trained on anti-corruption	9,257	26,890	27,123	5,284	495
% of Role 2+ employees trained on anti-corruption	36	96	90	17	12
% of employees below Role 2 trained on anti-corruption	7	30	6	2	0
by region (%)					
Europe	19	71	51	8	6
North America	36	59	45	11	not applicable
Asia-Pacific (APAC)	16	47	44	12	not applicable
Latin America	12	62	44	8	not applicable
Middle East and Africa (MEA)	18	80	66	12	not applicable

1 As of 2019, we changed our reporting method. Previously, our reports covered the active workforce who has been trained on a specific subject during a particular year. In 2019, we report on the active, trained workforce in the company, regardless of whether their training has already taken place prior to the reporting year. The possibility of trend forecasts for year-to-year comparisons is therefore limited.

2 In 2020, we began using our own global learning management tool and therefore now have a different reporting structure. As of 2020, we report on the active workforce that is part of the target group and has completed the training in the reporting year. The possibility of trend forecasts for year-to-year comparisons is therefore limited.

3 Includes contractors, external supervised workers (e.g. temps) and contract partners working on-site who were trained on anti-corruption guidelines (2021: 18).

4 Employees whose role level had not yet been recorded in our database by December 31 of the respective reporting year have been allocated to "employees below Role 2".

The (employee) target audience for a specific training is related to the risk level associated with employee positions and Role levels. Target audiences therefore may not include all Group employees and also may vary from training to training.

In order to address the special responsibility held by management personnel, and staff with HR responsibility, trainings on anti-corruption guidelines for these employees are in focus. This applies to all employees rated Role 2+.

Our new Anti-Corruption E-learning was rolled out in 2020. The majority of employees within the defined target group already completed the training in 2020. Therefore, the 2021 completion number is lower as the training was only assigned to new joiners, internal transfers or employees who did not complete the E-learning in 2020.

#### Internal audits on corruption and Human Rights Charter

	2018	2019	2020	2021 Merck Group	2021 thereof Merck KGaA <sup>1</sup>
Number of audits relating to corruption	54	50	52	56	29
% of audits relating to corruption	69	65	66	67	35
Number of audits relating to the workplace requirements of our Human Rights Charter	46	46	42	51	27

1 Includes global audits which are conducted at the headquarters in Darmstadt and/or the management of the audited function is reporting into KGaA.

In 2021, during 51 of our audits conducted in 11 countries, we reviewed workplace parameters as per our Human Rights Charter. No violations were identified.

#### Human rights violations<sup>1</sup>

	2018 <sup>2</sup>	2019 <sup>2</sup>	2020	2021
Number of reported violations of Social and Labor Standards Policy	-	-	108	121
Number of confirmed violations of Social and Labor Standards Policy	-	-	29	41
thereof number of incidents of discrimination	-	-	2	6

1 In 2020, we modified our reporting structure for human rights violations. Previously, we reported on such violations in the "Reported compliance violations" table. Since 2020, we report on violations of our [Social and Labor Standards Policy](#), which was drafted and rolled out across the entire Group in 2019.

2 Due to our revised reporting practices, we have decided not to report the data from previous years.

## Reported compliance violations

	2018	2019	2020	2021 Merck Group	2021 thereof Merck KGaA
<b>Total number of reported compliance violations</b>					
Number of reported compliance incidents	72	75	81	79	6
Number of confirmed cases	19	30	41	42	3
<b>Confirmed cases by category</b>					
Bribery and corruption	3	9	6	1	0
Violation of cartel laws and fair competition rules	1	0	0	0	0
Fraudulent actions against Merck	5	8	11	6	0
Other violations of the Merck Compliance Principles for the relations with business partners	1	4	0	0	0
Other violations of Merck values, internal guidelines or legal requirements	9	9	24	35	3

## Data Privacy

	2018	2019 <sup>1</sup>	2020	2021 Merck Group	2021 thereof Merck KGaA
Reported violations of Data Privacy Guidelines	1	1	3	3	1
<b>Customer Privacy<sup>2</sup></b>					
Total number of substantiated complaints received from outside parties	0	0	0	0	0
Total number of complaints from regulatory bodies	0	1	0	0	0
Total number of identified leaks, thefts, or losses of customer data	1	1	0	0	0

1 Since 2019, our reported figures have excluded the Consumer Health business, which was divested on December 1, 2018.

2 These data only reflect incidents classified as significant.

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**Legal actions**

	2018	2019	2020	2021 Merck Group	2021 thereof Merck KGaA
Total number <sup>1</sup> of legal actions pending or completed (for anti-competitive behavior, violations of anti-trust or violations of monopoly legislation)	3	3	4	4	2
pending	3	3	4	3	2
completed	0	0	0	1	0

1 As published in the annual reports, the herein listed total number of legal actions refers to the significant legal risks as per the company's definition. The significance of legal risks is based on potential negative effects on projected financial objectives as well as on the probability of occurrence.

For further information please see our annual reports:

[Annual Report 2018](#), pages 146-148 and pages 247-251, No. 26

[Annual Report 2019](#), pages 120-122 and pages 243-245, No. 26

[Annual Report 2020](#), pages 125-127 and pages 252-256, No. 27

[Annual Report 2021](#), pages 100-101 and pages 280-284, No. 27

## Employees

### Total number of employees

As of Dec. 31	2018	2019	2020	2021 Merck Group	2021 thereof Merck KGaA
<b>Total number of employees</b>	<b>51,749</b>	<b>57,071</b>	<b>58,127</b>	<b>60,348</b>	<b>8,081</b>
Men	29,006	32,531	33,204	34,274	5,292
Women	22,743	24,540	24,923	26,074	2,789

## Number of employees by hierarchical level

As of Dec. 31	2018 <sup>1</sup>	2019 <sup>2</sup>	2020	2021 Merck Group	2021 thereof Merck KGaA
<b>Total employees</b>	<b>51,749</b>	<b>57,071</b>	<b>58,127</b>	<b>60,348</b>	<b>8,081</b>
Senior management (Role 6+)	193	190	193	194	70
Middle management (Role 4 & 5)	3,095	3,352	3,637	3,831	824
Low management (Role 3)	9,019	9,499	10,286	10,880	2,077
Other employees (below Role 3)	39,442	44,030	44,011	45,443	5,110
<b>% of women (total)</b>	<b>44</b>	<b>43</b>	<b>43</b>	<b>43</b>	<b>35</b>
thereof in senior management (Role 6+)	36	39	42	49	18
thereof in middle management (Role 4 & 5)	1,025	1,146	1,284	1,413	257
thereof in low management (Role 3)	3,795	4,029	4,352	4,669	773
thereof other employees (below Role 3)	17,888	19,326	19,245	19,943	1,741
<b>% of men (total)</b>	<b>56</b>	<b>57</b>	<b>57</b>	<b>57</b>	<b>65</b>
thereof in senior management (Role 6+)	157	151	151	145	52
thereof in middle management (Role 4 & 5)	2,070	2,206	2,353	2,418	567
thereof in low management (Role 3)	5,224	5,470	5,934	6,211	1,304
thereof other employees (below Role 3)	21,554	24,704	24,766	25,500	3,369
<b>by age group</b>					
<b>Up to 29 years old (%)</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>14</b>
thereof in senior management (Role 6+)	0	0	0	0	0
thereof in middle management (Role 4 & 5)	5	8	6	8	2
thereof in low management (Role 3)	211	190	199	241	65
thereof other employees (below Role 3)	7,279	8,362	8,365	8,880	1,058
<b>30 to 49 years old (%)</b>	<b>61</b>	<b>60</b>	<b>60</b>	<b>60</b>	<b>53</b>
thereof in senior management (Role 6+)	69	69	68	63	25
thereof in middle management (Role 4 & 5)	1,829	1,933	2,032	2,172	512
thereof in low management (Role 3)	6,206	6,516	6,926	7,298	1,336
thereof other employees (below Role 3)	23,536	25,859	25,948	26,624	2,415
<b>50 years or older (%)</b>	<b>24</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>33</b>
thereof in senior management (Role 6+)	124	121	125	131	45
thereof in middle management (Role 4 & 5)	1,261	1,411	1,599	1,651	310
thereof in low management (Role 3)	2,602	2,793	3,161	3,341	676

1 In 2018 the position assessment had not yet been carried out for employees of all Sigma-Aldrich legal entities in Germany, or for employees of Allergopharma. In the facts and figures, these employees are included under "other employees (below Role 3)".

2 In 2019, the position assessment had not yet been carried out for employees of Versum Materials as well as of Allergopharma. In the figures, employees whose positions have not been assessed have been allocated to "other employees (below Role 3)".

### Number of employees by hierarchical level

As of Dec. 31	2018 <sup>1</sup>	2019 <sup>2</sup>	2020	2021 Merck Group	2021 thereof Merck KGaA
thereof other employees (below Role 3)	8,627	9,809	9,698	9,939	1,637

1 In 2018 the position assessment had not yet been carried out for employees of all Sigma-Aldrich legal entities in Germany, or for employees of Allergopharma. In the facts and figures, these employees are included under "other employees (below Role 3)".

2 In 2019, the position assessment had not yet been carried out for employees of Versum Materials as well as of Allergopharma. In the figures, employees whose positions have not been assessed have been allocated to "other employees (below Role 3)".

### Average number of employees by functional area<sup>1</sup>

	2018 <sup>2</sup>	2019 <sup>3</sup>	2020 <sup>4</sup>	2021
<b>Group</b>	<b>53,809</b>	<b>53,645</b>	<b>57,612</b>	<b>58,731</b>
thereof women	23,388	23,503	24,746	25,295
Production	16,240	16,455	17,624	19,782
thereof women	5,359	5,529	6,043	6,541
Logistics/Supply Chain	4,014	4,109	4,298	4,557
thereof women	1,569	1,626	1,734	1,838
Marketing and Sales/Commercials	15,479	13,970	14,127	14,318
thereof women	6,981	6,608	6,787	6,906
Administration	9,864	10,342	11,342	11,824
thereof women	5,067	5,194	5,499	5,718
Research and Development	7,245	7,561	7,504	7,168
thereof women	3,871	4,053	3,996	3,694
Infrastructure and Other	966	1,208	2,717	1,083
thereof women	541	493	687	598

1 The average employee headcount is calculated by adding up all employees at the end of each of the last 13 months, and dividing this total by 13.

2 The average employee headcount for fiscal 2018 incorporates the Consumer Health employees on a pro rata basis up until the end of November 2018 due to the divestment of the Consumer Health business as of December 1, 2018.

3 To calculate the average number of employees in fiscal 2019, the employee headcount of Versum Materials has been included on a pro rata basis as of October 2019 owing to the acquisition. They are allocated to the functional area "Infrastructure and Other".

4 The average employee headcount for fiscal 2020 incorporates the Allergopharma employees on a pro rata basis up until the end of March 2020 due to the divestment of the Allergopharma business as of March 31, 2020.



## Number of employees by region

As of Dec. 31	2018	2019	2020	2021 Merck Group	2021 thereof Merck KGaA
<b>Total</b>	<b>51,749</b>	<b>57,071</b>	<b>58,127</b>	<b>60,348</b>	<b>8,081</b>
<b>Europe</b>	<b>25,792</b>	<b>26,715</b>	<b>26,587</b>	<b>27,217</b>	<b>8,081</b>
Women	11,464	11,909	11,743	12,098	2,789
Women (%)	44	45	44	44	35
Number of employees with temporary contracts	1,209	1,137	1,105	988	247
% of employees with temporary contracts	5	4	4	4	3
<b>North America</b>	<b>10,978</b>	<b>12,829</b>	<b>13,312</b>	<b>14,070</b>	<b>0</b>
Women	4,742	5,285	5,527	5,800	not applicable
Women (%)	43	41	42	41	not applicable
Number of employees with temporary contracts	148	158 <sup>1</sup>	139	115	not applicable
% of employees with temporary contracts	1	1 <sup>1</sup>	1	1	not applicable
<b>Asia-Pacific (APAC)</b>	<b>10,486</b>	<b>12,728</b>	<b>13,518</b>	<b>14,285</b>	<b>0</b>
Women	4,348	5,049	5,425	5,874	not applicable
Women (%)	41	40	40	41	not applicable
Number of employees with temporary contracts	2,846	3,263 <sup>1</sup>	3,362	3,660	not applicable
% of employees with temporary contracts	27	26 <sup>1</sup>	25	26	not applicable
<b>Latin America</b>	<b>3,340</b>	<b>3,433</b>	<b>3,387</b>	<b>3,529</b>	<b>0</b>
Women	1,648	1,690	1,630	1,721	not applicable
Women (%)	49	49	48	49	not applicable
Number of employees with temporary contracts	62	55	67	12	not applicable
% of employees with temporary contracts	2	2	2	0	not applicable
<b>Middle East and Africa (MEA)</b>	<b>1,153</b>	<b>1,366</b>	<b>1,323</b>	<b>1,247</b>	<b>0</b>
Women	541	607	598	581	not applicable
Women (%)	47	44	45	47	not applicable
Number of employees with temporary contracts	189	182	420	59	not applicable

<sup>1</sup> Employees whose contract type had not yet been recorded in our database by December 31, 2019 were divided up proportionally between the categories "employees with permanent contracts" and "employees with temporary contracts".

### Number of employees by region

As of Dec. 31	2018	2019	2020	2021 Merck Group	2021 thereof Merck KGaA
% of employees with temporary contracts	16	13	32	5	not applicable

1 Employees whose contract type had not yet been recorded in our database by December 31, 2019 were divided up proportionally between the categories "employees with permanent contracts" and "employees with temporary contracts".

### Employees by business sector

As of Dec. 31	2018	2019	2020	2021
<b>Life Science employees</b>	<b>20,667</b>	<b>21,934</b>	<b>23,196</b>	<b>25,323</b>
thereof women	8,837	9,487	10,175	11,255
thereof women (%)	43	43	44	44
<b>Healthcare employees</b>	<b>17,456</b>	<b>18,136</b>	<b>17,463</b>	<b>17,269</b>
thereof women	8,884	9,232	8,788	8,717
thereof women (%)	51	51	50	50
<b>Electronics employees</b>	<b>5,278</b>	<b>7,329</b>	<b>7,228</b>	<b>7,432</b>
thereof women	1,411	1,712	1,666	1,704
thereof women (%)	27	23	23	23

### Employees by contract type

As of Dec. 31	2018	2019	2020	2021
<b>Total employees</b>	<b>51,749</b>	<b>57,071</b>	<b>58,127</b>	<b>60,348</b>
Number of employees with permanent contracts	47,295	52,276 <sup>1</sup>	53,034	55,514
% of employees with permanent contracts	91	92 <sup>1</sup>	91	92
thereof women	20,545	22,237 <sup>1</sup>	22,500	23,640
thereof women (%)	43	43 <sup>1</sup>	42	43
Number of employees with temporary contracts	4,454	4,795 <sup>1</sup>	5,093	4,834
% of employees with temporary contracts	9	8 <sup>1</sup>	9	8
thereof women	2,198	2,303 <sup>1</sup>	2,423	2,434
thereof women (%)	49	48 <sup>1</sup>	48	50
full-time employees	49,273	54,265	55,220	57,091
% full-time	95	95	95	95
thereof women	20,577	22,208	22,572	23,585
thereof women (%)	42	41	41	41
part-time employees	2,476	2,806	2,907	3,257
% part-time	5	5	5	5
thereof women	2,166	2,332	2,351	2,489
thereof women (%)	87	83	81	76

<sup>1</sup> Employees whose contract type had not yet been recorded in our database by December 31, 2019 were divided up proportionally between the categories "employees with permanent contracts" and "employees with temporary contracts".

## New employees

As of Dec. 31	2018	2019 <sup>1</sup>	2020	2021 Merck Group	2021 thereof Merck KGaA
<b>Total number of new employee hires</b>	<b>7,129</b>	<b>7,924</b>	<b>6,669</b>	<b>8,960</b>	<b>504</b>
<b>by age group</b>					
up to 29 years old	2,967	3,432	2,889	3,679	263
30 to 49 years old	3,728	4,055	3,347	4,610	225
50 or older	434	437	433	671	16
<b>by gender</b>					
Women	3,401	3,622	3,016	4,101	215
Men	3,728	4,302	3,653	4,859	289
<b>by region</b>					
Europe	2,560	2,529	2,160	2,567	504
North America	1,524	1,733	1,789	2,855	not applicable
Asia-Pacific (APAC)	2,222	2,729	2,206	2,803	not applicable
Latin America	583	578	396	579	not applicable
Middle East and Africa (MEA)	240	355	118	156	not applicable
<b>Rate of new employee hires<sup>2</sup> (%)</b>	<b>14</b>	<b>14</b>	<b>11</b>	<b>15</b>	<b>6</b>
<b>by age group<sup>3</sup></b>					
up to 29 years old	42	43	43	41	52
30 to 49 years old	52	51	50	51	45
50 or older	6	6	7	8	3
<b>by gender<sup>3</sup></b>					
Women	48	46	45	46	43
Men	52	54	55	54	57
<b>by region<sup>3</sup></b>					
Europe	36	32	32	29	100
North America	21	22	27	32	not applicable
Asia-Pacific (APAC)	31	34	33	31	not applicable
Latin America	8	7	6	6	not applicable
Middle East and Africa (MEA)	3	5	2	2	not applicable

1 These figures exclude the approximately 2,400 Versum Materials and Intermolecular employees who are not classified as new hires because they joined Merck as part of the acquisitions.

2 Formula for calculating the rate of new employee hires: Total number of new employee hires divided by number of employees at the end of the fiscal year.

3 Formula for calculating the rate of new employee hires by age/gender/region: New employee hires of the focus group divided by the total number of new employee hires.

Staff turnover<sup>1,2</sup>

	2018	2019	2020 <sup>3</sup>	2021 Merck Group	2021 thereof Merck KGaA
<b>Total turnover rate</b>	<b>9.09</b>	<b>9.07</b>	<b>8.22</b>	<b>10.82</b>	<b>2.37</b>
<b>Turnover rate by gender</b>					
Men	9.03	8.69	8.22	10.69	2.45
Women	9.18	9.54	8.22	11.00	2.22
<b>Turnover rate by age group</b>					
Up to 29 years old	14.24	13.13	11.30	16.64	2.59
30 to 49 years old	8.53	8.90	7.74	10.05	1.95
50 or older	7.39	7.03	7.52	9.22	2.95
<b>Turnover rate by region</b>					
Europe	5.73	5.72	5.64	6.00	2.37
North America	9.90	11.02	9.79	15.44	not applicable
Asia-Pacific (APAC)	14.51	13.18	10.60	14.66	not applicable
Latin America	15.41	13.47	11.40	12.95	not applicable
Middle East and Africa (MEA)	9.77	12.14	11.80	16.57	not applicable
<b>Total number of leavers</b>	<b>4,613</b>	<b>4,863</b>	<b>4,721</b>	<b>6,354</b>	<b>201</b>
<b>by gender</b>					
Men	2,578	2,621	2,697	3,575	139
Women	2,035	2,242	2,024	2,779	62
<b>by age group</b>					
Up to 29 years old	1,061	1,042	974	1,451	30
30 to 49 years old	2,649	2,898	2,677	3,545	86
50 or older	903	923	1,070	1,358	85
<b>by region</b>					
Europe	1,457	1,500	1,490	1,601	201
North America	1,064	1,264	1,281	2,078	not applicable
Asia-Pacific (APAC)	1,468	1,484	1,394	2,015	not applicable
Latin America	522	459	398	449	not applicable
Middle East and Africa (MEA)	102	156	158	211	not applicable

1 The table contains unadjusted turnover rates. The rate excludes employees who pause due to parental leave or a long-term illness, as well as employees who are transitioning to the non-working phase of partial retirement.

2 The employee turnover rate is calculated as follows: Total number of leavers from the past 12 months divided by the average employee headcount multiplied by 100.

3 The figures do not reflect the approximately 500 Allergopharma employees, who were not included in the employee turnover rate due to the divestment of the business.

In 2021, the average length of service for employees Group-wide was 9.5 years (2020: 9.6 years), with 15.7 years (2020: 16.2 years) for Merck KGaA employees.

### Work-related accidents<sup>1</sup>

	2018	2019	2020	2021 Merck Group	2021 thereof Merck KGaA
Lost Time Injury Rate (LTIR = workplace accidents resulting in missed days of work per one million hours worked)	1.2	1.6	1.3	1.2	2.5
by region					
Europe	1.8	2.6	2.4	2.1	2.5
North America	1.1	1.0	0.8 <sup>2</sup>	1.2	not applicable
Asia-Pacific (APAC)	0.3	0.2	0.1	0.1	not applicable
Latin America	1.5	1.7	0.8 <sup>2</sup>	0.4	not applicable
Middle East and Africa (MEA)	0.7	0.0	0.4	0.0	not applicable
Number of deaths	0	0	0	0	0
by region					
Europe	0	0	0	0	0
North America	0	0	0	0	not applicable
Asia-Pacific (APAC)	0	0	0	0	not applicable
Latin America	0	0	0	0	not applicable
Middle East and Africa (MEA)	0	0	0	0	not applicable
by gender					
Women	0	0	0	0	0
Men	0	0	0	0	0

1 Including supervised temporary staff

2 Figure retroactively adjusted

Through the LTIR, we record work-related accidents that involve at least one day of missed work. A work-related accident is an injury that results from the type of work, in the course of doing said work, and that has no internal cause. Work-related accidents are considered relevant if they occur on the premises, on business trips, during goods transport, as a result of external influences (e.g. natural disasters), or due to criminal acts involving personal injury. Commuting accidents and accidents during company sporting activities are not

included. First-aid incidents are generally not included in the LTIR since these usually do not result in more than one day of missed work.

We aim to sustainably lower our LTIR to 1.0 by 2025.

The LTIR is the key occupational safety indicator for the Merck Group as a whole. Therefore, we do not publish any other indicators such as workplace accidents, lost days or days of absence. The LTIR is not broken down by gender as this differentiation is not relevant to our strategic planning.

For Merck KGaA (about 13% of the employees of the Merck Group), we only report work-related illnesses if these have been certified as an occupational illness by the employers' liability insurance association. In 2021 period, 4 cases of work-induced illness were verified.

#### Employees who regularly receive a performance and development evaluation

	2018 <sup>1</sup>	2019	2020	2021 Merck Group <sup>2</sup>	2021 thereof Merck KGaA <sup>2</sup>
% of employees who receive a performance and development evaluation	98	98	98	98	100
by gender					
Women	99	98	98	98	100
Men	98	98	98	98	100
by employee category					
Senior management (Role 6+)	100	100	100	100	100
Middle management (Role 4 & 5)	100	100	100	100	100
Low management (Role 3)	100	100	100	100	100
Other employees (below Role 3)	98	98	98	98	100

1 In 2018 the position assessment had not yet been carried out for employees of all Sigma-Aldrich legal entities in Germany, or for employees of Allergopharma. In the facts and figures, these employees are included under "other employees (below Role 3)".

2 Employees whose role level had not yet been recorded in our database by December 31, 2021 are included under "other employees (below Role 3)".

Regular feedback and employee performance evaluations are essential to fairly ranking individual performance and to helping all employees follow their own career path at Merck. Our globally uniform Performance and Talent Management Process requires annual feedback meetings and performance assessments. Apart from evaluating employee performance, this helps us to identify individual development opportunities.

In Germany, all permanent employees have been participating in the Performance and Talent Management Process since 2013. In 2021, a total of 59,209 employees worldwide were involved in the process. The Performance and Talent Management Process is coordinated via our online platform HR4You.

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**Internationality of employees**

As of Dec. 31	2018 <sup>1</sup>	2019 <sup>2</sup>	2020	2021 Merck Group	2021 thereof Merck KGaA
Number of nationalities	136	139	141	142	89
Number of nationalities in management positions (Role 4 or above)	70	73	75	79	39
% of non-Germans in management positions (Role 4 or above)	64	64	66	66	13

1 In 2018 the position assessment had not yet been carried out for employees of all Sigma-Aldrich legal entities in Germany, or for employees of Allergopharma.

2 In 2019, the position assessment had not yet been carried out for employees of Versum Materials as well as of Allergopharma.



## Employee age by region

As of Dec. 31

Number of employees	Worldwide	North America	Europe (including Germany)	Merck KGaA	Asia-Pacific (APAC)	Latin America	Middle East and Africa (MEA)
2020							
Up to 29 years old	8,570	1,906	3,193	1,161	2,800	472	199
thereof women	4,018	825	1,525	420	1,307	260	101
30 to 49 years old	34,974	6,615	15,416	4,458	9,669	2,323	951
thereof women	15,268	2,841	7,076	1,505	3,776	1,161	414
50 or older	14,583	4,791	7,978	2,959	1,049	592	173
thereof women	5,637	1,861	3,142	839	342	209	83
Average age	41.7	44.4	43.1	43.4	37.0	40.7	39.1
Total employees	58,127	13,312	26,587	8,578	13,518	3,387	1,323
2021							
Up to 29 years old	9,129	2,219	3,341	1,125	2,912	482	175
thereof women	4,359	961	1,598	415	1,437	265	98
30 to 49 years old	36,157	6,939	15,653	4,288	10,260	2,404	901
thereof women	15,888	2,958	7,224	1,550	4,081	1,225	400
50 or older	15,062	4,912	8,223	2,668	1,113	643	171
thereof women	5,827	1,881	3,276	824	356	231	83
Average age	41.6	43.9	43.1	43.1	37.1	40.8	39.7
Total employees	60,348	14,070	27,217	8,081	14,285	3,529	1,247

## Age of youngest employee

As of Dec. 31	2018	2019	2020	2021
Age of youngest employee, excluding apprentices	17	18	18	18

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**Voluntary insurance benefits (voluntarily introduced and (co-) financed)**

As of Dec. 31	2018	2019 <sup>1</sup>	2020 <sup>1</sup>	2021 Merck Group	2021 thereof Merck KGaA
% of employees with healthcare benefits <sup>2</sup>	67	68	63	64	0
% of employees with Group accident insurance <sup>3</sup>	39	36	41	41	3
% of employees with life insurance <sup>4</sup>	58	58	56	59	0
% of employees with disability insurance (short-term and long-term) <sup>5</sup>	37	39	39	39	0

1 The figures exclude Versum Materials and Intermolecular since the integration process was still underway at this point of time. For more information, see [report profile](#).

2 Any spend on voluntarily introduced and (co-) financed healthcare benefits for employees and possibly their dependents. Not taking into consideration any mandatory social security cover (mostly covered by an insurance policy).

3 Any spend on voluntarily introduced and (co-) financed accident insurance that pays a defined amount in case of death or disability caused by a work-related accident (not taking into consideration any mandatory social security cover, e.g. workman's compensation).

4 Any spend on voluntarily introduced and (co-) financed life insurance cover that pays a defined amount of money in case of natural death (not accidental).

5 Any spend on voluntarily introduced and (co-) financed insurance cover that disability pays for salary continuation in case of inability to work caused by an insured incident.

All our employees are covered by either statutory or voluntary accident and health insurance. Employees of Merck KGaA are covered by statutory insurance as stipulated by the regulations in force in Germany.

We offer a company pension in numerous countries along with various programs for supplemental company pensions and survivor's benefits.

The global benefits listed in the table above are designed to provide additional security to our workforce and their families and to improve their quality of life. Benefits represent voluntarily employer-initiated as well as employer-financed assistance to our workforce in addition to the regular compensation package.

Our benefits offer meaningful choices, where possible, to support a diverse workforce and are sensitive to the needs and customs of the employees who use them, regardless of country, age, family status, interests, or values.

### Long-term pension obligations and post-employment benefits

€ million	2018	2019	2020	2021
Present value of all defined benefit obligations as of Dec. 31	4,719	5,644	6,352	5,995
Pension expenses	319	357	408	461

Depending on the legal, economic and fiscal circumstances prevailing in each country, different retirement benefit systems are provided for the employees. Generally, these systems are based on the years of service and salaries of the employees. Pension obligations include both defined benefit and defined contribution plans and comprise both obligations from current pensions and accrued benefits for pensions payable in the future. Further information can be found in the note on Provisions for employee benefits (p. 288-294, No. 33) of our [Annual Report 2021](#).

### Flexible working hours in Germany

As of Dec. 31	2018	2019	2020	2021
% of employees utilizing the "mywork@Merck" working model	42	43	48	51

In coordination with their teams and supervisors, employees taking advantage of "mywork@merck" can choose when and where they work.

## Parental leave<sup>1</sup>

As of Dec. 31	2018	2019	2020	2021
Number of employees with a right to parental leave	308	375	351	414
thereof women (recorded via maternity leave in the respective year)	188	239	225	255
thereof men (recorded via special paternity leave in the respective year)	120	136	126	159
Number of employees who took parental leave <sup>2</sup>	500	542	538	617
thereof women	240	248	265	278
thereof men	260	294	273	339
Number of employees on parental leave who worked part time during their leave	128	164	104	198
thereof women	109	140	73	172
thereof men	19	24	31	26
Number of employees who returned from parental leave <sup>2</sup>	312	536	529	597
thereof women	65	243	252	273
thereof men	247	293	277	324
Return to work rate (%)	62.4	98.9	98.3	96.8
thereof women	27.1	98.0	95.1	98.2
thereof men	95.0	99.7	101.5	95.6
Number of employees still working for Merck one year after their return from parental leave	268	496	490	- <sup>3</sup>
thereof women	26	218	220	- <sup>3</sup>
thereof men	242	278	270	- <sup>3</sup>
Retention rate (%)	93.1	92.5	92.6	- <sup>3</sup>
thereof women	63.4	89.7	87.3	- <sup>3</sup>
thereof men	97.9	94.9	97.5	- <sup>3</sup>

1 Figures pertain only to Merck KGaA (which accounted for around 13% in 2021). Figures are calculated on the basis of the data from one entire year, which also includes those employees who took parental leave during the calendar year but who had not yet returned by Dec. 31.

2 Since parental leave can be taken for a period ranging from one month to three years, it is possible for employees to be recorded across a period of up to four calendar years. This explains why the number of employees on parental leave exceeds the number of employees who have a right to it. It also explains why the "Number of employees who returned from parental leave" might exceed the "Number of employees who took parental leave".

3 Figure will be available on December 31, 2022.

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**Employees with disabilities<sup>1</sup> (%)**

	2018	2019	2020	2021
Employees with disabilities	4.3	4.4	4.7	4.8

<sup>1</sup> Only pertains to Merck KGaA (which accounted for around 13% of Merck Group employees in 2021, calculations based on the German Social Code IX - SGB IX).

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**Apprentices in Germany**

As of Dec. 31	2018	2019	2020	2021
Number of apprentices	604	589	607	602
% of apprentices	4.5	4.3	4.6	4.1

## Environment

### Total greenhouse gas emissions (Scope 1 and 2 of the GHG Protocol)<sup>1,2</sup>

metric kilotons	2018	2019	2020 <sup>3</sup>	2021 Merck Group	2021 thereof Merck KGaA
<b>Total CO<sub>2</sub>eq<sup>4</sup> emissions</b>	<b>636</b>	<b>621</b>	<b>2,028</b>	<b>1,843</b>	<b>153</b>
Thereof					
direct CO <sub>2</sub> eq emissions (Scope 1)	332	341	1,706	1,522	115
indirect CO <sub>2</sub> eq emissions <sup>5</sup> (Scope 2)	304	280	322	321	38
<b>Biogenic CO<sub>2</sub> emissions</b>	<b>13</b>	<b>13</b>	<b>13</b>	<b>15</b>	<b>0</b>

1 In line with the Greenhouse Gas Protocol, for all previous years greenhouse gas emissions were calculated based on the current corporate structure as of Dec. 31 of the reporting year and retroactively adjusted for acquisitions or divestments of (parts of) companies, or for changes in emission factors (portfolio-adjusted).

2 Baseline for our emission targets is 2020.

3 Includes Versum Materials as of 2020.

4 eq = equivalent

5 The figures presented here have been calculated in accordance with the market-based method.

Our response to the [CDP Climate change](#) contains a detailed description of our calculation methods.

We have included the following gases in our calculation of direct and indirect CO<sub>2</sub>eq emissions:

Direct CO<sub>2</sub> emissions: CO<sub>2</sub>, HFCs, PFCs, CH<sub>4</sub>, N<sub>2</sub>O, NF<sub>3</sub>, SF<sub>6</sub>.

Indirect CO<sub>2</sub> emissions: CO<sub>2</sub>.

In 2021, we emitted 0.09 kg of CO<sub>2</sub>eq per euro of net sales.

### Other relevant indirect greenhouse gas emissions (Scope 3 of the GHG Protocol)<sup>1</sup>

in metric kilotons of CO <sub>2</sub> eq <sup>2</sup>	2018	2019	2020	2021
<b>Total gross other indirect emissions</b>	<b>348</b>	<b>339</b>	<b>5,030</b>	<b>5,716</b>
Purchased goods & services (category 1) <sup>3</sup>	n/a	n/a	3,040	3,572
Capital goods (Category 2) <sup>3</sup>	n/a	n/a	293	291
Fuel- and energy-related emissions, not included in Scope 1 or 2 (category 3)	131	127	102	143
Upstream transportation & distribution (category 4) <sup>4</sup>	n/a	n/a	264	264 <sup>5</sup>
Waste generated in operations (category 5)	47	50	85	79
Business travel (category 6) <sup>6,7</sup>	104	87	32	26
Employee commuting (category 7)	66	75	90	94
Upstream leased assets (category 8) <sup>8</sup>	0	0	0	0
Downstream transportation & distribution (category 9) <sup>4</sup>	n/a	n/a	8	8 <sup>5</sup>
Processing of sold products (category 10) <sup>9</sup>	0	0	0	0
Use of sold products (category 11) <sup>4</sup>	n/a	n/a	1,091	1,213
End-of-life treatment of sold products (category 12) <sup>4</sup>	n/a	n/a	23	23 <sup>5</sup>
Downstream leased assets (category 13)	0	0	2	2
Franchises (category 14) <sup>10</sup>	0	0	0	0
Investments (category 15)	n/a	n/a	0	1

1 In line with the Greenhouse Gas Protocol, for all previous years greenhouse gas emissions were calculated based on the current corporate structure as of Dec. 31 of the reporting year and retroactively adjusted for acquisitions or divestments of (parts of) companies, or for changes in emission factors (portfolio-adjusted).

2 eq = equivalent

3 The reported figures contain 95-97% of our total spend. The difference stems from smaller sites that are not integrated in our Group-wide purchase volume data. 2020 data are slightly over-reported (approx. 3%) as the currency conversion factor (USD to EUR) from 2021 was used. Non-categorized spends are distributed pro rate to category 1 and 2.

4 Compared to other Scope 3 categories, the screening of the emissions in this category contains more uncertainties. Their impact cannot be estimated more precisely at this time. We are working on improving the accuracy of these data.

5 Due to high efforts for data preparation, we reference 2020 data for 2021.

6 Since 2021, we have applied a new calculation approach for 2021 and 2020. The figure for 2020 was therefore adjusted retrospectively.

7 Air travel, hotel stays, rental car travels, rail travel (German Railway)

8 Already covered under Scope 1 and 2 emissions

9 Our company produces a huge variety of intermediate products for various purposes. Due to their many applications and our customer structure, the associated greenhouse gas emissions cannot be tracked in a reasonable fashion.

10 This category is not relevant for us as we do not operate franchises, i.e. businesses operating under a license to sell or distribute another company's goods or services. Out-licensing in the pharmaceutical sector is not regarded as franchising.

Details on the calculation (methodology, assumptions, uncertainties) of the Scope 3 categories can be found in the [Scope 3 document](#).

Biogenic emissions (Scope 3), if present, are not being recorded.

### Emissions of ozone-depleting substances

metric tons	2018	2019	2020	2021
Total emissions of ozone-depleting substances	1.5	1.0	2.2	1.5
CFC-11eq <sup>1</sup>	0.1	0.1	0.1	0.1

1 CFC-11eq is a unit of measure used to compare the potential of various substances to deplete the ozone. Reference value 1 indicates the potential of CFC-11 to cause the depletion of the ozone layer.

Substances included: R-12, R-22, R-123, R-141b, R-401a, R-402a, R408a, R-409a, R-502, R-503.

Source for the emission factors: Montreal Protocol.

### Other air emissions

metric kilotons	2018	2019	2020	2021
Volatile organic compounds (VOC)	0.3	0.3	0.3	0.3
Nitrogen oxide	0.3	0.3	0.2	0.3
Sulfur dioxide	0.010	0.010	0.004	0.004
Dust	0.010	0.010	0.010	0.020

The VOC, nitrogen oxide, sulfur dioxide, and dust emissions reported here are attributable to production activities as well as energy generation. These figures do not include emissions from vehicles. Emissions are determined partially based on measurements and partially based on calculations or estimates. Only some sites are required to measure individual parameters.

### Transport of finished goods, by means of transportation

	2018	2019	2020	2021
% truck	74	70	70	71
% boat	14	19	22	21
% airplane	12	11	8	8

The figures contain the volumes of the biggest global distribution centers of our Life Science, Healthcare and Electronics business sectors. These figures pertain to the total weight of transported products and indicate the primary means of transport.

In shipping finished goods from our production sites to the local warehouses of our subsidiaries, we have been working to reduce the use of air shipping in favor of sea freight. This change aims to both reduce costs as well as lower transport-related CO<sub>2</sub> emissions.



Energy consumption<sup>1</sup>

In GWh	2018	2019	2020	2021 Merck Group	2021 thereof Merck KGaA
<b>Total energy consumption</b>	<b>2,158</b>	<b>2,178</b>	<b>2,374</b>	<b>2,454</b>	<b>628</b>
<b>Direct energy consumption</b>	<b>1,261</b>	<b>1,288</b>	<b>1,266</b>	<b>1,318</b>	<b>564</b>
Natural gas	1,194	1,222	1,179	1,232	556
Liquid fossil fuels <sup>2</sup>	33	33	52	48	8
Biomass and self-generated renewable energy	34	33	35	38	0
<b>Indirect energy consumption</b>	<b>897</b>	<b>890</b>	<b>1,108</b>	<b>1,136</b>	<b>64</b>
Electricity	749	745	945	958	64
Steam, heat, cold	148	145	163	178	0
<b>Total energy sold</b>	<b>0.0</b>	<b>0.1</b>	<b>0.2</b>	<b>0.1</b>	<b>0.0</b>
Electricity	0.0	0.1	0.2	0.1	0.0
Steam, heat, cold	0.0	0.0	0.0	0.0	0.0
In TJ					
<b>Total energy consumption</b>	<b>7,770</b>	<b>7,839</b>	<b>8,546</b>	<b>8,834</b>	<b>2,261</b>
<b>Direct energy consumption</b>	<b>4,541</b>	<b>4,637</b>	<b>4,558</b>	<b>4,745</b>	<b>2,030</b>
Natural gas	4,298	4,399	4,244	4,435	2,002
Liquid fossil fuels <sup>2</sup>	119	119	187	173	29
Biomass and self-generated renewable energy	124	119	126	137	0
<b>Indirect energy consumption</b>	<b>3,229</b>	<b>3,202</b>	<b>3,989</b>	<b>4,090</b>	<b>230</b>
Electricity	2,696	2,682	3,402	3,449	230
Steam, heat, cold	533	520	587	641	0
<b>Total energy sold</b>	<b>0.0</b>	<b>0.5</b>	<b>0.7</b>	<b>0.4</b>	<b>0.0</b>
Electricity	0.0	0.5	0.7	0.4	0.0
Steam, heat, cold	0.0	0.0	0.0	0.0	0.0

1 In line with the Greenhouse Gas Protocol, for all previous years energy consumption has been calculated based on the current corporate structure as of Dec. 31 of the reporting year and retroactively adjusted for acquisitions or divestments of (parts of) companies, or for changes in emission factors (portfolio-adjusted).

2 Light and heavy fuel oil, liquefied petroleum gas (LPG), diesel, biodiesel, gasoline and kerosene

At 15 sites we use photovoltaics to produce power.

We currently only record purchased secondary energy – this is primarily electricity and, to a lesser extent, heat/steam/cold. Details on the local energy mix, including the respective percentage of primary energy, renewable energy, etc. are not available. Data on local energy efficiency in electricity or heat generation are not available either. Our production sites are located in countries with a widely varying energy mix.

Our Darmstadt and Gernsheim sites in Germany consume the most energy, representing 25% of our Group-wide total. Here, fossil energy (coal, gas, etc.) accounts for approx. 39%, nuclear energy approx. 12% and renewable energies approx. 49% of the energy mix. Renewable energies account for a higher share of electricity generation at production sites in Switzerland, with nuclear energy taking the lead in France. Based on an estimated global energy efficiency of 37% for the conversion and distribution of generated electricity, this results in a primary energy consumption of 2,589 GWh for 2021. Based on an estimated global energy efficiency of 85% for heat/steam/cold, this results in a primary energy consumption of 209 GWh for 2021. This yields a total primary energy consumption of 2,798 GWh for 2021. (The calculation is based on factors stated in the "Manual for energy management in practice - Systematically reducing energy costs" published by DENA, 12/2012.)

In 2021, our energy intensity relative to net sales totaled 0.12 kWh/€.

#### Water withdrawal

millions of m <sup>3</sup>	2018	2019	2020	2021 Merck Group	2021 Water stress areas
<b>Total water withdrawal</b>	<b>14.7</b>	<b>14.0</b>	<b>14.0<sup>1</sup></b>	<b>13.5</b>	<b>0.160</b>
Surface water (rivers, lakes)	2.1	1.9	1.8 <sup>1</sup>	1.9	0.004
Groundwater	7.2	6.8	6.7	6.3	0.004
Drinking water (from local suppliers)	5.3	5.2	5.4 <sup>1</sup>	5.2	0.150
Rain water and other sources	0.05	0.05	0.06 <sup>1</sup>	0.06	0.003

1 Figure retroactively adjusted.

These figures do not include the ground water that we use for safety measures at our Gernsheim site in Germany. Here, the water is fed back directly into natural circulation.

The volume of seawater and produced water withdrawn is not significant and is therefore not reported separately.

#### Water reused

millions of m <sup>3</sup>	2018	2019	2020	2021
<b>Water reused</b>	<b>24.4</b>	<b>23.3</b>	<b>22.0</b>	<b>23.5</b>

The recirculating cooling system at our Darmstadt, Germany facility accounts for the majority of reused water as it allows the water to be re-utilized multiple times. The volume of reused water is thus greater than the total volume of consumed water.

## Wastewater volume

	2018	2019	2020	2021 Merck Group	2021 Water stress areas
Total wastewater volume (millions of m <sup>3</sup> )	13.5	13.2	13.4	13.3	0.118
Wastewater discharged directly	9.6	9.3	9.2	9.5	0.001
Wastewater discharged to third parties	3.9	3.8	4.1	3.8	0.103

The volume of seawater and groundwater discharged is not significant and is therefore not reported separately.

Discrepancies between total wastewater volume and the sum of directly discharged wastewater and wastewater sent to third parties arise from other disposal methods, which, however, only result in minor amounts of wastewater. Direct discharges correspond to the “freshwater” classification of the GRI. Indirect discharges correspond to their “other water” classification.

## Wastewater quality<sup>1</sup>

	2018	2019	2020	2021
Chemical oxygen demand (metric tons of O <sub>2</sub> )	1,509	1,568	1,482 <sup>2</sup>	1,426
Phosphorous (metric tons)	10	12	15	11
Nitrogen (metric tons)	260	481	291	392
Nickel (kg)	30	32	30	37
Lead (kg)	30	34	37	15
Cadmium (kg)	6	6	6	3
Mercury (kg)	0	0	0	1

1 In alignment with [ICCA reporting](#) requirements specified by Cefic, we track heavy metal emissions from lead, cadmium, nickel, and mercury.

2 Figure retroactively adjusted.

The wastewater treatment plant at our site in Gernsheim, Germany also treats wastewater from a neighboring municipality. The communal wastewater from this municipality is included in the emissions stated in the table.

Emissions are determined partially based on measurements and partially based on calculations or estimates. Only some sites are required to measure individual parameters.

These figures reflect the wastewater as it is when it leaves our facilities. Some of the substances in the water are then later removed by third-party purification plants before the water is ultimately discharged into the ecosystem.

### Hazardous and non-hazardous waste

metric kilotons	2018	2019	2020	2021
<b>Total waste</b>	<b>245</b>	<b>244</b>	<b>229<sup>1</sup></b>	<b>214</b>
Hazardous waste disposed <sup>2</sup>	44	44	38	34
Non-hazardous waste disposed <sup>2</sup>	54	41	34	33
Hazardous waste recycled <sup>3</sup>	75	78	90 <sup>1</sup>	84
Non-hazardous waste recycled <sup>3</sup>	72	81	67 <sup>1</sup>	63

1 Figure retroactively adjusted.

2 Disposed = incineration (without energy recovery) and landfill

3 Recycled = incineration (with energy recovery) and material recycling

### Exported/Imported hazardous waste

metric kilotons	2018	2019	2020	2021
Exported <sup>1</sup>	4.5	4.3	4.0	4.6
Imported	0.000	0.000	0.000	0.000

1 Disposal primarily within the EU and the United States.

In 2021, approx. 4% of hazardous waste was shipped internationally.

### Waste by disposal method

	2018	2019	2020	2021
<b>Total waste (metric kilotons)</b>	<b>245</b>	<b>244</b>	<b>229<sup>1</sup></b>	<b>214</b>
<b>Disposed waste</b>	<b>98</b>	<b>85</b>	<b>72</b>	<b>66</b>
Landfilled waste	35	26	17	18
Incinerated waste	63	59	55	48
<b>Recycled waste</b>	<b>147</b>	<b>159</b>	<b>157<sup>1</sup></b>	<b>148</b>
Material recycling	127	132	133 <sup>1</sup>	124
Waste-to-energy	20	27	24	24
<b>Recycling rate (%)</b>	<b>60</b>	<b>65</b>	<b>69</b>	<b>69</b>

1 Figure retroactively adjusted.

As in previous years, the total waste generated continues to be heavily influenced by the waste from construction and remodeling activities. Construction, excavation and demolition waste accounted for 20% of our waste in 2021. Around 32 metric kilotons of construction, excavation and demolition waste was recycled.

### Significant spills

	2018	2019	2020	2021
Total number of significant spills	0	0	0	0

## Community

### Spending on community engagement

€ million	2018	2019	2020	2021
Total spending	35.7	46.2	53.6	43.3

We calculate the value of pharmaceutical product donations according to the WHO Guidelines for Medicine Donations; for other product donations, we apply their fair value.

The main reasons for the decline in total spending in 2021 were lower Covid-19-related donations as well as a drop in demand for praziquantel tablets in the affected countries due to Covid-19.

### Community engagement spending by region<sup>1</sup>

	Europe	North America	Asia-Pacific (APAC)	Latin America	Middle East and Africa (MEA)
2020					
€ million	15.1	5.8	4.2	2.6	25.9
%	28	11	8	5	48
2021					
€ million	10.8	5.0	7.2	0.6	19.7
%	25	12	17	1	45

<sup>1</sup> This table presents the regions across the globe in which we support initiatives. For projects that benefit multiple regions, we have calculated the amount per region by dividing the project spending evenly per country.

### Focus of our local community engagement<sup>1</sup>

%	2018	2019	2020	2021
Global Health	34	33	36	33
Broad Minds: Education and culture	42	38	43	45
Sustainable Solutions: Environment	2	3	1	2
Disaster relief	2	2	1	2
Other	20	24	19	18

<sup>1</sup> Based on number of projects

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**Motivations for our community engagement<sup>1</sup>**

%	2018	2019	2020	2021
Charitable activities	7	6	23	21
Community investment	88	91	72	76
Commercial initiatives in the community	5	3	5	3

1 Based on total spending on all projects

We categorize the motivations for our activities based on the London Benchmarking Group model as well as the guidelines of the Bertelsmann Foundation for corporate social responsibility. Projects that primarily aim to make improvements within the community are classified as community investment.

Initiatives that are predominantly aimed at company-relevant factors such as image or personnel recruitment are classified as commercial initiatives in the community. Charitable activities cover any other projects that benefit a charitable organization, but cannot be listed under either of the other two motivation categories due to missing data or their narrow scope.

# GRI content index

## General disclosures

GRI Standards and Disclosure Number	Comment	Reference
<b>Organizational profile</b>		
102-1	Name of the organization	<a href="#">Company profile</a>
102-2	Activities, brands, products, and services	<a href="#">Company profile</a> <a href="#">Products &amp; Services</a>
102-3	Location of headquarters	<a href="#">Company profile</a>
102-4	Location of operations	<a href="#">Company profile</a> <a href="#">List of shareholdings</a>
102-5	Ownership and legal form	<a href="#">Company profile</a>
102-6	Markets served	<a href="#">Company profile</a> <a href="#">Macroeconomic and Sector-Specific Environment</a>
102-7	Scale of the organization	<a href="#">Company profile</a> <a href="#">Net sales</a> <a href="#">Capitalization</a> <a href="#">Consolidated Balance Sheet</a>
102-8	Information on employees and other workers	Supervised temporary staff is not logged in our employee data system. <a href="#">Indicators: employees</a>
102-9	Supply chain	<a href="#">Sustainable supply chain management</a> <a href="#">Mica supply chain</a>
102-10	Significant changes to the organization and its supply chain	<a href="#">Company profile</a> <a href="#">Report profile</a> <a href="#">Fundamental Information about the Group</a>
102-11	Precautionary Principle or approach	<a href="#">Sustainability strategy</a> <a href="#">Patient safety</a> <a href="#">Clinical studies</a> <a href="#">Plant, process &amp; transport safety</a> <a href="#">Chemical product safety</a> <a href="#">Health &amp; safety</a> <a href="#">Environmental stewardship</a> <a href="#">Climate action</a>

## 102-12 External initiatives

[Governance](#)  
[Stakeholder dialogue](#)  
[Sustainable Development Goals](#)  
[Global health](#)  
[Open innovation sharing](#)  
[Compliance management](#)  
[Human rights](#)  
[Sustainable supply chain management](#)  
[Mica supply chain](#)  
[Clinical studies](#)  
[Environmental stewardship](#)  
[Climate action](#)  
[Chemical product safety](#)  
[Diversity, equity & inclusion](#)

## 102-13 Membership of associations

[Stakeholder dialogue](#)  
[Compliance management](#)  
[Animal welfare](#)  
[Global health](#)  
[Human rights](#)  
[Mica supply chain](#)  
[Clinical studies](#)  
[Plant, process & transport safety](#)  
[Diversity, equity & inclusion](#)

## Strategy

## 102-14 Statement from senior decision-maker

[Letter from the CEO](#)

## 102-15 Key impacts, risks, and opportunities

[Sustainability strategy](#)  
[Materiality analysis](#)  
[Sustainable Development Goals](#)  
[Report on Risks and Opportunities](#)



## Ethics and integrity

102-16	Values, principles, standards, and norms of behavior	<a href="#">Sustainability strategy</a> <a href="#">Animal welfare</a> <a href="#">Governance</a> <a href="#">Compliance management</a> <a href="#">Responsible interactions with health systems</a> <a href="#">Human rights</a> <a href="#">Sustainable supply chain management</a> <a href="#">Sustainable Development Goals</a> <a href="#">Bioethics</a> <a href="#">Digital ethics</a> <a href="#">Clinical studies</a> <a href="#">Product-related crime</a> <a href="#">Plant, process &amp; transport safety</a> <a href="#">Chemical product safety</a> <a href="#">Attractive employer</a> <a href="#">Diversity, equity &amp; inclusion</a> <a href="#">Leading &amp; developing employees</a> <a href="#">Health &amp; safety</a> <a href="#">Environmental stewardship</a> <a href="#">Climate action</a> <a href="#">Waste &amp; recycling</a>
102-17	Mechanisms for advice and concerns about ethics	<a href="#">Compliance management</a> <a href="#">Responsible interactions with health systems</a> <a href="#">Human rights</a> <a href="#">Bioethics</a> <a href="#">Digital ethics</a> <a href="#">Clinical studies</a> <a href="#">Animal welfare</a> <a href="#">Diversity, equity &amp; inclusion</a> <a href="#">Health &amp; safety</a> <a href="#">Indicators: business ethics</a>
<b>Governance</b>		
102-18	Governance structure	<a href="#">Sustainability strategy</a> <a href="#">Management</a> <a href="#">Statement on Corporate Governance</a>
102-19	Delegating authority	<a href="#">Sustainability strategy</a> <a href="#">Statement on Corporate Governance</a>
102-20	Zuständigkeit auf Vorstandsebene für ökonomische, ökologische und soziale Themen	<a href="#">Sustainability strategy</a> <a href="#">Environmental stewardship</a> <a href="#">Compliance management</a> <a href="#">Diversity, equity &amp; inclusion</a> <a href="#">Attractive employer</a>

102-21	Consulting stakeholders on economic, environmental, and social topics	<a href="#">Sustainability strategy</a> <a href="#">Stakeholder dialogue</a> <a href="#">Materiality analysis</a> <a href="#">Global health</a> <a href="#">Bioethics</a> <a href="#">Digital ethics</a> <a href="#">Responsible interactions with health systems</a>
102-22	Composition of the highest governance body and its committees	<a href="#">Management</a> <a href="#">Statement on Corporate Governance</a> <a href="#">The Executive Board</a> <a href="#">The Supervisory Board</a> <a href="#">Objectives of the Supervisory Board with respect to its composition</a>
102-23	Chair of the highest governance body	<a href="#">Management</a> <a href="#">Statement on Corporate Governance</a>
102-24	Nominating and selecting the highest governance body	<a href="#">Diversity, equity &amp; inclusion</a> <a href="#">Management</a> <a href="#">Statement on Corporate Governance</a> <a href="#">Gender quota</a> <a href="#">Diversity policy</a> <a href="#">Objectives of the Supervisory Board with respect to its composition</a>
102-25	Conflicts of interest	<a href="#">Compliance management</a> <a href="#">Responsible interactions with health systems</a> <a href="#">Information on corporate governance practices</a>
102-26	Role of highest governance body in setting purpose, values, and strategy	<a href="#">Sustainability strategy</a> <a href="#">Values and compliance</a> <a href="#">Report of the Supervisory Board</a>
102-27	Collective knowledge of highest governance body	<a href="#">Sustainability strategy</a> <a href="#">The Executive Board</a> <a href="#">Statement on Corporate Governance</a>
102-28	Evaluating the highest governance body's performance	<a href="#">Board of Partners</a> <a href="#">The Supervisory Board</a> <a href="#">Articles of Association</a> <a href="#">Statement on Corporate Governance</a>

102-29	Identifying and managing economic, environmental, and social impacts		<a href="#">Sustainability strategy</a> <a href="#">Materiality analysis</a> <a href="#">Compliance management</a> <a href="#">Report on Risks and Opportunities</a> <a href="#">Statement on Corporate Governance</a>
102-30	Effectiveness of risk management processes		<a href="#">Sustainability strategy</a> <a href="#">Compliance management</a> <a href="#">Report on Risks and Opportunities</a> <a href="#">Report of the Supervisory Board</a>
102-31	Review of economic, environmental, and social topics		<a href="#">Sustainability strategy</a> <a href="#">Compliance management</a> <a href="#">Report on Risks and Opportunities</a> <a href="#">Report of the Supervisory Board</a>
102-32	Highest governance body's role in sustainability reporting		<a href="#">Report profile</a>
102-33	Communicating critical concerns		<a href="#">Compliance management</a> <a href="#">Values and compliance</a>
102-34	Nature and total number of critical concerns	<p>Due to the sensitive nature of critical concerns, these figures are only for internal use (except where external reporting is legally required). Significant additions to or changes in the risk register are disclosed in due course to the Executive Board on an ad hoc basis, as per stipulations in the risk policy.</p>	<a href="#">Compliance management</a> <a href="#">Indicators: business ethics</a> <a href="#">Values and compliance</a>
102-35	Remuneration policies		<a href="#">Compensation report</a>
102-36	Process for determining remuneration		<a href="#">Attractive employer</a> <a href="#">Compensation report</a>
102-37	Stakeholders' involvement in remuneration		<a href="#">Attractive employer</a> <a href="#">Compensation report</a> <a href="#">Voting results Annual General Meeting 2021</a>

102-38 Annual total compensation ratio	<p>Competitive salaries and additional benefits not only increase our attractiveness as an employer; they also motivate our people and build loyalty to the company. The compensation we offer is based on market analyses in the relevant field and the value of the respective position, and the employee's skill set and performance. Our Global Rewards Policy defines the framework for compensation and benefits across the entire Group. As far as possible, we strive to offer all our employees comparable compensation structures. Furthermore, we monitor compliance with minimum standards. We do not consider the information required under GRI 102-38 and GRI 102-39 to be relevant to assessing the fairness of our compensation structures.</p>	<a href="#">Attractive employer</a>
102-39 Percentage increase in annual total compensation ratio	<p>Competitive salaries and additional benefits not only increase our attractiveness as an employer; they also motivate our people and build loyalty to the company. The compensation we offer is based on market analyses in the relevant field and the value of the respective position, and the employee's skill set and performance. Our Global Rewards Policy defines the framework for compensation and benefits across the entire Group. As far as possible, we strive to offer all our employees comparable compensation structures. Furthermore, we monitor compliance with minimum standards. We do not consider the information required under GRI 102-38 and GRI 102-39 to be relevant to assessing the fairness of our compensation structures.</p>	<a href="#">Attractive employer</a>

## Stakeholder engagement

102-40	List of stakeholder groups	<a href="#">Stakeholder dialogue</a>
102-41	Collective bargaining agreements	<a href="#">Attractive employer</a>
102-42	Identifying and selecting stakeholders	<a href="#">Stakeholder dialogue</a>
102-43	Approach to stakeholder engagement	<a href="#">Stakeholder dialogue</a> <a href="#">Materiality analysis</a> <a href="#">Attractive employer</a> <a href="#">Diversity, equity &amp; inclusion</a>
102-44	Key topics and concerns raised	<a href="#">Materiality analysis</a> <a href="#">Bioethics</a> <a href="#">Digital ethics</a>

## Reporting practice

102-45	Entities included in the consolidated financial statements	<a href="#">Report profile</a> <a href="#">Company profile</a> <a href="#">Notes to the Consolidated Financial Statements</a>
102-46	Defining report content and topic Boundaries	<a href="#">Materiality analysis</a> <a href="#">Report profile</a>
102-47	List of material topics	<a href="#">Materiality analysis</a>
102-48	Restatements of information	<a href="#">Report profile</a>
102-49	Changes in reporting	<a href="#">Materiality analysis</a> <a href="#">Report profile</a>
102-50	Reporting period	<a href="#">Report profile</a>
102-51	Date of most recent report	<a href="#">Report profile</a>
102-52	Reporting cycle	<a href="#">Report profile</a>
102-53	Contact point for questions regarding the report	<a href="#">Report profile</a>
102-54	Claims of reporting in accordance with the GRI Standards	<a href="#">GRI Content Index</a> <a href="#">Report profile</a>
102-55	GRI content index	<a href="#">GRI Content Index</a>
102-56	External assurance	<a href="#">Report profile</a> <a href="#">Assurance Report</a>

## Economic Standards

GRI Standards and Disclosure Number	Comment	Reference
<b>GRI 201: ECONOMIC PERFORMANCE 2016</b>		
103-1	Explanation of the material topic and its Boundary	<a href="#">Company profile</a> <a href="#">Statement on Corporate Governance</a>
103-2	The management approach and its components	<a href="#">Economic performance</a>
103-3	Evaluation of the management approach	<a href="#">Pension schemes</a> <a href="#">Report on Risks and Opportunities</a>
201-1	Direct economic value generated and distributed	<a href="#">Indicators: employees</a> <a href="#">Indicators: economics</a> <a href="#">Indicators: community</a> <a href="#">Community engagement</a> <a href="#">Consolidated income statement</a> <a href="#">Consolidated cash flow statement</a> <a href="#">Operating activities</a> <a href="#">Personnel expenses</a>
201-2	Financial implications and other risks and opportunities due to climate change	We report in detail on various aspects of climate change as part of our participation in the CDP (formerly known as the Carbon Disclosure Project). <a href="#">Climate action</a> <a href="#">Water management</a> <a href="#">CDP Climate change</a> <a href="#">CDP Water security</a> <a href="#">Report on Risks and Opportunities</a>
201-3	Defined benefit plan obligations and other retirement plans	<a href="#">Indicators: employees</a> <a href="#">Pension schemes</a>
201-4	Financial assistance received from government	<a href="#">Accounting: Property, plant and equipment</a> <a href="#">Research and development costs</a>
<b>GRI 202: MARKET PRESENCE 2016</b>		
103-1	Explanation of the material topic and its Boundary	<a href="#">Attractive employer</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	

202-1	Ratios of standard entry level wage by gender compared to local minimum wage	This indicator is not relevant to us, which is why we do not collect data on the ratio of the standard entry level wage compared to local minimum wage. Our Global Rewards Policy applies to all our subsidiaries worldwide and guarantees a systematic compensation structure. Both base pay and short-term variable compensation are oriented to the median base pay of the relevant reference market. Our pay brackets are reviewed on an annual basis and reflect market conditions. We adhere to local minimum wage levels.	<a href="#">Attractive employer</a>
202-2	Proportion of senior management hired from the local community	We promote both the recruitment of local employees and their international deployment at all hierarchical levels. We do not record the proportion of local managers, as this is not relevant for the strategic personnel management of our company.	<a href="#">Attractive employer</a>
<b>GRI 203: INDIRECT ECONOMIC IMPACTS 2016</b>			
103-1	Explanation of the material topic and its Boundary		<a href="#">Global health</a> <a href="#">Prices of medicines</a> <a href="#">Health capacity &amp; awareness</a>
103-2	The management approach and its components		
103-3	Evaluation of the management approach		
203-1	Infrastructure investments and services supported		<a href="#">Global health</a> <a href="#">Health capacity &amp; awareness</a> <a href="#">Mica supply chain</a> <a href="#">Community engagement</a>
203-2	Significant indirect economic impacts		<a href="#">Prices of medicines</a> <a href="#">Health capacity &amp; awareness</a> <a href="#">Community engagement</a>

**GRI 204: PROCUREMENT PRACTICES 2016**

103-1	Explanation of the material topic and its Boundary		<a href="#">Sustainable supply chain management</a>
103-2	The management approach and its components		<a href="#">Mica supply chain</a> <a href="#">Human rights</a>
103-3	Evaluation of the management approach		
204-1	Proportion of spending on local suppliers	We have no internal guidelines stipulating that preference be given to local vendors in allocating contracts and therefore do not collect this type of data.  In some countries, local laws require contracts to be awarded to regional suppliers.	<a href="#">Sustainable supply chain management</a>

**GRI 205: ANTI-CORRUPTION 2016**

103-1	Explanation of the material topic and its Boundary		<a href="#">Compliance management</a> <a href="#">Sustainable supply chain management</a>
103-2	The management approach and its components		<a href="#">Values and compliance</a>
103-3	Evaluation of the management approach		
205-1	Operations assessed for risks related to corruption		<a href="#">Compliance management</a> <a href="#">Indicators: business ethics</a> <a href="#">Values and compliance</a> <a href="#">Report on Risks and Opportunities</a>
205-2	Communication and training about anti-corruption policies and procedures		<a href="#">Compliance management</a> <a href="#">Indicators: business ethics</a>
205-3	Confirmed incidents of corruption and actions taken	As applicable, we report on risks from litigation and legal proceedings in our Report on Risks and Opportunities.	<a href="#">Compliance management</a> <a href="#">Indicators: business ethics</a> <a href="#">Report on Risks and Opportunities</a>



**GRI 206: ANTI-COMPETITIVE BEHAVIOR 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Compliance management</a>
103-2	The management approach and its components	<a href="#">Responsible interactions with health systems</a>
103-3	Evaluation of the management approach	
206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	<a href="#">Indicators: business ethics</a>

**Additional material topics****TECHNOLOGY (Sustainable Innovation and R&D)**

103-1	Explanation of the material topic and its Boundary	<a href="#">Sustainable innovation &amp; technology</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	

## Environmental Standards

GRI Standards and Disclosure Number	Comment	Reference
<b>GRI 301: MATERIALS 2016</b>		
103-1 Explanation of the material topic and its Boundary	We only record the weight of the raw materials that are directly used in our pharmaceuticals and chemicals, which came to 400 metric kilotons in 2021 (2020: 387 metric kilotons). Additionally, we utilize operating supplies and packaging materials, such as folding boxes, glass bottles and ampules.	<a href="#">Sustainable products &amp; packaging</a>
103-2 The management approach and its components		
103-3 Evaluation of the management approach		
301-1 Materials used by weight or volume	We only record the weight of the raw materials that are directly used in our pharmaceuticals and chemicals, which came to 400 metric kilotons in 2021 (2020: 387 metric kilotons). Additionally, we utilize operating supplies and packaging materials, such as folding boxes, glass bottles and ampules.	<a href="#">Sustainable products &amp; packaging</a>
301-2 Recycled input materials used	In all our endeavors, we attempt to efficiently utilize materials and recycle as much as possible. Where feasible, we use recycled materials (in packaging, for instance.) Overall, our company considers material consumption to be a major concern. There are few opportunities to use recycled material in our production processes because our business model puts us at the start of the value chain. We therefore do not collect such data at Group level. Individual data and measures are reported in the respective chapters.	<a href="#">Sustainable products &amp; packaging</a>

301-3	Reclaimed products and their packaging materials	Owing to the multitude of products we supply and the minimal comparability of our various initiatives, we do not collect quantitative data at the Group level. The individual measures taken by our various businesses are reported in the respective chapters.	<a href="#">Sustainable products &amp; packaging</a>
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**GRI 302: ENERGY 2016**


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103-1	Explanation of the material topic and its Boundary		<a href="#">Climate action</a> <a href="#">Environmental stewardship</a>
103-2	The management approach and its components		<a href="#">Sustainable products &amp; packaging</a>
103-3	Evaluation of the management approach		
302-1	Energy consumption within the organization		<a href="#">Climate action</a> <a href="#">Indicators: environment</a>
302-2	Energy consumption outside of the organization	To date, we have not been tracking energy consumption outside our organization, but we are working to create more transparency on our Scope 3 emissions. Going forward, we will also make efforts to track energy consumption outside of our organization.	<a href="#">Climate action</a> <a href="#">Indicators: environment</a>
302-3	Energy intensity		<a href="#">Climate action</a> <a href="#">Indicators: environment</a>
302-4	Reduction of energy consumption		<a href="#">Climate action</a> <a href="#">Indicators: environment</a>
302-5	Reductions in energy requirements of products and services		<a href="#">Sustainable products &amp; packaging</a>

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**GRI 303: WATER AND EFFLUENTS 2018**


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103-1	Explanation of the material topic and its Boundary		<a href="#">Water management</a> <a href="#">Environmental stewardship</a>
103-2	The management approach and its components		
103-3	Evaluation of the management approach		
303-1	Interactions with water as a shared resource		<a href="#">Water management</a>
303-2	Management of water discharge-related impacts		<a href="#">Water management</a>

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303-3	Water withdrawal	The amount of seawater and produced water withdrawn is not significant and is therefore not reported separately.	<a href="#">Water management</a> <a href="#">Indicators: environment</a>
303-4	Water discharge	The volume of seawater and groundwater discharged is not significant and is therefore not reported separately.	<a href="#">Water management</a> <a href="#">Indicators: environment</a>
303-5	Water consumption	Most of the water we use in our production streams is released back into aquatic ecosystems through direct or indirect discharges. Evaporation processes are not a material part of our manufacturing operations. At individual manufacturing sites, we incorporate small amounts of water into our products. We are working to implement systems to track this. Because we lack the capacity for water storage, such information is irrelevant to our company.	<a href="#">Water management</a>
<b>GRI 304: BIODIVERSITY 2016</b>			
103-1	Explanation of the material topic and its Boundary		<a href="#">Environmental stewardship</a> <a href="#">Sustainable products &amp; packaging</a>
103-2	The management approach and its components		
103-3	Evaluation of the management approach		
304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	Our land use planning takes biodiversity impacts into account, with appropriate protective measures being taken on a case-by-case basis.	<a href="#">Environmental stewardship</a>
304-2	Significant impacts of activities, products, and services on biodiversity		<a href="#">Environmental stewardship</a>
304-3	Habitats protected or restored		<a href="#">Environmental stewardship</a>
304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations	Our land use planning takes biodiversity impacts into account, with appropriate protective measures being taken on a case-by-case basis.	<a href="#">Environmental stewardship</a>

**GRI 305: EMISSIONS 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Climate action</a> <a href="#">Environmental stewardship</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	
305-1	Direct (Scope 1) GHG emissions	<a href="#">Climate action</a> <a href="#">Indicators: environment</a>
305-2	Energy indirect (Scope 2) GHG	<a href="#">Climate action</a> <a href="#">Indicators: environment</a>
305-3	Other indirect (Scope 3) GHG emissions	<a href="#">Climate action</a> <a href="#">Indicators: environment</a> <a href="#">CDP Climate change</a>
305-4	GHG emissions intensity	<a href="#">Climate action</a> <a href="#">Indicators: environment</a>
305-5	Reduction of GHG emissions	<a href="#">Climate action</a> <a href="#">Sustainable products &amp; packaging</a> <a href="#">Indicators: environment</a> <a href="#">CDP Climate change</a>
305-6	Emissions of ozone-depleting substances (ODS)	<a href="#">Indicators: environment</a>
305-7	Nitrogen oxides (NO <sub>x</sub> ), sulfur oxides (SO <sub>x</sub> ), and other significant air emissions	<a href="#">Indicators: environment</a>

**GRI 306: WASTE 2020**

103-1	Explanation of the material topic and its Boundary	<a href="#">Waste &amp; recycling</a> <a href="#">Environmental stewardship</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	
306-1	Waste generation and significant waste-related impacts	<a href="#">Waste &amp; recycling</a>
306-2	Management of significant waste-related impacts	<a href="#">Waste &amp; recycling</a>
306-3	Waste generated	<a href="#">Waste &amp; recycling</a>
306-4	Waste diverted from disposal	<a href="#">Indicators: environment</a>
306-5	Waste directed to disposal	<a href="#">Waste &amp; recycling</a> <a href="#">Indicators: environment</a>

**GRI 307: ENVIRONMENTAL COMPLIANCE 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Environmental stewardship</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	
307-1	Non-Compliance with environmental laws and regulations	<a href="#">Environmental stewardship</a>

**GRI 308: SUPPLIER ENVIRONMENTAL ASSESSMENT 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Sustainable supply chain management</a>
103-2	The management approach and its components	<a href="#">Mica supply chain</a>
103-3	Evaluation of the management approach	
308-1	New suppliers that were screened using environmental criteria	<a href="#">Sustainable supply chain management</a>
308-2	Negative environmental impacts in the supply chain and actions taken	<a href="#">Sustainable supply chain management</a> <a href="#">Mica supply chain</a>

## Social Standards

GRI Standards and Disclosure Number	Comment	Reference
<b>GRI 401: EMPLOYMENT 2016</b>		
103-1	Explanation of the material topic and its Boundary	<a href="#">Attractive employer</a> <a href="#">Human rights</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	
401-1	New employee hires and employee turnover	<a href="#">Indicators: employees</a>
401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	<a href="#">Attractive employer</a>
	Part-time employees receive the same eligibility for employee benefits as full-time workers. Employees with temporary contracts, however, are not entitled to all company benefits, such as a company pension.	
401-3	Parental leave	<a href="#">Attractive employer</a> <a href="#">Indicators: employees</a>
<b>GRI 402: LABOR/MANAGEMENT RELATIONS 2016</b>		
103-1	Explanation of the material topic and its Boundary	<a href="#">Attractive employer</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	
402-1	Minimum notice periods regarding operational changes	The regulations on periods of notice vary worldwide. We apply the rules that are in force locally. There is no need for us to track periods of notice at Group level.
<b>GRI 403: OCCUPATIONAL HEALTH AND SAFETY 2018</b>		
103-1	Explanation of the material topic and its Boundary	<a href="#">Health &amp; safety</a> <a href="#">Plant, process &amp; transport safety</a>
103-2	The management approach and its components	The disclosures under GRI 403 pertain to our employees as well as supervised temporary staff. They do not include employees of contractors.
103-3	Evaluation of the management approach	

403-1	Occupational health and safety management system		<a href="#">Health &amp; safety</a>
403-2	Hazard identification, risk assessment, and incident investigation		<a href="#">Health &amp; safety</a> <a href="#">Plant, process &amp; transport safety</a>
403-3	Occupational health services		<a href="#">Health &amp; safety</a>
403-4	Worker participation, consultation, and communication on occupational health and safety	Occupational health and safety committees are required by law in Germany. All employees of Merck KGaA are therefore represented by such committees, which operate at site level. They account for around 13% of our total workforce. The majority of sites outside Germany also have health and safety committees to represent their employees. The organization of these committees is the responsibility of our individual sites. Health and safety issues are governed Group-wide by our EHS Policy. The organizational implementation of this policy is the responsibility of our individual sites and is subject to local laws and regulations. Merck KGaA, which accounts for approximately 13% of our total workforce, has company agreements in place on occupational health and safety.	<a href="#">Health &amp; safety</a>
403-5	Worker training on occupational health and safety		<a href="#">Health &amp; safety</a> <a href="#">Plant, process &amp; transport safety</a>
403-6	Promotion of worker health		<a href="#">Health &amp; safety</a>
403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships		<a href="#">Health &amp; safety</a> <a href="#">Human rights</a> <a href="#">Plant, process &amp; transport safety</a>
403-8	Workers covered by an occupational health and safety management system		<a href="#">Health &amp; safety</a>
403-9	Work-related injuries	We have identified the lost time injury rate (LTIR) as a key performance indicator for our company.	<a href="#">Health &amp; safety</a> <a href="#">Plant, process &amp; transport safety</a> <a href="#">Indicators: employees</a>



403-10	Work-related ill health	At Group level, we do not collect data regarding types of work-related illnesses or fatalities resulting from work-related illnesses. As deemed necessary, our sites may collect data on the incidence of occupational illness.	<a href="#">Health &amp; safety</a> <a href="#">Plant, process &amp; transport safety</a> <a href="#">Indicators: employees</a>
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**GRI 404: TRAINING AND EDUCATION 2016**


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103-1	Explanation of the material topic and its Boundary		<a href="#">Diversity, equity &amp; inclusion</a> <a href="#">Leading &amp; developing employees</a>
103-2	The management approach and its components		
103-3	Evaluation of the management approach		
404-1	Average hours of training per year per employee	We do not keep track of the average hours our employees spend on vocational training and continuing education because this indicator does not have any bearing on the quality or success of our efforts.	
404-2	Programs for upgrading employee skills and transition assistance programs		<a href="#">Sustainable supply chain management</a> <a href="#">Human rights</a> <a href="#">Product-related crime</a> <a href="#">Plant, process &amp; transport safety</a> <a href="#">Leading &amp; developing employees</a> <a href="#">Attractive employer</a> <a href="#">Diversity, equity &amp; inclusion</a> <a href="#">Environmental stewardship</a>
404-3	Percentage of employees receiving regular performance and career development reviews		<a href="#">Leading &amp; developing employees</a> <a href="#">Indicators: employees</a>

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**GRI 405: DIVERSITY AND EQUAL OPPORTUNITY 2016**


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103-1	Explanation of the material topic and its Boundary		<a href="#">Diversity, equity &amp; inclusion</a> <a href="#">Attractive employer</a>
103-2	The management approach and its components		<a href="#">Objectives of the Supervisory Board with respect to its composition</a>
103-3	Evaluation of the management approach		

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405-1	Diversity of governance bodies and employees		<a href="#">Diversity, equity &amp; inclusion</a> <a href="#">Indicators: employees</a> <a href="#">The Executive Board</a> <a href="#">The Supervisory Board</a> <a href="#">Objectives of the Supervisory Board with respect to its composition</a> <a href="#">Diversity policy</a>
405-2	Ratio of basic salary and remuneration of women to men	As a basic principle, our compensation systems and processes do not distinguish between women and men. The salaries we offer are predicated on the respective job description and are based on our Global Job Catalog, which has fixed salary bands that are identical for men and women. Variable salary components that fall under performance-based compensation are paid on the basis of whether mutually agreed targets have been achieved. A performance management system governs this process.	<a href="#">Attractive employer</a> <a href="#">Diversity, equity &amp; inclusion</a>
<b>GRI 406: NON-DISCRIMINATION 2016</b>			
103-1	Explanation of the material topic and its Boundary		<a href="#">Diversity, equity &amp; inclusion</a> <a href="#">Attractive employer</a>
103-2	The management approach and its components		
103-3	Evaluation of the management approach		
406-1	Incidents of discrimination and corrective actions taken		<a href="#">Diversity, equity &amp; inclusion</a> <a href="#">Indicators: business ethics</a>
<b>GRI 407: FREEDOM OF ASSOCIATION AND COLLECTIVE BARGAINING 2016</b>			
103-1	Explanation of the material topic and its Boundary		<a href="#">Sustainable supply chain management</a> <a href="#">Human rights</a> <a href="#">Attractive employer</a>
103-2	The management approach and its components		
103-3	Evaluation of the management approach		
407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk		<a href="#">Sustainable supply chain management</a> <a href="#">Human rights</a>

**GRI 408: CHILD LABOR 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Sustainable supply chain management</a>
103-2	The management approach and its components	<a href="#">Mica supply chain</a> <a href="#">Human rights</a> <a href="#">Attractive employer</a>
103-3	Evaluation of the management approach	
408-1	Operations and suppliers at significant risk for incidents of child labor	<a href="#">Sustainable supply chain management</a> <a href="#">Human rights</a> <a href="#">Mica supply chain</a>

**GRI 409: FORCED OR COMPULSORY LABOR 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Sustainable supply chain management</a>
103-2	The management approach and its components	<a href="#">Mica supply chain</a> <a href="#">Human rights</a> <a href="#">Attractive employer</a>
103-3	Evaluation of the management approach	
409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	<a href="#">Sustainable supply chain management</a> <a href="#">Mica supply chain</a> <a href="#">Human rights</a>

**GRI 410: SECURITY PRACTICES 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Human rights</a> <a href="#">Sustainable supply chain management</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	
410-1	Security personnel trained in human rights policies or procedures	We are currently formalizing our processes for security-relevant assessments as part of our Security Governance framework. Going forward, we will be integrating human rights aspects even more strongly into security-relevant processes, for instance training courses for security staff. To this end, we will use the newly established Security Academy platform. <a href="#">Human rights</a>

**GRI 412: HUMAN RIGHTS ASSESSMENT 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Human rights</a> <a href="#">Attractive employer</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	
412-1	Operations that have been subject to human rights reviews or impact assessments	<a href="#">Human rights</a> <a href="#">Indicators: business ethics</a>
412-2	Employee training on human rights policies or procedures	<a href="#">Human rights</a>
412-3	Significant investment agreements and contracts that include human rights clauses or that underwent human rights screening	<a href="#">Human rights</a>

**GRI 414: SUPPLIER SOCIAL ASSESSMENT 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Sustainable supply chain management</a>
103-2	The management approach and its components	<a href="#">Mica supply chain</a> <a href="#">Human rights</a>
103-3	Evaluation of the management approach	
414-1	New suppliers that were screened using social criteria	<a href="#">Sustainable supply chain management</a>
414-2	Negative social impacts in the supply chain and actions taken	<a href="#">Sustainable supply chain management</a> <a href="#">Mica supply chain</a>

**GRI 415: PUBLIC POLICY 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Stakeholder dialogue</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	
415-1	Political contributions	<a href="#">Stakeholder dialogue</a>

## GRI 416: CUSTOMER HEALTH AND SAFETY 2016

103-1	Explanation of the material topic and its Boundary		<a href="#">Clinical studies</a> <a href="#">Patient safety</a>
103-2	The management approach and its components		<a href="#">Product-related crime</a> <a href="#">Chemical product safety</a>
103-3	Evaluation of the management approach		<a href="#">Sustainable products &amp; packaging</a> <a href="#">Report on Risks and Opportunities</a>
416-1	Assessment of the health and safety impacts of product and service categories		<a href="#">Chemical product safety</a>
416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	As applicable, we report on risks from litigation and legal proceedings in our Report on Risks and Opportunities.	<a href="#">Clinical studies</a> <a href="#">Chemical product safety</a> <a href="#">Report on Risks and Opportunities</a>

## GRI 417: MARKETING AND LABELING 2016

103-1	Explanation of the material topic and its Boundary		<a href="#">Compliance management</a> <a href="#">Responsible interactions with health systems</a>
103-2	The management approach and its components		<a href="#">Patient safety</a> <a href="#">Chemical product safety</a>
103-3	Evaluation of the management approach		
417-1	Requirements for product and service information and labeling	All pharmaceuticals are subject to reporting and notification requirements, which we fulfill. In line with the statutory requirements, we provide our customers with easily accessible and relevant information on the safe handling and use of our chemical products. We report on the individual requirements in the respective chapters.	<a href="#">Patient safety</a> <a href="#">Chemical product safety</a>
417-2	Incidents of non-compliance concerning product and service information and labeling		<a href="#">Patient safety</a> <a href="#">Chemical product safety</a> <a href="#">Report on Risks and Opportunities</a>
417-3	Incidents of non-compliance concerning marketing communications	As applicable, we report on risks from litigation and legal proceedings in our Report on Risks and Opportunities.	<a href="#">Report on Risks and Opportunities</a>

**GRI 418: CUSTOMER PRIVACY 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Data protection &amp; privacy</a> <a href="#">Clinical studies</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	
418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	<a href="#">Data protection &amp; privacy</a> <a href="#">Clinical studies</a> <a href="#">Indicators: business ethics</a>

**GRI 419: SOCIOECONOMIC Compliance 2016**

103-1	Explanation of the material topic and its Boundary	<a href="#">Compliance management</a> <a href="#">Report on Risks and Opportunities</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	
419-1	Non-compliance with laws and regulations in the social and economic area	As applicable, we report on risks from litigation and legal proceedings in our Report on Risks and Opportunities. <a href="#">Report on Risks and Opportunities</a>

**Additional material topics****ETHICAL CONDUCT (bioethics, digital ethics, clinical studies, animal welfare)**

103-1	Explanation of the material topic and its Boundary	<a href="#">Animal welfare</a> <a href="#">Bioethics</a>
103-2	The management approach and its components	<a href="#">Digital ethics</a> <a href="#">Clinical studies</a>
103-3	Evaluation of the management approach	

**HEALTH FOR ALL**

103-1	Explanation of the material topic and its Boundary	<a href="#">Global health</a> <a href="#">Open innovation sharing</a>
103-2	The management approach and its components	<a href="#">Prices of medicines</a> <a href="#">Health capacity &amp; awareness</a>
103-3	Evaluation of the management approach	

**PRODUCT SAFETY AND QUALITY: product-related crime**

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103-1	Explanation of the material topic and its Boundary	<a href="#">Product-related crime</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	

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**COMMUNITY ENGAGEMENT**

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103-1	Explanation of the material topic and its Boundary	<a href="#">Community engagement</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	

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**ATTRACTIVE EMPLOYER**

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103-1	Explanation of the material topic and its Boundary	<a href="#">Attractive employer</a>
103-2	The management approach and its components	
103-3	Evaluation of the management approach	

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# SASB index

## SASB disclosure 2021

In 2021, we integrated our Sustainability Accounting Standards Board ([SASB](#)) disclosures into our Sustainability Report in 2021. In addition to our disclosures pursuant to the SASB standard “Biotechnology & Pharmaceuticals”, we reported our information for the “Medical Equipment & Supplies” and “Semiconductors” industries for the first time. We thus cover our three business sectors now. With our voluntary SASB disclosures, we want to meet the increasing demands of our investors and other stakeholders. The reported data provide transparent, financially material and meaningful information on sustainability. To meet the evolving interests and requirements of our stakeholders in the future as well, we will continuously develop and expand our SASB reporting.

The SASB disclosures were not part of the [limited assurance engagement](#) conducted by an independent auditor for our 2021 Sustainability Report.

### Biotechnology & Pharmaceuticals

Safety of Clinical Trial Participants		
HC-BP-210a.1	Discussion, by world region, of management process for ensuring quality and patient safety during clinical trials	<a href="#">Clinical studies</a> <a href="#">R&amp;D: Positions &amp; Policies (Healthcare)</a>
HC-BP-210a.2	Number of FDA Sponsor Inspections related to clinical trial management and pharmacovigilance that resulted in: (1) Voluntary Action Indicated (VAI) and (2) Official Action Indicated (OAI)	There were no FDA Good Clinical Practice (GCP) sponsor inspections related to clinical trials in 2021.
HC-BP-210a.3	Total amount of monetary losses as a result of legal proceedings associated with clinical trials in developing countries	Not reported
Access to Medicines		
HC-BP-240a.1	Description of actions and initiatives to promote access to health care products for priority diseases and in priority countries as defined by the Access to Medicine Index	<a href="#">Global health</a> <a href="#">Prices of medicines</a>
HC-BP-240a.2	List of products on the WHO List of Prequalified Medicinal Products as part of its Prequalification of Medicines Programme (PQP)	Currently there is no product on the list.
Affordability & Pricing		
HC-BP-240b.1	Number of settlements of Abbreviated New Drug Application (ANDA) litigation that involved payments and/or provisions to delay bringing an authorized generic product to market for a defined time period	Not reported



HC-BP-240b.2	Percentage change in: (1) average list price and (2) average net price across U.S. product portfolio compared to previous year	<p>The following overview shows the percentage change in the average list price (WAC) of our Healthcare US product portfolio compared to the previous year:</p> <ul style="list-style-type: none"> <li>◆ Rebif®: 7.1 %</li> <li>◆ Mavenclad®: 7.3 %</li> <li>◆ Bavencio®: 3.1 %</li> <li>◆ Gonal-f®: 7.4 %</li> <li>◆ Cetrotide®: 7.3 %</li> <li>◆ Ovidrel®: 7.4 %</li> <li>◆ Serostim®: 7.3 %</li> <li>◆ Saizen®: 6.4 %</li> </ul> <p>See also: <a href="#">Prices of medicines</a></p>
HC-BP-240b.3	Percentage change in: (1) list price and (2) net price of product with largest increase compared to previous year	We only report the percentage change in average list price across our U.S. product portfolio. The largest increase compared with the previous year amounted to 7.4% (Gonal-f® and Ovidrel®).

#### Drug Safety

HC-BP-250a.1	List of products listed in the Food and Drug Administration's (FDA) MedWatch Safety Alerts for Human Medical Products database	<a href="#">Safety information and adverse event reporting program (FDA website)</a> <a href="#">Adverse event reporting system (FAERS) public dashboard (FDA website)</a>
HC-BP-250a.2	Number of fatalities associated with products as reported in the FDA Adverse Event Reporting System	<a href="#">Adverse event reporting system (FAERS) public dashboard (FDA website)</a>
HC-BP-250a.3	Number of recalls issued, total units recalled	In 2021 we had three drug product recalls in total. None of these recalls was global; they affected individual countries only. None of the recalls was related to the USA. None of the recalls was related to serious injury or fatality, all were either Class II or III. According to our internal policies, any recall type is reported and discussed with the relevant national regulatory authority, including the U.S. FDA. All recall processes are managed under a Global Standard Procedure "Product Recall and Withdrawal Management" which is applied worldwide for medicinal products (pharmaceutical prescription, biological) and devices.
HC-BP-250a.4	Total amount of product accepted for take-back, reuse, or disposal	We do not take back products for reuse. In line with legal requirements in each country we take back products for disposal.
HC-BP-250a.5	Number of FDA enforcement actions taken in response to violations of current Good Manufacturing Practices (cGMP), by type	We had no such FDA enforcement actions in 2021.

## Counterfeit Drugs

HC-BP-260a.1	Description of methods and technologies used to maintain traceability of products throughout the supply chain and prevent counterfeiting	<a href="#">Product-related crime</a>
HC-BP-260a.2	Discussion of process for alerting customers and business partners of potential or known risks associated with counterfeit products	<p>We have implemented processes and procedures to ensure that all suspected counterfeit medicines are assessed by a team of experts. The scope of any notification that we provide is the outcome of strategic alignment between relevant functions (e.g. Medical, Procurement, Legal, Quality, Corporate Security, Regulatory Affairs, Communications). Levels of details and format of any notification, including the HA information and collaboration, dedicated patient communication, information/awareness communication to distributors, pharmacies, physicians etc. about the presence of counterfeit or diverted products in the market, is decided on a case-by-case basis in accordance with the identified risks and taking into account corporate, legal and regulatory responsibilities.</p> <p>See also: <a href="#">Product-related crime</a></p>
HC-BP-260a.3	Number of actions that led to raids, seizure, arrests, and/or filing of criminal charges related to counterfeit products	<a href="#">Product-related crime</a>

## Ethical Marketing

HC-BP-270a.1	Total amount of monetary losses as a result of legal proceedings associated with false marketing claims	Not reported
HC-BP-270a.2	Description of code of ethics governing promotion of off-label use of products	<a href="#">Responsible interactions with health systems</a>

## Employee Recruitment, Development &amp; Retention

HC-BP-330a.1	Discussion of talent recruitment and retention efforts for scientists and research and development personnel	<a href="#">Leading and developing employees</a> <a href="#">Attractive Employer</a> <a href="#">Diversity, equity and inclusion</a>
HC-BP-330a.2	(1) Voluntary and (2) involuntary turnover rate for: (a) executives/senior managers, (b) mid-level managers, (c) professionals, and (d) all others	<a href="#">Indicators: employees</a>

### Supply Chain Management

HC-BP-430a.1	Percentage of (1) entity's facilities and (2) Tier I suppliers' facilities participating in the Rx-360 International Pharmaceutical Supply Chain Consortium audit program or equivalent third-party audit programs for integrity of supply chain and ingredients	Our Healthcare business sector does not participate in the Rx-360 International Pharmaceutical Supply Chain Consortium. However, our facilities are frequently audited by the respective health authorities of the countries in which we distribute our healthcare products.
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As a major supplier to the pharmaceutical industry, our Life Science business sector participates in the Rx-360 audit program.

Regarding our supplier base, we have access to sustainability audits and assessments of our suppliers through our membership in the industry initiatives "Together for Sustainability" (TfS) and "Pharmaceutical Supply Chain Initiative" (PSCI).

See also:

[Sustainable supply chain management](#)

### Business Ethics

HC-BP-510a.1	Total amount of monetary losses as a result of legal proceedings associated with corruption and bribery	Not reported
HC-BP-510a.2	Description of code of ethics governing interactions with health care professionals	<p>Our <a href="#">Code of Conduct</a> presents and explains our company's values and our ethical integrity standards (e.g. "We cannot be bribed, and we do not offer bribes", "We make our cooperation with healthcare partners transparent", among many others). It is complemented by our Global Anti-Corruption Policy, which stipulates that all business activities must be conducted in line with legally applicable anti-corruption standards.</p> <p>Specifically, with regard to our interactions with healthcare professionals, our Healthcare Ethical Guiding Principles address the topic through our "Responsible Interactions" and "Safeguard Independence" principles. These general governance documents are complemented by more than 20 standards and policies, together with procedural and guidance documents covering multiple interactions and engagements with healthcare professionals.</p> <p>See also:  <a href="#">Responsible interactions with health systems</a>  <a href="#">Compliance management</a></p>

## Activity metrics

HC-BP-000.A    Number of patients treated

In 2021, our Healthcare medicines were used to treat around 92 million patients. Additionally, we donated 182 million praziquantel tablets, enough to treat schistosomiasis in 73 million school-aged children in 2021.

See also:

[Global Health](#)

HC-BP-000.B    Number of drugs (1) in portfolio and (2) in research and development (Phases 1-3)

[Healthcare portfolio](#)

[Research & Development \(Healthcare\)](#)

[Healthcare pipeline](#)

## Medical Equipment & Supplies

Affordability & Pricing		
HC-MS-240a.1	Ratio of weighted average rate of net price increases (for all products) to the annual increase in the U.S. Consumer Price Index	Not reported
HC-MS-240a.2	Description of how price information for each product is disclosed to customers or to their agents	<a href="#">Life Science portfolio</a>
Product Safety		
HC-MS-250a.1	Number of recalls issued, total units recalled	<p>We conduct monthly reviews of key performance quality indicators which include a review of multiple quality metrics including number of recalls. Quarterly trends are evaluated and reported through management reviews.</p> <p>In 2021, there were three recalls for our Life Science business:</p> <p>US - FDA Class II (43 units recalled)</p> <p>US – FDA Class III (20 units recalled)</p> <p>UK– HPRA notified (1 batch impacted)</p>
HC-MS-250a.2	List of products listed in the FDA’s MedWatch Safety Alerts for Human Medical Products database	In 2021, there were no Life Science products listed in the <a href="#">FDA’s MedWatch Safety Alerts for Human Medical Products database</a> .
HC-MS-250a.3	Number of fatalities related to products as reported in the FDA Manufacturer and User Facility Device Experience database	In 2021, there were no fatalities related to our Life Science products reported to the <a href="#">FDA Manufacturer and User Facility Device Experience database</a> .
HC-MS-250a.4	Number of FDA enforcement actions taken in response to violations of current Good Manufacturing Practices (cGMP), by type	Life Science received three U.S. FDA 483 forms in 2021.

### Ethical Marketing

HC-MS-270a.1	Total amount of monetary losses as a result of legal proceedings associated with false marketing claims	Not reported
HC-MS-270a.2	Description of code of ethics governing promotion of off-label use of products	<p>Before any products can be purchased from our Life Science platform, we use a customer screening process to guard against the purchase of our products for illegal purposes. Core steps of this process cover data sourcing, hazard assessment, safe-use/risk assessment and labels/safety data sheets. Besides our own process, we cooperate with responsible authorities in the U.S. (FBI and the Bureau of Alcohol, Tobacco, Firearms and Explosives, ATF), as well as international authorities (Interpol). If we become aware that any of our Life Science products is used beyond our marketed intention, we evaluate the situation to determine whether to continue sales or not. Proper use of our products is included in our <a href="#">Terms and Conditions</a> under "Use of Products".</p>

See also:

[Chemical product safety](#)

### Product Design & Lifecycle Management

HC-MS-410a.1	Discussion of process to assess and manage environmental and human health considerations associated with chemicals in products, and meet demand for sustainable products	<p>We assess environmental, human health, and further sustainability aspects of chemical products that we are sourcing and/or producing and selling. Furthermore, we screen our entire Life Science portfolio against growing demands arising from external stakeholders. For example, in alignment with the European Chemicals Strategy for Sustainability (CSS) we work towards a more sustainable product portfolio. Our Product Stewardship Council drives the transformation of existing products by considering appropriate measures like the substitution of chemical substances. Regarding future products, the selection of benign substance alternatives is done during ideation and early R&amp;D through our Design for Sustainability program. In support of this, we have developed a tool which monitors latest chemical regulations. Besides flagging banned substances, it also flags substances that are already considered critical but not yet regulated. In addition to this, experts of the Chemicals Regulations teams are directly consulted for further insights and advice.</p>
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See also:

[Chemical product safety](#)

[Sustainable products & packaging](#)

HC-MS-410a.2	Total amount of products accepted for take-back and reused, recycled, or donated, broken down by: (1) devices and equipment and (2) supplies	Since 2013, we have been partnering with Seeding Labs, a non-profit organization dedicated to equipping scientists in resource-limited countries with scientific equipment and support. In 2021, we donated 1,626 items of scientific equipment valued at more than \$360,000.
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See also:

[Sustainable products and packaging](#)

[Sustainability and Social Business Innovation](#)

#### Supply Chain Management

HC-MS-430a.1	Percentage of (1) entity's facilities and (2) Tier I suppliers' facilities participating in third-party audit programs for manufacturing and product quality	<p>As a major supplier to the pharmaceutical industry, our Life Science business participates in the Rx-360 audit program. The Life Science facilities are regularly audited by customers and respective health authorities for regulated products.</p> <p>(1) Rx-360 audit programs are conducted across the Life Science business on a multi-year cycle with approximately 15% of our manufacturing facilities audited annually.</p> <p>(2) Approximately 5% of our tier 1 supplier facilities participated in third party audit programs such as Rx-360.</p>
HC-MS-430a.2	Description of efforts to maintain traceability within the distribution chain	<a href="#">Product safety (Life Science)</a> <a href="#">Quality &amp; regulatory management (Life Science)</a>
HC-MS-430a.3	Description of the management of risks associated with the use of critical materials	<a href="#">Sustainable supply chain management</a>

#### Business Ethics

HC-MS-510a.1	Total amount of monetary losses as a result of legal proceedings associated with bribery or corruption	Not reported
HC-MS-510a.2	Description of code of ethics governing interactions with health care professionals	<a href="#">Responsible interactions with healthcare systems</a> <a href="#">Compliance management</a>

#### Activity metrics

HC-MS-000.A	Number of units sold by product category	Not reported
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## Semiconductors

Greenhouse Gas Emissions		
TC-SC-110a.1	(1) Gross global Scope 1 emissions	<a href="#">Indicators: environment</a>
	(2) amount of total emissions from perfluorinated compounds	Not reported
TC-SC-110a.2	Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	<a href="#">Climate action</a>
Energy Management in Manufacturing		
TC-SC-130a.1	(1) Total energy consumed	<a href="#">Indicators: environment</a>
	(2) percentage grid electricity	Not reported
	(3) percentage renewable	<a href="#">Indicators: environment</a>
Water Management		
TC-SC-140a.1	(1) Total water withdrawn	<a href="#">Indicators: environment</a>
	(2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	<a href="#">Water management</a> <a href="#">CDP Water security</a>
Waste Management		
TC-SC-150a.1	Amount of hazardous waste from manufacturing, percentage recycled	<a href="#">Indicators: environment</a>
Employee Health & Safety		
TC-SC-320a.1	Description of efforts to assess, monitor, and reduce exposure of employees to human health hazards	<a href="#">Health and safety</a>
TC-SC-320a.2	Total amount of monetary losses as a result of legal proceedings associated with employee health and safety violations	Not reported
Recruiting & Managing a Global & Skilled Workforce		
TC-SC-330a.1	Percentage of employees that are (1) foreign nationals and	<a href="#">Indicators: employees</a>
	(2) located offshore	<a href="#">Indicators: employees</a>
Product Lifecycle Management		
TC-SC-410a.1	Percentage of products by revenue that contain IEC 62474 declarable substances	Not reported
TC-SC-410a.2	Processor energy efficiency at a system-level for: (1) servers,	Not applicable
	(2) desktops, and	Not applicable
	(3) laptops	Not applicable



### Materials Sourcing

TC-SC-440a.1	Description of the management of risks associated with the use of critical materials	<a href="#">Research &amp; Development (Electronics)</a> <a href="#">Report on risks and opportunities</a>
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### Intellectual Property Protection & Competitive Behavior

TC-SC-520a.1	Total amount of monetary losses as a result of legal proceedings associated with anti-competitive behavior regulations	Not reported
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### Activity metrics

TC-SC-000.A	Total production	Not reported
TC-SC-000.B	Percentage of production from owned facilities	Not reported

# TCFD index

## TCFD disclosure 2021

Established in 2015, the Task Force on Climate-related Financial Disclosures ([TCFD](#)) aims to develop consistent, comparable and accurate climate-related financial risk disclosures. Companies can use this data to provide information to investors, lenders, insurers, and other stakeholders, allowing them to assess and analyze climate-related risks and opportunities. We use the recommendations of the TCFD for our climate-related reporting on governance, strategy, risk management, and metrics.

The TCFD reporting was not part of the [limited assurance engagement](#) conducted by an independent auditor for our 2021 Sustainability Report.

For the first time in 2021, we are taking into account the requirements of the TCFD in our sustainability reporting. Our TCFD disclosure is based on our responses to the [CDP 2021 climate change questionnaire](#). Going forward, we plan to continue expanding our quantitative disclosures on climate-related topics as we increasingly integrate the TCFD recommendations into our businesses.

### Governance

TCFD core elements	Required information	CDP climate change questionnaire 2021 reference
Disclose the organization's governance around climate-related risks and opportunities.	A. Executive Board's oversight of climate-related risks and opportunities.	<a href="#">C1.1a (p.3)</a> <a href="#">C1.1b (p.4)</a> <a href="#">C2.2 (p.8)</a>
	B. Management's role in assessing and managing climate related risks and opportunities.	<a href="#">C1.2a (p.5)</a>
Related Chapters	<a href="#">Sustainability Strategy</a> <a href="#">Climate Action</a>	

## Strategy

TCFD core elements	Required information	CDP climate change questionnaire 2021 reference
Disclose the actual and potential impacts of climate related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.	A. Description of climate-related opportunities and risks.	<a href="#">C2.1a (p.8)</a> <a href="#">C2.2 (p.8)</a> <a href="#">C2.3a (p.13)</a>
	B. Impact of climate-related risks on the organization's businesses, strategy, and financial planning.	<a href="#">C3.3 (p.26)</a> <a href="#">C3.4a (p.30)</a>
	C. Resilience of the organization's strategy.	<a href="#">C3.2b (p.26)</a>
Related Chapters	<a href="#">Sustainability Strategy</a> <a href="#">Climate Action</a>	

## Risk management

TCFD core elements	Required information	CDP climate change questionnaire 2021 reference
Disclose how the organization identifies, assesses, and manages climate-related risks.	A. Organization's processes for identifying and assessing climate-related risks.	<a href="#">C2.2 (p.8)</a> <a href="#">C2.2a (p.10)</a>
	B. Organization's processes for managing climate-related risks.	<a href="#">C2.2 (p.8)</a>
	C. Integration of processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	<a href="#">C2.2 (p.8)</a>
Related Chapters	<a href="#">Compliance Management</a>	

## Metrics and targets

TCFD core elements	Required information	CDP climate change questionnaire 2021 reference
Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.	A. Metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	<a href="#">C4.1 (p.30)</a> <a href="#">C4.2 (p.34)</a> <a href="#">C5 (p.41)</a> <a href="#">C7 (p.54)</a> <a href="#">C8 (p.58)</a>
	B. Disclose of Scope 1, Scope 2, and, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	<a href="#">C6.1 (p.42)</a> <a href="#">C6.3 (p.43)</a> <a href="#">C6.5 (p.45)</a> <a href="#">C7 (p.54)</a>
	C. Targets used by the organization to manage climate-related risks and opportunities and performance against targets.	<a href="#">C4.1 (p.30)</a> <a href="#">C4.1a (p.30)</a> <a href="#">C4.2 (p.34)</a>
Related Chapters	<a href="#">Climate Action</a> <a href="#">Environmental Stewardship</a> <a href="#">Water Management</a> <a href="#">Waste &amp; Recycling</a>	

# Global Compact CoP

## 2021 UN Global Compact Communication on Progress

We have been a participant in the United Nations Global Compact since 2005. As a signatory to the initiative, we have committed ourselves to its ten principles, which cover key UN conventions on human rights, labor, environment, and anti-corruption. At the same time, the UN Global Compact calls on all participating companies to work to implement these principles within their own sphere of influence.

The following table summarizes the key actions we took in 2021 to advance the principles of the Global Compact.

<p>COMMUNICATION ON PROGRESS</p> 	<p>This is our <b>Communication on Progress</b> in implementing the Ten Principles of the <b>United Nations Global Compact</b> and supporting broader UN goals.</p> <p>We welcome feedback on its contents.</p>
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Link: [www.unglobalcompact.org](http://www.unglobalcompact.org)

UNGC principles	Key actions in 2021	Relevant GRI disclosures	Link
<b>Human rights</b>			
<b>Principle 1:</b> Businesses should support and respect the protection of internationally proclaimed human rights.	<ul style="list-style-type: none"> <li>◆ Incorporated human rights and modern slavery into our “EHS StartUp!” training for new EHS managers</li> <li>◆ Offered e-learning courses on our <a href="#">Human Rights Charter</a> and <a href="#">Social and Labor Standards Policy</a>, targeted to all managing directors and senior leaders reporting directly to the Executive Board</li> <li>◆ Conducted webinars within the scope of the Security Academy meetings on human rights and modern slavery</li> <li>◆ Formalized review process to ensure fulfillment of safety-relevant human rights aspects at our sites through security audits</li> <li>◆ Participated in “TfS Talks” by sharing our conflict minerals approach</li> <li>◆ Adopted and published the <a href="#">Code of Digital Ethics</a></li> <li>◆ Offered a free-of-charge and anonymous whistleblowing channel, our <a href="#">compliance hotline</a>, to report potential human rights violations</li> </ul>	103-2, 412-1, 412-2	<a href="#">Compliance management</a> <a href="#">Human rights</a>
<b>Principle 2:</b> Businesses should make sure that they are not complicit in human rights abuses.	<ul style="list-style-type: none"> <li>◆ Supported the development of a training platform concept on sustainability management within the scope of our <a href="#">TfS</a> membership</li> <li>◆ Conducted internal and external audits of suppliers on sustainability topics and collected self-reported information</li> <li>◆ Chaired the <a href="#">Responsible Mica Initiative</a></li> </ul>	412-3, 414-1, 414-2	<a href="#">Compliance management</a> <a href="#">Sustainable supply chain management</a> <a href="#">Mica supply chain</a> <a href="#">Human rights</a>
<b>Labor standards</b>			
<b>Principle 3:</b> Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.	<ul style="list-style-type: none"> <li>◆ Conducted internal audits on workplace matters covered in our <a href="#">Human Rights Charter</a>, which are specified in more detail in our Social and Labor Standards Policy</li> <li>◆ Regularly included local employee representatives in company decision-making</li> <li>◆ Formalized review process to ensure fulfillment of safety-relevant human rights aspects at the sites through security audits</li> </ul>	102-41, 402-1, 407-1	<a href="#">Compliance management</a> <a href="#">Human rights</a> <a href="#">Attractive employer</a>

UNGC principles	Key actions in 2021	Relevant GRI disclosures	Link
<b>Principle 4:</b> Businesses should support the elimination of all forms of forced and compulsory labor.	<ul style="list-style-type: none"> <li>Conducted internal audits on workplace matters covered in our <a href="#">Human Rights Charter</a>, which are specified in more detail in our Social and Labor Standards Policy</li> <li>Published on our website the <a href="#">UK Modern Slavery Statement</a> and our <a href="#">Australia Modern Slavery Statement</a>, both endorsed by our Executive Board</li> <li>Incorporated human rights and modern slavery into our “EHS StartUp!” training for new EHS managers</li> <li>Conducted webinars within the scope of our Security Academy meetings on human rights and modern slavery</li> </ul>	409-1	<a href="#">Compliance management</a> <a href="#">Human rights</a> <a href="#">Attractive employer</a>
<b>Principle 5:</b> Businesses should support the effective abolition of child labor.	<ul style="list-style-type: none"> <li>Conducted internal audits on workplace matters covered in our <a href="#">Human Rights Charter</a>, which are specified in more detail in our <a href="#">Social and Labor Standards Policy</a></li> <li>Chaired the <a href="#">Responsible Mica Initiative</a></li> <li>Conducted internal and external audits of suppliers on sustainability topics and collected self-reported information</li> </ul>	408-1	<a href="#">Compliance management</a> <a href="#">Mica supply chain</a> <a href="#">Human rights</a> <a href="#">Attractive employer</a>
<b>Principle 6:</b> Businesses should support the elimination of discrimination in respect of employment and occupation.	<ul style="list-style-type: none"> <li>Refocused our Diversity, Equity and Inclusion (DE&amp;I) strategy on the following priority areas: gender parity, culture and ethnicity as well as inclusion</li> <li>Defined new DE&amp;I targets for 2030: Achieve gender parity in leadership positions (2021: 36%); increase the proportion of colleagues in U.S. leadership teams who are members of underrepresented racial and ethnic groups (2021: 21%); increase the global share of nationals from Asia, Latin America, and MEA in leadership positions to 30% (2021: 16%)</li> <li>Conducted a pay equity analysis</li> <li>Joined the <a href="#">UN Target Gender Equality Programme</a></li> <li>&gt;Integrated the inclusion concept into our Human Resources programs and processes</li> <li>Launched a tool to support the use of gender-neutral language in job advertisements</li> <li>Ran a pilot project in the United States: Increased bonuses for successful referrals of qualified diverse candidates.</li> <li>Offered trainings on unconscious bias Group-wide</li> <li>Fostered diverse talent through mentoring, sponsoring and talent programs</li> <li>Supported numerous local and global employee networks on diversity, equity &amp; inclusion</li> <li>Collaborated with <a href="#">Disability:IN</a></li> </ul>	102-8, 202-1, 202-2, 401-1, 401-3, 404-1, 404-3, 405-1, 405-2, 406-1	<a href="#">Diversity, equity &amp; inclusion</a> <a href="#">Attractive employer</a>

UNGC principles	Key actions in 2021	Relevant GRI disclosures	Link
<b>Environmental stewardship</b>			
<b>Principle 7:</b> Businesses should support a precautionary approach to environmental challenges.	<ul style="list-style-type: none"> <li>◆ Passed third-party ISO 14001:2015 audits at 13 sites</li> <li>◆ Performed 51 internal EHS audits, with all audited sites being rated as “good” or “satisfactory”.</li> <li>◆ Achieved a 9% reduction of our CO<sub>2</sub> emissions (Scope 1 and Scope 2) in comparison with the baseline year 2020 amid operating business growth, thereby contributing to our target to lower CO<sub>2</sub> emissions (Scope 1 and Scope 2) by 50% by 2030 compared with 2020.</li> <li>◆ Sourced 30% of our purchased electricity from renewable energies (2020: 27%), thereby contributing to our target to cover 80% of our purchased electricity with renewables by 2030.</li> <li>◆ Signed a renewable energy virtual power purchase agreement in the United States</li> <li>◆ Applied to join the <a href="#">Science Based Targets Initiative</a></li> <li>◆ Set new water management target: By 2025, lower the Water Intensity Score by 10% compared with the baseline year 2020.</li> <li>◆ Expanded the central wastewater treatment plant at the Darmstadt site (expansion to include a fourth purification stage).</li> <li>◆ Worked towards shrinking the environmental footprint of our waste by 5% by 2025, as measured by our waste scoring system, as compared with the baseline year 2016. In 2021, we achieved a 5.6% reduction (2020: 4.6%)</li> <li>◆ Took measures to ensure product safety (for instance <a href="#">REACH</a>, GHS), plant and process safety, and transport and warehouse safety (such as internal EHS audits)</li> </ul>	201-2, 301-1, 302-1, 303-1, 305-1, 305-2, 305-3, 305-6, 305-7	<a href="#">Safety of chemical products</a> <a href="#">Plant, process and transport safety</a> <a href="#">Environmental stewardship</a> <a href="#">Climate protection</a> <a href="#">Waste and recycling</a> <a href="#">Water management</a>
<b>Principle 8:</b> Businesses should undertake initiatives to promote greater environmental responsibility.	<ul style="list-style-type: none"> <li>◆ Introduced bulk packaging designs for a subset of our Durapore® and Millipore Express® filter cartridges</li> <li>◆ Commercialized greener alternative products such as Cyrene™, our Stericup E filtration system and our microplastic-free functional filler RonaFlair</li> <li>◆ Utilized reusable and recyclable packaging, which we also offer to our customers</li> <li>◆ Offered sustainable mobility options to employees (such as “Jobticket” public transit passes and shared bicycles)</li> <li>◆ Installed at our global headquarters an extensive electric vehicle charging infrastructure, part of which is available to our employees for their own personal use</li> </ul>	301 - 308	<a href="#">Sustainable Products and Packaging</a> <a href="#">Climate protection</a>



UNGC principles	Key actions in 2021	Relevant GRI disclosures	Link
<b>Principle 9:</b> Businesses should encourage the development and diffusion of environmentally friendly technologies.	<ul style="list-style-type: none"> <li>◆ Leveraged DOZN™, our web-based tool for evaluating greener alternatives to various chemicals. We also provided this tool to our customers and partner universities.</li> <li>◆ Updated our “DfS: Development” approach to integrate sustainability aspects into the product development process</li> <li>◆ Integrated ESG criteria into R&amp;D portfolio management</li> <li>◆ Developed sustainable products such as liquid crystal technologies, raw materials for natural cosmetics and “greener” alternatives to chemicals.</li> <li>◆ Reduced packaging materials and deployed more sustainable packaging as part of our <a href="#">SMASH</a> Packaging sustainable packaging strategy</li> <li>◆ Continued to expand the recycling programs for our Life Science and Electronics customers</li> </ul>	302-4, 302-5, 305-5	<a href="#">Sustainable Products and Packaging</a>
<b>Anti-corruption</b>			
<b>Principle 10:</b> Businesses should work against corruption in all its forms, including extortion and bribery.	<ul style="list-style-type: none"> <li>◆ Revised our risk matrix with a focus on bribery and corruption risks</li> <li>◆ Performed 84 internal audits on corruption-related risks</li> <li>◆ Provided employee training courses on topics such as anti-corruption, anti-trust, data privacy and healthcare compliance.</li> <li>◆ Expanded our training courses to comply with the Code of Conduct in healthcare-specific dilemma situations in all countries in which our Healthcare business sector operates and developed comparable training course for our Life Science and Electronics business sectors</li> <li>◆ Developed our anti-money-laundering program further by conducting a risk analysis</li> <li>◆ Offered a free-of-charge and anonymous whistleblowing channel (compliance hotline)</li> <li>◆ Formed partnerships and engaged stakeholders to coordinate and enhance anti-corruption efforts</li> <li>◆ Published annual EFPIA transparency reports</li> </ul>	102-16, 102-17, 205-1, 205-2, 205-3, 415-1	<a href="#">Compliance Management Responsible Interactions with Health Systems</a>

# Assurance report

## Limited Assurance Report of the Independent Auditor regarding Sustainability Information<sup>1</sup>

To the Executive Board of Merck KGaA, Darmstadt

We have performed an independent limited assurance engagement on the qualitative and quantitative disclosures on sustainability in the “Sustainability Report 2021” (further “Sustainability Report”) , published at <https://www.merckgroup.com/en/sustainability-report/2021/>, of Merck KGaA, Darmstadt, (further “Company” or “Merck”) for the period from January 1 to December 31, 2021.

It was not part of our engagement to review product- or service-related information, references to external information sources, expert opinions and future-related statements in the Sustainability Report.

As described in the Sustainability Report, Merck engaged external providers to perform assessments and audits. The evaluation of the adequacy and accuracy of the conclusions from these external assessments was not part of our limited assurance engagement.

### Management’s Responsibility

The legal representatives of the Company are responsible for the preparation of the Sustainability Report in accordance with the Reporting Criteria. Merck applies the principles and standard disclosures of the Standards of the Global Reporting Initiative (GRI) in combination with the Corporate Accounting and Reporting Standard (Scope 1 and Scope 2) and the Corporate Value Chain Standard (Scope 3) of the Greenhouse Gas Protocol initiative by the World Resources Institute and the World Business Council for Sustainable Development (WBCSD) as Reporting Criteria (further “Reporting Criteria”).

The responsibility of the legal representatives includes the selection and application of appropriate methods to prepare the Sustainability Report and the use of assumptions and estimates for individual qualitative and quantitative sustainability disclosures which are reasonable under the circumstances. Furthermore, the legal representatives are responsible for the internal controls they deem necessary for the preparation of the Sustainability Report that is free of – intended or unintended – material misstatements.

<sup>1</sup> Our engagement applied to the German version of the Sustainability Information contained in the Sustainability Report 2021. This text is a translation of the Independent Assurance Report issued in German, whereas the German text is authoritative.

### Practitioner’s Responsibility

It is our responsibility to express a conclusion on the Sustainability Report based on our work performed within a limited assurance engagement.

We conducted our work in the form of a limited assurance engagement in accordance with the International Standard on Assurance Engagements (ISAE) 3000 (Revised): “Assurance Engagements other than Audits or Reviews of Historical Financial Information” and the International Standard on Assurance Engagements (ISAE) 3410: “Assurance Engagements on Greenhouse Gas Statements”, published by IAASB. Accordingly, we have to plan and perform the assurance engagement in such a way that we obtain limited assurance as to whether any matters have come to our attention that cause us to believe that the Sustainability Report was not prepared, in all material respects, in accordance with the Reporting Criteria. We do not, however, issue a separate conclusion

for each disclosure. As the assurance procedures in a limited assurance engagement are less comprehensive than in a reasonable assurance engagement, the level of assurance obtained is substantially lower. The choice of assurance procedures is subject to the auditor's own judgement.

- Within the scope of our engagement, we performed, amongst others, the following procedures:
- Inquiries of group-level personnel responsible for the materiality analysis in order to understand the processes for determining material topics and respective reporting boundaries of Merck.
- A risk analysis, including media research, to identify relevant information on Merck's sustainability performance in the reporting period.
- Evaluation of the design and implementation of systems and processes for the collection, processing and monitoring of the sustainability disclosures included in the scope of this engagement, including the consolidation of data
- Inquiries of group-level personnel who are responsible for determining and consolidating disclosures and for performing internal controls, including the explanatory notes
- Inspection of selected internal and external documents
- Analytical evaluation of data and of the trends of quantitative disclosures as reported at group level by all sites
- Evaluation of local data collection, validation and reporting processes as well as of the reliability of reported data based on a sample of the sites in Ulsan in South Korea, in Meyzieu in France and in Darmstadt in Germany in the form of virtual meetings
- Use of the insights and relevant work regarding audit procedures performed for the group and statutory audit of the (consolidated) financial statements for the fiscal year 2021 of Merck KGaA for the information and indicators that were derived from those consolidated financial statements
- Evaluation of the consistency of GRI Standards in accordance with option "Comprehensive" as reported by Merck with the qualitative and quantitative disclosures in the Sustainability Report
- Assessment of the overall presentation of the disclosures
- Evaluation of the process for the identification of taxonomy-eligible economic activities and the corresponding disclosures in the Sustainability Report

The legal representatives have to interpret vague legal concepts in order to be able to compile the relevant disclosures according to Article 8 of the EU Taxonomy Regulation. Due to the innate risk of diverging interpretations of vague legal concepts, the legal conformity of these interpretations and, correspondingly, our assurance thereof are subject to uncertainty.

In our opinion, we obtained sufficient and appropriate evidence for reaching a conclusion for the assurance engagement.

## Independence and Quality Assurance on the Part of the Auditing Firm

In performing this engagement, we applied the legal provisions and professional pronouncements regarding independence and quality assurance, in particular the Professional Code for German Public Auditors and Chartered Accountants (in Germany) and the quality assurance standard of the German Institute of Public Auditors (Institut der Wirtschaftsprüfer, IDW) regarding quality assurance requirements in audit practice (IDW QS 1).

## Conclusion

Based on the procedures performed and the evidence obtained, nothing has come to our attention that causes us to believe that the qualitative and quantitative disclosures on sustainability for the period from January 1 to December 31, 2021, published in the Sustainability Report, have not been prepared, in all material respects, in accordance with the Reporting Criteria.

## Restriction of use/General Engagement Terms

This assurance report is issued for purposes of the Executive Board of Merck KGaA, Darmstadt, only. We assume no responsibility with regard to any third parties.

Our assignment for the Executive Board of Merck KGaA, Darmstadt, and professional liability as described above was governed by the General Engagement Terms for Wirtschaftsprüfer and Wirtschaftsprüfungsgesellschaften (Allgemeine Auftragsbedingungen für Wirtschaftsprüfer und Wirtschaftsprüfungsgesellschaften) in the version dated January 1, 2017 ([https://www.kpmg.de/bescheinigungen/lib/aab\\_english.pdf](https://www.kpmg.de/bescheinigungen/lib/aab_english.pdf)). By reading and using the information contained in this assurance report, each recipient confirms notice of the provisions contained therein including the limitation of our liability as stipulated in No. 9 and accepts the validity of the General Engagement Terms with respect to us.

Frankfurt am Main, March 17, 2022

KPMG AG  
Wirtschaftsprüfungsgesellschaft  
[Original German version signed by:]

**Glöckner**  
Wirtschaftsprüfer  
[German Public Auditor]

**ppa. Meldau**

# Glossary

## **(Q)SAR**

Structure-activity relationship (SAR) and quantitative structure-activity relationship (QSAR) models – collectively referred to as (Q)SARs – are mathematical models that can be used to predict the physicochemical, biological and environmental fate properties of compounds from the knowledge of their chemical structures. These models are available for free or as commercial software.

## **Arpraziquantel**

Arpraziquantel is a drug to treat schistosomiasis. It aims to close the treatment gap of preschool-age children affected by schistosomiasis. It contains the pharmacologically active enantiomer of praziquantel. The new tablet is small, orally dispersible – it dissolves in the mouth or in water –, has taste properties that are acceptable for children, and withstands the challenges presented by a tropical climate.

## **Big Data**

Large data sets that may be analyzed computationally to reveal patterns, trends and associations, especially relating to human behavior and interactions.

## **Biodiversity**

The diversity of ecosystems, habitats and landscapes on earth, the diversity of the species, and the genetic diversity within a biological species or population.

## **CAPA**

The quality management process CAPA (Corrective and Preventive Action) is used to systematically analyze deviations or errors as well as to take corrective and preventive action.

## **CO<sub>2</sub> equivalents**

CO<sub>2</sub> equivalents (CO<sub>2</sub>eq) indicate how much a specified quantity of a specific greenhouse gas contributes to the greenhouse effect using the global warming potential of carbon dioxide as a reference.

## **CRISPR/Cas**

A biomolecular method for targeting, cutting and editing the DNA of an organism (gene editing). Experts think this technique has great potential for curing diseases or generating plants and animals with new traits.

## **Dimethyl sulfoxide (DMSO)**

A non-toxic organosulfur compound with the formula (CH<sub>3</sub>)<sub>2</sub>SO. This colorless liquid is an important polar aprotic solvent that dissolves both polar and nonpolar compounds and is miscible in a wide range of organic solvents as well as water. It is used in various medicinal applications and in research.

## **Due diligence**

Due diligence means a risk analysis exercised with particular care that is done in preparation for a business transaction, e.g. an acquisition.

## **EHS**

Short for “Environment, Health and Safety”, this refers to environmental management, health protection and occupational safety throughout a company.

## **End-user declaration**

An end-user declaration is a binding customer declaration regarding the intended use of a product.

## **Endemic countries**

Countries in which a certain disease, in many cases an infectious disease, is prevalent.

## **Environmental, Social, and Corporate Governance (ESG)**

ESG represents an evaluation of a company’s collective conscientiousness for environmental, social and governance factors. An ESG score is compiled from data collected surrounding specific metrics related to intangible assets within the enterprise.

## **Equality Act**

A pending United States law with a special focus on

LGBTQI+ people (lesbian, gay, bisexual, transgender, queer or questioning, intersex, and additional self-identifying members of the community). It prohibits discrimination on the basis of gender, sexual orientation and gender identity.

### Exposure assessment

Exposure assessment aims to make a quantitative or qualitative estimate of the dose / concentration of the substance to which humans and the environment are or may be exposed. Exposure assessment under REACH consists of two steps: 1) development of exposure scenarios and 2) exposure estimation. These steps must be iterated until it can be concluded that the resulting exposure scenarios would ensure adequate control of risks upon implementation.

### Freshwater

Water containing 1,000 mg or less of dissolved solids per liter.

### GHS

Short for “Globally Harmonized System of Classification and Labelling of Chemicals”. This refers to an international standard system to classify chemicals. It covers labeling as well as safety data sheets.

### Germline

The cell sequence from which the germ cells (oocytes and sperm) arise within the individual development of multicellular animals and humans. The somatic cell lines branching off from the germ line form the body (the soma).

### Good clinical practice (GCP)

An international quality standard issued by the “International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use” (ICH) that describes the responsibilities and expectations of all involved participants (e.g. sponsors, investigators, and ethics committees) in the conduct of clinical studies. The standard covers aspects of the design, implementation, oversight, recording, and reporting of clinical studies.

### Good distribution practice (GDP)

An EU guideline that regulates the proper distribution of medicinal products for human use.

### Good manufacturing practice (GMP)

A system for ensuring that products are consistently manufactured and controlled according to quality standards. These guidelines are used in the production of medicines, active pharmaceutical ingredients and cosmetics, as well as food and animal feed.

### Greenhouse gases

Gases in the atmosphere that contribute to global warming. They can be either naturally occurring or caused by humans (such as CO<sub>2</sub> emissions generated by burning fossil fuels).

### ISO 14001

This international environmental management standard sets globally recognized requirements for an environmental management system.

### ISO 45001

This international standard defines globally recognized requirements for an occupational health and safety management system.

### ISO 50001

This international standard defines globally recognized requirements for energy management systems.

### ISO 9001

This international standard defines globally recognized requirements for a quality management system.

### In vitro

In vitro (latin for in glass, or in the glass) studies are performed outside of a living organism with microorganisms, cells, or biological molecules. In-vivo studies in contrast are performed in a living organism.

### In vivo

Latin for “within the living”, this term describes processes that take place within a living organism.

### Investigational product

A pharmaceutical form of an active ingredient or placebo being tested or used as a reference in a clinical trial, including approved as well as unapproved products when used or assembled (formulated or packaged) in a way different from the approved form, when used for an unapproved indication, or when

used to gain further information about an approved use.

### **LGBTQI+**

This abbreviation stands for Lesbian, Gay, Bisexual, Transgender, Queer or Questioning, Intersex, and additional self-identifying members of the community.

### **LTIR**

The lost time injury rate measures the number of accidents resulting in missed days of work (one or more days) per one million working hours.

### **Liquid crystals (LC)**

A hybrid of a crystalline and liquid state. In general, molecules are perfectly arranged only when in a solid crystal state, in contrast to the liquid state, when they move around chaotically. However, liquid crystals are a hybrid of the two states: Although they are liquid, they exhibit a certain crystalline arrangement. Their rod-shaped molecules align themselves like a shoal of fish. In addition, they respond to the electromagnetic waves of light like tiny antennae. Therefore, such swarms of molecules can either allow specially prepared “polarized” light to pass through, or they can block it. This takes place in the pixels of liquid crystal displays. A similar phenomenon occurs in liquid crystal windows, which can provide shade against sunlight.

### **Location-based approach**

Location-based figures are calculated on the basis of the average emission factors of the area in which the electricity consumption takes place. In most cases, this method utilizes the national average.

### **Managing director**

This individual is ultimately responsible for ensuring that our subsidiaries, including R&D and manufacturing centers, comply with all applicable laws and regulations, including applicable internal guidelines.

### **Market-based approach**

Market-based figures are calculated on the basis of emission factors provided by electricity suppliers specifically for the electricity they sell.

### **NMP**

N-Methyl-2-pyrrolidone is a polar aprotic compound

that is miscible with water and has good solvency properties. NMP is used in the manufacture of polymers, semiconductors, batteries, and pharmaceuticals. The ECHA (European Chemicals Agency) has designated NMP as a substance of very high concern (SVHC) and included it in the candidate list for authorization.

### **Neglected tropical disease (NTD)**

Neglected tropical diseases affect more than 1 billion people in primarily poor populations living in tropical and subtropical climates in low- and middle-income countries. NTDs include schistosomiasis, intestinal worms, trachoma, lymphatic filariasis, and onchocerciasis. This group of diseases is called neglected because, despite the large number of people affected, they have historically received less attention and research funding than other diseases.

### **Neuromorphic computing**

Neuromorphic computing aims at processing information similar to the human brain. Like in the human brain neuromorphic computing systems use an architecture where the memory and the processing units are co-located within the same hardware element and interlinked in a network. These elements are called memristors and can both store and process information.

### **Non-communicable disease (NCD)**

Non-communicable diseases tend to be of long duration and are the result of a combination of genetic, physiological, environmental, and behavioral factors. The main types of NCD are cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes. NCDs disproportionately affect people in low- and middle-income countries where more than three quarters of global NCD-related deaths occur.

### **Nucleases**

A group of enzymes whose primary function is to partially or fully degrade nucleic acids.

### **OHSAS**

The Occupational Health and Safety Assessment Series (OHSAS) is an international occupational health and safety management system. As of March 2021, ISO 45001 replaced OHSAS 18001, the occupational health and safety standard that had previously been applied.

**Other water**

Water with more than 1,000 mg of dissolved solids per liter.

**Patent pool**

A consortium of at least two competing companies that allows partners to share the use of patents relating to a particular technology.

**Patient access programs**

This refers to commercial programs that are typically self-sustaining and provide medicines for underserved populations, for example by offering a reduced treatment fee.

**Patient support programs**

Any organized system providing services and direct patient or patient-caregiver interactions that are intended and designed to educate patients about certain diseases, and help patients with access to and/or the management of prescribed medicines and/or disease outcomes and/or offer doctors support for their patients.

**Pharmacovigilance**

The science and activities related to the detection, evaluation, understanding, and prevention of adverse reactions or other drug-related problems.

**Phase I clinical trial**

Phase I clinical trials test a new therapeutic candidate in a small group of subjects (for example, 20-80) for the first time ('first in man study') to evaluate safety (for instance, to determine a safe dosage range and to identify side effects).

**Phase II clinical trial**

Phase II clinical trials study the medical or behavioral intervention in a larger group of subjects (several hundred) to determine efficacy (biological activity) and to further evaluate its safety.

**Phase III clinical trial**

Phase III clinical trials investigate the efficacy of the medical or behavioral intervention in large groups of subjects (from several hundred to several thousand) by comparing the intervention to other standard or experimental interventions as well as to monitor

adverse effects and collect information that will allow the intervention to be used safely.

**Prediabetes**

A condition regarded as indicative that a person is at risk of progressing to Type 2 diabetes.

**Process-related emissions**

Greenhouse gases released into the atmosphere during manufacturing operations.

**Product serialization**

During serialization, every product within a production line receives a clear, usually random and encrypted number, which is stored in a database. The manufacturer of each individual product can later be traced securely.

**Pulse survey**

A pulse survey is a short employee survey that focuses on a specific topic to gauge the current sentiment of the workforce. This can, for example, relate to a single business unit in the case of change processes or be targeted to the entire workforce.

**Read-across**

Grouping of substances and read-across is one of the most commonly used alternative approaches for filling data gaps in registrations submitted under REACH. This approach uses relevant information from analogous ("source") substances to predict the properties of 'target' substances. If the grouping and read-across approach is applied correctly, experimental testing can be reduced as there is no need to test every target substance.

**Registration dossiers**

One part of the REACH registration process is the preparation of a technical dossier and its submission to the European Chemicals Agency (ECHA). The information that a registration dossier should contain includes the physical-chemical, toxicological, and ecotoxicological characteristics of the substances, human and environmental exposure, intended uses, classification and labelling, and recommended risk management measures.

**Risk-sharing agreement**

An agreement between the producer or manufacturer



and the payer or provider that allows access to a health technology through coverage or reimbursement under certain conditions.

## Robotics

Robotics or robot technology concerns the drafting, design, control, production, and operation of robots, e.g. industrial or service robots.

## Role

Our company uses a market-oriented system to rate positions within the company. To facilitate consistency across the organization, each position is assigned a specific role, with an overarching job architecture classifying each role as one of 11 levels, 15 functions and an array of career types (Core Operations, Services & Support Groups; Experts; Managers; Project Managers).

## SQ

The abbreviation for our Corporate Sustainability, Quality and Trade Compliance function.

## STEM

Science, technology, engineering and mathematics.

## Schistosomiasis

Schistosomiasis is a chronic condition and one of the most common and most devastating parasitic diseases in tropical countries. Flatworms transmit the disease. It is widespread in regions where large sections of the population have no access to clean water or sanitary installations. People are infected by the parasite when exposed to infested water during routine agricultural, domestic, occupational, and recreational activities. The minuscule larvae penetrate human skin, enter the blood vessels and attack internal organs. The infection rate is particularly high among children. Untreated schistosomiasis can cause potentially fatal chronic inflammation of vital organs as well as anemia, stunted growth and impaired learning ability, all of which have devastating consequences for the lives of children.

## Scope 1

This includes emissions that occur in our company, for instance by generating energy from fossil fuels or by releasing process-related emissions.

## Scope 2

This includes emissions from purchased energy such as electricity, heat, steam, or cold.

## Scope 3

Scope 3 includes indirect greenhouse gas emissions, such as the extraction and production of purchased materials, transport-related activities, waste disposal, and employee travel.

## Scorecard

An evaluation tool for measuring, documenting and controlling activities using metrics.

## Security

This relates to all necessary measures and governance activities to detect, analyze, handle, and mitigate security- and crime-based threats to the company. It is integral to protecting both our employees and the tangible and intangible assets of the company.

## Signal management

A set of activities performed to determine whether, based on an examination of individual case safety reports, aggregated data from active surveillance systems or studies, scientific literature information, and other data sources, new risks are associated with an active ingredient or a medicinal product or whether known risks have changed. These activities also provide any related recommendations, decisions, communications, and tracking.

## Small-molecule drugs

Substances with a low molecular weight ("small"-molecule) substances consist of only a few hundred atoms. Compared to larger biological treatments, the particularly small size of these drugs makes it more likely that they will reach their target in the body. Today, the vast majority of pharmaceuticals are of the small-molecule kind.

## Soil-transmitted helminthiasis (STH)

Soil-transmitted helminthiasis (STH) is a type of intestinal worm infection. It is considered the most widespread of NTDs and has a particularly damaging impact on the health and development of children. Approximately 1.5 billion people, nearly 20% of the world's population, are infected with STH. It is transmitted by eggs present in human feces, which

can contaminate the soil in areas where sanitation is poor. The most common species that affect people are roundworm, whipworm and hookworm.

### **Spontaneous reports on adverse effects**

An unsolicited communication by a healthcare professional or consumer to a company, regulatory authority or other organization (e.g. the World Health Organization, a regional center or poison control center) that describes one or more adverse reactions in a patient who was given one or more medicinal products and that does not derive from a study or any organized data collection scheme.

### **Stakeholder**

People or organizations that have a legitimate interest in a company, entitling them to make justified demands. Stakeholders include people such as employees, business partners, neighbors in the vicinity of our sites, and shareholders.

### **Stem cell lines**

Groups of stem cells derived from animal or human tissue. They can be cultivated in vitro and multiply indefinitely.

### **Stem cells**

Undifferentiated cells with the potential to develop into many different cell types that carry out different functions.

### **TRIPS**

The Agreement on Trade-Related Aspects of Intellectual Property Rights is an international legal agreement between all the member nations of the World Trade Organization. TRIPS seeks to ensure that the measures and procedures for enforcing intellectual property rights do not become a barrier to lawful trade.

### **Tetramethylammonium hydroxide (TMAH)**

A quaternary ammonium salt with the molecular formula  $N(CH_3)_4^+ OH^-$ . It is a strong base and is commonly encountered as concentrated solutions in water or methanol. TMAH has numerous and diverse

industrial and research applications, such as the anisotropic etching of silicon

### **Thin films**

A very thin layer (one atom or one molecule thick) of a substance deposited on a supporting material such as a semiconductor. Customers use our products to create such thin films.

### **Traces**

Substances dissolved in water that are present only in minute amounts. Also referred to as micropollutants, these are synthetic substances present in concentrations ranging from one nanogram to one microgram per liter of water.

### **Transfer of value**

Direct and indirect transfers of value, whether in cash, in kind or otherwise (for instance promotional purposes).

### **Vivarium**

The vivarium, also known as animal research facility, is a specially designed building type, which accommodates controlled environments for the care, use and maintenance of experimental animals.

### **WAC**

Wholesale acquisition cost (WAC) means, with respect to a drug or biological, the manufacturer's list price for the drug or biological to wholesalers or direct purchasers in the United States, not including prompt pay or other rebates, discounts or reductions in price, for the most recent month for which the information is available, as reported in wholesale price guides or other publications of drug or biological pricing data. WAC is the US equivalent for Ex-Factory (EXF) wholesale price that our company uses globally to label the price from the manufacturer to the wholesaler.

### **WASH**

This stands for "water, sanitation and hygiene". The acronym is used to refer to a set of activities addressing inadequate access to clean water and sanitation facilities, as well as poor hygiene behavior.

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