PRODUCTS

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 and 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.

Today, our products are already having positive impact on human progress and global health, namely our medicines and our biological and chemical innovations that utilize the latest technologies. We want to continuously improve the way we measure our progress by adapting to upcoming regulations and integrating quantitative sustainability criteria into our product development processes across all business sectors.

In 2023, we continued our partnership with the patent information platform LexisNexis® PatentSight® and evaluated the sustainability impact of our intellectual property. In the reporting year, 29% (2022: 40%) of our patent families published had a positive sustainability impact. However, this key indicator is not comparable with the previous year's figure as the underlying UN SDG terminology has changed and the LexisNexis® PatentSight® concept has been adapted accordingly.

To develop pioneering solutions that have a **positive impact on society** and support 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 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 and strategic investments as well as through collaboration with academia. In addition, we continually seek to foster and encourage **open innovation** for healthcare products.

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 in independent R&D units that pursue their own innovation strategies. **Group Corporate Sustainability** supports our business sectors and Group functions to advance sustainability within the R&D and innovation processes. This includes the coordination and alignment of common core sustainability

criteria in line with our shared goals as well as quality and quantification requirements. In 2022, we created a Group-wide dashboard, showing the potential contribution of our R&D portfolio to sustainable solutions. In 2023, we integrated a procedure describing the global sustainability evaluation in our R&D process.

Our **Group Science & Technology Office** leads the implementation of our combined strategy for innovation as well as data and digital, enabling innovation across our business sectors while harnessing the power of advanced data and digital capacities. It aims to identify and integrate transformative and strategically relevant technology trends into our business sectors while maintaining a Group-wide overview of our tech roadmap and innovation portfolio. Fostering data and digital capacities 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.

Our venture capital fund, M Ventures, prioritizes sustainable innovations through equity investments. The fund's mandate is to invest in innovative technologies and products that have the potential to significantly impact our core business areas. In addition, the fund focuses 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. First, it invests in sustainable solutions relevant to our three business sectors, such as novel solutions for reducing emissions and waste, green life science technologies and green electronics technologies. These solutions may be more energy- or resource-efficient or may create products designed for circularity or with a lower carbon footprint. As many of these technologies are still in their early stages, M Ventures is partnering with **SEMI.org** along with the leading corporate venture capital funds to help accelerate the innovation and adoption of potential sustainable semiconductor solutions. The second approach involves making investments that leverage our core competencies to drive sustainability in other markets. These may include start-ups addressing sustainable foods, bio-manufacturing or carbon capture and utilization.

Our commitment: Aiming for circularity

Within our R&D processes, we are committed to continuously improving and integrating sustainability and circular economy criteria to assess the **sustainability performance of our products and portfolio**, enabling us to create more sustainable products for our customers and society. We have integrated and tailored Design for Sustainability (**DfS**) across all business sectors and use our overarching dashboard to monitor progress on key sustainability criteria. In 2023, we assessed allmost all relevant R&D projects and thus enhanced transparency around the sustainability performance of our global R&D portfolio. We integrated a sustainability in R&D key indicator to track progress and continued advancing the use of evaluation tools such as **DOZN™** and **GreenSpeed**. We aim to combine the insights from the R&D dashboard with those gained from our commercial portfolio evaluation to steer our future R&D activities.

We have dedicated corporate resources for **our circular economy strategy** and we are driving several circular economy pilots and initiatives throughout the organization. In addition, we held a global circular economy summit to provide a platform for best practice sharing with internal and external participants.

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 grow real meat in a bioreactor. These research and commercial efforts aim 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. To achieve production at scale, the cell culture media must be cost-efficient, produced from a robust food-grade raw material supply chain, 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 build a food-grade raw material supply chain via performance testing in research labs and qualification in our production facilities to manufacture optimized media formulations. We supply dry powdered cell culture media to customers who are bringing the first cultured meat products to market.

Another technological challenge is the need for suitable bioreactor designs to efficiently produce structured cuts of meat rather than lesser-value ground meat. **CraftRidge** is our flagship bioreactor project focused on delivering an edible hollow fiber bioreactor system that can produce entire cuts of meat cost effectively. At the same time, we are collaborating with three **leading academic labs.** Together with a team at Tufts University in Massachusetts, USA, we aim to enable the production of whole-muscle cultured meat through textile bioengineering. At the same time, we will apply industrial rapid printing technology to **create complex meat structures** in collaboration with a team at the Technical University of Darmstadt (TU Darmstadt) in Germany. In a third project with the University of Illinois, we are developing an electrochemical technology to recycle the cell culture media, enabling more sustainable cultured meat production.

Our M Ventures portfolio includes Mosa Meat, a pioneer in cultured meat, and Formo, a company focused on making cultured cheeses using recombinant protein synthesis.

Empowering sustainability through collaboration

We contribute and engage in numerous consortia to leverage the development of standards and measures for sustainability across companies and industries, including the American Chemical Society Green Chemistry Institute Pharmaceutical Roundtable.

Many key players have set the goal to reach net-zero carbon emissions by 2040. To achieve this goal, it is essential to track and control upstream and downstream indirect emissions, which make up a significant part of each company’s carbon footprint. A lack of data transparency across the supply chain poses a challenge yet presents an opportunity for innovation and industry collaboration, as is the case in the semiconductor industry.

We are collaborating with Palantir to address the lack of emissions data transparency in the semiconductor value chain. The 50/50 partnership Athinia™ is an independent platform that provides a secure and semiconductor-specific data analytics tool for the industry. With the cloud solution for the ecosystem, data from various isolated sources can be integrated, enabling seamless collaboration in the industry. As a founding member of the Semiconductor Climate Consortium (SCC), Athinia™ is pioneering sustainability standards on a digital platform, enabling companies to benchmark their emissions performance against industry peers, identify areas for improvement and collaborate on initiatives for reducing emissions.

Fruitful strategic partnership

Our long-term commitment to academic research partnerships reflects our strong ambition to find sustainable solutions to pressing problems. In the framework of the **Sustainability Hub** we continued our strategic collaboration with the TU Darmstadt in multidisciplinary fundamental research projects. The projects cover basic challenges of life cycle modelling, 3D liver tissue model, biodegradation of plastics, and the simulation of neuromorphic computing architectures. The research continues to increase our understanding of product sustainability assessment, toxicological testing of drugs, circular material flows, and energy efficient computing, respectively. In 2023 we evaluated additional proposals to further expand our research project portfolio.

Promoting visionary research

The **2023 Future Insight Prize** recognized achievements that are helping to build a global pandemic early warning system. The € 500,000 prize was awarded to Professor Khalid Salaita, Samuel Candler Dobbs Professor of Chemistry and Director for Graduate Studies in the Chemistry Department at Emory University in Atlanta, Georgia, USA. His research focuses on solutions that enable the development of a novel platform technology for automated, real-time surveillance and tracing of airborne pathogens.

In 2023, we again offered a sustainability research grant in the field of green hydrogen to the scientific community. We received over 250 research proposals from around the world and will select one project to receive funding in 2024. Our Collaboration with Esy-Labs GmbH, the winner of one of our research grants in 2021, is being continued and is now part of the Electrifying Technical Organic Syntheses (**ETOS**) Cluster, a cluster initiative founded by the German Federal Ministry of Education and Research.

Sustainable products & packaging

Life Science

In our Life Science business sector, we use data-driven methods to reduce the adverse impacts of our products on health and the environment. Our approach covers **the entire product life cycle**, from sourcing, manufacturing and packaging to use and end-of-life. At the same time, we aim to make our products more efficient and user-friendly. We work to reconcile these requirements at the beginning of product development and when re-engineering existing products.

Our approach to sustainable product design

We take a **systematic approach** to advancing sustainability through enhanced product design. In 2023, we continued to differentiate our sustainability portfolio through our Design for Sustainability framework.

To understand the potential environmental impacts of each product throughout its life cycle, we conduct streamlined product life cycle analyses. Their findings help us 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 throughout the process.

Design for Sustainability enables our product developers to analyze product impacts regarding materials used, energy and emissions, water, packaging, usability, innovation, circular economy, and supplier- and manufacturing-related issues. Our product developers use these sustainability criteria to assess product performance in each category across our broad and diverse portfolio. When developing new products, we aim to improve as many of these criteria scores possible.

To ensure that our product development teams target and track sustainability improvements in all new products, the framework provides data-driven deliverables at each phase of the development cycle, including a scorecard system that helps our development teams address and minimize negative product- and supply chain-related factors. The scorecard also helps us communicate our product sustainability data to customers more effectively. Products with meaningful sustainability improvements are identified as Greener Alternative Products in our Life Science portfolio.

As of December 2023, we offer over 2,500 Greener Alternative Products across our portfolio, a 34% increase compared with 2022. In the course of 2023, 637 products were recognized as Greener Alternative Products across our portfolio – 404 of which were new products evaluated using our Design for Sustainability framework.

Our approach to sustainable packaging

We work to deliver our products in packaging that is safe and easy for customers to handle, while also working to improve the sustainability characteristics of our material choices.

With a vast number of products in our Life Science portfolio – ranging from antibodies and lab chemicals to filtration materials, systems and instruments – we face a broad range of packaging challenges. Through our **SMASH Packaging** program for Life Science, we work to improve the sustainability characteristics of our packaging by optimizing resources, using more sustainable materials and designing for a **circular economy**.

SMASH Packaging is built upon four pillars:

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

While we did not reach all **2022 targets** set in our inaugural SMASH Packaging plan, we were able to integrate systematic internal changes to strategically address packaging sustainability, notably to track and implement sustainability in new product packaging. As such, we have we have integrated our previous commitments and increased our ambition through **SMASH Packaging 2.0**, the next generation of packaging sustainability. In 2023, we raised the bar further for our packaging sustainability framework and developed a more systematic implementation plan for internal teams to implement packaging sustainability improvement projects. We aligned these guidelines directly with our **new 2030 goals** with a 2020 baseline to maximize the related sustainability improvements:

- Reduce 10% of packaging weight per unit sales by 2030.
- 100% of fiber packaging to be deforestation-free by 2030.
- 100% of packaging to be designed following circular design principles by 2030.

Roles and responsibilities

The Life Science business sector works across its operational units to holistically embed sustainability in its operations, products and culture. The business sector's Sustainability and Social Business Innovation team is responsible for setting KPIs and targets, planning and executing our strategies, and overseeing monitoring and reporting activities.

This structure helps us implement an ambitious and coordinated sustainability strategy to formalize our processes, governance and goals. In this way, we can embed the strategy in our business and become a sustainability multiplier for our customers.

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.

Wide range of solutions

Bio-based solvents

Switching to bio-based solvents, such as our alternative, greener solvent **Cyrene™** and Cyrene™ blends, helps our customers reduce their carbon footprint. We are a member of the EU Horizon 2020 project, ReSolute, which began constructing a new Cyrene™ production facility in France in 2021. The site is scheduled to open in 2025 and will produce 1,000 metric tons of Cyrene annually to help us meet the growing demand for greener solvents. We will continue to add new bio-based solvents to our portfolio in 2024 – not only for our customers but also for our own internal applications in manufacturing. In 2023, our diverse portfolio of bio-based solvents helped customers avoid over 50 metric tons CO_2e.

Green chemistry evaluator 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 through the "Green Scores" calculated in the tool. DOZN™ industrializes the 12 Principles of Green Chemistry, a previously theoretical framework, and **rates products** in three stewardship categories, namely "Improved resource use", "Increased energy efficiency", and "Reduced human and environmental hazards". DOZN™ 2.0 is the tool's external interface and is free for anyone to use, enabling both our customers and other scientists to make **more environmentally sustainable choices** in their development processes.

In 2023, we counted nearly 2,200 users of DOZN™ from 78 countries and DOZN™ was cited in 87 academic papers. In addition, as of the end of 2023, DOZN™ had been integrated into 15 university curricula through partnerships with universities in Canada, France, Germany, India, Switzerland, the United Kingdom, and the United States. These partnerships apply the DOZN™ tool in both virtual and in-lab chemistry curricula. Using DOZN™ in an academic setting yields many benefits. Firstly, it increases access to **Green Chemistry** and the tangibility of its principles for the future scientists entering the workforce. Secondly, it provides a practical opportunity to calculate scores for chemical products and processes and reinforces learning while highlighting the importance of sustainability to future scientists.

Expanding circular recycling

We have continued expanding the **biopharma recycling program** we kicked off in 2015, in which single-use plastic product waste is collected from biopharmaceutical manufacturing operations and **recycled into plastic lumber**. This material can be used in many industries, such as landscaping, transportation and marine construction. The program now serves 23 major biopharma manufacturing customers. Since its launch in 2015, it has recycled approximately 11,045 metric tons of plastic waste. This program continues to expand throughout the United States while simultaneously exploring new options and recycling technologies in other regions, such as Europe. By assessing advanced recycling technologies and collaborating across multiple industries, we will develop innovative **circular recycling** programs.

In October 2022, we developed a strategy to increase the recycling rates of single-use plastics and the circularity of our Life Science products. Our approach relies on customer engagement and feedback to assess the types and volumes of plastics used. In 2023, we engaged with 72 customers and instructed them on how to conduct plastic waste assessments in their labs.

Based on insights gained from these assessments, our Product Recycling and Innovation team is developing solutions to address plastic waste in labs and facilitate transfers to specialized recyclers worldwide. Ultimately, we aspire to enable all high-quality plastics to be reintegrated into our Life Science supply chain to form an industry-wide recycling ecosystem.

More sustainability offerings for Process Solutions

In 2023, we launched two new Greener Alternative Products in our Process Solutions portfolio: Millistak+® HC and Millistak+® HC Pro Micro 20 clarification devices. These products significantly reduce the amount of single-use plastic needed. By redesigning the shape of the devices, we reduced the amount of plastic used by 75%, resulting in 75% less related single-use plastic waste. The Millistak+® HC Pro Micro 20 device even provides improved scalability performance and can more accurately predict the size of process-scale depth filter installations required for full-scale cell culture harvest applications.

Embedding sustainability in our packaging

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

Packaging sustainability in product development

New product packaging is where we can achieve the greatest impact. For this reason, we have also integrated SMASH Packaging principles into our product development process under our Design for Sustainability framework.

In 2023, 65% of our new product development projects aligned with the sustainability standards in at least one of the four pillars of our SMASH Packaging strategy.

Shrink: How we minimize the amount of packaging

We seek **eco-friendly alternatives** for shipping our products safely, which is why we partnered with a biotech company a few years ago and jointly developed a more sustainable bulk packaging design for transporting our Millistak+® Pod Disposable Depth Filters. We also expanded this approach to a subset of our Durapore® and Millipore Express® filter cartridges. These products are dedicated to high-volume clients and deliver both environmental and economic benefits to our customers compared with traditional individual or multipack packaging.

For example, changing from a three-pack to the new bulk packaging for our ten-inch filter cartridges reduces the amount of corrugated cardboard required by 55%. This corresponds to a 49% decrease in greenhouse gas (GHG) emissions throughout the life cycle of these packaging materials. In addition, our customers spend approximately 50% less time unpacking, which reduces their labor costs. In 2023, these bulk packaging solutions saved around 50 metric tons of corrugated cardboard. We continue researching similar solutions for additional products.

Secure: How we’re moving towards zero deforestation

Deforestation is a significant driver of global warming and a threat to biodiversity worldwide. As a large proportion of our packaging contains wood-derived fibers, we aim to responsibly source wood and fiber-based packaging materials so that that we do not contribute to deforestation.

Each year, we assess the practices of our main suppliers and the characteristics of our packaging to monitor our progress toward our zero-deforestation goal. The evaluated suppliers represent the majority (98%) of our total direct spend on sourcing wood and fiber-based packaging. The assessments identify opportunities to further align packaging with our zero-deforestation standards, selecting packaging with **sustainable forestry certifications** or recycled materials.

As of December 2023, more than 70% of the packaging materials we source align with our zero-deforestation standards or are made from recycled materials.

Switch: How we substitute plastics

In the past, we used insulated containers made of expanded polystyrene (EPS) to ship our chemicals in glass bottles and our temperature-controlled products. While EPS provides good insulation and cushioning properties, it is a petroleum-based material that takes hundreds of years to decompose. As options for recycling EPS are limited, it is typically incinerated or sent to landfill.

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 2023, we continued piloting our new **greener coolers** at one of our U.S. distribution centers to replace EPS in our cold-chain shipments. The greener cooler is made from renewable resources and is certified recyclable with corrugated materials. We conducted further investigation on our requirements and potential solutions for using a greener cooler in our European markets. In 2024, we aim to roll out these greener coolers to our major U.S. distribution centers. We also aim to begin implementing at some of our key European distribution centers for both wet and dry ice shipments.

Save: Enabling proper disposal of packaging

To help our customers correctly dispose of and recycle our product packaging, we have developed a catalog of identification codes for all our packaging materials. In 2023, we began offering specific **recycling guidance** for customers in Italy to facilitate the collection, reuse, recovery, and recycling of packaging materials. We also published disposal guidance for customers in other major markets including Germany, the United Kingdom and the United States. We will continue developing country-specific guidance for each of our major markets globally.

Healthcare

We believe it is our duty to consider the sustainability performance of our products throughout their life cycle, starting with the development stage.

Our approach to sustainable product design

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.

In 2023, we have worked on an update of our healthcare overarching strategy to make our medicines, our medical devices and their packaging more ecologically sustainable and user-friendly. The update strategy is planned to be deployed in 2024.

We are working to advance environmental compatibility across various phases of the **healthcare** value chain. For example, in 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 any harmful emissions into the air and water.

In 2023, we continued to implement the Design for Sustainability framework in our Healthcare R&D approach. The initiative includes establishing a governance framework to integrate sustainability more effectively during product development. It also involves defining **sustainability criteria** for qualitative and quantitative scorecards we can use to measure our sustainability impacts.

Our approach to sustainable packaging

In 2023, the Healthcare business sector continued to implement MPact, our sustainable packaging initiative that is aligned with our Global Healthcare Operations strategy. MPact investigates product packaging solutions to reduce the overall environmental impact. Its three primary objectives are to reduce Scope 3 GHG emissions, to reduce packaging materials while increasing the circularity of packaging, and to assess replacing secondary and tertiary plastic packaging by 2030. MPact also analyzes the requirements of the European Packaging and Packaging Waste Regulation (PPWR) in order to be ready, aligned and compliant in the upcoming years.

Meanwhile, we continue to implement various initiatives to reduce our product packaging, switch to more sustainable materials and promote recycling and circularity.

Roles and responsibilities

Our Healthcare business sector has integrated sustainability across its R&D and operating units. The implementation the 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.

Our commitment: Chemicals and product policies

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

We have an intranet page on chemical regulations for the Healthcare business sector that is aligned with our Group-wide EHS policy. It provides a framework and information on exposure limits, Predicted No Effect Concentration (PNEC)s, Globally Harmonized System (GHS) classes and categories, safety data sheets, labeling products according to **GHS requirements**, etc.

Further information can be found under **chemical product safety**.

Making product design and packaging more sustainable

Green Biotech

Launched in 2022, our **Green Biotech program** helps to integrate sustainable innovation and state-of-the-art technology into our development processes and products along the clinical manufacturing value chain. This program is aligned with the sustainability strategy to drive progress for more than one billion people through sustainable science and technology and is linked to other sustainability projects aimed at helping us achieve climate neutrality by 2040.

Compete to Green

During the reporting year, we added various sustainable product design and packaging initiatives to our **Compete to Green program**. This transformation program aims to comprehensively integrate sustainability across our business. We are currently applying the Principles of Green Chemistry to support our vision of designing sustainable products.

Slim packaging solutions

Launched in 2021, **Slim Pack** requires fewer raw materials, reduces transport volumes and is more convenient for customers and patients as it requires less storage space.

Since 2021, thanks to Slim Pack, we have reduced the ecological footprint of our Pergoveris®, Gonal-f® and Ovidrel® fertility pens by design. Slim Pack is 40% smaller than its predecessor and it is 100% free of plastic components. Plastic trays holding the pens were replaced by a paper carton alternative.

In 2023, the introduction of Slim Pack continued in further European countries. Its global rollout is expected to be completed in 2025.

Take-Back fertility pen pilot

To progress towards complete end-to-end sustainability for our Fertility portfolio – from manufacturing to patient use – we launched with consortium partners the Take-Back pilot program in Denmark in 2023. Through this program it is possible to hand in used injection pens from our company at fertility clinics throughout Denmark. The 12-month pilot program allows patients to return their used **fertility injection pens** for recycling. It aims to achieve a 25% return rate. The pilot aims to achieve a 75% recyclability rate of the returned pens to recycle their plastic, glass and metal.

Electronics

Within our Electronics business sector, we are committed to shaping the digital transformation in a sustainable way. Guided by our commitment to sustainability, we embrace a comprehensive approach in assessing and developing our product portfolio. This starts at the R&D stage and includes supporting our customers with their sustainability endeavors and actively collaborating with our partners in the industry to help solve existing sustainability challenges.

Our approach to sustainable product design

In our **Electronics** business sector, we aim to reduce any potential adverse environmental impacts caused by the manufacture, packaging, transportation, use, and disposal of our products. We aim to embed sustainability into our operations and apply strict sustainability criteria to prioritize new green and innovative materials that deliver sustainable value to our customers. We also believe in the importance of collaboration to reach ambitious sustainability goals and proactively engage in partnerships with our customers to collectively drive more sustainable value creation.

Our holistic approach comprises the following elements:

- **Sourcing responsibly**: As a member of the **Responsible Minerals Initiative**, we support the responsible sourcing of minerals, such as tantalum, tin, tungsten, gold, and cobalt. Our efforts help the respective supply chains make positive contributions to global, social and economic development.
- **R&D**: In 2023, we continued to implement a sustainability scorecard, which enables us to focus on sustainable criteria while developing products and solutions across all Electronics R&D projects. All our R&D projects successfully underwent sustainability assessments using this scorecard. Its detailed evaluations offer a comprehensive overview of our innovation portfolio and how it contributes toward our own sustainability goals as well as the United Nations Sustainable Development Goals (UN SDGs).
- **Process development**: We have implemented a digital tool that automatically calculates sustainability indicators, including process mass intensity as well as solvent and water intensity. It enables us to perform carbon footprint modeling and analyze the impact of recycling as well as the energy needed for individual process steps. It also enables R&D scientists to select the most sustainable synthesis route as early as possible. The tool helps us to more effectively steer our future portfolio.
- **Sustainability Performance Assessment of the current product portfolio:** In 2023, we continued the pilot review of our product portfolio to understand its sustainability profile and determine whether greener and equally effective chemistry alternatives are available. A multi-functional team is working to establish a process that puts greater emphasis on the sustainability and green chemistry aspects of our product portfolios. Our Product Sustainability Committee oversees the sustainability assessment process and results.
- **Contributing to our customers' sustainability goals:** We work to establish partnerships with our customers to optimally understand how our products and activities can contribute to their sustainability goals and to work towards solving the sustainability challenges of our industry. For example, we are actively involved in collaborations to develop and produce new process gases with a lower global warming potential. We also established a partnership to fund a new academic research program for more sustainable innovations in the semiconductor industry.

- **Continuous improvement through digitalization:** We aim to strengthen the use of data and digital solutions to further improve processes and implement sustainable changes. For example, we have analyzed the carbon emission drivers at the production batch level for a selected product. The proposed re-design of the process has enabled our teams to implement new and innovative steps that have reduced waste by approximately 35% compared with the original production batch. Carbon emissions have also been reduced through the application of the re-designed process.

Roles and responsibilities

We have implemented a sustainability governance structure across our Electronics business sector to ensure that we effectively implement our sustainability strategy across all Electronics business units. Since mid-2023, three different committees – the Commercial Leadership Board, the Supply Chain Leadership Board and the Technology Leadership Board – have been taking sustainability-related decisions, each in their area of expertise and responsibility. In addition, a dedicated sustainability program team coordinates sector-related sustainability activities. The team orchestrates key initiatives across all our Electronics business units in support of our **sustainability strategy**. In 2023, we also established an Electronics-wide sustainability network to closely connect sustainability experts and representatives across our business and to ensure integration and alignment of activities.

Our commitment: Adhering to chemicals and product policies

Product safety is one of our highest priorities. Starting at the development stage, we investigate potential adverse impacts that chemical substances may have. We aim to meet all statutory requirements along the entire value chain for our chemicals.

Within our Surface Solutions business unit, we aim to meet the strict standards of the EU Cosmetics Regulation for all our raw materials intended for the cosmetics industry. In addition, these raw materials should be 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** (**CBD**), 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 apply a Group-wide standard entitled Access to Genetic Resources, the objective of which is to define requirements, roles and responsibilities to ensure compliance with the Nagoya Protocol, even in countries that are not party to it.

We have established an internal exchange across our business sectors for aligning and sharing information on initiatives related to access and benefit sharing. In 2022, we successfully filed a due diligence declaration for two product developments with a genetic resource to the **German Federal Agency for Nature Conservation** (Bundesamt für Naturschutz, **BfN**) in accordance with current EU regulations. Based on one of the BfN's recommendations, we established a collaboration with the University of Oldenburg (Germany) in 2023. This new information exchange aims to clarify the practical implementation processes and enable improvements for authorities and the industry.

A wide range of solutions

Colloida silica

We began introducing **next-generation colloidal silica products** with increased efficiency, significantly reducing the amount of silica required per wafer. This supports the efforts of our customers in the semiconductor materials industry to use more environmentally sustainable materials, while improving performance and reducing costs. Our latest particle designs can achieve a 60% to 90% reduction compared with the original formulations. This innovation also enables silica to be supplied in concentrated form, reducing its packaging and transportation requirements by a similar degree. Customer feedback has been promising and we are continuing to work together to integrate these new products and reduce the environmental footprint of semiconductor manufacturing.

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.

In many cases, however, the most effective solvents also pose significant environmental hazards. For example, NMP, a mainstream solvent common in wafer cleaning, is highly toxic and classified as an SVHC (Substance of Very High Concern) under the European Union's **REACH regulation**. In response, we have continued expanding our portfolio of formulated cleaners and have committed to not using NMP in new product development.

PFAS replacement program

Per- and polyfluoroalkyl substances (PFAS) have unique chemical properties and are widely used in our daily lives. Today, the highly complex manufacturing of chips is impossible without process chemicals containing PFAS. At the same time, persistent PFAS exposure may lead to adverse effects for the environment and human health. We therefore support the search for PFAS substitutes and are actively conducting our own research in this area. We also work in close consultation with our customers on products and solutions for replacing PFAS. We already offer alternative products for some applications. For example, we have made progress in replacing PFAS surfactants in our products with non-PFAS alternatives in photoresists, solvent-based bottom antireflective coatings as well as rinse solutions and are transitioning our customers to the new versions.

Dynamic liquid crystal glazing

Liquid crystal dynamic window glazing automatically adjusts its tint level within seconds based on weather conditions. The self-darkening glazing effectively regulates glare and solar heat gain without blocking the view. As a result, it increases occupants' visual and thermal comfort while reducing life cycle GHG emissions by 40% compared with conventional outside shading. We offer these products under the **eyrise®** brand. Real estate investors regard eyrise® as an important way to help them deliver on their ESG targets and have installed more than 10,000 m^2 of our product since its launch in the premium commercial segment in 2021.

Natural cosmetic ingredients

We continuously work with our partners in the cosmetics industry to find more natural cosmetic ingredients that comply with strict criteria. As of the end of 2023, 103 of our cosmetic pigments and active ingredients had been confirmed to be compliant with Ecocert’s COSMOS standard for organic and natural cosmetics. The review, based on COSMOS’s new standard version 4.0, was completed for 98 cosmetic ingredients. We have also obtained **halal certificates** for all our cosmetic ingredients.

Vegan cosmetic products

A growing number of consumers view the use of non-animal and non-animal derived ingredients, i.e. **vegan and plant-based raw materials**, as a critical product attribute. Therefore, the majority 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

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

Reusable packaging

The packaging for specialty gases, thin films and some patterning products manufactured by Semiconductor Materials is designed to be reused. Our reusable packaging types include various sizes of cylinders and tube trailers for bulk specialty gases, smaller stainless steel and quartz containers for thin films and totes and drums made of high-density polyethylene for patterning.

Once our customers have used the product inside 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 demand for the manufacture of new containers and the associated resource requirements, thus moving us **closer to a circular economy**.

Plastic drum recycling

Our facility in Dallas, Texas (USA) specializes in producing materials and solutions for the semiconductor industry, with a focus on the planarization product portfolio. Typically, these raw materials are transported in plastic drums that are ultimately discarded as waste at the end of the production process. We have successfully developed ways to shred the drums and convert them to high-density polyethylene, a new raw material with multiple applications. Through this initiative, we processed more than 64 metric? tons of waste and eliminated drum disposal costs. We also expanded the reach and benefits of this recycling solution by processing waste from a customer’s facility.

Recyclable packaging

For large quantities of products in our patterning and 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

With Iriotec® 8000 pigments, we enable inkless printing with contact-free and durable laser marking technology. These pigments make it possible to mark plastics, which in turn makes them easier to trace and recycle, restoring value to used plastic packaging. The **laser marking** provides a unique identifier and acts as a digital product passport between the product and the database. It can replace ink and paper labels, reducing the waste associated with label removal.

In 2023, we showcased ways to improve the circularity of plastic packaging, highlighting the aesthetic appeal of effect pigments combined with the functionality of a laser marking additive in post-consumer recycling polymers. We collaborated with customers to demonstrate that recycling packaging containing effect pigments and laser marking has no impact on plastic sorting and provides attractive coloration after recycling. This approach enables the pigments to be reused in the production of new plastic products. We also started to promote this cosmetic packaging by using laser-marked, label-free tubes in our selected sample cosmetic kits.

Health for all

Global Health

Half of the world's population lacks access to essential health services. 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 equity

Our overarching objective is to drive health equity. We are committed to advancing global health and to using our scientific and technological innovations to improve the health of underserved populations in low- and middle-income countries.

Our **Global Health strategy** aims to develop and provide access to health solutions in low- and middle-income countries by creating equitable and **sustainable access mechanisms** for patients and society. Besides enabling access to our healthcare portfolio, our strategy focuses on diseases that disproportionally impact underserved populations. These include the neglected tropical disease (NTD) **schistosomiasis**, which is largely unknown in industrialized nations and attracts little attention or funding, and **malaria**. Specifically, the goals of this strategy are to:

- Expand access to our healthcare portfolio of innovations and products to patients in low- and middle-income countries.
- Drive the elimination of schistosomiasis as a public health problem.
- Catalyze innovative solutions for global health challenges, primarily targeting schistosomiasis and malaria. In particular, we strive to reach those who are most vulnerable, namely **women** and **children**.

Three core operating principles drive the execution of our Global Health strategy:

- **Pioneering solutions:** We develop new medicines and support the development of diagnostics for schistosomiasis as well as new treatment options and vector control solutions for malaria through our integrated science and technology approach.
- **Engaging with cross-sector partners:** We participate in multi-stakeholder global health platforms to amplify the impact and shape the progress of the United Nations (UN) Sustainable Development Goals. We join access alliances and create partnerships to implement our programs.
- **Creating sustainable business models and opportunities:** We strive to increase our company's competitiveness and value while delivering long-term benefits to society by reaching underserved populations with our products and technologies.

We also engage **in building capacity and expertise** across the value chain to strengthen health systems in low- and middle-income countries.

Our Access to Medicine approach

We strive to make health solutions available, affordable and accessible to all. As part of our sustainability strategy, we are implementing our access strategy for **low- and middle-income countries**. This will help us fulfill our ambition of serving a total of **170 million patients annually** across these countries by 2030. In 2023, we reached around 140 million patients.

Our strategy comprises two important aspects. First, we aim to accelerate and expand access to more than **80 million patients by 2030** with our healthcare innovations and portfolio of products for non-communicable diseases, such as cancer indications and endocrine disorders (more details about our SHAPE program can be found under **Prices of Medicines**). This strategy integrates a systematic approach to drive health equity and enables us to:

- Enhance our impact through equitable pricing to improve affordability while strengthening health systems.
- Ensure more patients can access our existing innovative therapies in a broader range of countries.
- Improve access to our healthcare innovations through our systematic approach to R&D access planning. Our objective is to ensure that future registrations in low- and middle-income countries are implemented within 12 months of the first global launch, such as in the European Union and the United States.

Second, we are continuing our efforts to eliminate the neglected tropical disease schistosomiasis as a public health problem. We aim to reach more than **90 million patients per year by 2030** through donations and new sustainable access models for established treatment and innovations. In the reporting year, we reached 84 million patients. We also invest in the fight against malaria.

Eliminating schistosomiasis as a public health problem

Schistosomiasis, also known as bilharzia, is a tropical disease caused by parasitic worms. The disease affects **almost 240 million people** worldwide and **kills an estimated 200,000 people** every year. More than 90% of cases are in sub-Saharan Africa, significantly burdening public health systems and local economies.

The ultimate goal of our schistosomiasis-related work is to eliminate the disease as a public health problem in line with the World Health Organization (WHO) **NTD Roadmap 2021-2030**. We are committed to the objectives of the **Kigali Declaration** on NTDs, in which participating companies, governments and private organizations commit to helping control and ultimately eliminating the 21 most prevalent NTDs, including schistosomiasis.

To achieve the elimination of schistosomiasis, we have adopted an integrated strategy, which we are implementing in close collaboration with multiple partners worldwide. The approach focuses on four 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 programs for a next generation of drugs, for the development of **arpraziquantel**, a new treatment option for children aged six and under, and for new and more sensitive diagnostics. We also build **research expertise and capacity** through our collaborations with institutions in endemic countries.
- **Behavioral change:** We believe prevention is the most effective health intervention. Therefore, we invest in behavior change initiatives to raise awareness of the causes and dangers of schistosomiasis and teach people how to prevent it. Since the disease is transmitted through contaminated water, we have also supported WASH (water, sanitation and hygiene) projects with the aim of preventing transmission of the disease by providing functioning sanitary infrastructures and access to clean water.
- **Advocacy and partnerships:** We accelerate the progress towards schistosomiasis elimination through partnerships as well as through the dialogue with the wider stakeholder community, for example via the Global Schistosomiasis Alliance (**GSA**).

Preventing and fighting malaria to support elimination

According to WHO estimates, almost half of the world's population is at risk of contracting malaria. The latest annual figures report over **240 million cases of malaria** and more than 600,000 related deaths, with around 80% occurring in children under the age of five. Currently, 95% of cases and deaths occur in Africa.

There is a growing need for new medicines to overcome increasing drug resistance, as well as additional preventive measures to achieve the ultimate goal of elimination. Through our **As One Against Malaria program**, we develop and help deliver integrated health solutions to fight this deadly disease.

Roles and responsibilities

Our Global Health organization is responsible for Group-wide initiatives, programs and sponsorships. Our experts work closely with the business sectors to internally leverage our common strengths and competencies. Our Global Health team also works with a broad range of international and local partners.

Our Health Equity (formerly Access to Health) unit extends the reach of our Healthcare portfolio in low- and middle-income countries. It leverages a strategic approach and shared value initiatives implemented in collaboration with our global and country teams.

Working closely with external partners (such as WHO), our **Schistosomiasis Elimination Program** executes initiatives to contribute to the elimination of schistosomiasis as a public health problem by 2030.

Our **Global Health Institute** catalyzes innovations for global health challenges by translating science, technology and digital approaches into transformative, integrated health solutions (e.g. treatments, diagnostics, technologies, and preventive measures) to fight schistosomiasis and malaria.

Our commitment: Providing a solid basis for access to health

Our commitment to expanding health access is summarized in our **Charter on Access to Health in Developing Countries**.

Every two years, the **Access to Medicine Foundation** publishes **the Access to Medicine Index**. The Index 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. We use the results of this benchmarking to inform our strategy.

The latest Index was published in November 2022. We **ranked fifth**, moving up from eighth place in the previous ranking. Our ranking is mainly attributable to our strong performance in the areas of research and development, intellectual property and capacity building.

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

We apply access models for global health, including donations (e.g. praziquantel), and work with partners to explore new procurement models for equitable and **sustainable access** to established treatment and innovations for NTDs.

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 in this complex and challenging environment.

This includes the shared value program, which supports our teams in low- and middle-income countries to implement initiatives that **address health system barriers** to patient access through capacity building and training for healthcare professionals. For example, a team in Argentina carried out a series of activities to raise awareness and train healthcare professionals on the importance of early detection and treatment of growth hormone deficiency in children, reaching 300 pediatricians in rural areas of the country. By the end of 2023 our shared value initiatives had reached around 54 million people via screening and awareness and trained around 20,000 healthcare professionals.

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

In 2023, a Startup competition resulted in the launch of collaborations in Indonesia and the Philippines. The objective is to support local health systems in strengthening and accessing pilot initiatives around non-communicable diseases (e.g. thyroid disorders).

We also upgraded an evaluation tool to track the impact of our access programs on patients, healthcare providers and health systems. This tool serves to monitor our progress over time and continue integrating recommendations from the Access to Medicine Index into our strategy.

Eliminating schistosomiasis: Four pillars

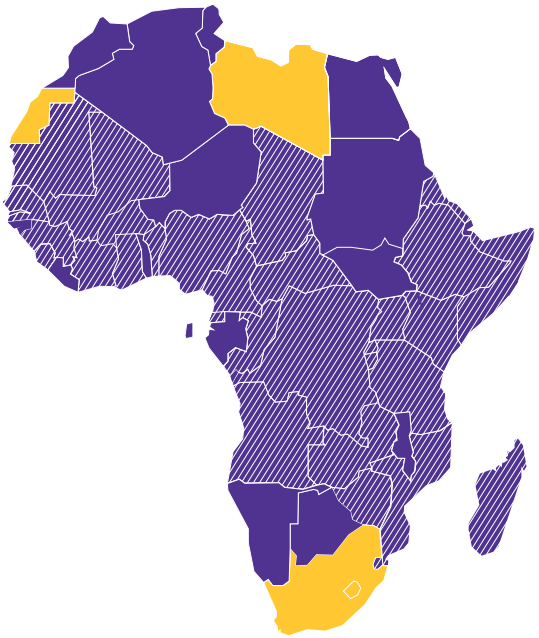
To support the elimination of schistosomiasis as a public health problem, we have adopted an integrated approach based on four pillars: treatment, research & development, behavioral change, and advocacy & partnerships.

Treatment

As part of our long-standing partnership with WHO, we are committed to producing and donating up to 250 million praziquantel tablets every year. This initiative is a major part of our integrated and coordinated approach to treating and eliminating schistosomiasis as a public health problem. Since 2007, we have donated around **2 billion tablets** to WHO to combat this disease. They have been **distributed in 47 endemic African countries**, primarily to treat school-aged children. In 2023, we donated over 210 million tablets for distribution in 37 countries, 29 of which are in sub-Saharan Africa.

Countries that have received donations of praziquantel tablets

Since 2007, we have donated **2 billion** tablets of praziquantel, which is enough to treat around 800 million school-aged children.



- African countries that have been receiving tablet donations from us since 2007*.
- African countries to which we also donated tablets in 2023.
- Countries that have received no donated tablets to date.

* Launch of our Praziquantel Donation Program.

To improve transparency of the supply chain for NTD medicine donations, including praziquantel, we use NTDeliver, a digital supply chain management tool. We work with multiple partners to optimize efficiencies and timelines from the manufacturing site to the national warehouse, and from there to the delivery of treatments. In Kenya, a tailored last-mile tracking system is now being used to capture real-time data up to the distribution level, reporting the number of tablets used and any remaining stock. In 2023, this digital system was rolled out in 13 Kenyan counties.

Research and development

In partnership with the **Pediatric Praziquantel Consortium**, we have developed **arpraziquantel as a new treatment** option for children aged three months to six years infected with schistosomiasis. In December 2023, **arpraziquantel received a positive scientific opinion** from the Committee for Medicinal Products for Human Use (CHMP), part of the European Medicines Agency (EMA). EMA assessed arpraziquantel under the “EU-M4all” procedure for high-priority medicines intended for markets outside of the European Union. This positive result facilitates arpraziquantel’s inclusion in the WHO List of Prequalified Medicinal Products. Prequalification will also help to support regulatory pathways in African countries. In Brazil, regulatory submission is planned by the consortium partner Farmanguinhos, the public pharmaceutical laboratory of the Fiocruz Foundation. Within the consortium, the implementation research program (ADOPT) is underway to prepare for the introduction of

arpraziquantel in schistosomiasis-endemic communities. New procurement and funding mechanisms for equitable and sustainable access to the medicine – to be made available on an at-cost basis – are being collaboratively explored.

On the research side, pre-clinical tests were conducted on a promising candidate to prevent and cure schistosomiasis as part of our efforts to develop a new generation of the drug.

To support drug discovery and development, we have introduced innovative artificial intelligence and epidemiology modeling. We have also started developing new technologies to diagnose schistosomiasis, including **female genital schistosomiasis**.

There is still a critical need for more **sensitive diagnostics** to detect cases in low-endemicity settings. They can help to effectively manage and surveil schistosomiasis while forming tools to eliminate the disease. Therefore, we are continuing 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.

Our R&D programs integrate and invest in scientific, educational and training initiatives to enhance expertise and capacity in low- and middle-income countries. More information can be found under **Building health capacity and awareness**.

Behavioral Change

Our health education project with the **NALA** (Neglected Tropical Disease Advocacy, Learning, Action) Foundation focuses on southwestern Ethiopia. It includes WASH activities and aims to promote long-term behavioral change via a community-based approach to eliminate schistosomiasis and other neglected tropical diseases. In 2023, the main emphasis of the project was its handover to the local government. The aim was to ensure the government could integrate the program’s disease-prevention initiatives into its processes and activities, sustaining and expanding the project’s outcomes. Operational research comparing two districts was conducted to evaluate the effectiveness of behavioral change combined with mass drug administration versus mass drug administration alone. The results showed a **greater reduction in the prevalence** of schistosomiasis in the intervention district, strongly suggesting a positive correlation between integrated interventions and changed behavior in these communities.

In 2023, we implemented our collaborative access to water program in partnership with World Vision in Ghana to improve WASH in communities, to combat infectious diseases such as schistosomiasis. This initiative has increased access to clean water for targeted households, health facilities and schools, reaching over 22,000 people. In 2023, the involved communities in Ghana showed a significant reduction (65-78%) in the number of cases of waterborne diseases, including schistosomiasis.

More information can be found under **Building health capacity and awareness**.

Advocacy and partnerships

We work with international and local partners to advance schistosomiasis control and elimination. We continue to support the Global Schistosomiasis Alliance (**GSA**), a coordinated, multi-sectoral effort to combat the complex disease. The GSA’s role as a central platform for all schistosomiasis matters has grown considerably over the past few years. In 2023, the GSA organized various meetings about schistosomiasis, including a full-day stakeholder event entitled “Celebrating recent achievements supporting elimination goals”.

Malaria: Treatment and prevention

Developing therapeutic solutions

As part of our **As One Against Malaria program**, we are developing a new drug called cabamiquine. It has the potential to be a promising treatment and preventive option for malaria due to its activity in several **different stages** of the parasite's life cycle. The drug has successfully completed two clinical Phase I studies as a single agent for **cure** and **prevention**, and we published the results in peer-reviewed scientific journals. In 2023, the program progressed to clinical Phase II with the implementation of two cabamiquine combination studies for cure and prevention. Preclinical research and new technologies, including a **new 3D culture-based hepatic platform** used to investigate the activity of our drug candidate, have supported the clinical development program.

In the course of 2023, our drug discovery platform generated an additional promising antimalarial candidate in early preclinical development.

Preventing and controlling malaria transmission

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

The laboratory tests conducted in Ghana evaluated the efficacy of a new formulation of IR3535® for longer-lasting protection. Based on the positive results, an additional field test was carried out to determine how IR3535® performs in real-world settings. The study indicated long-term efficacy and protection against anopheles bites in malaria-endemic areas.

In partnership with local institutions in Africa, we have established PAVON, the Pan-African Vivax and Ovale Network. It is a network of centers of excellence that support malaria elimination through the epidemiology of the parasites P. Vivax and P. Ovale and capacity building in Africa. In over ten African countries, PAVON supports policymaking, accelerates the development and uptake of new therapeutics and provides training to African scientists.

Engaging stakeholders

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

In 2023, we continued engaging with our partners and key stakeholders, including **WHO**, to advance global health discussions and address shared challenges. We are collaborating with partners such as the **END Fund** and **DNDi**, as well as with academia in African countries. We have engaged in consortia with partners, such as the **Pediatric Praziquantel Consortium**; alliances, such as the Swiss Alliance for Neglected Tropical Diseases; and advocacy groups, including the **Uniting to Combat NTDs** and **GSA**. In addition, we are working closely with foundations, such as the **Bill & Melinda Gates Foundation** and the **Access to Medicine Foundation**, that promote scientific research and health access. We have also joined forces with funders, such as the Global Health Innovative Technology Fund (**GHIT**) and the European and Developing Countries Clinical Trials Partnership (**EDCTP**).

We also strengthen our **collaborations with the scientific and global health community** through publications, patent sharing and taking active roles at international events. On several occasions, we presented the progress of the Pediatric Praziquantel Consortium program we lead, including at the Global NTDs Meeting (prior to G7), the EDCTP Forum and the SACRA conference. We also attended the Annual NTD NGO Network and the Coalition for Operational Research on Neglected Tropical Diseases (**COR-NTD**) in 2023 to address the spread of misinformation about NTDs.

Open innovation sharing

We have a responsibility to improve global access to health through our scientific and 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 the **safety and high quality** of medicines 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 **refrain 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**. Additionally, we support voluntary licensing agreements, including non-exclusive voluntary licenses, legally binding non-assertion covenants and clauses that aim to broaden access to health. We also support the concept of patent pools and believe they should be structured to improve access to medicines, prevent anti-competitive behavior and overcome geographic limitations.

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 facilitate the exchange of intellectual property. We aim to 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). It 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 extended the deadline for the least developed countries to apply TRIPS provisions to pharmaceutical patents by 2033.

Improving 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. It also covers products on **the WHO Model List of Essential Medicines** that are not within these therapeutic areas.

Creating research opportunities

We are committed to accelerating innovation and advancing science for the benefit of the most neglected populations. That is why we catalyze research in the spirit of open innovation and with the intention of reducing financial barriers. For example, through our **Schistosomiasis Research Grant Initiative**, which we launched in 2021, we awarded 15 research projects € 30,000 each in the past years. Most of the progress reports from these projects were made available by the end of 2023 and have so far resulted in four publications and additional funding for other organizations.

In addition, our **Open Global Health Library** shares 250 compounds from our proprietary chemical library that may be used for infectious diseases research. Since its launch in 2020, the library has been accessed 24 times for screening in 17 indications.

We are also collaborating with the **Drugs for Neglected Diseases initiative** (DNDi) and, through the memorandum of understanding with DNDi and the Swiss Tropical and Public Health Institute, continuing our dialogue for research 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 2022, pharmaceutical spending accounted for **between 6% and 31%** of total health spending by OECD countries. At the same time, advances in the research and development of innovative medicines are significantly transforming the healthcare landscape, enabling chronic diseases – the greatest cost drivers – to be treated more effectively and affordably.

Our approach to pricing medicines

The prices of our products reflect the value they deliver to patients as well as broader society. We price our products responsibly and work to prevent costs from becoming a barrier to treatment. In doing so, we strive to deliver on our steadfast commitment to providing **the broadest possible patient access**. We also continue to invest in meaningful scientific innovation to address the high number of unmet medical needs still faced by many patients and their caregivers. Therefore, we adapt the prices of our medicines in different geographic and socioeconomic segments according to people's ability to pay.

We acknowledge the affordability challenges many healthcare systems face amid growing financial pressures. We recognize the unique characteristics of each health system and adapt our pricing based on local market considerations, including unmet medical and treatment needs, health system capacity, infrastructure, socioeconomic standards as well as affordability within the respective healthcare system and the ability of patients to pay. We apply intra-country and inter-country equitable pricing approaches to all our brands.

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 annual price analyses to validate price thresholds and provide guidance on local pricing to our subsidiaries for the following year. We aim to ensure that they meet patient access needs by taking a **consistent, data-driven approach**.

To increase the availability, accessibility and affordability of our medicines in Africa, Asia, Latin America, and the Middle East, we have adopted a **new systematic approach known as the** SHAPE program. This will enable us to address these access barriers for underserved patient populations in low- and middle-income countries.

Additionally, we support innovative risk-sharing agreements and are working to improve data efficiency in health systems to help distribute funds and resources more optimally.

Roles and responsibilities

Our Global Value Demonstration, Market Access & Pricing (GVAP) unit, formerly called GMAP, reporting directly to a member of our Healthcare Executive Committee, evaluates market launch prices in coordination with the respective franchises. In addition, the GVAP unit systematically evaluates our medicine portfolios and applies equal access initiatives to them. 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 **Charter on Access to Health in Developing Countries** 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 comply with 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 2023, we continued to implement and maintain innovative risk-sharing agreements (RSAs) that provide immediate access to Mavenclad® for patients with multiple sclerosis (MS). We broadened access to this medicine through specific agreements in eligible countries across Europe, Latin America and the Middle East including Argentina, Hungary, Kuwait, South Africa and the United Arab Emirates.

SHAPE program for low- and middle-income countries

We have set **ambitious goals** for our SHAPE program to **improve access to our medicines** for underserved patient populations in low- and middle-income countries. The program covers both existing and upcoming products, focusing on therapeutic areas such as head and neck, colorectal and bladder cancers as well as thyroid disorders.

More specifically, to enable greater access to our medicines in low- and middle-income countries, we have adopted a three-pronged approach that goes deeper, wider and faster. We are going deeper in our collaborative efforts to remove access barriers in individual countries, including launching equitable pricing strategies and health system strengthening initiatives. We are going wider by making our medicines available in more countries, focusing on those with significant prevalence. And lastly, we are going faster when introducing new products to low- and middle-income countries, **reducing the time** between the first global launch and regulatory filings in those countries.

In 2023 we served **more than 57 million patients** in low- and middle-income countries with our healthcare portfolio. Boosted by our SHAPE program, we aim to **reach 80 million patients per year by 2030**. As of 2023, 15 pilots have been initiated in countries such as Argentina, Brazil, Egypt, Indonesia, and Mexico as well as several countries of Central America.

Strategic tender activities

Tenders constitute a significant percentage of our global sales and are a crucial growth driver for our established portfolio. We participate in government tenders for products used in public hospitals serving low-income patients, often in low- and middle-income countries.

High-quality, affordable second brands

For some of our existing high-quality products, we offer second brands at affordable prices, particularly in countries with a large percentage of low-income patients. For example, second brands for the betablocker bisoprolol (Concor®) are available at affordable prices in Brazil, Chile, Peru, Poland, and South Africa. The same applies to levothyroxine (Euthyrox®) in Brazil and Mexico, and to metformin (extended release, Glucophage® and Glucophage XR®) in Mexico.

Patient access programs

Patient access programs (PAPs) are **self-sustaining commercial programs** that provide registered medicinal products for underserved populations. They primarily seek to address affordability challenges. We operate PAPs in several countries. Some representative examples are shown here.

In India, we offer a program for our oncology drug Erbitux® that provides financial assistance to eligible underprivileged patients in line with local laws and regulations. Since we initiated the program in 2013, it has been made available to over 7,000 patients nationally. In 2023, approximately 1,200 patients benefited from the program.

In Indonesia, we started implementing an oncology access initiative featuring PAPs and affordable pricing for low- and middle-income patient groups. This initiative supported approximately 100 patients in 2022 and over 400 patients in 2023.

In Egypt, under the presidential initiative for early detection of cancers, we launched a nationwide equitable access program for Erbitux®. In support, we signed a Memorandum of Understanding in September 2023. The program aims to reduce the prevalence and mortality rates of colorectal cancers by increasing public awareness, providing continuous medical education for healthcare practitioners and supporting diagnosis and treatment.

In Peru, we worked closely with local authorities in 2023 to initiate a new project aimed at increasing hypothyroidism diagnosis in Lima and its surrounding suburbs.

Building health capacity & awareness

We believe that in order to make tomorrow's world a healthier place for everyone, it is essential 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-building 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, skills and information so that they can 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 and applying adapted mechanisms for access to medicines, we support countries in building up infrastructure and expertise for preparedness of local health systems to deliver care to all patients in need and address emergencies effectively. That is why we invest to strengthen the prevention, preparedness and resilience capabilities of health systems in low- and middle-income countries. Our efforts include the following aspects:

- **Increasing country preparedness** by enhancing scientific and healthcare workforce competencies and capacities through a network of experts.
- **Forming partnerships** to extend 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 operationalize these elements along the entire value chain in our collaborative programs and through our health education initiatives with our local partners.

We also collaborate with committed global partners to conduct educational campaigns for prevention, early diagnosis and awareness. We focus primarily on the diseases for which we have the greatest expertise. 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 and awareness initiatives in low- and middle-income countries to support our mission of improving the health of the most vulnerable populations.

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

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 **Charter on Access to Health in Developing Countries**. 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 national 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 also include malaria. Some examples include:

- Clinical trials in African health centers to investigate **arpraziquantel** as a potential new treatment option for pre-school children infected with schistosomiasis. These trials have enabled local healthcare professionals to acquire valuable experience in **Good Clinical Practice**, which they can apply in other studies.
- Our partnership with the **University of Cape Town for malaria drug discovery** activities that transfer scientific expertise and support the employment and training of talented local young scientists.
- **PAVON** (Pan-African Vivax and Ovale Network), a network of centers for excellence in over ten African countries. It offers training to African scientists in a collective effort to build capacity and expertise to treat all forms of malaria.

Manufacturing and supply chains

We manufacture some of our products directly in the regions where they are needed. We also 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 quality medicines where they are needed most.

- We produce praziquantel, the standard-of-care treatment for schistosomiasis, in our production facility in Mexico. This enables the provision of up to 250 million tablets per year to treat the disease, mainly in school-age children.
- We apply a local production approach in our work with the **Pediatric Praziquantel Consortium** to help countries become self-sufficient and serve local populations in need. We are partnering with Universal, a contract manufacturer in Kenya, to prepare for the large-scale production of arpraziquantel upon its approval, in addition to the production by Farmaguinhos in Brazil.
- We partner with Business for Health Solutions (**BHS**) to build sustainable supply chains of local distributors in Africa through our **Access Delivery Mentorship program**. Since the start of the collaboration in 2019, we have supported a total of seven distributors in five countries.

Education and awareness raising

We invest in **education and behavioral change initiatives** that raise disease awareness. Examples of those initiatives include:

- In Ethiopia, we operate a joint health education and WASH project in partnership with the **NALA Foundation** and the Ethiopian Ministry of Health. We reached around 230,000 community members and more than 370,000 school-age children in districts with the highest prevalence of schistosomiasis. More information about the project can be found under **Global Health**.
- To support behavioral change for **schistosomiasis** elimination, we introduced the **Bilharzia Storytelling Lab** **in 2022**. The lab brings together storytellers, health experts and community leaders from one country to develop creative communication products that provide accessible and tailored disease information to risk groups. We award the most promising solution with a € 10,000 prize. We intend to apply the concept in several **endemic countries** in sub-Saharan Africa. In 2023, the winning team from Rwanda successfully piloted its solution in three schools. We are preparing a third lab for 2024.

Health infrastructure and training

We are **building infrastructure, strengthening health systems and supporting training** in low- and middle-income countries.

In 2023, our achievements included:

- Continuing our support for the availability of microscopes and training sessions in **Ghana, Burkina Faso and Botswana** to improve local health workers' ability to detect malaria and other diseases that can be diagnosed via blood samples. In 2023, we also prepared to extend this initiative in Nigeria and Kenya.
- Completing our collaborative **access to water program in Ghana**. It improves healthcare infrastructure through safe water services in health centers and provides training to health workers on schistosomiasis case management.
- Partnering with the H3D Foundation at the University of Cape Town and launching a virtual, free-of-charge drug discovery and development course. It primarily targets students and scientists in low- and middle-income countries.
- Integrating the **Thyromobile project in the Philippines** as part of our access initiatives to strengthen health systems in low- and middle-income countries. The mobile unit brings essential equipment and personnel to specific communities to provide public information and healthcare services to patients with thyroid disorders. Since its launch in May 2023, the Thyromobile has covered 15 provinces in the Philippines with high incidence rates of thyroid disorders.

More information can be found under **Global Health**.

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.

January 30: World NTD Day
World **NTD** Day brings together civil society advocates, community leaders, global health experts, and policymakers who collaborate across disciplines 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 2023, the theme was again “Close the care gap”.

April 7: World Health Day
World Health Day raises awareness about a specific health theme each year to highlight a priority area of concern for the World Health Organization. In 2023, the theme was “Health for all”.

April 25: World Malaria Day
World Malaria Day highlights the need for continued investment in and sustained political commitment to malaria prevention and control.

May 25-31: Thyroid Awareness Week
In collaboration with the Thyroid Federation International (**TFI**), the annual awareness campaign, which used the slogan “**Know Your Past and Understand Your Future**” in 2023, to inform that genetics may strongly influence the risk of developing 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 2023, it focused on again on ”connections”.

July 27: World Head And Neck Cancer Day
World Head and Neck Cancer Day is an opportunity to inform the general public about head and neck cancer and recognize the impact it has on those affected in the community.

August 1: World Lung Cancer Day
The Forum of International Respiratory Societies has observed World Lung Cancer Day every year since 2012 to raise awareness about the risk factors of the disease.

September 17: Patient Safety Day
We celebrate **Patient Safety Day** via our affiliates worldwide to raise awareness about this vital topic. In 2023, we organized various online and on-site events with affiliates in all continents and jointly celebrated Patient Safety Day with other companies in India and Kenya.

September 29: World Heart Day
World Heart Day was established by the World Heart Federation and increases awareness about cardiovascular diseases and how to control them to negate their global impact.

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 highlight the issue of unequal access to treatment in Europe.

November 14: World Diabetes Day
World Diabetes Day was created in response to growing concerns about the escalating health threat posed by diabetes. The aim of the 2023 campaign, the theme of which was “Show Type 2 Diabetes the Red Card”, was to keep diabetes in both the public and political spotlight.

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. 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**).

The APEC Healthy Women, Healthy Economies **Research Prize**, which we support, has highlighted sex-disaggregated research that enables policymakers, business leaders and other stakeholders to identify and implement measures that improve women's health in APEC economies. In 2023, the US$ 20,000 prize was awarded to Dr. Jason Junjie Huang, the Deputy Director and Research Assistant Professor at the Centre for Health Education and Health Promotion at the Chinese University of Hong Kong). His study investigated the global burden of endometrial cancer and its risk factors, primarily lifestyle choices such as smoking and alcohol consumption.

Embracing Carers

Embracing Carers® is our global initiative led in collaboration with prominent caregiving organizations from around the world. Embracing Carers is designed to increase awareness, action and discussion around the frequently overlooked needs of unpaid caregivers.

In 2023, Embracing Carers collaborated with the United Nations-Guided Global Initiative on Ageing (GIA) to provide a **training course** on critical skills for family caregivers. The five-module course offers professional instruction and guidance on vital caregiving topics such as using medical equipment, creating safe environments and overcoming communication barriers.

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 that arise from their use. We continuously strive to improve the safety of our products and reduce the environmental impact of our businesses through innovative solutions and digital communication tools.

Our approach to safe chemical products

Product safety is one of our top priorities. During the product development phase, we investigate the potential adverse impacts of chemical substances. 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 pertinent regulatory requirements. We publish this information primarily on the relevant digital channels. As paper safety data sheets are still common in some countries, we can 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.

An important topic arising from the European Green Deal is the universal PFAS (per- and polyfluoroalkyl substances) restriction proposal submitted in January 2023 by five national authorities to the European Chemicals Agency. Products based on PFAS play an essential role in our three business sectors (Life Science, Healthcare and Electronics) and are valuable to society in various ways. For example, they enable the manufacture of products and services that address medical needs, accelerate drug development and manufacturing, aid the discovery of new treatments for challenging diseases, and enable more intelligent electronic devices. However, very persistent PFAS may lead to adverse effects for the environment and humans. We therefore support the search for substitutes for PFAS and conduct active research ourselves. As part of our mission to advance human progress, we fully support the ambition for smart and targeted PFAS regulations. We are actively searching for PFAS substitutes and conducting research into viable alternatives.

Roles and responsibilities

Our Life Science, Healthcare and Electronics business sectors have organizational structures in place to implement our product safety strategy in line with their **respective business requirements and customer needs**. This approach includes registering chemicals, classifying hazardous substances and highlighting risks using safety data sheets, labels and digital communication tools.

Our **Group standard** provides a framework for governing the setup of effective operational processes for product safety, hazard communication and chemical regulatory compliance throughout our business sectors. In addition, the Group Chemicals Regulations Council fosters cross-sectoral alignment of strategic regulatory activities required for existing and emerging chemicals regulations as well as sustainability and identifies potential impacts for our company.

This approach also applies to innovative fields of development such as nanomaterials, which we use with the greatest of 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 standard defines 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**. Our organizational setup enables us 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 enables 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 to stay abreast of trends and best practices.

In 2023, there was one incident of non-compliance with regulations concerning potential health and safety impacts and the labeling of our chemical products. Some information and the REACH registration number was missing on a safety data sheet which resulted in a fine in Italy. In this regard, to the best of our knowledge, there were no negative impacts on human health or the environment.

Safety analysis of our products

Safe and sustainable by design implies that product safety starts during development. Therefore, at an early stage of our **product development process**, we analyze innovations in terms of their impacts on human health and the environment. We continuously evaluate the intrinsic hazards of both our existing and new products to create relevant product safety information in line with 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 **relevant information** to our customers and the public, which helps to raise awareness of the hazards and build a greater understanding of how to mitigate risks and use the products safely.

To obtain the relevant information on hazard profiles, we employ industry-standard **digital tools** through which we gather 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. We have automated and standardized most 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. In 2023, we successfully used (Q)SAR and read-across-derived data to register products under the Act on the Registration and Evaluation of Chemicals in

Korea (known as “Korea REACH”). 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

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.

Project M-SPOT: Our Sustainable Portfolio Transformation

In July 2023, we started to apply a portfolio sustainability assessment approach based on the industry standard of the **World Business Council for Sustainable Development**. Initially, we started implementing it in our Life Science and Electronics business sectors. Our Healthcare business sector will be included in the framework in 2024. Using M-SPOT, we are systematically developing a baseline for the sustainability performance of our product portfolio. We will determine the ratio of our sales from the most relevant products within defined performance categories. This performance data will enable us to set corporate, sector and business segment sustainability targets for strategic portfolio steering.

Patient safety

The safety of patients treated with our medicines is our top priority. Our medicinal products must be effective in treating the respective disease while posing the lowest possible risk to patients. That is why we aim to 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 human **clinical studies** to investigate the safety and efficacy of the medicinal product. During clinical development, we diligently use all the collected data to continuously evaluate the medicinal product's **benefit-risk profile**. If we consider the medicinal product's benefit-risk profile to be positive, we then submit an application for marketing authorization to the relevant regulatory authorities.

Continual monitoring of product safety risk profiles

Once we launch a new medicinal product, the number of patients being treated with the product 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 risks and assess the benefit-risk profiles of the products after their market launch. Pharmacovigilance includes the process of monitoring a medicinal product on an ongoing basis to detect and assess safety signals as part of signal management activities. Our pharmacovigilance system and our pharmacovigilance business continuity management help to ensure continuous monitoring of adverse effects, allowing us to proactively and transparently minimize and communicate any risks. Emergency response procedures for business continuity are managed in accordance with global and local business continuity plans, tested in regular, defined intervals or with mock scenarios. In addition, we provide healthcare professionals and patients with the **latest information on the safety** of our marketed medicinal products. The scope of continuous safety monitoring covers the entire life cycle of a product, ranging from development, market launch and commercialization to the expiration or cancellation of its marketing authorization.

We continuously monitor our service objectives through our **pharmacovigilance quality strategy** and annual quality plan. We also regularly monitor our performance and compliance through the internal and external reporting of key performance indicators. These include making timely submissions of high-quality documents to health authorities, along with assessments to support the safety monitoring of products throughout their life cycles.

The capabilities we have developed and strengthened in this area include:

- Advanced benefit-risk management
- Safety data analytics in support of benefit-risk strategy implementation (taking into account and integrating real-world data)
- Advanced signal detection methodology
- Reporter-oriented methods for collecting adverse effects (such as via mobile app)
- Comprehensive evaluation of identified adverse effects by the company in the context of the products' known benefit-risk profiles and ensuring medicinal product information and labels reflect any relevant changes

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 and approval.

By 2025, we aim to deliver product specific safety and benefit-risk strategies to support the execution of all key priority programs in line with internal and external stakeholders' expectations. These strategies will enable us to understand in greater detail the benefit-risk profiles at each stage of product development and post-marketing. During the reporting year, we worked toward achieving this goal by providing high-level safety and benefit-risk contributions for development programs with priority in oncology, neurology and immunology. Our contributions include for example, safety planning where all safety issues are properly defined with their corresponding strategy. And additionally, ongoing or planned safety investigations are also structured along with risk minimization measures. Additionally, we supported new partnering and in-licensing opportunities with medical safety strategies and outputs and ensured professional contract management for exchanging safety data. We also worked to develop a better understanding of Global Patient Safety's tasks and interactions during early development. Our initiatives included the scope extension of the Benefit-Risk Action Team to early development phases, and the respective enhancement of the Benefit-Risk Strategy Document to enable early, evidence-based safety decisions.

Roles and responsibilities

Our Global Patient Safety unit is responsible for drug safety. 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 vision is to embed a deep knowledge of safety into early decision-making as we evolve **to practice predictive safety**.

Our experts help to ensure that all information on the risks and adverse effects of our medical products are 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**. We convey this information through stipulated regulatory reports, safety communications (as applicable) and corresponding product label updates.

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 their impacts on our global and local pharmacovigilance systems. This council enables us to make strategic decisions and govern changes in pharmacovigilance requirements, which fosters our target to ensure continuous compliance with regulatory requirements.

Our Medical Safety and Ethics Board

Our Medical Safety and Ethics Board (MSEB) is the governance board that oversees the safety and benefit-risk assessments of our medicinal products throughout their clinical development and commercialization. This internal 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 endorses appropriate **measures to minimize risks**, such as updates to product information. The MSEB also assess human-related bioethical matters as appropriate and is accountable for the use of our medicinal products in early and post-study access.

The cross-functional 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 head of Global Patient Safety. Important issues may be submitted to the MSEB for final assessment and endorsement.

Our commitment: Guidelines and statutory requirements

We rigorously aim to follow international guidance and standard procedures. These include the International Council for Harmonisation (**ICH**) guidelines, the Good Pharmacovigilance Practices (GVP) established by the European Medicines Agency (**EMA**), Title 21 of the Code of Federal Regulations governed by the U.S. Food and Drug Administration (FDA), and other pharmacovigilance regulations issued by national health authorities. We also aim to comply with relevant new statutory pharmacovigilance regulations in the countries where we market our products.

Inspections and audits for drug safety monitoring

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 2023, we had five pharmacovigilance inspections (2022: four).

We also perform audits to our systems and processes to ensure that all our units and subsidiaries involved in pharmacovigilance consistently meet all global requirements. In 2023, we conducted a total of seven pharmacovigilance audits (2022: 19) and found no significant deviations in our pharmacovigilance systems from these requirements and standards. We also conducted twelve external audits at our vendors and licensing partners involved in pharmacovigilance, helping us to improve our pharmacovigilance processes and to comply with regulatory requirements.

Applying our proactive safety strategy to benefit-risk assessments

Regarding product safety risk assessments, we have successfully implemented in the past years an improved benefit-risk management strategy to become a more proactive and benefit-risk-focused organization. This strategy firmly establishes the concepts and principles for conducting benefit-risk assessments at each stage of product development and post-marketing. In addition, our Benefit-Risk Action Team co-leadership model, created in 2022, enables us to understand in even greater detail the benefit-risk profiles of our products and

enable early decision-making within our organization to protect patient safety. Ultimately, we aim to provide **the right medicine to the right patient at the right time**.

Product safety assessment and emergency response procedures

We use a product prioritization tool that objectively scores the safety profile of our products, forming the basis of our product prioritization strategy. The tool ranks our products into high-, medium- or low-risk categories, defining our approach for benefit-risk activities and product safety surveillance. Our actions include individual case safety report management, signal and risk management, our benefit-risk strategy and aggregate safety reporting. These measures ensure the **efficient management of safety** risks of our medicinal products throughout their life cycles.

If our safety risk assessments identify any emerging safety issues, safety observations that require urgent safety measures or other new safety information that could impact the benefit-risk balance of the medicinal product (e.g. product recall as part of crisis management), we promptly notify health authorities via the respective emergency response procedures. These steps include seeking health authority approval for further actions and communicating the information to relevant healthcare professionals. In addition, we promptly share this information with our business partners and clinical trial investigators, enabling them to take proper actions where the medicinal product concerned is used.

Innovative safety signal detection

Through our tools for safety signal detection, we analyze and manage large volumes of global data, such as scientific studies and information about adverse events in connection with our medicinal products. These tools ensure we retain adequate oversight and comply with regulatory timelines for safety signals and other safety-related factors. They also enable us to archive all signal data, documentation and decisions in a unified repository, which facilitates easy data access and analysis as well as cross-functional collaboration between our 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 product information documents, such as package leaflets, thereby, we want to ensure our medicinal products contain the latest information on safety, efficacy and pharmaceutical formulation. In accordance with regulatory requirements, we submit modifications to our leaflets to the respective regulatory authorities for approval. In 2023, there were no reportable 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 and maintain the required experience and knowledge to carry out their activities. We manage our training via a global learning platform and verify compliance with our training requirements by producing training completion reports.

Our approximately 25,000 internal and external 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 medicinal 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 us to ensure adherence to pharmacovigilance requirements.

Enhancing patient safety and sharing expertise with other countries

We share our experiences and expertise and engage in dialogues about pharmacovigilance with health authorities by contributing to initiatives hosted by non-profit organizations and industry associations. We actively participate in expert committees and industry groups worldwide, such as the European Federation of Pharmaceutical Industries and Associations (EFPIA), the Pharmaceutical Research and Manufacturers of America (PhRMA), the Kenyan Association of Pharmaceutical Industry (KAPI), the Association des Laboratoires Pharmaceutiques Innovants (ALPI) in Algeria. We also network with health authorities to improve the safety of our medicinal products and promote the topic of pharmacovigilance.

For example, as an active member of the non-profit organization TransCelerate, we have directly contributed to initiatives such as intelligent automation opportunities in pharmacovigilance, pharmacovigilance agreements optimization and the interpretation of guidance documents and regulations. We also maintain a long-term partnership and regular dialogues with the health authority in Kenya via KAPI and we have contributed in 2023 to the work of the ALPI to help the Algerian health authority refine pharmacovigilance guideline.

Reporting side effects via app

Since 2017 we have been offering a reporter-oriented method, a mobile and web application. It allows field forces, sales representatives, healthcare professionals, pharmacists and non-medically trained users to **report any suspected side effects** or adverse events arising from the use of our medicinal products. Since 2023, the application has been available in 14 languages in over 70 countries.

Campaigns for patient safety

We celebrate **Patient Safety Day** via our affiliates worldwide to raise awareness about this vital topic. In 2023, we organized various online and on-site events with affiliates in all continents and jointly celebrated Patient Safety Day with other companies in India and Kenya.

Pharmacovigilance in Access to Health

We strive to continue expanding pharmacovigilance expertise worldwide, particularly in countries where healthcare workers need to build this expertise.

We continue our efforts 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. For example, we have maintained a stable partnership with the Tunisian health authority over many years to actively establish the national pharmacovigilance system through various initiatives. In 2023, we sponsored or partnered with health authorities in Tunisia and Morocco to support their pharmacovigilance congresses. We also included patient safety in our rollout of trainings to 28 pharmacy students in Saudi Arabia, and around 350 pharmacy students in Egypt. We launched an initiative to raise awareness about thyroid treatments in Indonesia.

Access to approved medication for unapproved uses

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, based on an individual benefit-risk assessment, may wish to administer a product to a patient suffering from a serious 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, factually balanced and clearly state that it applies to unapproved use. To maintain compliance, we have implemented a standard to govern these requests. We also 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 high 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 with government authorities as well as national and international organizations. Together, we want to tackle product-related crime and raise awareness of the issue among stakeholders and 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. Experts from various units, including Legal/Trademarks, Product Security, Export Control, Supply Chain, Patient Safety, Regulatory Affairs, and Quality Assurance support the operational implementation of the strategy. Furthermore, 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 notifications we receive regarding suspected counterfeit medicines. Our response aims to comply with both the regulatory requirements and our own wider objectives for tackling counterfeit products. We proactively **conduct investigations** both online and offline in order to identify and disrupt the availability of illicit products in legitimate and illegitimate channels. We document 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 2023, 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 by tracking them 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 complying with the terms of the Guideline for Operators published by the European Commission.

3. Protecting 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 robust security measures for products and supply chains.

We strive to 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 audits 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 by the Luftfahrt-Bundesamt (German Federal Aviation Office).

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. This allows users to quickly and effectively test the quality of 113 different active ingredients. Since 2023, six additional active ingredients for the treatment of heart disease have been added to the compact lab’s method portfolio. Currently, a total of 1012 Minilabs are in use. In 2023, 36 Minilabs were delivered, of which 34 went to fifteen countries in the Sahel zone and 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. Our employees 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.