

# One Health



As one of the only biopharmaceutical companies focused on both human and animal health, and in recognition of the connection between the health of people and animals and our shared environment, Merck & Co., Inc., Kenilworth, NJ, USA, applies a One Health approach to our mission to save and improve lives. Our company is actively collaborating with human, animal and environmental health stakeholders to tackle major population health challenges, including antimicrobial resistance, zoonotic diseases, vector-borne diseases, and ensuring a safe and sustainable food supply.

## What is One Health?

One Health is a collaborative, multisectoral, and multi-disciplinary approach—working at the local, regional, national, and global levels—with the goal of achieving optimal health outcomes. One Health approach recognizes the interconnection between the health of people, animals, plants and their shared environment.<sup>1</sup>

Over the past century, society has undergone many major changes, including those brought about by technological innovations, increased mobility, industrialization, urbanization, and globalization. In many ways, these innovations have advanced human, animal and environmental health, but they have also increased our vulnerability to new health challenges. The concept of One Health is not new but has gained momentum in recent years due to several new challenges resulting from these changes:

1. With the growth of the human population, more people are living in close contact with wild and domestic animals. Animals play an important role in our lives, whether for food, clothing, livelihoods, transport, sport, education or companionship. Close contact with animals and their environment provides more opportunities for diseases to pass between animals and people. In fact, 60% of existing human infectious diseases are zoonotic in origin.
2. Disruptions in land use, environmental conditions and habitats have created new health issues and opportunities for diseases to pass between animals and humans.

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<sup>1</sup> <https://www.cdc.gov/onehealth/basics/index.html>

3. The increase in international movement of humans, animals and animal products has increased the probability and speed of spreading diseases across borders and around the globe.

## What Are Key One Health Issues?

Issues that could benefit from a One Health approach include zoonotic diseases, antimicrobial resistance, a safe and sustainable food supply, vector-borne diseases, health security, mental health and chronic disease to name a few.

## One Health Requires Collaboration

The key to an effective One Health approach is collaboration. Professionals in human health (e.g., doctors, nurses, public health practitioners, epidemiologists), animal health (e.g., veterinarians, veterinary technicians, paraprofessionals, farmers and other agricultural workers), environmental sciences (e.g., ecologists, wildlife experts), and other areas of expertise need to communicate, collaborate and coordinate. Other relevant stakeholders in a One Health approach could include policymakers, communities and even pet owners. No one person, organization, or sector can address issues at the animal-human-environment interface alone.

**As a company with deep expertise in both human and animal health as well as our commitment to our shared environment, Merck is well-positioned as a strong partner in a One Health approach to contribute to today's health solutions.**

## One Health Requires Collaboration

### Prevention

Prevention of disease in animals and humans is a key component of any One Health approach. Our company has a broad pipeline and portfolio of vaccines and technologies to help prevent both human and animal diseases, including zoonotic diseases. By adopting preventative strategies, we can improve human and animal health and well-being—and advance public health.

Merck Animal Health is one of the world's largest producers of vaccines for animals, producing over 102 billion doses per year. Our vaccines safeguard animal health and welfare to further prevent the spread of disease. Vaccination and other prevention strategies are in development to reduce foodborne infections (for example, salmonella) and help ensure a safe and sustainable food supply. Rabies is an example of fatal zoonotic disease that can be carried by a number of hosts, including dogs, and has a significant, negative impact on public health budgets, local communities and livestock economies in developing areas. Of the thousands of people who die from rabies every year, 99 percent of those affected received the infection from rabid dogs, and 40 percent of the bites by rabid animals affect

children under the age of 15.<sup>2</sup> Our company is committed to addressing this problem by funding a number of [programs](#) to increase canine vaccination and rabies awareness education in areas where the disease is endemic.

Zoonotic and other emerging infectious diseases pose particular threats to global health security but can be managed or prevented through well-coordinated vaccination efforts. For example, Merck's vaccine against Ebola Zaire virus, a deadly and extremely contagious zoonotic disease that has had a devastating impact on parts of the world, is an important tool for outbreak preparedness and response. Investigational doses of Merck's vaccine played an important role in the response to the Ebola outbreak centered in the eastern region of the Democratic Republic of Congo, which thankfully came to an end during the summer of 2020. Merck, in collaboration with our public and private global partners, remains committed to supporting current and future outbreak response efforts.

### **Surveillance and Monitoring**

Our company is committed to advocating for and participating in scientifically based surveillance and monitoring systems to better understand, track and predict health-related issues.

For example, Merck has long supported evidence-based approaches to understand AMR. The U.S. [National Antibiotic Resistance Monitoring System \(NARMS\)](#) is part of the U.S. national public health surveillance system and is an excellent example of an interagency government program that utilizes a One Health approach to understanding the risks posed by AMR.

Recognizing the importance of AMR surveillance, Merck initiated the [Study for Monitoring Antimicrobial Resistance Trends \(SMART\)](#), one of the world's largest and longest-running AMR surveillance studies, in 2002. SMART has more than 200 sites across more than 60 countries - with 67 of the participating sites in low- and middle-income countries. Merck is working to ensure researchers around the world have greater access to SMART data. This type of AMR surveillance data can be a valuable resource in determining pathogen prevalence and antibiotic susceptibility, important data that can be used to support antimicrobial stewardship programs and improve patient outcomes.

Additionally, our identification and monitoring tools and services help farmers better manage their livestock's health and well-being, in addition to the responsible and appropriate use of veterinary medicines, including antibiotics and vaccines. We also offer technological solutions to help pet owners monitor their companion animals for improved health outcomes. Click [here](#) to learn more.

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<sup>2</sup> [https://www.who.int/health-topics/rabies#tab=tab\\_1](https://www.who.int/health-topics/rabies#tab=tab_1)

## **Innovation**

Our company is one of the last remaining large pharmaceutical companies with a continued focus on research and development of novel vaccines and therapeutics for a broad array of infections. Our human and animal health research laboratories collaborate in antimicrobial and vaccine research in many ways including by sharing enabling technologies, expertise, and evaluation of external opportunities. Our human health antimicrobial and vaccine R&D programs span discovery to late-stage clinical development and address the key unmet needs established by public health authorities. In 2017, we established the [Merck Exploratory Science Center](#) in Cambridge, Mass, which focuses on the earliest stages of discovery research to better understand the underlying biology of human disease. The center's research explores the most promising areas of emerging disease biology and will be used to inform Merck's ongoing drug discovery with a special focus on infectious disease.

Beyond vaccines and therapeutics, our company is investing and developing predictive, monitoring and diagnostic technologies to help animal caretakers make data-driven evaluations of an animal's health status and optimize their animals' health and well-being. These tools will allow for sophisticated monitoring and better decisions about health interventions for animals. For example, as world leader in identification and monitoring for livestock, we offer solutions to help advance animal well-being and make farmers more efficient. Additionally, our DNA traceability technology can link any animal-derived food product back to the animal and farm from which it originated.

## **Stewardship of Essential Medicines**

For over 100 years, our company has played a leading role in addressing antimicrobial resistance (AMR), not only discovering and developing medicines and vaccines to treat and prevent infectious diseases in humans and animals, but also supporting responsible use of these products.

As inventors of many of these important medicines, we are committed to advancing antimicrobial stewardship (AMS). AMS involves multi-disciplinary efforts to systematically improve antimicrobial use with the ultimate goals of optimizing outcomes and minimizing the unintended consequences of antimicrobial use. We collaborate with a broad group of stakeholders, including governments, regulators, veterinarians and healthcare providers to implement evidence-based AMS policies and programs in both humans and animals. We support AMS through a variety of initiatives focused on education, implementation, research and/or advocacy. More information can be found [here](#).

Several drugs originally intended for use in animals have been found to be effective in treating human disease. For example, ivermectin, a product Merck initially designed for livestock, has contributed enormously to the (near) elimination of river blindness and

lymphatic filariasis (LF) in West Africa that have been a major public health problem affecting local economies. Better control of river blindness opened up the Senegal River Valley and other affected areas in Africa and across the world to both people and agriculture. In 2019 alone, 403 million treatments were approved, and 344 million treatments were shipped to endemic countries for the elimination of river blindness and LF.<sup>3</sup>

### **Ensuring a Safe and Sustainable Food Supply**

Diseases in food-producing animals result in 20% loss of global production, jeopardizing global food security. Prevention of animal disease, through vaccination and other tools, is critical to ensuring a safe, nutritious sustainable food supply and to prevent foodborne diseases. Our company has implemented precision livestock management and traceability initiatives to enable more accurate risk profiling, early disease detection and individualized diagnosis/treatment decisions. <sup>1</sup> Our company's vaccines help safeguard animal health and welfare to ensure that producers are able to supply high-quality and secure protein.

Our company is developing vaccines and other strategies to reduce foodborne infections caused by Salmonella and Campylobacter. Additionally, our research, monitoring tools, and technologies enable farmers across the world to better manage their animals, leading to enhanced trust and security for all who use and consume products sourced from these animals.

### **Respecting Our Shared Environment**

Our company recognizes and appreciates the common environment that is shared by both humans and animals, including livestock, companion animals, fish and wildlife. Environmental health plays a large role in the overall health of the human and animal population, which underscores the need for interventions to prevent disease transmission. Our company supports science-based, environmentally sound international and national programs to address the challenges to environmental health, including: conducting environmental risk assessments of our products to support drug marketing authorizations, implementing programs to minimize environmental risk from manufacturing discharges, and supporting industry efforts to offer medicine disposal programs. More information can be found [here](#).

### **Future Actions and Strategies in One Health**

We support programs and policies that take a One Health approach to achieve optimal health outcomes for people, animals and our environment.

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<sup>3</sup> <https://www.msdrresponsibility.com/access-to-health/affordability/mectizan-donation-program/>

- **For Companion Animal Health**, we advocate for a comprehensive approach to ensure the overall health and well-being of companion animals, including health monitoring, traceability, appropriate rabies vaccination policies and ongoing monitoring and treatment of zoonotic diseases and other vector-borne diseases.
- **For Livestock Health**, we work to improve health management, welfare and health outcomes through the use of our digitally connected identification, traceability and monitoring products and solutions.
- **For Antibiotic Use**, we raise awareness of the responsible use of antibiotics, and advocate for science-based and practical policies applying to people and animals.
- **For Food Safety**, we build and establish trust among food producers, processors and retailers by enabling full accountability and greater transparency, quality and sustainability of food sources through our unique combination of science, technology and insights-driven solutions, ultimately to advance public health.
- **For Prevention**, we advocate for incentives and policies that promote the use of vaccination and policies that foster innovation to continue the development of new vaccine technologies for people and animals.
- **For International Standards and Global Trade**, we advocate for science-based international standards for food safety, animal health and welfare and support the World Trade Organization rules-based trading system.

### Merck -- a Strong One Health Partner

The One Health approach is a pathway to collaboratively improve health and sustainability for the people and animals that share our complex and ever-changing environment. Multidisciplinary approaches are needed at the local, national and global levels to prevent, detect and respond to issues at the interfaces between humans, animals and the environment. Our company is a key partner in many multisectoral initiatives that are One Health focused because of our expertise in both human and animal health.