

One Health: One World, One Future

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ABSTRACT

“Why human, animal and environment health are connected – and why treating them as one is the work of the century”

The environment, animals, and human health are all part of one story rather than three distinct ones. Ebola, COVID-19, bird flu, and the slow-burning problem of antibiotic resistance are all found where people, animals, and ecosystems converge. One Health is the term for the 20-year-old notion that these seams can only be addressed together, which has been embraced by the world's leading agricultural and health organisations. This feature examines the origins of this concept, why it is important to both veterinarians and the general public, how it appears in everything from the family dog to the world's livestock and wastewater, and why its potential still depends on dismantling disciplinary barriers.

INTRODUCTION:

Veterinarians and Medicos have lived in different worlds for a large portion of modern history, and the environment has been someone else's domain. However, over the past decade, there has been a significant increase in the dissemination of

infectious agents, and the risk of pandemics has gradually increased due to the expansion of epidemics, zoonoses, and epizootics. Bird flu, Ebola, Zika, and SARS-CoV-2 have demonstrated to the world what ecologists and veterinarians have long maintained: the health

of humans, animals, and ecosystems are interrelated, and a threat that starts in one rarely stays there (Destoumieux *et al.*, 2018).

That acknowledgement has a name. Physicians, veterinarians, environmental scientists, public health specialists, wildlife experts, and many others must work together to implement One Health, a global plan that acknowledges the interdependence of public health, animal health, and environmental health (Overgaauw *et al.*, 2020). It is an intentional, multisectoral, transdisciplinary, holistic perspective on health.

Where the concept originated:

One Health didn't just happen. It evolved from the earlier idea of "One Medicine," which solely promoted the combination of veterinary and human care in the treatment of illnesses that both humans and animals share (Destoumieux *et al.*, 2018). The third crucial component- the health of ecosystems, especially wild fauna-was included to the "One World – One Health" concept in 2004.¹ What began as a link between two fields evolved into a framework encompassing public health, human medicine, ecology, veterinary medicine, microbiology, and even social sciences, economics, and commerce.

The momentum was palpable. Among the "integrated health" movements, this one has been the most successful, gaining the backing of international financiers, national governments, and UN organisations. Particularly catalytic have been the COVID-19 pandemic, the Ebola outbreak in West Africa, and the growing issue of antibiotic resistance.² To assist nations, a One Health Joint Plan of Action is currently coordinated by the "Quadripartite," which consists of the Food and Agriculture Organization, the UN Environment Program, the World Health Organization, and the World Organization for Animal Health (Dar *et al.*, 2024).

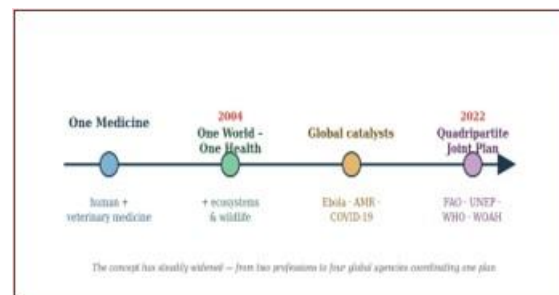


Figure 1. The evolution of the idea. One Health grew from "One Medicine" (human plus veterinary care), gained its environmental third leg in 2004, and - spurred by Ebola, AMR and COVID-19 — is now coordinated by four global agencies under a shared plan of action.

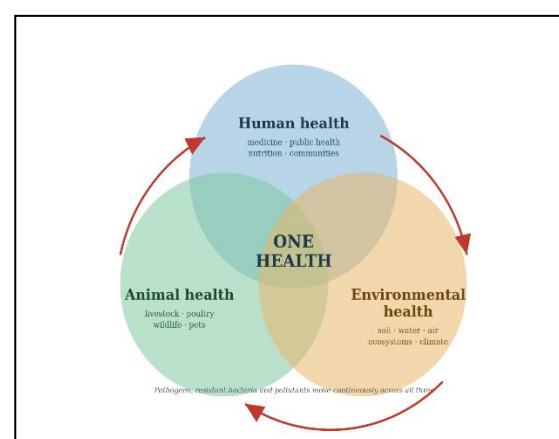


Figure 2. One Health in one picture. Human, animal and environmental health overlap rather than sit side by side; pathogens, resistant bacteria and pollutants circulate continuously across all three, so no single sector can safeguard health alone.

Why animals matter?

The majority of infectious diseases that pose a threat to public health originate from animals. Almost three-quarters of newly developing infectious diseases that are considered critical to human health are zoonotic, meaning they originated in wild animals. The distribution of infections, their vectors, and their reservoirs is altered by habitat destruction, environmental pollution, and climate change. As a result, diseases like schistosomiasis and chikungunya have lately surfaced in previously uninhabited regions of Europe (Destoumieux *et al.*, 2018).

Additionally, the relationship moves in a more moderate path. Pets can be really helpful for their owners' physical and emotional health, but they can also spread zoonotic infections through behaviours like sleeping with them or letting them lick wounds. The relationship between people and their pets has evolved from that of working animals to that of companions. In One Health conversations, dogs and cats are sometimes overlooked. However, appropriate pet ownership, which includes sensible cleanliness, breeding, and nutrition, is a One Health approach in and of itself that doctors and veterinarians can teach together (Overgaauw *et al.*, 2020).

The problem that made One Health urgent: antibiotic resistance

If there is one issue that has propelled One Health to the top of the policy agenda, it is antimicrobial resistance (AMR) – the point at which bacteria develop the ability to survive the drugs designed to kill them. In 2019 AMR was linked to some 5 million deaths, with 1.27 million of them directly caused by drug-resistant bacterial infections. By 2050, at current trends, the annual toll could reach 10 million (Al-Khalaifah *et al.*, 2025).

Resistance is the textbook example of the One Health problem because it won't stay in one sector. The use of antibiotics in human medicine, for animal feed additives for growth promotion and disease prevention, and the discharge of residues into the environment all select for resistant organisms that can be transferred through human-animal-ecosystem interrelations via direct contact, the food chain and water. Wastewater, agricultural run-off and manure become “resistance hotspots” where resistant bacteria and resistance genes accumulate and swap between microbes; up to 30 to 90 percent of the antibiotics given to livestock are excreted largely unchanged, turning manure into a rich reservoir of

residues and resistance genes. The response must also be shared because the drivers are shared, and AMR cannot be contained in a one sector approach (Quadripartite, 2023).

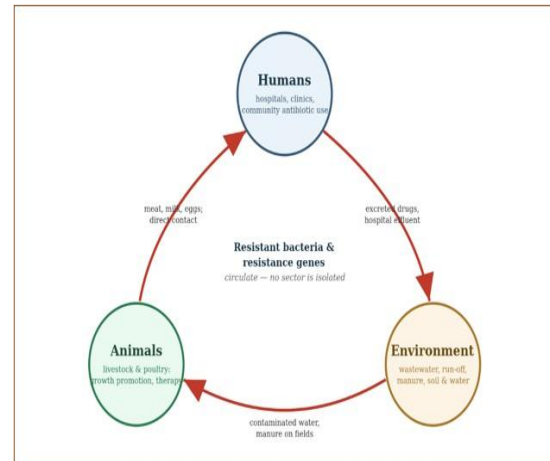


Figure 3. How resistance circulates. Antibiotic use in people, in farming, and drug residues in the environment all select for resistant bacteria, which then travel between the three sectors through food, direct contact, and water — so resistance cannot be contained in any one of them.

Global politics now incorporates that logic. Because AMR spreads between humans, animals, plants, and the environment and necessitates a coordinated, cross-sectoral evidence base, the Quadripartite agencies have created a One Health priority research agenda for AMR based on five pillars: transmission, integrated surveillance, interventions, behavioural insights, and economics and policy (Quadripartite, 2023).

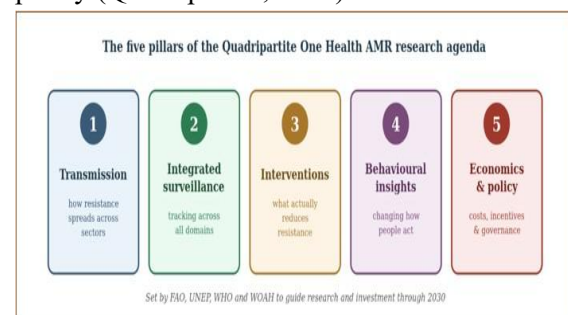


Figure 4. The Quadripartite's five research pillars for tackling AMR through One Health, set by FAO, UNEP, WHO and WOAHT to steer research and investment through 2030.

Extending the circle: biosecurity, plants, and welfare

As more individuals discover what it omits, One Health is expanding. One argument is that animal welfare ought to be at its core because, while being virtually absent from legally binding international law, welfare is intimately related to animal health and, consequently, to human health. A UN convention on animal health and protection, according to some, would give the One Health approach actual legal authority. Over 60% of newly discovered viral diseases in humans are zoonotic, and roughly 70% of them start in wildlife. This serves as a reminder that protecting ourselves and treating animals are related issues (Goetschel, 2024).

Some expand the boundaries to include invasive plants and species. According to the "One Biosecurity" plan, the dangers of bringing undesirable organisms—such as pests, weeds, and diseases—across international boundaries go beyond the conventional distinctions between the environment, agriculture, and health. A single invasive species can simultaneously be a crop pest, a disease reservoir, and a threat to biodiversity (Hulme, 2020). However, since sustainability is still not universally understood in the human, animal, and environmental domains, a parallel endeavour has proposed broad approaches to assess if such multisectoral partnerships are actually long-term sustainable (Dar et al., 2024).

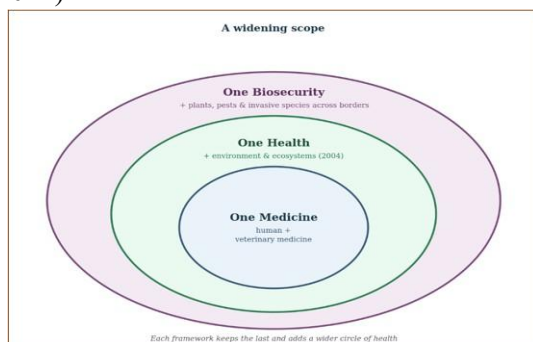


Figure 5. A widening scope. Each framework keeps the last and draws a larger circle — from One Medicine, to One Health with the environment added, to One Biosecurity, which brings in plants, pests and invasive species crossing borders.

Where it still falls short

Despite the momentum, One Health is still a work in progress. Twenty years later, the promised integration of ecosystems is still unfulfilled: very few researches truly address the ecology of health, and a large portion of published work still sees the environment as merely the background to transmission rather than an active player. The social, legal, and economic sciences, as well as the primary environmental sciences like soil and climate, are still somewhat marginal in practice (Destoumieux et al., 2018).

The obstacles are both structural and scientific. The primary obstacle is the absence of connection between ecological, environmental, and evolutionary science and human and veterinary care. Establishing shared research networks, shared training, and shared surveillance is necessary to remove that barrier (Destoumieux et al., 2018). Even in cases where international frameworks are in place, their implementation is uneven due to a lack of resources, lax enforcement, ingrained practices like the selling of over-the-counter antibiotics, and political division among the ministries in charge of health, agriculture, and the environment (Al-Khalaifah et al., 2025).

What this actually means

For the local veterinarian, doctor, or farmer, One Health is more of a set of practices than a catchphrase:

- View surveillance as a common duty. When data from hospitals, farms, wastewater, and animals are analysed collectively rather than separately, the patterns of resistance, disease outbreaks, and environmental contamination are best understood (Al-Khalaifah et al., 2025).
- When prescribing and farming, consider the system as a whole. Vaccination, biosecurity, and the careful use of



antibiotics prevent disease at its source, which is nearly always less expensive than battling it downstream (Al-Khalaifah *et al.*, 2025).

- Acknowledge the importance of the relationship between humans and animals, from ethical pet ownership in the clinic to animal welfare in legislation, as both improve human health.5 (Overgaaauw *et al.*, 2020; Goetschel, 2024)
- Cross disciplinary boundaries: When medical professionals, veterinarians, ecologists, and social scientists truly collaborate, the greatest benefits result (Destoumieux *et al.*, 2018).

The bottom lines

One health does not imply that everything is somehow related to everything else. It is a practical realisation that our institutions have historically been designed to disregard the common norms that govern the onset of disease, the transmission of resistance, and the health of ecosystems. The concept has already changed how people throughout the world view antibiotics and pandemics (Destoumieux *et al.*, 2018).

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