

# Introduction

## Is One Health delivering results?

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### Summary

The One Health concept is responsible for a shift towards practices, policies and partnerships that better link the health of people, animals and our shared environments. The papers in this issue of the World Organisation for Animal Health *Scientific and Technical Review* illustrate a myriad of ways in which a One Health approach could advance or has already advanced human and animal well-being. Independently, the authors conducted their own thematic analysis of One Health activities and found strong support for the notion that One Health has inspired a renaissance in veterinary public health, increased our basic knowledge of the mechanisms and natural history of many animal diseases, promoted systems approaches to health issues and encouraged stronger cross-sectoral collaboration. Unfortunately, many collaborations often end when funding ends and many remain distinct partnerships. One Health still suffers from a lack of strong environmental stakeholders and has mostly worked on infectious disease rather than addressing many of the pressing determinants of health that will confront us in the next century. There is no shared conception of health across veterinary, medical and environment sectors, and this is an issue that must be confronted if there are to be programmes that are truly integrated across people, animals and the environment.

### Keywords

Animal – Collaboration – Environment – One Health – Public health – Zoonosis.

There are two basic ways to measure whether or not a programme is successfully delivering results. One way is to enumerate activities or outputs such as workshops, conferences, papers, etc. If one were to track the explosion of publications, projects and programmes evoking One Health, it would be hard not to conclude that One Health has been remarkably successful. The second approach is to track impact or outcomes, such as improved cost effectiveness, reduction in the burden of disease, etc., which ultimately is far more meaningful, though often more challenging and less immediate than quantifying outputs. Encouragingly, papers in this volume elucidate successes in both categories. At the broadest level though, evaluating One Health success is still challenging. While an explicit definition of the goals of a health programme is crucial to demonstrating its impacts and effects (1), the

recent promotion and adoption of One Health has, for the most part, been done without a specific globally shared goal beyond that of collaboration.

The authors began to address the question posed in the title of this paper by examining One Health definitions found by scanning online descriptions of One Health organisations, institutions and programmes. They found no globally accepted definition of One Health. They subsequently conducted a thematic analysis of the different definitions and descriptions found to identify key concepts associated with One Health. Figure 1 visually summarises the findings as a word cloud that randomly displays words or phrases associated with online One Health definitions, with the word's size being proportional to the number of times the word appeared. While not a complete and systematic review



**Fig. 1**

**A word cloud identifying key words and terms associated with definitions of 'One Health' found by an online search of programmes and agencies involved in One Health**

of all One Health definitions and goals, Figure 1 provides a sense of what the English-speaking world is talking about when it speaks about One Health. One Health, as being practised in 2013, seemed focused on improving or supporting multidisciplinary communication and collaboration at the human–animal–environment interface, with a major goal of addressing key public health outcomes of integrated disease prevention and surveillance, food safety, and food security. This characterisation of One Health overlaps significantly with the scope of practice of veterinary public health espoused by the Food and Agriculture Organization of the United Nations (FAO), World Health Organization (WHO) and World Organisation for Animal Health (OIE). These organisations describe veterinary public health as a multidisciplinary issue generally relating to understanding, preventing and controlling zoonotic diseases and managing food safety issues (2). A significant impact of One Health has been a re-invigoration of veterinary public health.

Just as the emergence and impact of HIV was a significant contributor to the rebirth of the fields of infectious disease research and public health, it can be postulated that emerging zoonotic diseases, particularly severe acute respiratory syndrome (SARS) and avian influenza, have been the inspiration for One Health, which has in turn resulted in a renaissance of modern veterinary public health. Although veterinary public health is at the very heart of veterinary medicine's historic and current practice, the number of veterinarians involved in public health is comparatively small and has declined in many countries over recent years. Seeing the role of animals in the spread of emerging infectious disease has reminded both the veterinary and medical professions that the origins of human diseases can be found in how society interacts with animals (3). This reminder was acutely needed in more affluent countries, where society had grown increasingly disconnected from the animal world. The One Health interest in emerging infections re-opened doors for investment in the control

of endemic zoonoses and food security, issues causing much greater burdens of human suffering and death than emerging infections (4, 5, 6). The WHO, for example, has organised international conferences aimed at raising global awareness about neglected zoonotic diseases because of their significant morbidity and mortality in impoverished livestock-dependent communities.

Increased attention to zoonoses in general, and wildlife diseases specifically, has resulted in an increase in the number of publications and programmes that have improved our basic knowledge of the mechanisms and natural history of many animal diseases. For example, the US\$75 million PREDICT programme, funded by the United States Agency for International Development, seeks to identify new emerging infectious diseases that could become a threat to human health and focuses on wildlife that are most likely to carry zoonotic pathogens, such as bats, rodents, and non-human primates. One Health has driven investment in improved surveillance, new approaches to disease prevention and control, and control of pathways for infection. These investments have not only served to improve preparedness and response to emerging infections, but also contributed to better animal health, with its subsequent benefits for animal welfare, food security and local communities. Investment in research to find possible new emerging disease risks in animals has increased our understanding of microbiological biodiversity in animal hosts as well as revealed new avenues for pathogen flow between people and animals. This increased knowledge may have come at a cost, because it increased political and public awareness of the role of animals in emerging diseases and thus created a risk perception that may foster a fear of animals. This can lead to calls for the exclusion or elimination of animals, rather than improved understanding of how people and animals can safely live together (7). This problem of risk perception is a common concern among people and organisations working with wildlife and, although actual reactive responses are rare, a One

Health approach could add rational and environmentally sound interpretations and recommendations to otherwise traditional zoonotic disease control efforts.

The emphasis of One Health on multi- and interdisciplinary cooperation has led the veterinary public health sector to extend its approach, i.e. to reduce its traditional emphasis on veterinary biomedical interventions targeting single hazards (e.g. drugs and vaccines) and to take a team approach instead, one that examines multiple dimensions of a shared problem. This in turn has opened lines of investigation and action that are systems-based and recognise that health outcomes are derived from complex socio-ecological interactions. While this concept has been applied for over 30 years in human population health and ecosystem management, it has been less common in veterinary approaches to risk management. The systems view of One Health can be traced back to the Manhattan Principles on 'One World – One Health' (8), which were developed in 2004 by international experts at a symposium in New York City organised by the Wildlife Conservation Society. They urged leaders and institutions to take an holistic approach to the prevention of epidemic/epizootic disease and the maintenance of ecosystem integrity by recognising the link between human, domestic animal, and wildlife health. One of the key features of these principles was their emphasis on the use of collaborative relationships across disciplines, communities and sectors to meet the challenges of global health and biodiversity conservation. While still lacking a strong environmental stakeholder, this collaborative approach is effective and is best seen at an international level. For example, in 2010, the OIE, FAO and WHO produced a tripartite concept note on 'Sharing responsibilities and coordinating global activities to address health risks at the animal–human–ecosystems interfaces'. Their vision was that of supporting a 'world capable of preventing, detecting, containing, eliminating, and responding to animal and public health risks attributable to zoonoses and animal diseases with an impact on food security through multi-sectoral cooperation and strong partnerships' (9). The OIE, FAO and WHO have also worked together to develop the Global Early Warning System for Important Animal Diseases including Zoonoses (GLEWS), a One Health initiative that combines and coordinates the mechanisms of the three organisations to assist in prevention and control of animal disease threats. Several regional, national and sub-national agencies and institutions now support One Health working groups aimed at fostering better collaborative approaches. New and effective collaborations targeting high-consequence diseases have been well illustrated in other sections throughout this volume. One Health has fostered new governance processes and structures which ensure that obligations and responsibilities for policy and programme design and delivery are shared among agencies, while at the same time preserving the legislated authority of the individual partners – a situation that was exceedingly uncommon even ten

years ago. Examples include the Danish Zoonosis Centre, AfriqueOne, the One Health Association of South Asia and the Rockefeller Foundation's Disease Surveillance Networks Initiative. Unfortunately, many One Health collaborations often end as project funding terminates or they are a collage of partners where agencies remain distinct and separated. One Health activities are often initiated and maintained by veterinary organisations, with lesser involvement from physicians and a virtual absence of the environment sector. Too often 'the environment' is considered to be included when wildlife are part of One Health considerations, but wildlife are simply 'unowned' animals, not environments or ecosystems.

Animal disease is a critical driver of poverty and a source of significant human morbidity and mortality, and thus deserves the re-invigorated focus brought by One Health. In the face of a human population of nine billion in the next half century, finding ways to produce safe, secure and sustainable food through improved livestock systems will become an increasingly important role for One Health. The recent shift in One Health investment and effort towards endemic zoonoses, livestock diseases and food safety is a necessary development to ensure this approach remains relevant beyond the spectre of emerging infections. The FAO, for example, has recognised the importance of animal health in achieving the Millennium Development Goals (10). It can, however, be concluded that the Millennium Development Goals and Millennium Ecosystem Assessment Goals cannot be achieved independently. Despite widely accepted evidence that the health of humankind is interdependent on healthy populations of a wide diversity of other species and on the ecological processes of the biosphere, an equivalent thrust to achieve health outcomes through new understanding of environmental interdependence has not fully materialised in One Health. This may be due to the wide embrace of One Health by the veterinary community without a corresponding engagement of the environmental sector as originally envisioned by some (8).

Most of the fundamental social and environmental determinants of health, such as water security, biodiversity, climate change, social justice, equitable access to resources, pollution and land use planning, have remained beyond the scope of most One Health programmes, despite their profound impacts on human and animal health and welfare. Two factors that could be driving the more specific focus on infectious diseases in One Health are i) the desire to reduce economic losses and to ensure access to markets by meeting the legislated obligations to attest to freedom from specific infectious diseases of animals, and ii) the investment of resources from the public health sector for emerging zoonotic disease research and control programmes.

With the looming challenges of climate change, depletion of ecological services, and exponentially growing human

populations, achieving animal, environmental and human health by separate science, policies and actions is impossible. One Health is encouraging investigators and managers to find levers for change outside the more traditional technical approaches to animal health management. For example, veterinarians have begun to apply social science methodology to better understand the human dimensions of animal disease surveillance (11). Studies of zoonoses have seen veterinarians working in concert with public health professionals to examine the role of the social determinants of health on community risk (12). One Health is helping to pave a path forward by fostering development of the intellectual tools for a collaborative, integrated approach that manages the co-dependence of human, animal and environmental health, but attention needs to be paid towards a wider suite of determinants of health than just infectious diseases.

As made clear in some of the papers in this volume, it would be unfair to characterise One Health as becoming entirely anthropocentric. It is important to recognise the presence of words such as 'ecosystem', 'wildlife', and 'natural resources' in Figure 1. Although public-health-related concerns are an overwhelming proportion of One Health activities, the idea that there are reciprocal relationships between people, animals and their shared environment and that these relationships affect animal health outcomes, is not lost. The Animal and Human Health for the Environment and Development (AHEAD) programme is an example of the application of a One Health perspective for the mutual benefit of people, agriculture and wildlife. Launched at the 2003 International Union for Conservation of Nature (IUCN) World Parks Congress in Durban, South Africa, AHEAD works to find collaborative ways to address challenges at the interface of wildlife health, livestock health, and human health and livelihoods. Unfortunately, the One Health community has not directed sufficient attention to collecting evidence to support the case that investment in One Health approaches to animal health and conservation is a social good equal to investment in One Health approaches to public health disease prevention and control.

One Health has focused its efforts on controlling disease rather than on protecting and promoting health. Health is more than the absence of disease. Health is a reflection of how individuals or populations interact with their world to cope and recover from stressors or changes, often what ecologists refer to as 'resilience'. The Ottawa Charter for Health Promotion, which was drawn up by 38 countries at the First International Conference on Health Promotion in 1986, popularised the notion that the inextricable links between people and their environment constitute the basis for a socio-ecological approach to health and recommended that health agencies recognise that reciprocal care of health and the environment is essential for human well-being

(13). One Health can expand that conception of reciprocal care across and between people, animals and environments to protect and promote the health of each rather than looking to two-thirds of this triumvirate for disease hazards (animals and environment) that threaten the remaining third (people). This would require One Health to accept a modern definition of 'health' as the capacity to adapt to, respond to, or control life's challenges and changes (14), rather than the absence of disease.

The One Health community faces several challenges. The first is to develop and sustain cross-sectoral collaborations over the long term. New governance mechanisms and funding strategies will be required to ensure that collaborations extend beyond the current urgent issue or funding opportunity. The second challenge is to forge a coherent perspective of health across species and disciplines. The way that we currently assess and measure health is ill-defined or inconsistent across animal species (15) and goals for animal health and welfare often conflict with the way that society uses animals. Health has different philosophical and applied meanings in veterinary medicine, human medicine and environment sectors, resulting in a lack of a shared conception of health. This is an issue that must be confronted if we wish to have 'all-of-government' One Health programmes truly integrated across people, animals and the environment. The final challenge to One Health is to turn this ideal into sustainable practice, i.e. to focus beyond infections and to begin to invest in promoting and protecting health in a reciprocal manner across people, animals and the environment.

To return to the question posed in the title of this introduction: is One Health delivering results? It is clear that One Health is responsible for a recent shift in practices, policies and partnerships towards those that better link the health of people, animals and our shared environments. The idea that health is a product of interactions with the world around us is not new. Hippocrates recognised that health and disease were the result of the interaction between the constitution of a person and the context of his or her physical and social environments (16). Many indigenous cultures have held the same view for centuries (17). The biomedical world shifted away from that understanding as it pursued advances in biomedical technology. One Health is a first but critical step in changing the approach to animal health research, policy and practice, i.e. moving away from the reductionist, single-hazard-focused approach that is widely pursued in clinics and laboratories and moving towards a broader holistic, multi-causal approach embedded in the socio-ecological environment. The ideal of One Health recognises that our historic approach to dealing with health risks and determinants in isolation is poorly suited to the challenges that will confront us in the next century.

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