41. Manifold health: the need to specify One Health and the importance of cooperation in (bio)ethics

F.L.B. Meijboom[*] and J. Nieuwland
Centre for Sustainable Animal Stewardship, Faculty of Veterinary Medicine, Utrecht University, Yalelaan 2, 3584 CJ Utrecht, the Netherlands; f.l.b.meijboom@uu.nl

Abstract

It looks like One Health (OH) is here to stay, given its endorsement at the level of policy and the way it shapes curricula of relevant scientific disciplines. This has not gone unnoticed by philosophers who critically appraise the concept and its normative assumptions (cf. Capps and Lederman, 2015; Thompson and List, 2015; Verweij and Bovenkerk, 2016). Though applauded for bringing together a diversity of disciplines to deliver solution to multifarious problems, the concept involves ambiguity. On the one hand, its added value sometimes remains unclear when narrowly understood as cooperation between veterinary professionals and their human health counterparts, on topics such as zoonotic disease and antimicrobial resistance. On the other hand, more broadly interpreted, One Health encompasses everything related to health, which may lead some to question its relevance and applicability. To address these vulnerabilities of the One Health concept we suggest a four-way distinction of functions. This avoids a narrow understanding by pointing out the relevance of health promotion, while at the same time putting flesh on the bones of OH as a full-fledged perspective on interspecies health policy. We believe these functions provide a compelling specification of One Health, enriching practical application as well as ethical reflection. We complement this proposal with an outline for an ethical framework to support decision-making at different levels within a One Health perspective.

Keywords: health, humans, animals, nature

One Health: linking humans, animals and the environment

The idea of One Health (OH) explicitly puts human and non-human animal health (hereafter 'animal') against the background of their shared environment (Zinsstag *et al.*, 2011). In that sense, it represents an ecological perspective on public health (cf. Lang and Rayner, 2012; Coutts *et al.*, 2014). OH understands human beings, as well as animals, as inextricably part of ecosystems. This recognition of the interplay between individual health and the environment also has its historical precursors, going back for example to the writings of Hippocrates (Barrett and Osofsky, 2013). Nonetheless, it took until the beginning of the 21st century, facing an upsurge of emerging infectious diseases, for the idea of OH to gain a strong foothold. In 2004, the Wildlife Conservation Society made an effort to bring together relevant partners to discuss this threat of emerging infectious diseases arguing that:

> (r)ecent outbreaks of West Nile virus, Ebola hemorrhagic fever, SARS, monkeypox, mad cow disease, and avian influenza remind us that human and animal health are intimately connected. A broader understanding of health and disease demands a unity of approach achievable only through a consilience of human, domestic animal and wildlife health – One Health (Cook *et al.*, 2004).

'One World One Health' was officially established, along with the so-called Manhattan principles to inform health policy (Cook *et al.*, 2004). This was followed up some years later in 2008 by an endorsement of the idea of OH by the American Veterinary Medical Association (AMVA), describing it as the need for a 'collaborative effort of multiple disciplines – working locally, nationally, and globally –

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to attain optimal health for people, animals and the environment' (2008). Eventually, the UN endorsed OH via a tripartite position paper (2010), involving the World Health Organization (WHO), the Food and Agricultural Organization (FAO) and the World Animal Health Organisation (OIE).

While OH as an idea spans a wide range of factors, much of how it is understood and operationalized relates to zoonotic diseases – pathogens with the ability to jump species – and other threats associated with animals and our interactions with them, such as antimicrobial resistance (Lapinsky *et al.*, 2014). Given that the increasing threat of emerging infectious diseases has played a remarkable role in the development and endorsement of OH, this focus does not come as a surprise. But it could obfuscate other relevant aspects and avenues of thought. Now that One Health is acknowledged at several levels – e.g. determining (inter)national health policy, shaping curricula of medical sciences and professions (Gibbs, 2014) – the question of what OH involves exactly becomes rather relevant. This in part involves value assumptions about whose health matters (cf. Nieuwland and Meijboom, 2015). We suggest a further specification of OH in terms of four functions with a two-fold aim: to get a better grip on the idea of interspecies health as well as to avoid blind spots in ensuing moral deliberations.

Interspecific threats

OH is often linked to health problems related to emerging infectious diseases (EID), especially in the case of novel threats to human health, for example Avian Influenza, AIDS, Ebola, and SARS. It is no coincidence that these examples are zoonotic with a wildlife origin, as the majority of EID's are zoonotic (Taylor *et al.*, 2001), with almost 75% of zoonotic emerging infectious disease events having a wildlife origin (Jones *et al.*, 2008). The development of antimicrobial resistance in animals such as pigs is another example of a substantial threat to health. Transmission of these resistant bacteria to human beings could lead to infections not susceptible anymore to antimicrobial treatment. As One Health connects the health between human beings and animals against the backdrop of their shared environment, this human-centric way of viewing animals as source of infectious threat is not the only way. We could also look at interspecies relations from the perspective of animals. Furthermore, the focus cannot be restricted to zoonosis. For OH reverse zoonotic diseases, or anthropozoonoses, are equally relevant (Hanrahan, 2014).

Interspecific benefits

Others have already pointed out the potential of One Health to extend beyond interspecific threats to health. Hodsgon and Darling put it as follows:

> One Health is not limited to the prevention of zoonoses; it also encompasses the human health benefits from animals. Benefits to humans include animals used in the production of food for human consumption, animals as models for research of human diseases, and pet-assisted therapy (2011: 189).

What the authors call *zooeyia* signifies the human health benefits that follow from interaction or use of animals. Establishing the benefits of interspecies interaction is not straightforward. The correlation between, for instance, better cardio-vascular functioning and having the companion of a dog may not reflect a causal relation. The American Heart Association carefully states, based on the available literature that '(p)et ownership, particularly dog ownership, is probably associated with decreased CVD [cardio-vascular disease] risk' (Levine *et al.*, 2013). Interspecies interaction may be one of the ways in which human health could be promoted. Animals are inextricably part of human societies, which makes interspecies interaction a possible social determinant of health. However, similar to the bi-directional nature of threats to health between species, benefits might also accrue for animals; OH

involves, as some have argued, a 'two-way affair' (Sandøe *et al.*, 2014). Indeed, we could also consider anthropoeyia*:* the health benefits to animals that follow from their interaction with human beings. What sort of human behaviour promotes the health and longevity of companion animals? Recognition of the social determinants of health opens up new ways of looking at human-animal interaction. While OH first and foremost emphasized the role of animals with regard to emerging infectious diseases, it also provides a framework to look at the possible health benefits of human-animal interaction. This prompts research into hypothesized health benefits of interspecies interaction, the results of which could inform policy measures aimed at promoting health at the level of social determinants (e.g. Rock *et al.*, 2015). So interaction with animals could represent a social determinant of health for human beings, and vice versa. Furthermore, rather than representing a social determinant of health for each other, human beings and animals might also share certain social determinants of health. For example, Sandøe and colleagues (2014) discuss the extent to which obesity in humans and animals might have certain determinants in common; information that could prove very helpful to promote the health of both humans and their animal companions.

Epistemic challenge

Animals and their health represent a potential source of information and knowledge. The integrated approach to health that underlies OH provides an interesting perspective of generating interspecies health knowledge. As a result, we distinguish the epistemic function of One Health. To what extent can health knowledge be translated and used across species? Despite its relation to modern health care, the issue of animal research is less prominently part of the OH discourse compared to zoonotic diseases. But how could we possibly exclude the involvement of animals in research from the scope of OH? Granted, the links are comparative rather than causal, but this does not appear relevantly different. The extent to which human health policy relies extensively on animal models resonates with the way in which the idea of OH strives to bring out the relevant connections between human and animal health. Instead of viewing animal research as merely an element of OH, it should be considered a major part of interspecies health policy. If animal research indeed contributes to human health, its importance cannot easily be overstated. The involvement of animals is pervasive throughout human medicine, as it is regarded a necessary precursor to clinical trials in human beings. Virtually all human medication and medical technology that required a clinical trial has been tested on animals. A comparative approach to human and animal health is thus considered vitally important in human medicine looking at both institutional design as well as flow of resources. By providing an interspecies perspective on health, OH thinking should encourage investigating the epistemic value of animal models for the benefit of humans and animals. Again, this is not restricted to the potential health benefits of humans only. To avoid bias, like in the case of interspecies threats and benefits to health, OH as a descriptive approach should highlight relevant pathways of knowledge transferal across species. The subsequent task is then to make a moral judgment about how to deal with these possibilities.

Ecological challenge

One Health goes beyond the idea of One Medicine by explicitly putting the interconnections between human and animal health against the background of their shared (natural) environment. Changes to the natural environment may play an important role in the emergence of infectious disease (Patz *et al.*, 2004). If one does not engage with the ecological background of disease emergence, and primarily focuses on the transmission of disease between human beings and animals, any subsequent measures to protect health could very well prove inadequate, symptomatic, and incomplete.

Ecological processes are important in understanding and addressing disease emergence but there is more to the link between human health and ecology than that. Ecosystem functioning is vitally important to

support human and animal health. Moreover, ecosystems not only benefit human and animal health in terms of the services they provide, they are fundamental in the sense of representing necessary conditions for health (Holland, 2008). Sketching out the relevant links, human health inevitably relies on clean water, breathable air, pollination, fertile soil, stable climate, and so forth. Some may argue that this takes OH thinking too far. It becomes an all-encompassing framework containing all things health-related. This objection, however, is itself question-begging. Why would it be a problem to include the ways in which human and animal health is supported by ecosystem services? Moreover, if one would exclude these considerations, we might indeed end up with symptomatic and ad hoc solutions that are profoundly incomplete. Taking OH to its logical consequence entails a socio-ecological perspective (Zinsstag *et al.*, 2011; Stephen and Karesh, 2014). Social and ecological factors together make up the fabric of our shared environment, affecting individual health in various ways. This opens up a wide array of new questions for health professionals. By linking different biological domains and bringing them to bear upon each other, OH confronts for example the veterinary profession with new issues and background considerations. For example, if veterinarians have a responsibility at the level of veterinary public health, should they not also engage (perhaps primarily on a collective rather than individual level) with the ecological impact of livestock production?

Ethical challenges

We believe that the four functions represent a plausible specification of OH. In doing so, we have also highlighted novel ethical challenges that such an interspecies perspective on health raises. Linking humans, animals, and the environment not by means of threats to health only but also taking into account the positive health effects broadens the range of ethical concerns. We do not believe that OH requires a new kind of or specialization in ethics. Instead, we better rely on already existing expertise, but doing so in a way that traverses disciplinary boundaries both within the natural sciences as in bioethics. Developing such integrated perspectives can be stimulated in various ways, for example by setting up specific journals, congresses and research collaborations. Our contribution in this paper, in addition to the aforementioned functions, is proposing an outline of an ethical framework to inform OH policy. We consider four aspects essential to any framework in this field (Meijboom and Nieuwland 2017).

First, it requires reflection on fundamental moral assumptions, for example about the moral status of human beings and non-human individuals or collectives, and the conception of health. Again, these are up for discussion rather than fixed values of OH. And they represent the gamut of moral philosophy, emphasizing the need for transcending boundaries between disciplines both within natural sciences and (bio)ethics.

Second, in addition to the moral assumptions and bio-ethical concerns, the framework should address questions of justice, the configuration of health-related institutions, and representation. This pushes the need for transcending the boundaries of disciplines even more, going from moral to political philosophy. Health policy involves decisions about the distribution of resources, which are matters of justice. To what extent should an interspecies and ecological perspective on health policy consider the boundaries of nation states or those between species morally relevant? In addition to the question of distribution is the issue of representation. Not only whose health matters – cashed out in terms of resource distribution – but also who decides on these matters politically?

Finally, more of a challenge than a characteristic, the framework should be able to support decision-making in often multi-disciplinary contexts with regard to concrete health issues. In doing so, it needs to pay sufficient attention to the various moral assumptions involved without ending up in endless philosophical debate. The same holds for the capacity to view health in all its complexity and interconnectedness, while still finding ways forward for distinct issues.

Conclusion

We have proposed a specification of OH to provide common ground amongst the various participants in health policy. These four functions already uncover new ethical considerations. To support ethical decision-making, we have highlighted three aspects of what it means to do ethics in the context of ecological and interspecies health policy. Some will question whether such a framework actually supports ethical decision-making, or that it demands too much of individual (health) professionals and policy makers; it only makes things more difficult. But perhaps making things more difficult is inevitable if we take OH seriously.

We should emphasize that an ethical framework based on these elements is not for ethicists only. Every OH professional is confronted by normative choices, which, from an ethical perspective, demand awareness, analysis and justification. The ethical framework can help to do so. This way, ethicists can work together with researchers, policymakers, and others to address the ethical conundrums involved in realizing an ecological and interspecies approach to health policy.

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