One health as a normative concept: implications for food safety at the wildlife interface

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Abstract

Starting from the recognition of the interdependence of human, animal, and ecosystem health, the concept of One Health promotes multispecies and integrative approaches to health. While zoonoses (diseases that can be transmitted from non-human animals to human beings) have been a major impetus for the development of One Health, it is the human-animal-ecosystem interface in general that is emphasised. One Health has received little attention from (applied) ethics, despite its clear normative dimension. The aims of the paper are twofold, by showing: (1) the importance of explicating the normative dimension of One Health, and following from this; (2) the need for integrated ethics at the human-animal-ecosystem interface. A holistic understanding of health is presented, together with the acknowledgment of the moral status of animals, to discuss the normative implications of One Health. The discussion will address, in particular, the implications for food safety with respect to wildlife health.

Keywords: multispecies health, badgers, bovine tuberculosis, animal ethics

Health at the wildlife interface

The One Health concept emphasizes the interdependence of human, animal, and ecosystem health (e.g. Cook *et al*., 2004; Zinsstag and Schelling, 2011). Based on this recognition, health is promoted within all these three domains. This has brought attention to the wildlife interface of human and animal health. The issue of bush meat consumption in Africa, and it's devastating consequences for both public health and wildlife, have illustrated the significance of wildlife interactions understood in terms of food safety.

In the UK, European badgers (*Meles meles)* are believed to contribute to the increase of bovine tuberculosis (bTB), which is caused by *Mycobacterium bovis*. There is however some uncertainty about the extent that badgers can be blamed for this (Hancox, 2002). Due to its zoonotic nature, bTB has been a target for public health interventions such as pasteurization of milk and control programs, which have been successful in minimizing the threat to public health (Pfeiffer, 2013). Despite prevalent disagreement about both its efficacy and justification, culling of badgers has been implemented with the aim to reduce bovine tuberculosis infections (Mathews, 2009). This case about food safety provides an opportunity to investigate the normative implications of a One Health perspective, especially because it explicitly addresses the health of human beings, domesticated animals, and wild animals in the context of a shared natural environment.

One Health as a normative concept

Multispecies and integrative approaches to health go beyond the domain of public health. The latter is primarily concerned with human health, and only indirectly interested in animal health. Both in principle and in effect, however, public health cannot be isolated from other disciplines such as veterinary medicine. This notion has been taken up by 'one medicine', an integration of human and veterinary medicine based on the premise that 'both sciences share, as a general medicine, a common body of

knowledge in anatomy, physiology, pathology, and the origin of disease in all species' (Zinsstag and Schelling, 2011: 149). Zoonotic diseases such as bTB are paradigm examples for this line of thinking. But still, this can leave unaddressed the environmental factors supporting health and underlying disease emergence. In addition to being interdependent, the health of humans and animals is inextricably connected to ecosystems. This recognition lies behind the formulation of the Manhattan Principles (Cook *et al*., 2004), which have been key reference points for One Health ever since.

In its aim for a integrative and multispecies approach to health, One Health lacks a systematic evaluation of its normative dimension (cf. Capps and Lederman, 2014; Rock and Degeling, 2014); i.e. in what way are values and ethical considerations involved? There are, in particular, three reasons in support of bringing out the normative dimension. First, health tells us how organisms should function (e.g. Nordenfelt, 2006). There is, however, no agreement on what this exactly entails for humans, animals, or ecosystems. If the concept of health is to guide policy in a multispecies context, its normative implications should be made explicit. The inclusion of animals is a second reason for philosophical scrutiny. If animals have moral status, this involves specific normative implications for the understanding of One Health. The third reason pertains to the integrative nature of One Health. There are multiple disciplines involved with their own area of interest and methodology. Furthermore, as One Health is adopted at an international level, it will be rooted in different worldviews. This will affect the two reasons just discussed, but also include other aspects such as environmental values and framing assumptions. Leach and Scoones (2013: 16) recognize the normative import when they state that 'the challenge is therefore not just combining disciplines, data and models, but more importantly, deliberation around framing assumptions, cultural understandings, policy narratives, politics and values'. This underlines the importance of reflecting on such aspects and how these influence the design and outcome of One Health approaches.

The conceptualisation of health in a multispecies approach

An overarching concept of multispecies health invites one to consider the meaning of health (cf. Lerner and Berzell, 2014). Arguments have been put forward to understand human health in bio-statistical terms as the absence of disease (Boorse, 1977). This is opposed to the holistic 1946 WHO definition of health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'. The utopian aim at completeness and its static understanding of health, however, have been points of major criticism with regard to this definition (e.g. Forrest, 2014). Recent contributions to the debate (Nordenfelt, 2006) are holistic in the sense of understanding health in relation to subjective experience, as instrumental to attaining vital goals.

Animal health is discussed far less than its human counterpart, although there is a large body of literature on animal welfare (Nordenfelt, 2006). How health of animals is conceptualised, can depend on discipline, context, and species (Lerner and Hofmann, 2011). Within veterinary medicine it is often understood as normality or the absence of disease, or associated with context-specific factors, such as productivity and reproduction (Gunnarsson, 2006). With regard to the badger case, it has been suggested that high productivity of cattle could have negatively impacted their immune status, making them more susceptible to bTB infection (Mathews, 2009). This could raise doubt regarding the adequacy of productivity as a criterion for health.

Comparing health concepts across different domains can help to reflect on the assumptions involved in context and species-specific understandings of health (Vieweger and Döring, 2014). If animal health is different from human health, what are the arguments supporting such discrepancy? Can the debate on human health be extrapolated to animal health? Nordenfelt (2006) has argued that to a large extent, there is nothing in the way of doing exactly that. According to him, health also enables animals to attain

vital goals, albeit understood in terms of animal welfare. This is different from health as absence of disease, which does not take animal welfare as a goal. Following from this, the question arises whether health promotion is important in itself, or because it serves other goals. Furthermore, who are the beneficiaries of these goals? It is due time to look at the value of health in a multispecies approach.

Cross-species comparison of health

The health of animals can hold instrumental value with respect to human interests. From an epidemiological perspective, wild animals in particular are considered important. Animals or animal populations can function as sentinels for early detection and early warning of zoonotic disease outbreaks, as animal models for human disease, or be reservoir hosts for zoonotic pathogens (Rabinowitz *et al*., 2008). Badgers are identified as maintenance hosts for *M. bovis*, which means that they constitute an independent source for tuberculosis infection in cattle. Interestingly, this is believed to be the result of spillover from cattle herds a little more than 100 years ago (Palmer and Thacker, 2012). Anyhow, there is more to badger health rather than its epidemiological value. It is – especially in a holistic understanding – valuable for badgers themselves. These two ways of valuing animal health can overlap and/or conflict.

A multispecies approach to health involves both questions about health as an interspecific concept and questions about distribution. Any One Health approach has to grapple with distributing the costs and benefits across the entities involved, perhaps without ever resolving conflict of interest (Rock and Degeling, 2014). Then, to what extent can agricultural practices be justified when the spatial configuration of landscapes is associated with risks to wildlife health or the use of culling strategies? In addition to the need for humans to justify their treatment of domesticated animals, these human-animal interactions (e.g. agriculture) should also be put into the perspective of wild animals, in this case, badgers.

Assumptions regarding the moral status of animals assign the boundaries for such comparison across species. A purely anthropocentric account (attributing moral status to humans exclusively) will be interested in bTB and the risk imposed to public health. From a narrow public health perspective, what counts is reducing or preferably eliminating the risk to human health. One could argue that this largely applies to the current situation in the UK (Torgerson and Torgerson, 2010). For 'one medicine', even when public health objectives are met, this is unsatisfactory, as the underlying issue remain unsolved. As already discussed, a One Health approach would also look at the environmental factors involved.

However, this broadening of scope can also have other normative implications. By going beyond mere public health, animals have become part of health policy. This brings along new questions about their position from a normative point of view. Despite the holistic aims of One Health at improving human and non-human health, the interests of the former appear to remain at the forefront (Hanrahan, 2014). A zoocentric account (attributing moral status to sentient animals) would argue that public health is too narrow, especially if it generally discounts animal health and welfare for the benefit of human health (cf. Akhtar, 2013). Animal health should be promoted, also irrespective of human interests. This is also supported by Nordenfelt's theory of animal health. Framed within a 'one medicine' perspective, this could entail sharing risks between sentient beings rather than fully eliminating risk for one species only (cf. Rabinowitz *et al*., 2008). If one takes seriously the environmental factors that support human and animals health, as acknowledged by One Health, this will affect how ecosystems are managed and protected. This inevitably puts health of both humans and animals into its shared environmental context.

Health in context

For wildlife, health is evidently not a mere individual affair. First of all, animal health is embedded in and dependent on environments. Considerations that go 'beyond the skin' of the individual contribute

to health in significant ways (Forest, 2014). This is not limited to physical environments, but includes the broader spectrum of socioecological interactions as the background for health (Hanisch *et al*., 2012; Stephen, 2014; Zinsstag and Schelling, 2011). Second, wildlife health is generally assessed at the level of the population, rather than at the individual level. Going beyond absence of disease, a holistic understanding of wildlife population health can be formulated in terms of sustainability and resilience (Hanisch *et al*., 2012). This appears to outweigh considerations at the individual level, but one could also argue that individual animals living in the wild are dependent on their populations. The vital goals of wild animals are then considered inseparable from considerations regarding the health of the population. How does this correspond with duties towards wild animals?

A principle of avoiding unnecessary harm to individual animals in the wild swiftly expands the normative scope of One Health, especially if one considers the influence that human beings exercise on nature. Anthropogenic activity such as habitat encroachment and agriculture can be important drivers for the emergence of tuberculosis infection in wild animals (Palmer and Thacker, 2012). However, human responsibility does not have to be limited to negative duties only (Swart, 2005). Swart argues for a principle of 'non-specific care', which entails taking care of the habitat of wild animals. The relation between animals and the environment is mediated by both dependency and adaptation. For Swart, this relation elicits non-specific care, which by definition is directed at the population rather than the individual level. Wild animals such as badgers are part of social groups and embedded in a particular environment, both of which are important to protect according to Swart. This contextual approach thereby matches the holistic articulation of wildlife health, both regarding the relevancy of socio-ecological factors, and the level of health assessment.

If one applies the principle of non-specific care, there is a need to integrate the health of animals in the way ecosystems are managed and protected. Furthermore, this involves considerations regarding future animal populations. Protecting habitats is in the interest of animals currently living in the wild, as it is for future animal populations. Vice versa, considerations about the sustainability and resilience of future animal populations affect how current populations are managed. From a One Health perspective, such considerations are in significant ways connected to public health.

Concluding remarks

The concept of One Health provides an integrative perspective on health that involves new normative questions. Different understanding of health and assumptions regarding moral status of animals influence One Health approaches in important ways.

Regarding the fate of the badgers, the debate appears primarily centred on the implementation of culling strategies and considerations regarding the effectiveness of such a measure. This may obscure the fact that even if culling strategies are effective, which is disputed, these measures still have to be justified from an ethical point of view. The aforementioned Manhattan Principles (Cook *et al*., 2004) recommend to 'limit the mass cull of free-ranging wildlife species for disease control to situations where there is scientific evidence that a wildlife population poses an urgent, significant threat to public health and safety'. The culling of badgers does not appear to be compatible with this One Health principle. At the very least, it is an invitation to further examine the meaning of urgent and significant threats.

Stephen (2014) has expressed his concern about One Health reinforcing a disease-focused outlook at the expense of wild animals. Although this concern might be appropriate, it need not follow from One Health if health is conceptualised in a more holistic way. Throughout the badger case, similar to discussions on food-borne zoonotic diseases (cf. Romero Barrios *et al*., 2013), it appears that the predominant understanding of health amounts to absence of disease. There is, on the one hand, a mainly

anthropocentric and, on the other, a more zoocentric perspective on moral status. Both sides largely appear to share a similar understanding of health. This discussion entails the risk of reducing badgers to their role as maintenance hosts in the disease ecology of bTB. A holistic understanding of health would take into consideration the socio-ecological dynamics of these badger populations in relation to agro-environmental factors. Mathews *et al*. (2006) have illustrated this by relating the presence of ungrazed grassland and plentiful hedgerows to decreased interaction at the wildlife/livestock interface. Taking into account these environmental needs of badgers resulted in a lower incidence of bTB. Furthermore, a holistic understanding puts health into the perspective of animal welfare. Especially if one takes a zoocentric perspective, questions arise about the ways badgers are affected by bTB and whether there is a duty to reduce bTB infections in these populations, for example, by vaccination strategies.

Diseases that jump species, such as bTB, connect human and animal health in important ways. Although targeting diseases is of vital importance, more terrain has to be covered to adequately promote multispecies health. Holistic understandings, as discussed, are especially insightful in providing additional coverage. Such a perspective would recognize environmental drivers of infectious diseases, but furthermore be interested in determinants of health understood in terms of sustainability and resilience (Hanisch *et al*., 2012; Stephen, 2014). In line with Nordenfelt's holistic approach, this entails that 'healthy individuals or populations need to have a minimal set of resources, functions, and capabilities that operate within an environment that enables them to cope with changes and challenges to meet expected end points' (Stephen, 2014: 429). The promotion of multispecies health, as envisioned by One Health, will benefit from integrating health objectives of wildlife populations understood in these terms.

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