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One Health needs a vision beyond zoonoses

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Summary

The unprecedented pandemic events that currently affect animals and humans have fueled calls for One Health action. We argue that the One Health framework must be accompanied by 'rich outcomes' to avoid a reductionist One Health focus on zoonotic pathogens, that forgoes the benefits of the framework. We propose that the United Nation's sustainable development goals provide an adequate multidimensional set of targets that can help researchers and policymakers contextualise emerging diseases, and guide One Health long-term solutions that are equitable, efficacious, and sustainable.

Recent, unprecedented pandemics such as COVID-19 and African swine fever (ASF) have necessitated extraordinary outbreak responses and fuelled calls for a 'One Health' (OH) approach to tackling these global health issues (Stoffel et al., 2020). Although OH describes a rich framework of transdisciplinary quantitative and qualitative methods, it arguably lacks a vision of a set of rich outcomes – health, social, economic and environmental outcomes – whose interdependence is similarly acknowledged (dos S. Ribeiro, van de Burgwal, & Regeer, 2019). Thus, OH frequently defaults to a reductionist focus on zoonotic pathogens that emphasises the control, management, and eradication of infection at the animal-human interface. When this is the main approach, solutions to OH problems may be ineffective, inefficient, or unsustainable because a primary emphasis on the zoonotic elements of such a problem may forgo the very benefits that OH offers in understanding the context and complexity of an issue.

By way of example, having emerged from an animal reservoir, COVID-19 now acts as an essentially human pathogen (Li et al., 2020) while ASF infections are confined to suids (Costard et al., 2009). Nevertheless, a OH

approach is crucial because these diseases' effects transcend their original and current host species, affecting the wellbeing of animals, people, and the environment in multiple ways. Therefore, calls to adopt OH approaches in dealing with these pandemics (Amuasi et al., 2020) must transcend reductionist, pathogen-centric approaches and focus on holistic outcomes, embracing the intricate interactions within a system and confronting the problems that beset it (Zinsstag, Schelling, Waltner-Toews, Whittaker, & Tanner, 2015). Without this approach, the OH response to COVID-19 and ASF will likely continue to result in scattered actions confined to the immediate need for disease control.

Multidimensional targets such as the Sustainable Development Goals ("Transforming our world: the 2030 Agenda for Sustainable Development," 2015) can provide a set of 'rich outcomes' for systems-based OH strategies to address these pandemics. The SDGs offer a way to systematically understand the pandemic effect on the interrelationships between the human, animal, and environmental elements of the OH framework. Understanding the interactions and overlaps between the SDGs can help policymakers and researchers prioritise and identify points of leverage for OH actions, making these more efficient and sustainable, minimising antagonistic outcomes, and generating explicitly defined, maximal benefits.

Much has already been written about the antagonism between the human health (SDG 3) and socioeconomic effects (SDG 8) of COVID-19 responses (Hodgins & Saad, 2020). The SDGs may help to contextualise the human, animal and environmental effects of diseases and mitigation efforts more widely. For example, Laborde *et al.* (2020) suggest that COVID-19 will increase extreme poverty (SDG 1) globally by 20% and increase agricultural labour availability caused by job losses in the urban service sector. Although the latter may boost rural agricultural production (SDG 2), it may simultaneously depress incomes (SDG 1 & 8). COVID-19 has also augmented recognition of the OH implications of trading wildlife (SDGs 12 and 15), but a systems OH perspective is needed to achieve effective and sustainable changes to this activity. In the absence of support for alternative livelihoods for those engaged in the exotic species trade, banning wildlife markets may unintentionally increase illicit trade, hamper conservation efforts, and undermine disease surveillance and reporting (Eskew & Carlson, 2020). These consequences should be acknowledged in response strategies and their intended outcomes.

The emergence of the COVID-19 pandemic is necessarily intertwined with increasing human pressures on the environment (SDGs 12, 14, 15) and climate change (SDG 13) (WHO, 2020). In turn, climate change may expand the distribution of ASF reservoirs and soft tick vectors (Costard et al., 2009). In areas where pig

farming supports food security (SDG 2), and underpins peri-urban and urban sustainability (SDG 11) (Costard et al., 2009), smallholders respond to ASF outbreaks by selling or consuming infected pigs (Chenais et al., 2017). These practices may result in counter-intuitive shorter-term nutritional, economic, schooling and/or healthcare benefits (SDGs 2, 4, 3). However, the large fluctuations in food supply, prices, and incomes caused by these practices may create groups of poor urban consumers who obtain unconventional foods from unregulated sources through preference or necessity (Blecha, 2015), with direct OH implications for foodborne illness, household nutrition, and disease emergence (SDGs 2, 3, 10). A pathogen-centric OH approach that only advocates biosecurity interventions to control ASF may overlook how such actions magnify socioeconomic and gender inequality (SDGs 5, 8, 10) by disproportionately reducing smallholder incomes to the benefit of livestock traders in the absence of good market linkages (Ouma et al., 2018). Thus, more holistic ASF management that promotes semi-intensive urban pig rearing and more efficient value chain operation can support urban income generation (SDG 1, 2, 8, 11, 12), reduce zoonoses such as cysticercosis (SDG 3), and reduce trading of free-ranging pigs and other wildlife species (SDGs 12, 14, 15).

The merit of the OH framework is that it helps not only to identify the emergence and spread of diseases between humans, animals and the environment, but also conceptualises the synergistic and antagonistic effects of disease outbreaks and mitigation efforts on these domains. Figure 1 is a simple example of such an OH approach, which may serve as a model for others interested in this framework. When the advantages of this holistic, systems-based view are appreciated, other system-based instruments such as the SDGs can be integrated to help researchers and policymakers delineate outcomes and pathways to them. In turn, the OH paradigm—called for but still under-implemented—can help promote long-term solutions that are equitable, efficacious, and sustainable.

Figure Caption

Figure 1. An example of hypothetical management of coexisting Coronavirus disease (COVID-19) and African swine fever (ASF) using One Health and Sustainable development goals (SDGs). COVID-19 resulted in wildlife trading ban (Eskew & Carlson, 2020). This measure creates positive SDG outcomes for wildlife and environment (A → B) but may negatively affect the livelihoods of people who depend on this activity (A → A).

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If after COVID-19 the community resumes the trade of wildlife, positive SDG effects associated with the trading ban will be lost (C → B) to improved human population wellbeing (C → C). If pig production is promoted as an alternative livelihood in the region, the value chain must be strengthened at all levels (D) to create resilient systems that warrant simultaneous community animal, and environmental wellbeing. If in contrast, the systems lack resilience and ASF outbreaks result in pathogen-centric approaches (for example, culling of animals with minimum or no compensation), the positive SDGs effects associated with the pig value chain are severely undermined (E → D). If wildlife trading resumes due to ASF, there is increasing negative SDGs outcomes on the environment (E → B), and increased risk of new emerging zoonoses and adverse SDG outcomes on people (B → A).

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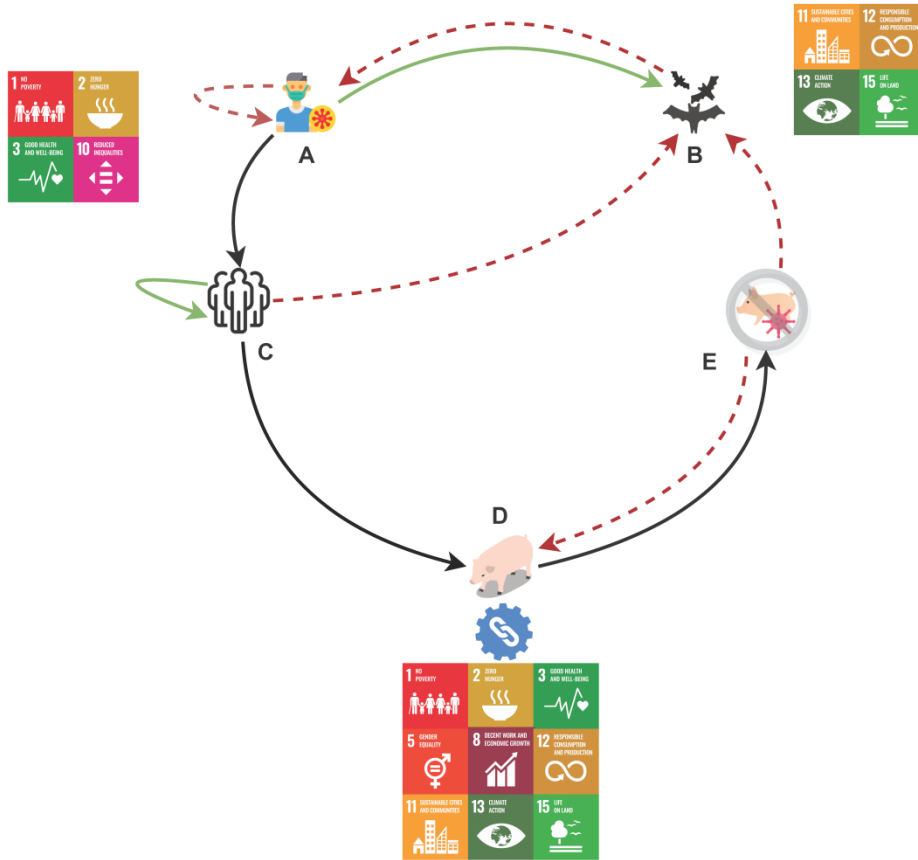
Ethical Statement

The authors confirm that the ethical policies of the journal, as noted on the journal's author guidelines page, have been adhered to. No ethical approval was required as this is a letter to the editor with no original research data.

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