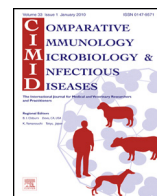


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Operationalizing a One Health approach to global health challenges



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ABSTRACT

The One Health approach, which recognizes the interconnectedness of human, animal and ecosystem health, encourages collaboration between diverse disciplines to address complex health problems. The advantages and challenges posed by these interdisciplinary collaborations are described in this review. Learning networks where diverse participants can openly share processes, best practices, and case studies are discussed as a strategy for conducting transdisciplinary One Health research and tackling complex global health problems. The 11 papers in this special issue are also introduced as they illustrate how a One Health approach can be applied to better understand and control zoonotic pathogens, engage community stakeholders in One Health research and utilize wildlife species, most notably sea otters and birds, as sentinels of ecosystem health. Collaboration is rarely without complications; however, drawing on these insights may benefit the process of operationalizing the One Health approach to address today's global health challenges.

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One Health is gaining recognition nationally and internationally as a practical and innovative approach to global health challenges that recognizes the interconnections among humans, animals and their shared environment as well as the economic, cultural and physical factors that influence health. There is an increasing recognition that larger and more sustainable health benefits will result if research and interventions are collaborative across these human, animal (domestic and wildlife), and ecosystem health sectors rather than targeted at each of these factors individually and in isolation from each other.

1. A One Health approach requires collaboration

In many ways, the One Health approach extends and deepens the features of global health which, as

defined by Koplan et al. [1], should emphasize interdisciplinary collaboration, involving disciplines both within and beyond the health sciences, to address transnational health issues, determinants, and solutions. What the One Health approach offers is an even broader multi-systems perspective on what health means and the inclusion of a wider range of expertise to include areas of academic specialization such as veterinary as well as human medicine, ecology and environmental management, agriculture, social sciences and engineering.

Conceptual and methodological differences between fields are amongst the most substantial but least addressed challenges faced by researchers collaborating across disciplines. Eigenbrode, et al. [2] specifically identified six of these challenges: (1) determining the appropriate level of integration of different disciplinary methods and concepts; (2) translating each discipline's terminology and concepts into the other participating fields (because the same word can mean something very different across fields); (3) mediating different assumptions and views about what counts

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Box 1: Types of research collaboration [2]

Disciplinary – researchers are located within the same discipline but have different areas of expertise.

Multidisciplinary – researchers use the theory, methods, and interpretive standards of multiple disciplines, but usually combine them only at the end of the project and often with one discipline forming the foundation upon which other views are added.

Interdisciplinary – researchers from different disciplines collaborate throughout the project from problem formulation through analysis and interpretation. In this more integrated collaboration they accept, understand, and may apply one another's disciplinary methods and approaches, sometimes resulting in sufficient integration to produce new questions and methodologies.

Transdisciplinary – a research collaboration that fully integrates the theory, methods, and questions of different disciplines to address problems that cannot be captured within existing disciplinary domains. Transdisciplinary efforts and outcomes are uniquely formulated and have the potential to be even more integrated and transformational than interdisciplinary efforts as participants adopt epistemological perspectives that are unique to the collaborative effort and distinct from those of any of the cooperating disciplines.

as evidence, how it can be acquired, and how it can be validated (e.g. qualitative versus quantitative methods); (4) incorporating stakeholder input (such as government agencies or participating communities) in research topics and design; (5) facilitating debates over objectivity versus social construction (e.g. Are researchers and their values separate from or part of the world they investigate?); and (6) combining preferences for reductionistic or holistic approaches (studying each part of a system separately or looking at “properties of complex systems” as a whole). Most of these challenges show up in One Health projects. Therefore, identifying them early on can greatly help in moving these projects forward and making use of the diversity that the groups contain.

For all of the discussion about and advocacy for interdisciplinary research and transdisciplinary collaboration (for definitions see Box 1), particularly to address complex problems such as improving global health, ecosystems, and sustainability, far less has been written on how researchers can best establish and maintain successful research collaborations involving diverse disciplines, or how they can address some of the perceived costs for academics who have historically been encouraged to stay focused on achievements within their disciplinary silos [3]. Research across disciplines, while often lauded, can be difficult for practical and professional reasons. Strathern [4] observed that “There seems widespread acknowledgment that what makes interdisciplinary work difficult is knowing how to recognize that it has happened, and beyond that knowing to what extent it has been productive – in short, how to pinpoint the value of the interaction”. She noted that the value of interdisciplinary collaboration is in the research products, skills learned, and new theories, but that until researchers learn how to talk about and describe those

benefits, they will go underappreciated. Another challenge, as Barlow et al. [5] noted, is that the sheer amount of knowledge needed to have a solid multi-disciplinary grasp on any issue can be overwhelming or exceed the amount of time researchers can invest, while mono-discipline research (and the conditions under which it is produced) is sometimes rewarded more by academic review systems.

Given the challenges of collaboration, Barlow et al. [5] suggested “learning networks” as a strategy for conducting transdisciplinary research on complex systems. A learning network is a structure for sharing knowledge and skills, with the following three aims: (1) to do so “efficiently and rapidly”; (2) to help make researchers aware of the key “scientific challenges” of various disciplines, with regards to the issue under investigation; and (3) to encourage interdisciplinary collaboration that benefits from combining different “economies of scale”. The concepts of “learning networks”, like “communities of practice”, recognize that diverse participants can best produce new “knowledge for action” when they are part of structured, non-formal interactions, such as workshops or online communities, where they can openly share processes, best practices, and case studies [5,6]. Although the authors could not find a learning network/community of practice that incorporates the characteristics above for global One Health, an on-line network for rural development established by the Aspen Institute (<http://www.aspeninc.org/rdp/>) serves as an example of how such a network might function. As One Health moves forward, learning networks will be essential tools for facilitating effective responses to today's global health challenges.

The benefits of learning networks include: interacting with collaborators through networks prior to developing projects in order to discuss priorities and challenges; sharing data; paying careful attention to differences in temporal and spatial scales and key factors for addressing complex problems; providing for the dissemination of up-to-date changes in theory, technology, and practice; and increasing scientific impact by using ‘multi-media communication channels’ in order to disseminate research findings immediately, rather than waiting for peer-review journal publications to share knowledge with fellow researchers [5]. One of the other requirements of a successful learning network is that researchers must be willing to adjust their behavior and attitudes, as they encounter alternative epistemological and methodological approaches. Although it may not be possible to completely overcome this challenge, some strategies for dealing with it include adopting a ‘common language’ for talking about the key aspects of global One Health projects and agreeing upon a core set of shared values to guide the research.

One Health as a transdisciplinary learning network should be seen as an always-unfinished approach, one that continually benefits from new and unexpected contributions. As you read the papers in this issue, pay attention to the ways in which the various authors propose new perspectives, employ diverse methods and develop solutions and recommendations that may differ from your own. What perspectives have been left out of each and what might the participation of community members and other disciplines provoke in terms of additional responses? Then

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