

COMMENTARY

Operationalizing the One Health approach: the global governance challenges

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While there has been wide-ranging commitment to the One Health approach, its operationalisation has so far proven challenging. One Health calls upon the human, animal and environmental health sectors to cross professional, disciplinary and institutional boundaries, and to work in a more integrated fashion. At the global level, this paper argues that this vision is hindered by dysfunctions characterising current forms of global health governance (GHG), namely institutional proliferation, fragmentation, competition for scarce resources, lack of an overarching authority, and donor-driven vertical programmes. This has contributed, in part, to shortcomings in how One Health has been articulated to date. An agreed operational definition of One Health among key global institutions, efforts to build One Health institutions from the ground up, comparative case studies of what works or does not work institutionally, and high-level global support for research, training and career opportunities would all help to enable One Health to help remedy, and not be subsumed by, existing dysfunctions in GHG.

Keywords Health policy, globalization, governance

KEY MESSAGES

- Despite its great potential to strengthen collective action across sectors, operationalization of the One Health approach has been hindered by dysfunctions hindering current forms of global health governance (GHG) and by shortcomings in how its agenda has been articulated to date.
- Efforts to build One Health institutions from the ground up, “implementation science” case studies of what works or does not work institutionally, and high-level global support for research, training and career opportunities are among many factors necessary to strengthen the initiative into one capable of catalyzing change in GHG.

Introduction

According to the World Health Organization (WHO), one or more new infectious diseases have emerged each year since the 1970s (WHO 2007). The majority of these have been zoonoses, diseases caused by pathogens that can be transmitted between animals and humans, with more than three-quarters originating from wildlife (Jones *et al.* 2008). Of the ~1400 diseases now recognized in humans, ~64% are caused by pathogens transmissible across species (Heeney 2006; Davis 2008). These trends

have led to support for a more integrated and holistic approach to human, animal and environmental health. Known as One Health, this approach has received growing attention over the past decade among policy makers, practitioners and funders seeking more effective prevention, control and treatment responses in an increasingly populous and globalized world.

Despite great hopes for a ‘health care transformation’ (King 2008), implementation of One Health has so far proven a major challenge. As Leboeuf (2011, p. 2) writes, ‘[i]n contrast with the case of HIV/AIDS, no new institution has been created . . . at

the global level, governance remains very fragile, to the point that if some key actors stop supporting it, One Health risks being set aside in favour of other concepts or approaches'. Similarly, the US Institute of Medicine observed that it was 'unable to identify a single example of a well-functioning, integrated zoonotic disease surveillance system across human and animal sectors' (Keutsch *et al.* 2009).

This commentary explores the prospects of operationalizing the One Health approach within current institutional arrangements that comprise global health governance (GHG). GHG can be understood as 'the use of formal and informal institutions, rules, and processes by states, intergovernmental organizations, and nonstate actors to deal with challenges to health that require cross-border collective action to address effectively' (Fidler 2010, p. 3). Despite its laudable goal of strengthening collective action across different sectors to address the complex health needs arising from globalization, operationalizing One Health appears to be challenged, first, by dysfunctions characterizing current forms of GHG; and, second, by shortcomings in how its agenda has been articulated to date. Understanding these challenges offers important lessons for strengthening both GHG and One Health.

Origins of the One Health approach

The concept of 'One Medicine' was coined in 1984 by the 'father of veterinary epidemiology', Calvin Schwabe. Schwabe (1984) reintroduced the concept of 'One Medicine' in his book *Veterinary Medicine and Human Health*, which argued that 'the critical needs of man include the combating of diseases, ensuring enough food, adequate environmental quality and a

society in which humane values prevail'. His core idea echoed the 19th century physician Rudolf Virchow who believed that, 'between animal and human medicine there are no dividing lines—nor should there be' (as quoted in Saunders 2000). Schwabe renewed the basic principle that a more holistic approach to human, animal and environmental health was needed to better protect the health of all.

Since the late 1990s, this core idea has been given additional impetus in the wake of many emerging and re-emerging zoonoses including human immunodeficiency virus, severe acute respiratory syndrome, West Nile virus, Nipah virus, Ebola, dengue haemorrhagic fever, Q-fever (Box 1) and, most notably, highly pathogenic avian influenza (HPAI). Endemic and/or neglected zoonoses (e.g. rabies, brucellosis and leishmaniasis) are an additional concern in developing nations. Growing evidence suggests that globalization—the increased circulation of people, other life forms, goods and services, finance and capital, and knowledge and ideas across the world since the late 20th century—is creating new conditions where disease could spread geographically and across species (Lee 2003; Saker *et al.* 2006). Ever growing human populations, reaching 7 billion in 2011 (UNFPA 2011), and the resulting environmental degradation from expanding land use, intensified agricultural and animal husbandry methods, and closer habitation between humans and both domesticated and wild animal species, are also recognized as key factors increasing shared risk across the animal–human–ecosystem interfaces (Ostfeld 2009; Sherman 2010).

Officially launched in 2004 at the 'One World, One Health: Building Interdisciplinary Bridges to Health in a Globalized World' conference, convened by the Wildlife Conservation Society with support from the Rockefeller Foundation, One

Box 1 Q-fever and the case for One Health

- The public health management of Q-fever (a rare zoonotic disease caused by intracellular bacterium *Coxiella burnetii* transmitted to humans via contaminated material from livestock farms) in the Netherlands offers an example of the need for a One Health approach. Accumulating in the wombs of host animals, *C. burnetii* increases the risk of spontaneous abortions and premature births in animal hosts, but otherwise causes little overt disease, rendering *C. burnetii* not a major concern among farmers or veterinarians historically. However, the release of high levels of *C. burnetii* into the environment, likely as a result of intensified farming practices, has become a major human health risk. The Netherlands alone recorded more than 2300 cases of Q-fever in 2009, up from 182 in 2007. Despite the formation of a national interdisciplinary working group to inform policy on handling the outbreak, successful collaboration has not been achieved. Human health authorities accuse their animal health counterparts of withholding key information, and failing to report animal outbreaks in a timely manner, while the latter were opposed to the public health 'solution' of industry-crippling livestock culls given a lack of evidence that such an intervention would reduce human disease (Enserink 2010).
- One Health entails a reframing process, where the critical hurdle will be the refocusing of priorities from the currently human-centric towards a holistic perspective that values the three pillars equally. This will require a realignment of professional values, interests and goals between the three disciplines, underpinned by institutional factors such as authority and resource allocation. Management of the Dutch Q-fever outbreak underscores the profound challenges in transitioning inter-disciplinary collaboration from concept to practice. It also raises the key question that, if high-income countries are struggling with implementing One Health, what prospects does the approach hold in resource-limited settings?

Source: Enserink (2010).

Health calls for improved collective action across the three sectors. In addition, the conference put forth the Manhattan Principles urging ‘world leaders, the global health community, and institutions of science to holistically approach the prevention of epidemic/epizootic disease and the maintenance of ecosystem integrity’ (Wildlife Conservation Society 2004). Since 2004, a variety of efforts to implement One Health have been made (Box 2), initially building on the global institutional framework for responding to pandemic influenza, but soon extending to a broad range of animal and human diseases and their causal factors.

Institutionalizing One Health: pandemic influenza and beyond

Since 2005, efforts have been made to embed One Health within existing global institutions, initially as part of concerns about pandemic influenza preparedness. Three institutions—the World Organization for Animal Health (OIE), Food and Agriculture Organization (FAO) and WHO—have largely been the focus of these efforts, which began with the International Ministerial Conference on Avian and Pandemic Influenza, subsequently renamed the International Ministerial Conference on Animal and Pandemic Influenza (IMCAPI). In addition, they have been joined at various meetings by the Office of the United Nations System Influenza Coordinator (UNSIC), UN Children’s Fund (UNICEF) and World Bank, as well as the scientific community, government agencies, foundations and nongovernmental organizations. On the surface, the aim of forming ‘a flexible network, which is expected to be nimble enough to be able to adopt, form new coalitions and respond rapidly to any new health emergencies’ (FAO/OIE/WHO/World Bank/UNICEF/UN System Influenza Coordination 2008, p. 23), would appear to be moving forward.

In practice, however, One Health has struggled to gain a firm institutional foothold. Beyond meetings, there has been little attempt so far to create a single designated global level institution for One Health. Instead, implementation has taken the form of what Leboeuf (2011) describes as ‘soft GHG’, achieved through principles and declarations agreed to at meetings, endorsements by international organizations, governments and other institutional players, and in some cases, ‘focal points’ within existing institutions. Moreover, much of this impetus has come from the animal health side, with veterinarians and the OIE demonstrating by far the strongest commitment to the approach. As described by Leboeuf (2011, pp. 20–24), the OIE has referred most often to the approach and included it within its Fifth Strategic Plan (2011–15), while the FAO and WHO hardly mention One Health in public communications.

The dysfunction of GHG: the risks to One Health

Much has been written about the dysfunctions that plague current forms of GHG. As such, simply grafting One Health onto existing institutional structures is likely to pose risks. The main criticisms of GHG stem from its uncoordinated

burgeoning into a melange of initiatives, too often competing. Driven by the need to chase scarce resources, global health initiatives have taken on a certain herd mentality, congregating around selected diseases, types of interventions and population groups. The absence of a coordinating body, or even an agreed coordination mechanism, has led to resource allocation based on *ad hoc* criteria—attractiveness to donors, public opinion, foreign, economic or security policy priorities and so on—rather than health need. Thus, while global health funding has grown exponentially from US\$5.6 billion in 1990 to US\$21.8 billion in 2007 (Ravishankar *et al.* 2009), it is unclear whether the resulting proliferation of initiatives has led to concomitant health improvements worldwide (Scheiber *et al.* 2007; McCoy *et al.* 2009; Piva and Dodd 2009).

In seeking to join up the dots of human, animal and environmental wellness, One Health has wandered directly into the crossfire between reductionist and holistic approaches to health, and into the longstanding debate between vertical (disease-focused) and horizontal (systems-focused) programmes that remain key fault lines in GHG (Lee 2004). Yet, as health determinants and outcomes have become increasingly globalized, the critical need for collective action to pursue more holistic approaches is widely recognized (Lee *et al.* 2009). For example, the Final Report of the WHO Commission on Social Determinants of Health, established in 2005 in response to increasing concerns about widening health inequities globally, recommended the establishment of ‘whole-of-government’ mechanisms to ensure policy coherence to address health equity, and suggested that multilateral coherence could be achieved through a strengthened UN Economic and Social Council (Marmot 2008). Sridhar *et al.* (2008) go further by calling for a ‘multi-level, multi-party and multi-purpose partnership framework of GHG...which includes all the key players and attempts to integrate the key functions needed to achieve an inclusive, equitable, flexible, democratic and sustainable mechanism.’ The manner in which global health initiatives have sprung up and pursued their own goals, however, has led to a high degree of reductionism and fragmentation (Dodd and Hill 2007).

The One Health approach has been particularly challenging to operationalize in this context. Despite strong arguments put forth by OIE for investment in animal health systems *per se*, albeit focused on zoonoses, rather than disease-specific responses (Leboeuf 2011), current initiatives aimed at building collaboration across human, animal and environmental health communities remain largely focused on single diseases (e.g. pandemic influenza preparedness). In this sense, the challenges facing One Health are akin to those facing health systems strengthening, an idea in danger of becoming a ‘container concept’ used to label very different interventions including potentially counterproductive disease-specific initiatives (Marchal *et al.* 2009). The Manhattan Principles issued in 2004 highlighted the need for ‘breaking down the barriers among agencies, individuals, specialties and sectors’ (Wildlife Conservation Society 2004). Although a laudable goal, the human, animal and environmental health sectors would seem to have much to do, to get their own houses in order, prior to breaking down barriers and reaching out to collaborate beyond their own boundaries.

Box 2 Key meetings supporting the One Health approach

- 2001

Meeting of Society for Tropical Veterinary Medicine and the Wildlife Disease Association issues joint Pilanesberg Resolution sent to 30 international donor agencies calling on them to recognize animal health sciences as essential to the design and implementation of livestock and wildlife-based projects in low-income countries for the purpose of preventing disease transmission.

- 2004

Wildlife Conservation Society convenes 'One World, One Health: Building Interdisciplinary Bridges to Health in a Globalized World' conference, which launches concept and Manhattan Principles.

OIE/FAO Global Framework for Progressive Control of Transboundary Animal Diseases (GF-TADs) formed to empower regional alliances in the fight against transboundary animal diseases (TADs), to provide for capacity building and to assist in establishing programmes for the specific control of certain TADs based on regional priorities.

- 2005

FAO/OIE Network of Expertise on Animal Influenzas (OFFLU) is formed to 'provide early recognition and characterization of emerging influenza viral strains in animal populations, and effective management of known infections, thereby better managing the risk to human health and promoting global food security, animal health and welfare, and other community benefits derived from domestic animals and wildlife'.

International Ministerial Conferences on Avian and Pandemic Influenza held in Washington, DC.

- 2006

FAO/OIE Crisis Management Centre (CMC-AH) created to 'respond rapidly to transboundary animal disease and emerging infectious disease crises'.

- 2007

AMA adopts resolution supporting One Health Initiative that promotes partnership between human and veterinary medicine.

American Veterinary Medical Association convenes the One Health Initiative Task Force, which becomes the One Health Commission headed by Roger Mahr in 2009, and adopts a resolution akin to the AMA on One Health.

FAO/OIE/WHO GLEWS created 'to improve the early warning and response capacity to animal disease threats of the three sister organizations for the benefit of the international community'.

- 2008

WMA approves resolution by AMA to establish a dialogue on One Health with the WVA.

FAO/OIE/WHO/UNICEF/UNSIC/World Bank publish 'Contributing to One World, One Health: a strategic framework for reducing risks of infectious diseases at the animal-human-ecosystems interface' during the IMCAPI held in Sharm el-Sheikh, Egypt.

- 2009

Public Health Agency of Canada hosts expert consultation in Winnipeg, Canada, on 'One World, One Health: From Ideas to Action' to identify country-level recommended actions to advance the framework globally

One Health Commission formed by AVMA, in partnership with the Institute of Medicine and National Research Council, 'to raise awareness of the importance of transcending institutional and disciplinary boundaries to improve health outcomes for all species'.

One Health Approach to Influenza conference held in Washington DC convened by US Department of Homeland Security and National Institutes of Health.

One Health Initiative formed by four medical and veterinary professionals, led by Laura Kahn, 'to increase communication and collaboration between human, animal, and ecosystem health professionals'.

- 2010

One Health Initiative Task Force publishes final report, *One Health: A New Professional Imperative*.

Box 2 (continued)

FAO/OIE/WHO publish 'The FAO-OIE-WHO Collaboration: Sharing responsibilities and coordinating global activities at the animal-human-ecosystems interfaces, A Tripartite Concept Note' at IMCAPI held in Hanoi, Vietnam.

World Bank report, *People, Pathogens and Our Planet, Towards a One Health Approach for Controlling Zoonotic Diseases* puts forward a framework for the funding and implementation of One Health.

Scientific Planning Committee (CDC, OIE, FAO, WHO, EU and Princeton University) holds expert consultation in Stone Mountain, USA, to define specific actions to implement the One Health approach.

Wildlife Trust launches One Health Alliance of South Asia (OHASA) as a collaborative group of scientists and government agencies focused on the spread of emerging diseases among wildlife and human populations.

- 2011

American Association for the Advancement of Science conference session entitled 'One Health: From Ideas to Implementation, Rhetoric to Reality'.

1st International One Health Congress held in Melbourne, Australia.

Expert Meeting on One Health Governance and Global Network held in Atlanta, USA.

High Level Technical Meeting to Address Health Risks at the Human-Animal-Ecosystems Interface, Mexico City.

One health, multiple meanings: defining scope and institutional boundaries

One Health has been challenged in large part by varying interpretations of what the concept means in practice. Although the fundamental principle of a closer interface between human, animal and environmental health is broadly accepted, how far should the net be cast? Originally envisioned as a strategy to strengthen surveillance and prevention of emerging and re-emerging zoonoses, there is a lack of consensus regarding which (if any) specific diseases the approach should focus on, or whether systems-based approaches are preferable. Although high-income countries have primarily been concerned with transboundary diseases with pandemic potential (e.g. HPAI), low- and middle-income countries call for a strong focus on endemic, often neglected, diseases with major human and economic impact (e.g. brucellosis). Also challenging are trends towards an even broader definition of One Health. In the Summary Report of the First International One Health Congress held in 2011, there were suggestions to expand the definition of 'zoonotic' to include environmental disease reservoirs (including food- and water-borne infections), and 'prevention' to include the impact on health of 'any activities at the human-animal-environmental interface' (Anon 2011), a definition that would extend One Health to include the effects of global climate change on human, animal and ecosystem health (Slenning 2010). Comparative medicine (including health risks of environmental toxins and chronic conditions such as cancer, obesity and aging) (Rabinowitz *et al.* 2010) and wellness benefits of companion animals (Hodgson and Darling 2011) have also been proposed to fall under One Health.

These differences in perspective have direct implications regarding which global institutions should assume a lead role in moving One Health forward. Consistent with their established technical roles, and likely reflecting the desire to protect their mandates and any future resources accruing to them, the

OIE, FAO and WHO favour the original focus on zoonoses. The Strategic Framework put forth at the 2008 IMCAPI by the FAO/OIE/WHO/UNICEF/UNSC/World Bank covers 'emerging infectious diseases at the animal-human-ecosystems interface' (FAO/OIE/WHO/World Bank/UNICEF/UN System Influenza Coordination. 2008). The 2010 Tripartite Concept Note by FAO/OIE/WHO focuses on 'animal and public health risks attributable to zoonoses and animal diseases with an impact on food security' (FAO/WHO/OIE 2010). The World Bank (2010, p. x) supports the development of an institutional framework that 'builds on the model of the GPAI (Global Programme on Avian Influenza) and that broadens its scope to cover future pandemics', and addresses 'long-standing endemic diseases that pose little or no risk of becoming pandemic, but that impose severe human and economic costs on the developing countries in which they persist', agendas that would require a more systems-based approach, focusing on health issues that have similar infrastructure needs, rather than particular diseases. The World Bank further calls for a 'more general, permanent system for coordinated national and international surveillance and control' that would entail 'more regular channels of collaboration than the current communication between agencies that prevails to date, which is based on temporary arrangements formed in response to various contingencies'. The World Bank's vision of One Health, in this sense, seeks to be proactive and avoid 'the need to negotiate agencies' respective roles on the fly, and would greatly reduce the likelihood of duplications of effort'. Overall, global institutions have so far tended to interpret the scope of One Health within the context of their existing mandate and activities, with most institutions reluctant to broaden their remit too widely. Indeed, claims by FAO and WHO that they already function according to One Health principles arguably demonstrate their lack of active engagement with the initiative, and raises broader concerns about their commitment to change.

Beyond the UN system, there are nevertheless promising signs that professional associations have created institutional

channels to facilitate closer communication and interaction across sectors. This has occurred largely at the national level, and within a limited number of countries, but there is potential for such efforts to feed upwards to the global level. Founded in 2009 with funding from the Rockefeller Foundation, the One Health Commission comprises a board of directors representing the American Medical Association (AMA), American Veterinary Medical Association, Association of American Veterinary Medical Colleges, Association of American Medical Colleges, American Public Health Association, Association of Academic Health Centers and other organizations. Its mission is to 'establish closer professional interactions, collaborations, and educational opportunities across the health sciences professions, together with their related disciplines, to improve the health of people, animals and our environment' (One Health Commission n.d.). In 2008, the AMA successfully proposed a resolution at the World Medical Association (WMA), representing 90 national medical associations worldwide, to establish a dialogue on One Health with the World Veterinary Association (WVA). The CDC's National Center for Emerging and Zoonotic Infectious Diseases, formed following the 1999 outbreak of West Nile virus, comprises an interdisciplinary unit whose crosscutting mission includes collaboration 'with other CDC centres and national and global partners to conduct, coordinate, and support infectious disease surveillance, research, and prevention' (CDC 2011). Similarly, Canada's national integrated enteric pathogen surveillance system, known as C-enternet, focuses 'on the necessity of collaboration among jurisdictions and of integration of efforts, new communication networks, rigorous systematization, and involvement of local public health units to inform policy at the local, regional and national levels' (Public Health Agency of Canada 2010). Extending these efforts to other national settings and ultimately globally, however, will face enormous challenges given differences in cultural values, beliefs and practices, as well as disparities in resources, knowledge and infrastructure.

Conclusion: progressing the One Health approach at the global level

The One Health approach, which sees human health as inseparable from the health of the planet as a whole, seeks to achieve a critical paradigm shift. Indeed, as globalization continues apace, One Health will arguably become increasingly relevant. As Yang (2011, p. v) writes, 'As emerging diseases and health priorities evolve into global and multi-sectoral issues, public health professionals—from interventionists to advocates to researchers—must step outside of their silos'.

The prospects for One Health to help remedy, and not be subsumed by, existing dysfunctions in GHG are dependent on several related factors. First, an agreed definition of One Health that is operational is a key starting point: an overly narrow take will not lead to buy-in from sufficient stakeholders, whereas too broad an interpretation renders the concept meaningless. The World Bank's support for an integrated national and international surveillance and control system for emerging and re-emerging zoonotic diseases with pandemic potential, adapted from the global response to HPAI, which could also address the impact of longstanding endemic diseases, offers a possible win-

win scenario. The Global Early Warning System for major animal diseases including zoonoses (GLEWS), an information sharing system that combines and coordinates international surveillance, alert, and disease intelligence mechanisms of OIE, FAO and WHO, represents an example of a step towards this end (OIE/FAO/WHO n.d.).

Second, it would be too much to expect One Health to resolve the entrenched problems of fragmentation and lack of coordination within GHG, but it can perhaps offer a beacon of light by building examples from the ground up. For example, in 2008 the Wildlife Conservation Society and large food company Cargill announced five multi-disciplinary projects in Brazil concerned with human health, the environment and food animal production that would support 'new ways of joint work that will bring a healthier world to us all' (Wildlife Conservation Society 2008). The USAID-funded Health for Animals and Livelihood (HALI) project, a multi-level study aimed at assessing the impact of zoonotic disease on human, livestock and environmental health in a water-scarce region in rural Tanzania, provides evidence that One Health can be acceptable to local stakeholders and communities, and could be practically implemented in resource-poor settings (Mazet *et al.* 2009). Also based in Tanzania is the Southern African Centre for Infectious Disease Surveillance (SACIDS), founded in partnership with the London International Development Centre and other international organizations, and funded by Wellcome Trust, the Rockefeller Foundation and the Google Foundation. SACIDS (2011) seeks to build capacity in zoonotic disease surveillance in southern, central and East Africa. Similarly, the Integrated Control of Neglected Zoonoses (ICONZ) project, comprised of 21 African and European institutional partners, has developed 12 interrelated 'work packages' aimed at gap analysis, development of control strategies, analysis of burdens, technology transfer and communication for eight neglected zoonoses (ICONZ 2012).

A third factor is the current lack of analysis of efforts to integrate human, animal and health at the local, national, regional or global levels, and no comparative analysis from which to draw lessons. The scientific case for One Health is supported by substantial research from the environmental, veterinary and medical sciences, brought together on the One Health initiative website (<http://www.onehealthinitiative.com/>) and their associated *One Health Newsletter*. Coker *et al.* (2011) set out a conceptual framework for research to inform one-health policy research strategy that coherently links to the overarching goals of policy makers. With respect to global governance strategies, case studies of what works or does not work institutionally, notably success stories of One Health in action, would offer valuable lessons for taking scientific results forward. In particular, such studies should focus on the establishment and maintenance of institutional arrangements for One Health. What processes are needed to engage relevant institutional players? What forms of governance are adopted to structure their contributions? What implications do these arrangements have for resource distribution and re-distribution? And ultimately what impact have these arrangements had on human–animal–environmental health?

A fourth key factor affecting the success of One Health is high-level global support, underpinned by access to appropriate

resources, to institutionalize the approach from basic training to end user application. In this respect, GHG could lend far more weight, channelling resources towards building capacity and integrating institutional players, across the three sectors. To date, veterinarians and animal health institutions have led the way (Sherman 2010), including for example a study of *Workforce Needs in Veterinary Medicine* by the Association of American Veterinary Medical Colleges (2012) that highlights the One Health approach. Although there has been a surge of interest in global health within public health training programmes across the world, corresponding reflection on how public health professionals are educated, and the potential role of One Health in this process, is needed. Changes might range from the creation of interdisciplinary One Health degree programmes (such as the Master of Health Science Degree programme with One Health concentration at University of Florida) to (re)training of existing practitioners and the creation of career opportunities, to appointing One Health leaders at major organizations [the University of Utrecht (2011) being one prominent example] and to global level initiatives that fund research, training and institution building.

Perhaps most importantly, One Health advocates must recognize that their vision is highly political and must strategize accordingly. In its most ambitious form, One Health could radically transform GHG because of its challenge to institutional boundaries within and across human, animal and environmental health. These boundaries constitute mandates and resources, and any effort to 'shake up' mandates, however well intended, is bound to spark turf wars. This is evident already by how different institutional players have interpreted One Health according to self-interests. Strategically navigating the tricky political terrain of GHG will be essential if the One Health approach is to be a catalyst for improving GHG, and not simply another casualty in a long line of initiatives.

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