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One Health: A primer for environmental public health practice

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One Health works towards optimal health outcomes by recognizing, understanding, and managing the interconnection between people, animals, and their shared environment. It is neither “human first,” “animal first” nor “environment first,” but all together. One Health proposes to transform health systems by mobilizing multiple sectors, disciplines, and communities to tackle some of our most challenging health crises.

This paper is the first in a series that focuses on One Health and its role in environmental public health practice.

The One Health movement

One Health is a response to the growing urgency to translate science and policy into action against health threats at the interface of people, animals, and environments. The One Health movement initially confronted emerging diseases linked to animals, like COVID-19, avian influenza, and Ebola. It grew to influence environmental and social determinants of human health by working upstream in animal and environmental health. For example, by managing livestock diseases, One Health programs help impoverished livestock-dependent communities escape the poverty trap caused by endemic zoonoses and poor food production. One Health is now being called upon to help humanity confront and cope with global health security threats tied to human development and environmental crises including pandemic infections, climate change, biodiversity loss, and food insecurity. It has evolved to promote intergenerational and interspecies health equity.

Perspectives of One Health

Public health programs most often focus on integrated zoonotic diseases management when characterizing One Health. Development agencies and global health programs tend to see One Health as a way to address the sustainable development goals in an integrated and efficient manner. Environment agencies often see One Health as a coordinated approach to protect ecological services necessary for life, like air quality, biodiversity, and safe water. Despite different perspectives of the focus of One Health, at its core is the integration of knowledge from multiple sectors so that no person, animal, or ecosystem is prevented from being healthy because of their social or environmental circumstances. Its cross-sectoral collaborations address the collective need for clean water and air, safe and nutritious food, climate change action, emerging disease preparedness and sustainable development.

One Health shares many perspectives and methods used in population health practice, health promotion or global health. The fundamental difference is the explicit attention to other species and the view of



environments and ecosystems as entities deserving care and not just as economic resources or sources of threat for people. Too often, environmental health practices have viewed animals or environments primarily as sources of harms or hazards such as zoonotic infections or contaminants. One Health remains firmly human-centric in its attention to societal and individual health and well-being but recognizes that protecting human health comes from protecting animal and ecosystem health.

Why is the One Health orientation important now?

The world is changing

Indigenous knowledge systems understand that to maintain human health over time, the health of future generations and the health of other species must be protected without compromise. Respecting this truth and applying this knowledge are necessary components of Canada's path to reconciliation.

Pressures such as climate change, urbanization, and global travel and trade have created a new dynamic in which the health of people, animals, and our environments are inextricably interconnected at scales never seen before. These pressures are amplifying existing problems (e.g., expanding ranges of vector-borne diseases) and exacerbating new public health threats (e.g., heat domes and pandemics).

Expectations are changing

International declarations are translating into pressures on national and local public health systems to reflect on how One Health can help develop programs that are simultaneously socially, environmentally, and economically just. For example, in response to the COVID-19 pandemic, G20 health ministers declared that there is no health without One Health. A joint G20 health and finance ministers' communique emphasized the need for a comprehensive One Health approach to advance pandemic prevention, preparedness, and response, as well as to prepare the way for stronger post-pandemic recovery.¹ The WHO Director General underlined the intimate and delicate relationship between people and planet at the 2020 World Health Assembly, noting that efforts that fail to address this critical interface are doomed to failure.² The World Bank is promoting nature-based solutions to manage disaster risk and reduce the health impacts of climate change.



Efficiencies and innovations are needed

In a world of overlapping problems concurrently affecting people, animals, and the environment, unique solutions for each problem are neither feasible nor effective.³ One Health aims to create efficiencies by addressing the shared causes of threats and investing in widespread “multi-solving” actions that help people, animals, and environments together. One Health not only enables interdisciplinary approaches to single problems but also fosters teams that examine the interactions and implications of multiple problems occurring at the same time in the same place. One Health’s emphasis on sharing knowledge, resources, infrastructure, and governance helps overcome inefficiencies and delays in turning knowledge into action.

An interdisciplinary approach to problem solving offers a more fulsome look at the issue or situation, and can often show new avenues for intervention or enable teams to be more aware of the consequences of their actions. For example, biosecurity plans that interrupt the avian influenza virus movement from wild birds to poultry to people greatly benefit from collaborations between farmers, ecologists, veterinarians, and environmental health professionals who each bring unique insights into the opportunities to effectively block viral movement on local farms.

Does One Health fit into environmental public health practice?

Partnerships to solve the problems

In today’s world of multiplying challenges to health and wellbeing, agencies established to deal with these problems can quickly become overwhelmed. Many of the drivers of environmental health problems are found outside of the legislated scope of public health practice. Partnerships are essential. Effective solutions need multi-sectoral coordination, collaboration, and engagement to find shared paths forward despite different goals and values. For example, public health goals of reducing foodborne pathogens in meat products can conflict with economic goals of livestock farmers. Public health, in this case, must work with others to manage the practical realities of farming to safeguard human health while also promoting the health of animals and farmer incomes. Such an approach facilitates collaborative actions that are acceptable, equitable and effective.



Working across all levels of prevention

Figure 1 is a schematic of how cross-sectoral collaborations with animal health and environmental sectors can contribute to public health functions. Table 1 provides examples of those contributions, citing real-world cases where possible.

Figure 1. Situating One Health in Public Health Functions

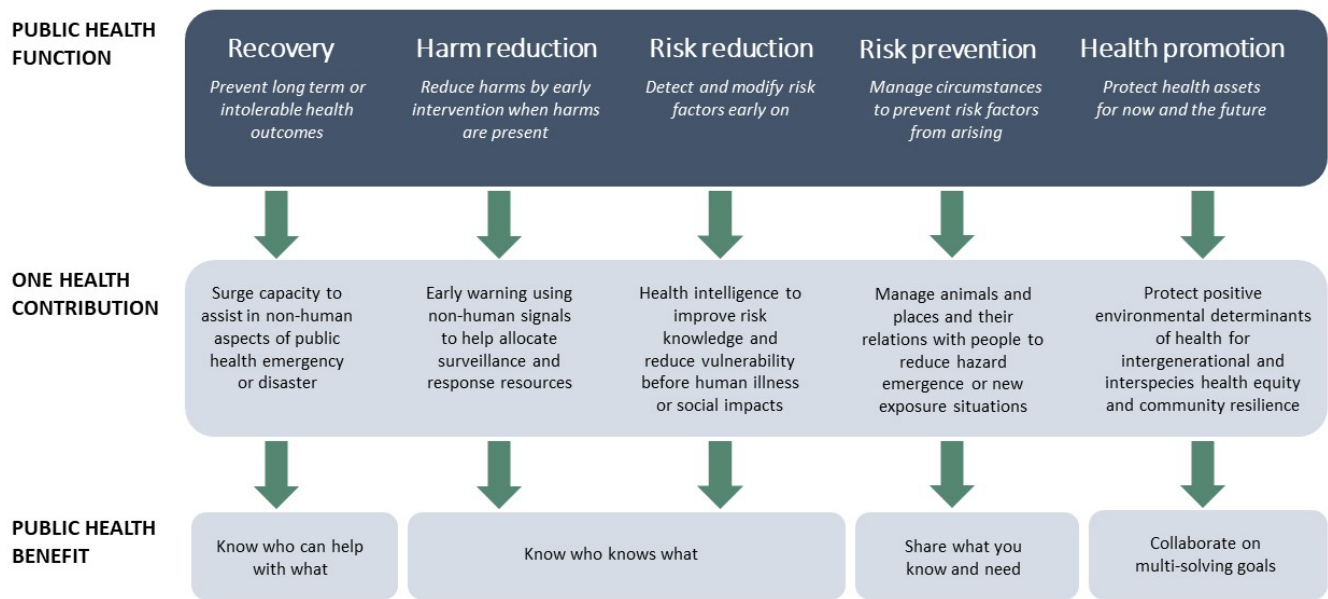


Table 1. Examples of One Health contributions to public health functions

Public health function	Example of One Health collaboration
Recovery	Veterinarians contributed to COVID-19 responses by maintaining local food security, providing diagnostic and vaccination surge capacity to the human health response, and ensuring mental health support to people by protecting human-animal bonds. ⁴
Harm reduction	A network of environmental health, veterinary and public health professionals created trusted relationships that allowed easy sharing of independently detected signals of a highly unusual outbreak of

	Cryptococcosis. No single sector had sufficient data to indicate that an outbreak was starting, but together, their findings convincingly revealed not only an unusual cluster of cases in people and animals but also helped to target high risk places and identify environmental characteristics associated with the persistence of the pathogen. ^{5,6}
Risk reduction	Water and sanitation systems are very sensitive to weather extreme events. Safe procedures of integrated animal and human excrement management are needed to prevent water contamination and eutrophication in locations vulnerable to extreme weather. ⁷
Risk prevention	Urban and peri-urban wildlife can play a role maintaining and transmitting antimicrobial resistant pathogens. ⁸ Urban green space planning and peri-urban farm management need to consider how to interrupt the flow of resistance genes from wildlife and environmental sources to people.
Health promotion	Sustainable wildlife management is a food security cornerstone for many Indigenous and remote communities as well as for biodiversity conservation. Poor wildlife health and changing wildlife distribution and abundance are major contributors to Canada's northern food insecurity crisis. Changes to wildlife migration routes, population size, body condition and infection and contamination status are being caused by climate change, in turn affecting northern food security. ⁹ Collaborations between wildlife health and public health officials can make better use of resources by addressing upstream drivers of wildlife and public health problems.

Who is involved?

Everyone has a stake

Everyone needs sustainable, healthy relationships between people, animals, and the environment. But not everyone needs to be equally involved in One Health in all situations. To date, veterinary medicine has been the most active and vocal proponent of One Health, largely because their professional scope of practice straddles public health, animal health, and environmental determinants of health. As the interests of One Health has expanded from its origins in emerging zoonotic diseases, so too has the



variety of disciplines and communities brought into One Health teams. Community members, public health practitioners, ecologists, geographers, psychologists, anthropologists, physicians, biologists, microbiologists, and economists are just a few of the disciplines that have been part of One Health efforts.

The composition of a One Health team is highly dependent on the knowledge and relationships needed to confront a specific problem. A team tackling endemic salmonellosis in a rural African community will be different than one focussed on nature-based climate change resilience in a coastal Canadian village. There is no set of disciplines that must be included in all situations. Public health practitioners should strategically consider the perspectives, knowledge (including both Western and Indigenous knowledge) and capacities needed to generate and mobilize the evidence sufficient to inspire actions on public health goals when assembling or contributing to a One Health team.

Collaborations are the new normal

The walls between disciplines have been falling for decades in Canadian environmental health practice. Cross-sectoral teams working on public health issues such as vector-borne disease surveillance, farm-to-fork food safety, antimicrobial resistance, and pest management are becoming the norm. However, these collaborations tend to be issue by issue rather than ongoing and sustained. When using One Health approaches, practitioners and managers need to develop collaborations that are neither too narrow (missing chances for efficiencies and innovation through collaboration), too broad (missing chances to make changes in prevailing public health concerns), nor too brief (requiring processes and relationships to be rebuilt with every new urgent event).

Many upstream drivers of environmental health risks arise and reside outside of the public health sector. Building well-connected networks and cross-sectoral governance practices among researchers, practitioners, policy makers, private actors and community members will facilitate the knowledge transfer and negotiations necessary to cope with many environmental health threats.

A natural and necessary partnership

Too often, the urgency of the pressing problems confronting us now provides little time for practitioners to get ahead of the problems or think to the future. One Health collaborations can be a way to share the burden and help overcome present challenges to a healthier future. Sharing knowledge, capacities, and



resources across sectors can create efficiencies that are appealing to funders, help us to prevent emerging risks, dampen current problems and protect ecological determinants of health more effectively.

There are many environmental health activities that function well with “business as usual” programs. But as problems become more complex and have larger and more wide-reaching impacts, the need grows to reach out to others for information and insights into options or solutions. Environmental public health is closely aligned with a One Health agenda due to their shared focus on the relationships between people and their environments, promotion of human health and well-being, and fostering healthy and safe communities.

One Health approaches can close gaps in knowing who knows what, where information is found, and the needs and capacities of others—gaps which can delay decisions and actions. One Health data networks and professional networks can support proactive and strategic use of inspection, surveillance, or responses resources. It provides an integrative way to think about environmental public health issues beyond one’s immediate span of responsibilities, thus promoting practice and policy innovations to implement concepts such as Health in All Policies and systems thinking in public health.

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