UNIVERSITY OF THE FRASER VALLEY

CONNECTING FOR THE FUTURE:
A One Health Approach for UFV

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Executive Summary

One Health is an applied, transdisciplinary approach to the study of the interaction between the human systems and their containing ecosystem, most usually through the study of linked issues of human, animal, and ecosystem health. This approach has developed over the last few decades in response to complex issues such as zoonotic disease and agricultural impact on ecosystem health and other issues that are poorly served by disciplinary study. One Health has successfully been used by universities to organize activities designed to create applied research solutions to emergent problems and could prove to be a powerful tool for the University of the Fraser Valley due to our dedication to applied research and teaching, regional grounding, strength in agriculture, environment, and health, and dedication to indigenization.

A Brief Overview of the One Health Approach

One Health is a transdisciplinary approach to studying complex problems involving the collaboration of multiple disciplines working together at multiple scales to attain optimal human, animal, and ecosystem health outcomes. One Health can be viewed as grounded in complex adaptive systems theory, in which humans are considered as part of their local cultures and environments. On a more practical level, One Health links seemingly diverse areas of study such as agriculture, medicine, kinesiology, food security, veterinary studies, environmental studies, and ecosystem science by framing wellness as a holistic outcome in which humans, animals, and environment must all thrive together as a connected system. One Health thus mirrors other attempts to link academic studies across disciplines in order to shed light on system-level challenges. A similar approach is found in the emerging science of the polycrisis (Homer-Dixon et al, 2021) as explored by British Columbia's Cascade Institute and others; One Health, however, is less crisis-driven and reactive and leans strongly into proactive intervention to improve overall system health.

One Heath emerged out of growing understanding of zoonotic disease (diseases that pass between humans and animals such as SARS, COVID, HIV, and others) and awareness of human and animal health, and the agricultural drivers of increasing zoonotic risk. For example, see Ghai et al, 2021, for a brief overview of how public health can't be viewed only through a human lens as we are interconnected to the ecological systems in which we live. The feedback loops that drive issues such as climate disruption and the spread of diseases such as COVID-19 can't be separated from the realms of culture, agriculture, and nature. One Health is increasingly being used as a guiding principle for understanding complex human-ecological systems and issues of nature and culture and is supported by the Food and Agriculture Organization (FAO) and the Centre for Disease Control and Prevention (CDC). The former is of particular note as the FAO sees **One Health** as instrumental in advancing toward sustainable agricultural systems (FAO, 2024).

A Brief History of One Health

A definitive history of One Health is difficult as there are numerous earlier examples of using interdisciplinary and transdisciplinary approaches to solve specific problems. However, some recognition can be given to Rudolf Virchow's work in the 19th century on holism in health and the importance of public health (McNeely, 2002). In a similar fashion, we can point to early pioneers such as Dr. John Snow and his use of mapping to understand cholera (Newsom, 2006 gives a good overview). A more contemporary influence is that of Calvin Schwabe, an epidemiologist, who in the 1980s called for a unified approach to combat zoonotic disease. As a veterinarian trained in the field of public health, Schwabe designed a "One Medicine" approach in 1964 that stresses the points of similarity between animal and human medicine and argued for collaboration between physicians and veterinarians to solve global health issues. He is arguably the first person to bring a One Health strategy to a university as he founded a department at the University of California, Davis to address human and animal health (Ancheta et al, 2021).

The modern precursor to One Health was the "One World, One Health" conference of 2004, held at Rockefeller University by the Wildlife Conservation Society. This symposium framed wildlife, domestic animals, and humans to be interconnected, and ended with the establishment of the Manhattan Principles, which framed a unified approach to disease control. The principles included recognizing the essential link between human, domestic animal, and wildlife health, recognizing that decisions regarding land and water use have health implications and that wildlife health science is a critical component of global disease prevention. They further stressed the link between human health programs and conservation, the need for holistic and adaptive programs for global health, and the need to pursue opportunities to integrate conservation perspectives and human needs. The principles laid out the need for bushmeat regulation, restriction of wildlife culls, and increased investment in human and animal health infrastructure, and finally called for collaboration between government, local communities, and the private sector (WHOA, 2009).

The One Health approach continued to develop. The impact of the Manhattan Principles and growing fear of H5N1 influenza inspired the American Veterinary Medical Association to establish a One Health Task Force in 2006, and the American Medical Association resolved to use a One Health approach to study the interaction

of human and animal disease in 2007 (Gibbs, 2014). These initiatives contributed to the creation of a formal platform through the jointly authored "Contributing to One World, One Health-A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface" in 2008, created by the FAO, WHO, and OIE, supported by the World Bank (FAO et al, 2008).

One Health was formalized as a concept by 2008 and recognized by the US government in 2009 with the establishment of the One Health Office at the CDC. The office is the lead institution for One Health activities at the CDC, headquartered in Atlanta, Georgia. The office promotes One Health globally and domestically in the US and serves as the head of the World Organization for Animal Health for emerging zoonotic diseases. The One Health Office focuses on zoonotic disease, pandemic preparedness, global health security, and zoonotic prevention. One Health has been adopted broadly over the last decade and has been used by the WHO, FAO, and UN. The history of the One Health approach reflects the recognition of the relationships between human, animal, and environmental health, and has evolved into a formalized global approach that addresses pressing health challenges in a more interconnected and collaborative manner.

Academically Grounding One Health

One Health straddles several academic disciplines and direct linkages to disciplinary study will be made later in this document, however, the deeper philosophic home of One Health is understudied. I would position One Health as a manifestation of social ecology, and feel there are subtle linkages between One Health, social ecology, and the larger science of complexity theory. The latter is the study of complex systems and explores the interactions between numerous individual components within large systems. This can include anything from study of an ecosystem, study of a human brain, or study of a financial market or relations between nations. At its simplest, complexity theory studies systems of size between the realm of Newtonian mechanics and thermodynamics. Complexity theory studies how interactions at this scale can give rise to phenomena that cannot be easily predicted or explained by analysing components in isolation. Instead, it highlights the importance of examining the system as a whole where unexpected patterns and emergent properties can occur.

Much of the early work in the field involving practical application to real-world systems stems from CS. Holling, a Canadian ecologist known for his work on resilience in ecosystems. As a founder of social ecology, he examined the dynamics within ecological systems, including the interactions between predators and prey, and the role of disturbances within ecosystems. He was fascinated with the ability of ecosystems to withstand disturbance, leading to the idea of resilience. The human element entered social ecology through studies of ecosystem management and conservation, and spreading to larger concepts including health, agriculture, and the idea of the Anthropocene, or age of the human. Social ecology continues to develop through related ideas such as the polycrisis and One Health.

Elements of a One Health Approach

One Health is defined by its collaborative transdisciplinary nature applied over a variety of spatial scales and time periods, but in application there are some common elements to develop. These fall under four broad categories: a geographical component, an ecological component, a human systems component, and a food systems component.

The geographical component: This component covers physical geography including weather and climate, hydrology (including ocean systems and limnology where appropriate), topography, soil structure, and mineral wealth.

The ecological component: Close related to the above, the ecological component includes ecological systems, with a focus on wild animal populations on land and in the water. This category also includes ecosystems as a whole, including biomes, wild species, forestry, wild harvest, invasive species, and other ecological elements.
The human component: includes population dynamics, social systems, the ecological/human interface, human health and welfare, and political systems among others.

The food systems component: Focuses on agriculture with special attention to the interaction between agriculture and natural ecosystems, however, this component considers the food system as a whole from production to processing and distribution to human access.

A focus on food security and food sovereignty.

Though not specific to the One Health approach, food systems are best studied with clear definitions of food security and food sovereignty.

From the **Rome Declaration on World Food Security**: "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." (FAO, 1996, s. 1). This can also be framed using the Ryerson Declaration's "4A" approach:

Availability requires that a sufficient supply of food be produced to meet the needs of all people at all times. Accessibility requires that all people within and between societies have equal physical and economic access to food. Acceptability requires

that food and food practices reflect the social and cultural needs of a society, that the symbolic role of food be acknowledged, and that food systems be socially and ecologically acceptable to a society. Adequacy requires that food systems guarantee the sustainable production, distribution, consumption, and waste management of food so as to ensure that the food system can satisfy basic human needs without compromising the ability of future generations to meet their needs (adapted from Koc et al, 1999, p. 1-2).

Food sovereignty is the right of peoples to define their own food and agriculture; to protect and regulate domestic agricultural production and trade in order to achieve sustainable development objectives; to determine the extent to which they want to be self-reliant; and to restrict the dumping of products in their markets. Food sovereignty does not negate trade, but rather, it promotes the formulation of trade policies and practices that serve the rights of peoples to safe, healthy and ecologically sustainable production (Patel, 2009).

A comprehensive One Health approach should embrace both concepts and then integrate food systems into the broader study of all categories. It should be made clear that One Health is about bridging and boundary crossing, and all categories work together to create comprehensive solutions to problems. This approach also requires extremely detailed data monitoring, monitoring, and analysis over long time periods. In some respects, a One Health study can never really be said to be "finished".

One Health and Universities

Universities are key actors in a One Health approach. In brief, they can integrate One Health into academic programs, research, and campus activities. They can also position themselves within a larger One Health ecosystem of Not-for-Profits, various levels of government, and industry interests. Below are four key areas of focus for universities enacting One Health:

1. Curriculum Integration:

Universities can incorporate One Health principles into their curricula across various disciplines, including medicine, veterinary science, public health, environmental studies, and more. This entails offering courses and programs that emphasize the interdependence of human, animal, and environmental health. For example, health programs can include zoonotic disease studies, while environmental science programs can explore the impact of ecosystems on health. This integration fosters a holistic understanding of health issues and encourages collaboration among diverse fields.

2. Interdisciplinary Research and innovation:

Universities should promote interdisciplinary research initiatives that encourage collaboration between faculties, departments, and research centers. Funding and support for One Health research projects can lead to groundbreaking discoveries in disease prevention, antimicrobial resistance, and ecosystem health. Collaborative research can also attract external funding. Though only loosely related to One Health, transdisciplinary work is well suited to innovation that bridges university work and industry needs within a local context.

3. Outreach and Awareness:

Universities can organize outreach programs and awareness campaigns to educate students, faculty, and the broader community about One Health. These initiatives can include seminars, workshops, and public lectures by experts in the field. Additionally, universities can establish partnerships with local health authorities and organizations to address specific health challenges in the surrounding community, demonstrating the practical application of One Health principles. Over time this work can position a university into a broader ecosystem.

4. Campus Sustainability

To fully embrace the One Health approach, universities should also implement sustainable practices on their campuses. This includes reducing waste, conserving resources, and promoting eco-friendly transportation options. By creating a healthy and sustainable campus environment, universities set an example for students and the community, reinforcing the One Health ethos in all aspects of life. This can extend the rehabilitation of ecosystems on and near campus. This approach pairs well with bridging campus and community (Barrett et al, 2011; Degeling et al, 2015).

Canadian Examples of University One Health Approaches

One Health approaches have been implemented at a selection of universities in Canada and elsewhere. A comprehensive map of global examples is available from the **Global One Health Commission**.

University of Guelph:

The University of Guelph hosts the One Health Institute, which focuses on research and education in the field of One Health. It is consistently recognized for its comprehensive approach to health studies and research. Guelph offers a Batchelor's in the One Health approach. However, adoption across the university including within Guelph's sweeping agricultural offerings remains a work in progress. At Guelph, the One Health Institute is directed by the vice-president academic and focuses on complex problems at the intersection of animal, human, and environmental health. Founded in 2019, the institute includes 140 affiliated faculty members from across the university.

University of Calgary:

The University of Calgary offers the One Health Summer Institute, a program that explores the One Health approach in the context of climate change. This initiative promotes interdisciplinary collaboration in addressing complex health and environmental challenges. UCalgary has a strong commitment to One Health and is a natural partner for a BC institution. One Health at UCalgary achieved public notice when the One Health research group studied COVID-19 outbreaks in the meat processing industry, leading to practical action plans.

University of Saskatchewan:

The University of Saskatchewan provides an undergraduate certificate program in One Health. This interdisciplinary program positions the university as a leader in One Health education in Canada, focusing on the interplay between human, animal, and environmental health, though integration with agricultural elements of the university remains a work in progress. U of S was an early adopter of One Health, declaring the subject a signature area of research in 2011.

At a smaller scale, Université de Montréal has just begun a strategic focus on One Health through its **One Health Initiative**, and a Global One Health Network is coordinated out of the University of Ottawa. Other groups are emerging at McMaster, Western, and the University of Toronto. Also of interest is the One Health group at the University of Washington's School of Public Health in Seattle.

One Health and the Indigenous Lens

The University of the Fraser Valley is well positioned to add to an understudied and important component of the One Health story. The intersection of Indigenous worldviews and One Health. There is one major paper on the subject by Hillier et al, (2021) "Examining the concept of One Health for Indigenous communities: A systematic review." The authors explored the question of alignment between One Health and Indigenous systems of health and wellness. They found the existing literature to lack an understanding of how Indigenous worldviews and One Health fit together. They suggest some avenues of study; traditional Western medicine focuses on illness and disease, or a lack of health, and Indigenous worldviews balance physical and mental health grounded within the landscape. This worldview seems compatible with the goals of One Health, and maps onto the World Health Organization's interest in stewardship. Overall, there is an unmet conversation to be had re: One Health that might involve expanding on work to embed indigenous knowledge within the existing disciplines that make up One Health as a concept.

One Health at UFV

There are a number of steps UFV could take to join the growing One Health community:

1. Set up a One Health Task Force based out of the provost's office, resourced to build out a more fulsome plan.

2. Identify an actor network within UFV, including traditional One Health subjects, and more imaginative partners such as the proposed MBA in agriculture and the new planning program. Several research institutes and centres are positioned to provide support.

3. Identify aligned researchers and research directions.

4. Explore how One Health could be reflected in the UFV curriculum, including potential expansion or creation of new programs.

5. Identify fund-raising goals and capital projects to support a One Health approach.

6. Identify industry and community partnerships and other important regional supports.

One Health Funding Directions

Building out a full One Health approach opens up several potential avenues for funding and advancement, including:

1. A Life Sciences building in Chilliwack that becomes the physical heart of the One Health initiative.
2. Funding for institutes and centers in aligned areas, including new initiatives in Agriculture.
3. Short-term faculty One Health chairs funded through packages of course release.
4. Funding for Indigenous work in the area of One Health.
5. A dedicated One Health research and engagement fund.

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