ONE HEALTH
at UCalgary

UNIVERSITY OF
CALGARY

One Health at UCalgary

Research Strategy

2020 - 2025

One Health at UCalgary

Strategic Plan: 2020-2025

One Health at UCalgary (OH@UC) was founded in 2019 as an emerging, cross-cutting research theme with support from the Office of the Vice-President (Research). One Health takes a systems view of complex problems, recognizing interconnections of people and animals in their shared environments. The One Health research paradigm aligns with UCalgary's three research priorities (Matching Strengths with Opportunities, Increasing Research Capacity, and Driving Innovation) thereby increasing UCalgary's capacity for solution-oriented research.

Complex problems include global challenges such as emergence of COVID-19, climate change, loss of biodiversity, antimicrobial resistance, food and water insecurity, and the infrastructure gap. Knowledge and understanding of complex problems are often incomplete or contradictory, people with diverse perspectives are involved, and the problem, and its potential solutions, often impose a substantial initial economic burden. Due to system qualities inherent in complex problems, a One Health approach with solutions co-developed from various disciplinary spheres and cultural perspectives, is necessary for effective and sustainable change.

One Health uses a transdisciplinary approach to address problems at the intersection of the environment, people, plants, and animals. Transdisciplinary research is conducted by investigators with diverse backgrounds and perspectives, representing various branches of knowledge, collaborating and using novel, holistic approaches to solve a common issue. Combining diverse expertise has great potential to yield innovative adaptations that better address complex scientific and social challenges (Figure 1).

A diverse and transdisciplinary team is also able to examine upstream determinants of health that shape the health of both individuals and different populations. In public health, determinants of health are the social, economic, cultural, physical, built, and political environments that can either promote or inhibit wellness. Animal and environmental health and resilience are also impacted by characteristics of their physical environment and the anthropogenic imposition of social, cultural, and economic expectations. A One Health approach can identify and implement robust and meaningful solutions to improve the health and wellness of people, animals, and the environment within existing social, economic, cultural, and political contexts.

OH@UC aims to remove barriers to the One Health approach, as a prerequisite for tackling the world's complex problems; we will bring together people, expertise, and resources to inspire innovation through research, investing in the future through transdisciplinary training programs,

and creating a better and more equitable future, based on community engagement and policy development.

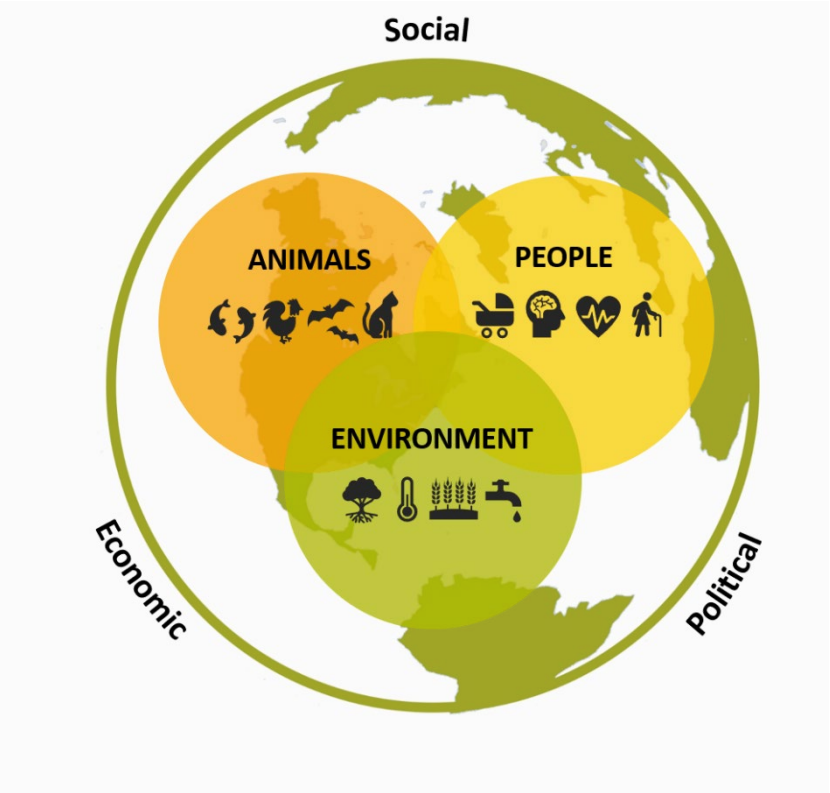


Figure 1. Representation of a One Health approach

Territorial Acknowledgement

The One Health at UCalgary team acknowledges the traditional territories of the people of the Treaty 7 region in Southern Alberta, which includes the Blackfoot Confederacy (comprising the Siksika, Piikani, and Kainai First Nations), as well as the Tsuut'ina First Nation, and the Stoney Nakoda (including the Chiniki, Bearspaw, and Wesley First Nations). The City of Calgary is also home to Métis Nation of Alberta, Region 3. We would also like to note that the University of Calgary is situated on land adjacent to where the Bow River meets the Elbow River, and that the traditional Blackfoot name of this place is "Moh'kins'tsis", which we now call the City of Calgary.

Goals of OH@UC Strategic Plan

The goals of this strategic plan are to define OH@UC's priorities, demonstrate how we will allocate resources to pursue this strategy, and how we will measure success. The plan builds on existing and developing areas of excellence and resources and identifies the scientific and social challenges we will work to address (Grand Challenges). It defines the areas of work we will pursue to build human capacity and attract funding (Theme Areas), and the transdisciplinary, cross-sectoral approach that defines us (Implementation Strategy) (Figure 2).

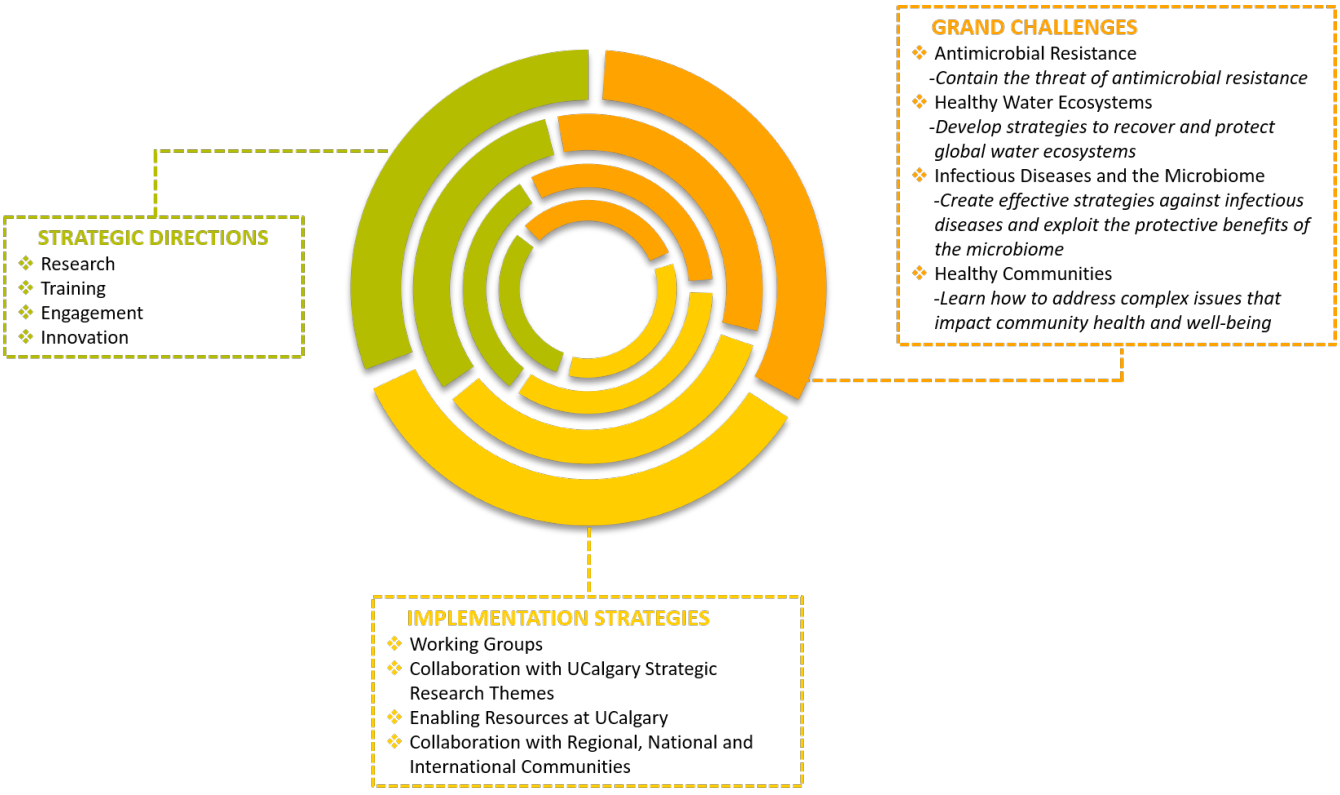


Figure 2. OH@UC Strategic Plan Summary

Definition of One Health: One Health uses a transdisciplinary approach to address problems at the intersection of people, animals, and their environments.

Vision: Improved health and wellbeing for people, animals, and the environment.

Mission: Using a One Health approach, OH@UC will create partnerships across UCalgary, our communities, and the world to improve our understanding of connections among people, animals and the environment, and to solve complex problems for the benefit of all.

Core Values:

- **Collaborate**: We deliver better outcomes through inclusive partnerships, shared goals, and integrated co-developed approaches that draw on diverse expertise in research, practice, and policy; *together we go further*.
- **Excel**: We embrace challenging work and achieve excellence in research, teaching, and knowledge engagement and mobilization that promotes meaningful improvements in human, animal, and environmental well-being in ways that are shared, equitable and fair; *excellence creates progress*.
- **Innovate**: Pushing boundaries is risky. We promote innovation through an environment of trust, respect, inclusiveness, and creativity; *innovation pushes boundaries*.
- **Inspire**: We believe that building supportive transdisciplinary relationships that facilitates the exploration of interesting and complex questions from various perspectives inspires researchers and trainees; *inspiration requires new perspectives*.

One Health at UCalgary (OH@UC)
Equity – Diversity – Inclusion Statement

OH@UC believes in equity, diversity and inclusion. Specifically, OH@UC recognizes that equity, diversity and inclusion strengthen research communities and help to generate high-quality research and innovation that is socially relevant, impactful, and accessible to diverse populations. OH@UC is committed to working with our institutional partners to implement policies, processes, and initiatives that mitigate biases and remove barriers to inclusion.

Specifically, OH@UC recognizes that:

- Diverse members of our community must see themselves fairly represented in its governance
- Building and sustaining respectful, ethical relationships between Indigenous Peoples and the UCalgary research community must be based on a mutual understanding, shared respect, and the recognition of rights
- Incorporating equity and diversity considerations into recruitment processes for researchers, trainees and all team members enhances the inclusiveness of our research community
- Ensuring that research design is informed by equity, diversity, and inclusion-related considerations will generate research that is more rigorous and better serves the communities it is intended to benefit
- The creation of a respectful and inclusive culture that values a diversity of perspectives is the responsibility of all members of our research community

One Health at UCalgary Governance Structure

Operating under the Office of the Vice-President (Research), OH@UC serves as an institutional hub for collaborations that transcend artificial boundaries imposed by faculties and disciplines. To reflect our light governance vision, OH@UC has elected to adopt a constellation model of partnering (Figure 3). The model reflects the initiatives and research projects as of August 2020 but is expected to grow and expand over time.

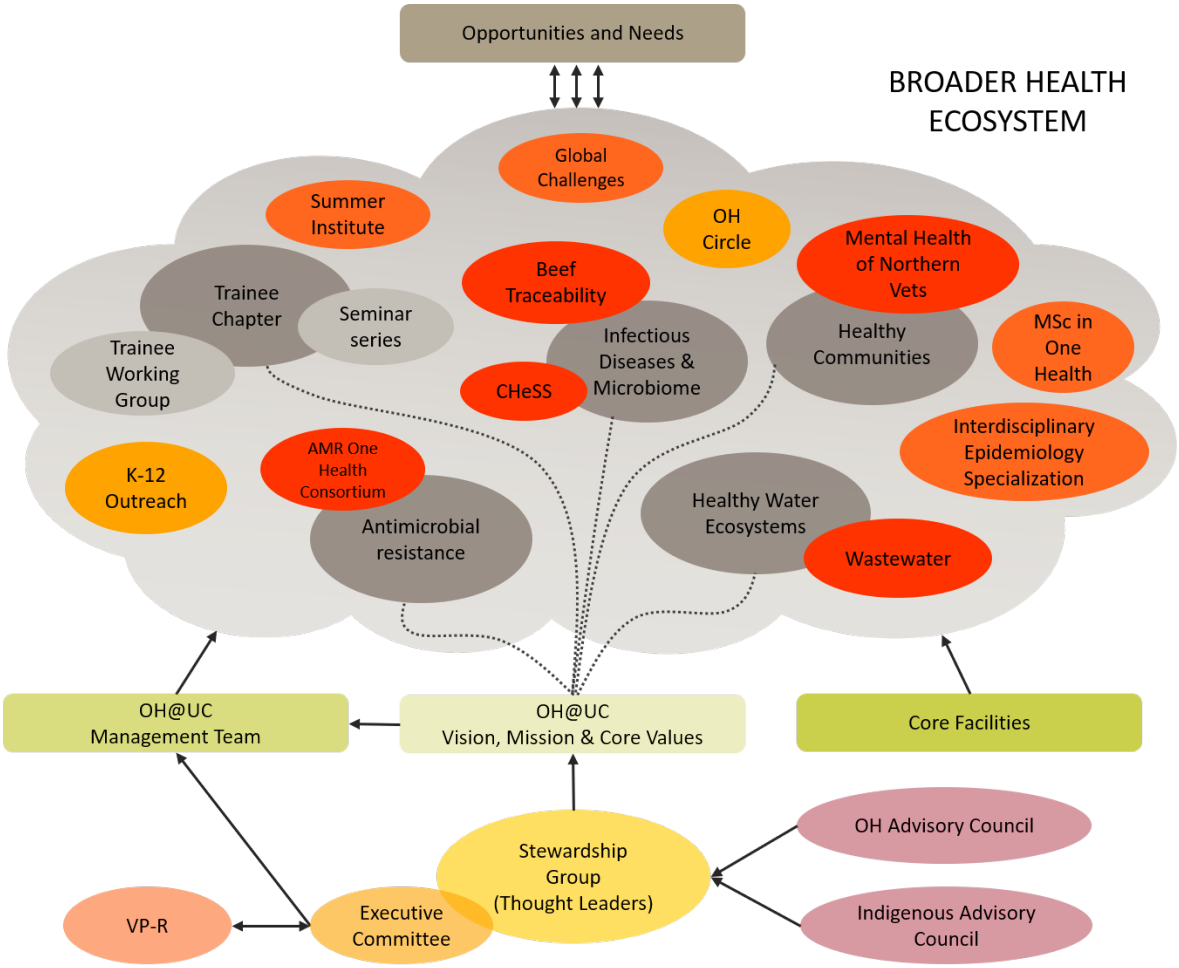


Figure 3. Organizational structure of One Health at UCalgary.

The cloud represents the sphere within which groups encompassing multiple disciplines within UCalgary and other academic institutions, and stakeholders from government, private sector, and the not-for-profit sector come together as **Work Teams** toward a joint outcome. It includes:

- **Working Groups**: Trainee Chapter, AMR, Healthy Water Ecosystems, Infectious Diseases and the Microbiome, and Healthy Communities
- **Research projects** that are under OH@UC management (August 2020)
  - AMR – One Health Consortium
  - Beef Traceability (Canadian Livestock Industry Traceability Movement Data)
  - CHeSS (Cattle Health Surveillance System)
  - Wastewater (A One-Health approach for monitoring, modelling and mitigating the evolution of antimicrobial resistance from wastewater in the environment)

    - Mental Health of Northern Vets (Improving Access and Quality of Community Medicine by Addressing Mental Health of Northern Veterinary Service Providers)
- **Training programs** to be delivered by OH@UC
- **Outreach programs** to be delivered by OH@UC

Our research, training, and outreach activities are in self-organizing **Work Teams** with a focus on action. Work teams are formal research projects or initiatives focused on training, engagement or fundraising that are often partnered with a working group (Antimicrobial Resistance, Healthy Water Ecosystems, Infectious Diseases and the Microbiome, Healthy Communities, and Trainee Chapter).

The **OH@UC Management Team's** priority is to support the Work Teams at UCalgary. It provides day-to-day coordination of the teams with services that include networking, mentorship, internal peer review, research infrastructure, and knowledge engagement platforms. The OH@UC Team, together with Thought Leaders, Executive Committee, One Health Advisory Council and Indigenous Advisory Council provide strategic direction to the partnership. The governance structure provides for feedback processes to actively inform future directions

The **Executive Committee** (EC) members provide leadership for operational decision-making to the OH@UC Scientific Director and team on all matters. The EC is comprised of the OH@UC Scientific Director, OH@UC Manager, one lead from each working group (including the Trainee Chapter) and three members responsible for 'Indigenous Peoples', 'Policy', and 'Outreach', respectively.

A group of ~25 **Thought Leaders,** selected from the Confederation of Scholars, from all faculties and representing diverse perspectives, will serve as advocates for the program and increase its visibility at UCalgary. As an advisory group, it provides strategic directions to support OH@UC in development and implementation of plans and policies necessary to meet its objectives and commitments.

A **One Health Advisory Council** (OHAC) will be formed to provide timely advice on strategies that enable OH@UC to experience excellence in research, policy, training, outreach, and commercialization. Membership in this council will be shaped by the principles of the OH@UC Equity – Diversity – Inclusion (EDI) statement. Specifically, the role of the OHAC will be to:

- Provide strategic direction and advice with respect to research, training, outreach, policy, and commercialization;
- Provide feedback required for OH@UC to successfully meet its goals; and
- Identify new collaborators and opportunities, and help OH@UC members to expand their international networks.

An **Indigenous Advisory Council** (IAC) will be formed; its primary role will be to provide strategic direction, guidance and advice, imparting a unique perspective to the research and advancing issues of particular relevance and importance to Indigenous communities. The IAC will provide guidance on Indigenous ways of knowing, doing, connecting, and being for the OH@UC governance and membership.

Working Groups, Thought Leaders, Executive Committee, One Health Advisory Council, and the Indigenous Advisory Council will have documented Terms of Reference, outlining membership, key roles and responsibilities.

The OH@UC Management Team is comprised of a manager, an administrative coordinator, an events and trainee coordinator, and project managers and research associates for large projects within OH@UC. Currently, these large projects are: AMR – One Health Consortium and the Beef Cattle Traceability study. Our long-term objective is to grow the number of large research and education projects managed by the OH@UC team.

Partnerships Across UCalgary and Beyond

Transdisciplinary cooperation builds knowledge, research expertise, and infrastructure to tackle complex problems. As a research-intensive institution, UCalgary has invested in faculty, staff, students, and infrastructure that enhance our dynamic research capabilities. There are numerous research themes, assets and institutes that are important collaborative resources for OH@UC.

Strategic Research Themes at UCalgary

- Energy Innovations for today and Tomorrow
- Infections, Inflammation, and Chronic Disease
- Human Dynamics in a Changing World
- Engineering Solutions for Health
- New Earth-Space Technologies
- Brain and Mental Health
- Child Health and Wellness

Research Centres and Institutes

- *ii'taa'poh'to'p,* UCalgary's Indigenous Strategy
- School of Public Policy
- Centre for Health Informatics
- University of Calgary Biostatistics Centre
- Advancing Canadian Wastewater Assets
- Bamfield Marine Sciences Centre
- Arctic Institute of North America (Kluane Lake Research Station)
- Biogeoscience Institute (Barrier Lake Station and RB Miller Station)
- International Microbiome Centre
- O'Brien Institute for Public Health
- Snyder Institute for Chronic Diseases
- Alberta Children's Hospital Research Institute
- Calgary Prion Research Unit
- W21C
- Simpson Centre for Agriculture, Food Innovation, and Public Education
- WA Ranches

Institutional partnerships are about people. OH@UC's Thought Leaders and Working Group members are researchers and trainees from faculties across campus and are also associated with many other UCalgary Research Themes, Centres, and Institutes. The affiliations of the OH@UC Thought Leaders are provided in Appendices 1 and 2. A list of all Working Group members and their disciplines is presented in Appendix 3.

OH@UC will also collaborate beyond our institutional boundaries. We will continue to build strong relationships with Indigenous communities, governments and leadership, regional and provincial non-Indigenous governments, and national and international universities and organizations. A partial list is provided and we will work to grow new partnerships.

Provincial

- City of Calgary
- Alberta Agriculture and Forestry
- Alberta Health
- Alberta Health Services
- Provincial livestock associations
- Alberta Jobs, Economy, and Innovation
- Regional Indigenous Organizations (e.g. Alberta Assembly of First Nations, Metis Council of Alberta)

National

- Provincial and Territorial Governments
- Indigenous Services Canada
- First Nations and Inuit Health Branch
- Infrastructure Canada
- Academic Institutions
- Public Health Agency of Canada
- Agriculture and Agri-Food Canada
- Canadian Food Inspection Agency
- Canadian AMR Network
- National Livestock Organizations
- Assembly of First Nations
- Inuit Tapiriit Kanatami

International

- Joint Programming Initiative on AMR
- AMR Insights
- World Health Organization
- United Nations Department of Economic and Social Affairs
- WHO Collaborating Centre for Research, Development, and Training on Antimicrobial Stewardship
- Food and Agriculture Organization
- World Organization for Animal Health (OIE)
- World Bank

- One Health Lessons

Strategic Directions

Research – Training – Engagement – Innovation

OH@UC will promote alignment of UCalgary's research, training, and engagement programs to optimize benefits of our partnerships while promoting diversity and inclusion. We will assess our performance using formal metrics. Baseline measures will be determined in 2021 and repeated in 2025 to evaluate our results.

Research. Our strategic research direction enables UCalgary researchers at all stages of their careers to build on their current research successes and address global challenges impacting health of people, animals, and the environment and the inequitable distribution health and well-being arising from these global challenges.

We will foster strong community-based partnerships through co-developed and co-drafted research programs with Indigenous communities. This will include the hiring of community-based research partners who will help guide the One Health research direction within the community and act as community Champions for the One Health initiative. Through the incorporation of Indigenous research methodologies, OH@UC will become a leader in the integration of diverse knowledge systems as a tool to solve complex problems.

OH@UC is committed to being a transdisciplinary hub for research excellence. We identified four *Grand Challenges* of our time, ambitious but achievable goals that harness science, technology, and innovation to solve important national or global problems. We will focus our research efforts on: i) *antimicrobial resistance*, ii) *healthy water ecosystems*, iii) *infectious diseases and the microbiome*, and iv) *healthy communities*. We will also remain nimble so as to quickly and effectively respond to changing research demands.

The objectives of our research plan are to:

- Build transdisciplinary research relationships among diverse UCalgary researchers
- Produce and disseminate high-quality transdisciplinary research
- Attract and attain the best and brightest talent via principles of EDI
- Build capacity for co-developed research with community partners, and
- Build capacity among researchers and trainees across disciplines to develop relationships with communities, government, the private sector, not-for-profit organizations and the general public to create and share knowledge

We will meet these objectives by creating and supporting transdisciplinary Working Groups within each research priority area. Working Group members will work collaboratively to develop research proposals that identify and address ambitious, important, and valuable research questions under each *Grand Challenge*. Research proposals will encompass and strengthen research interests of team members, benefitting from the creativity, innovation, and diverse perspectives inherent to transdisciplinary research.

Research projects associated with a Grand Challenge and a working group that are currently managed by OH@UC include: i) the AMR-One Health Consortium, a collaborative pan-Alberta platform focused on antimicrobial use (AMU) and antimicrobial resistance (AMR) research, policy, training, outreach, and commercialization; ii) the Canadian Livestock Industry Traceability Movement Data, which will examine novel animal identification technologies; iii) the Cattle Health Surveillance system (CHeSS) of major infectious diseases and antimicrobial resistance in Alberta, using a comprehensive approach for surveillance and control of endemic diseases in dairy cattle; and iv) a One-Health approach for monitoring, modelling and mitigating evolution of antimicrobial resistance from wastewater in the environment. It is expected that OH@UC will manage additional research projects in the future.

As our research priorities are of national and international importance, our partnerships will extend beyond UCalgary. OH@UC is committed to community-engaged participatory research and we will ensure that there are organizational supports for co-developing research projects with local, regional, national, and international communities. We will ensure that our research practices and policies align with the UCalgary's Indigenous Strategy (ii'taa'poh'to'p) by building relationships, creating a culturally competent research agenda, and advancing reconciliation through strong partnerships.

Leveraging on UCalgary's expertise and assets, OH@UC will be able to provide One Health researchers with critical tools and resources required to move ideas and discoveries forward. As our research capacity increases, there will be opportunities for new researchers with a range of backgrounds and research interests to come to the UCalgary. Our international reputation for supporting excellence in research will attract and retain outstanding researchers.

Training. OH@UC is committed to involving trainees as partners, colleagues, and future leaders. We provide valuable and inclusive research opportunities and training initiatives that address the technical skills and the social and communication competencies required for transdisciplinary research, learning and engagement.

Objectives of our training plan are to:

- Increase capacity in One Health-trained personnel in Alberta
- Build active participation in One Health research and practice
- Foster best practices for transdisciplinary and collaborative research and training, and
- Train culturally competent researchers

Our training programs will address gaps in technical training and 'soft skills' necessary to build successful One Health teams and programs and will be shaped by our EDI principles. One Health trainees will develop proficiency in systems thinking, project management, communication, informatics, leadership, diverse and transdisciplinary teams, collaboration, cultural competence, ethics and experience working with diverse groups, communities and organizations.

The Working Groups and our research-intensive approach will enrich the educational experience for students with research-inspired learning opportunities. We will align our research and engagement priorities with educational opportunities, including: i) a massive open online course (MOOC) in antimicrobial resistance; ii) a course teaching highly-qualified personnel

(HQP) how to communicate effectively through enhanced knowledge translation tools; iii) cultural awareness training and Indigenous research methodologies; and iv) a course on Entrepreneurial Thinking in One Health.

In collaboration with the Department of Community Health Sciences, and the Faculties of Kinesiology, Nursing, and Veterinary Medicine, we are creating an **Interdisciplinary Specialization in Epidemiology**.

We will develop a global, online **Non-thesis Masters in One Health (MSc One Health)**. This will be a transdisciplinary credit program for graduate students from across the world. It will include online course work and a course and project-based **Summer Program** at UCalgary. It will provide an overview and hands-on learning in systems thinking applied to (for example) emerging infectious diseases, food safety, water shortages and healthy communities.

We will host an **International One Health Challenge,** inviting interdisciplinary teams of graduate students and their supervisors to submit a research proposal that addresses a complex problem in a specified research area. Selected winning teams will travel to meet with UCalgary researchers and graduate students in a similar research area to refine their proposal and participate in the Summer Program with students in the MSc One Health program and other UCalgary graduate programs. Throughout the year, teams will meet to foster collaborations and strengthen student capacities in technical skills, innovation, and knowledge exchange. Visiting research supervisors will contribute to host institutions' learning environment with seminars and workshops.

Research and Training Targeted Outcomes	***Metrics***
• Best and brightest research talent that represents diverse backgrounds, addressing complex problems using a One Health approach	• Number of actively engaged faculty members • Number of graduate students • Number of postdoctoral scholars • EDI data describing diversity of participants and inclusivity of the initiative • Number of Indigenous faculty, research associates, graduate students, and postdoctoral scholars
• Partnerships and collaborations across UCalgary faculties	• Joint research projects and investigations • Co-supervised HQP • Joint publications, presentations, patents • Indigenous community partnerships or memorandums of understanding
• Partnerships and collaborations across Canada and the world	• Joint research projects and investigations • Proportion of publications with international collaborations • Co-supervised HQP

	• Joint publications, presentations, patents • Diverse cultural perspectives represented • Diverse environmental considerations included • Local community involvement • Indigenous community/organization participation and collaborations
• Community-based and community-driven research	• Number of research projects co-developed or co-drafted with communities
• Research excellence	• Normalized citation impact • Number of publications in top 1%
• International leadership in One Health	• Funding from international sources • Number of keynote presentations, lectures, plenary leads at international conferences focused on One Health • EDI principles considered in selecting and inviting speakers and participants
• Train culturally competent researchers	• Number of researchers that incorporate, respect, and elevate Indigenous ways of knowing, being, connecting, and doing • Number of researchers completing cultural awareness training • Number of researchers with OCAP® (Ownership, Control, Access, and Possession) training
• Increased Indigenous community representation and involvement	• Number of First Nations, Métis, and Inuit students, community members or others engaged in our One Health community • Participation of Indigenous students in training and enrichment opportunities • Proportion of direct research with Indigenous communities • Involvement of Indigenous communities in research process • Number of Indigenous community-based researchers • Number of Indigenous community partners included in publications

• Training graduates	• Number of students with Specialization in Transdisciplinary Epidemiology • Number of students in MSc One Health program, summer program, Grand Challenge • Number of students with OCAP® designation • Number of students completing cultural awareness training

Engagement. Our relationships and partnerships will cross boundaries of communities, scientific disciplines, academia, government, and the private sector, and will follow our EDI principles. These relationships and our connections to land and place will support development of innovative policies, procedures, and practices. Our roles as stewards will be emphasized. By engaging diverse stakeholders, rights-holders, and respecting the land, we will be better positioned to carry out a public purpose than could be accomplished by one organization alone. Our engagement plan will maximize the usefulness of our research.

Objectives of our engagement plan are to:

- Expand partnerships with diverse communities across Alberta, Canada, and the world
- Expand partnerships with Indigenous communities across Alberta and throughout Canada
- Develop our ability to mobilize knowledge to benefit people, animals, and the environment
- Develop strategies to incorporate research evidence into policy development for the benefit of all
- Develop methodologies for the integration of diverse knowledge systems into One Health approaches
- Inspire youth to recognize and embrace One Health principles
- Commit to advancing reconciliation with Indigenous communities across Canada

To meet these objectives, we will host regularly scheduled webinars for the public and encourage participation. On a monthly basis, the **One Health Circle** will meet with the wider community online to explore a relevant One Health problem. A regular seminar series with presentation by researchers from our Working Groups and for the UCalgary's research community, will also be developed.

With support of UCalgary's Knowledge Engagement Unit, we will develop **knowledge engagement** processes to increase the accessibility and impact of our research. Effective knowledge mobilization between researchers and knowledge users recognizes the need for learning on both sides; it is a two-way exchange of ideas, insights and perspectives. Early in the research process, we will identify and engage relevant knowledge users and communities affected by our research to ensure research outcomes will inform responsible and equitable policy and decision making.

In collaboration with the Werklund School of Education, we will develop **One Health educational resources** for teachers (kindergarten to Grade 12) that will be freely available on our website. Our objectives for this program are to cultivate an interest in science and problem solving in young students, and to develop an understanding of the interconnectedness of the world and our responsibilities as citizens and stewards. Our trainees will be central to this program, both by helping to develop content and by visiting schools to talk to students about their research. Trainees will also benefit by improving their science communication skills.

Innovation. UCalgary is an entrepreneurial institution. The innovation outcomes will meet societal needs and be responsive to *Grand Challenges* within their existing social, economic, and political contexts. Through collaboration and mutual understanding, our researchers, trainees, and collaborators will plan research and integrate knowledge, research skills, and experiences to identify innovative solutions to complex problems.

Implement and Innovate Targeted Outcomes	***Metrics***
• Improved health and well-being of people, animals, and the environment	• Provide quantitative and qualitative evidence of improved outcomes that are equitably distributed
• Ability to mobilize knowledge to benefit people, animals, and the environment	• Number of publications, impact factor of those publications, and number of citations • Number of community partners • Number of invention disclosures • Number of patents applied/ awarded • Number of new licenses, start-ups
• Contributions to national or regional strategic priorities	• Number of improved processes • Number of new technologies and innovations • Number of HQP placements in Alberta, Canada, globally and the extent to which those HQP reflect our EDI principles
• Contributions to changes in policies and public perceptions	• Policy, technical, regulatory position papers • Cumulative assessment studies completed • Pilot and field-testing facilities operating • Measured changes in public perception

Meaningful Engagement Within a Shared Space

The foundation of One Health is that the health of people, animals and the environment are intimately linked; therefore, working in a more integrated fashion will lead to meaningful and sustainable solutions to local and global challenges. This approach also aligns with the Indigenous perspective of transformation and renewal in the natural world and the inextricable interconnectedness of the nature and people. UCalgary's Indigenous Strategy is helping to shape how we frame these Grand Challenges within a shared ethical space, where 'disparate systems come together for meaningful engagement". With our Indigenous and non-Indigenous partners, our goals are to build a sustainable, healthy and resilient natural environment, and an equitable future for the planet, using inclusive, transdisciplinary and intercultural approaches to research, training, and engagement. Harmonization of the interconnected elements will lead to innovative approaches that inspire and cause positive change.

Grand Challenges

One of our strategic focus areas is to remove barriers to a One Health approach to research and to support and sustain a dynamic, cross-disciplinary, and inclusive research environment among faculty, research associates, and graduate students. To promote mutual understanding, collaborative activities, and transdisciplinary research, training, and engagement, we have created **transdisciplinary working groups** for each of our *Grand Challenges*: **antimicrobial resistance**, **healthy water ecosystems**, **infectious diseases and the microbiome**, and **healthy communities**.

Under each *Grand Challenge*, working groups will identify research questions that address a complex problem to be addressed using a One Health approach, and that is also informed by Indigenous ways of knowing, being, connecting, and doing. Working groups will develop research proposals, identify training needs, foster community engagement in research and advance new policy directions to address grand challenges. OH@UC will provide seed grants designed to provide early-stage funding for novel, transdisciplinary research. Funding guidelines are under development.

I. Antimicrobial resistance: Contain the threat of antimicrobial resistance

Antimicrobials are agents intended to kill or slow the growth of bacteria. Since the introduction and adoption of antibiotics, bacteria have been selected that can survive antimicrobials, i.e. AMR. As there are limited antimicrobials, the same active ingredients are often used in products intended for humans, animals, and agriculture. Not only can AMR arise due to use in humans or animals, but it can also develop in soil or water when antimicrobials are used for aquaculture or crops. Pollution from inadequate treatment of industrial, residential and farm waste is amplifying the resistome in the environment. The threat of AMR also has serious implications for our economy, work force productivity, and agricultural sector where antimicrobials are used to prevent and treat diseases in animals. As these vital tools lose their effectiveness, our food supply and economic security face increasing risks.

The ecological aspects of AMR and interrelationships among species and their environments can promote, impede, maintain or spread antimicrobial resistance genes. Therefore,

transdisciplinary and cross-sectoral approaches, encompassing expertise and decision-making in all sectors and communities impacted by antimicrobial use, is required.
UCalgary's research strengths including the AMR – One Health Consortium, collaborative research in the O'Brien Institute for Public Health, policy development in the W21C, International Microbiome Centre, Advancing Canadian Wastewater Assets, and AMR collaboration with Tanzania and other countries (e.g. China). In addition, UCalgary has been formally invited to develop a WHO Collaborating Centre on Antimicrobial Stewardship, using a One Health approach. Our expertise and resources allow us to address the following AMR-related challenges:

a) **Transmission:** Better understanding of AMR transmission dynamics across species and in their shared environment.
b) **Surveillance:** Development of improved AMU and AMR surveillance methods in all spheres (human, animal, and environment), recognizing the inequitable impact of AMR across various human and animal populations.
c) **Innovation:** Development of new technologies that:
    - modify co-regulation of commensals in the microbiome, virulence factors and AMR;
    - discover new antimicrobials;
    - create new early diagnostics; and
    - design new prevention and control systems.
d) **Engagement:** Develop knowledge user engagement tools to improve:
    - antimicrobial stewardship programs;
    - antimicrobial prescribing practices and policies;
    - input of traditionally marginalized communities;
    - infection and prevention control practices.

II. Healthy Water Ecosystems: Develop Strategies to Recover and Protect Global Water Ecosystems

People cannot live without water. Healthy aquatic ecosystems are essential to replenishing the supply of water and maintaining aquatic biodiversity. Resilient aquatic environments are essential for ensuring greater natural sustainability for the benefit of people and all life forms. Protection of water ecosystems is a complex global health and sustainability issue.

Water is a precious resource; consequently, access to safe water and sanitation is critical for health and security. This is particularly relevant for Indigenous communities in Canada, who are disproportionately impacted by a lack of access to safe, clean drinking water and adequate sanitation. Indigenous communities in Canada are more vulnerable to the impacts of climate change, and lack access to basic infrastructure, including safe, clean drinking water. Indigenous people across Canada, and globally, have distinct spiritual relationships with water.

Protecting aquatic ecosystems and providing clean water is essential for limiting the spread of contaminants, pathogens and antimicrobial resistant genes among humans and from humans to the environment. Changing hydrological conditions associated with climate change, intensification of agriculture and expanding industrial activities and water requirements threaten availability, sustainability and overall quality of clean water. Aquatic ecosystems are impacted

by development and land use changes, exploitation of underground aquifers and contamination by waste and discharges from humans, agriculture, and industry. It is expected that both water scarcity and flooding will lead to increased transboundary conflicts associated with water availability and contaminant transfer.

Watershed and hydrological monitoring are important for forecasting flow conditions and flooding (as undertaken by Global Water Futures) but alone they are not capable of achieving sustainability in the complex social-ecological systems of water; it is inherently a transdisciplinary problem. A One Health approach is very relevant to the imperative of protecting the quality of water and the health of animals and people dependent on it. UCalgary's researchers, in partnership with communities (e.g. First Nations or Inuit partners) will develop collaborative projects with interdisciplinary experts within the Arctic Institute of North America, and in the departments of: Ecosystem and Public Health; Geosciences; Chemical, Petroleum, Geomatics, Civil, and Environmental Engineering; Environmental Science; Geography (including FloodNet, Integrated Modelling Programme for Canada, and Global Water Futures); Biological Sciences; Chemistry; Environmental Physiology and Toxicology; Law; Integrated Sensor and Intelligence Systems; Environmental Design; School of Architecture, Planning, and Landscape; Sociology; and Molecular and Population Ecology. These areas are well positioned to strategically adopt a transdisciplinary, iterative One Health approach to develop treatment solutions to ensure food, water and wastewater safety. The availability of our research platforms, including globally leading field research stations that are sentinels for environmental change where these challenges occur (e.g. the Bamfield Marine Sciences Centre, Biogeoscience Institute and the Kluane Lake Research Station) as well as ACWA's infrastructure provides an opportunity to allow UCalgary to lead development of innovative solutions to emerging issues in municipal waste treatment and monitoring. We aim to address the following water-related challenges:

a) **Innovation**: inventing and implementing technologies, developing policy frameworks, and advancing knowledge mobilization tools to ensure safe drinking water for all;
b) **Impact**: limiting environmental impacts of municipal wastes and incorporating community-based approaches to holistic water management; and
c) **Monitoring**: developing a sustainable, integrated, and community-relevant monitoring and management framework to improve the health of water and animals and people depending on it, particularly for Indigenous communities in Canada.

III. Infectious Diseases and the Microbiome: Create effective strategies against infectious diseases and exploit the protective benefits of the microbiome

The emergence of COVID-19 could not have been predicted, but it was not unexpected. According to the World Organization for Animal Health (OIE), 60% of human infectious diseases are of animal origin, 3 new diseases of animal origin appear annually and 20% of animal losses are due to infectious diseases. Despite huge advances in defenses against infectious diseases, human, animal, and environmental health continues to be threatened by emerging and neglected pathogens, environmental pollution, and development of multifactorial, chronic diseases. Future improvements in containment of infectious diseases will require better

knowledge of their causes and consequences, as well as development of novel diagnostics and therapies.

The composition of the microbiome and its function have huge impacts on human, animal and ecosystem health by influencing immunologic responsiveness and risks for a multitude of chronic inflammatory diseases, e.g. asthma, inflammatory bowel disease and allergies. Understanding the role of the microbiome and its dynamic interactions with hosts, pathogens and the external environment will play a key role in enabling the engineering of new diagnostic techniques and interventions. A better understanding of how non-pathogenic microbial transfer and microbiome interactions among humans, animals and their shared environment could lead to innovative interventions.

Using a One Health approach, transdisciplinary research teams will generate new understandings of the pathogen, microbiome, host, environmental, and social determinants that underlie the development of infectious and immune disease across species and ecosystems. UCalgary's strengths include the International Microbiome Center (IMC), Advancing Canadian Wastewater Assets (ACWA), collaborative research in the O'Brien Institute for Public Health, intensive collaboration of veterinary and human health researchers, and policy development in the W21C. These together make it possible to address the following issues:

- **Microbiome:** Create effective methods to prevent and manage disease by modifying and manipulating the microbiome;
- **Prions**: Deliver research outcomes and policy direction to minimize the risk to people and animals of prion and prion-like diseases;
- **Gastrointestinal:** Create strategies to reduce morbidity and mortality due to infectious diarrhea in people and livestock;
- **Respiratory:** Create strategies to reduce morbidity and mortality due to infectious pneumonia in people and livestock;
- **Wildlife:** Surveillance, mitigation and building infectious disease resilience in wildlife populations;
- **Zoonoses:** Deliver research and policy direction to minimize risks of vector-borne and emerging infectious diseases.

IV. Healthy Communities: Learn how to address complex issues that impact community health and well-being

Health and wellness are shaped by the places in which we live, our relationships and the circumstances as we work, learn, play, and age. One Health promotes integrated approaches to human and animal health while encouraging us to be cognizant of the broader social and environmental contexts. The OH@UC approach to healthy communities has a strong connection to Indigenous People in Canada. UCalgary has recently developed an Indigenous Strategy (ii'taa'poh'to'p), and a focus on Indigenous engagement is also prioritized by many faculties across campus. Indigenous People worldviews parallel the One Health approach, in ways of knowing, doing, connecting, and being. The recognition and understanding the interconnectedness of animals, people, and the environment, and the importance of this lens for healthy communities.

The One Health research approach is based on existing community-based projects with Indigenous People in Canada, including northern and Arctic Canada, as well as with local communities in Tanzania, Uganda and China. Using the One Health approach, in collaboration with communities, and guided by Indigenous ways of knowing, doing, connecting, and being, transdisciplinary research teams will seek to understand the importance of human-animal relationships to the mental and physical health, welfare, culture, and economy of Indigenous People in urban and rural communities.

Healthy communities link where and how we live to our health and wellbeing. Examples include: i) understanding the role of physical environment as a social determinant of health; ii) evaluating the effects of physical geography and environment on community mental health and resilience; iii) understanding the role of infrastructure in advancing community resilience and adaptability; iv) examining how anthropogenically-driven habitat loss and extinction of wildlife species can impact food security, culture, and the physical and mental health of people and whole communities; and v) undertaking research to better understand the geographically and culturally diverse interactions between people and animals.

Food security is also an important component of healthy communities, and a relevant food sovereignty and important component of healthy Indigenous communities. OH@UC will also focus on food security, investigating the four essential biological pillars: soil, water, climate, and biodiversity. Science and sustainability experts agree food production and consumption are contributing to global environmental crises, jeopardizing planetary health, and posing the biggest threat to human health. Economic and environmental sustainability and social expectations around food define the nature of public concerns. Lastly, food insecurity, connected to climate change, economic and social inequities, and the food-water-environment nexus – is amplifying social and political instability and undermining the health of communities, especially as their access to healthy, culturally appropriate and adequate diets is curtailed.

UCalgary's strengths in healthy communities, that distinguishes our research from other Canadian community health initiatives include work under the Human Dynamics in a Changing World research theme, by researchers in the Faculty of Veterinary Medicine, the O'Brien Institute for Public Health, the School of Public Policy, the Arctic Institute of North America, the Brenda Stafford Centre on Aging, the Canada Research Chair in Arctic One Health (decision pending), the Canada Research Chair in Integrated Knowledge, Engineering & Sustainable Communities, and also include collaborations of veterinary and human health researchers, and policy development in the School of Public Policy.

With these strengths, researchers are well positioned to address:

a) **Mental Health**: enhance population-level mental health through a One Health approach to policies and practices in urban, rural, and wilderness settings globally;
b) **Infrastructure as a Social Determinant of Health**: enhance understandings on the role of infrastructure in community health and wellbeing, advance community-driven policies and practices;
c) **Pets and Wildlife**: elucidate and resolve pet and wildlife health issues important to the health, wellbeing, culture and economy of Indigenous and non-Indigenous communities; and

d) **Food systems and Food Sovereignty**: developing strategies for a substantial food system transformation towards healthy diets, and sustainable and regenerative food systems, and food sovereignty for Indigenous people, particularly in the far North.

Investing in One Health Research, Training, and Engagement

Funds provided by the Office of the VP (Research) will support the OH@UC Team's daily operations, including those required for training and engagement programs. Through priority-based budgeting, we will identify programs for which additional funding are necessary (Table 1).

- Funding form Office of VP (Research) to 2024 $200,000/year
- Salaries and benefits ($150,000/year)
- Supplies and services including conferences ($15,000/year)
- Research support – grant writing (multiple projects) ($10,000/year)
- Research support – seed funding (multiple projects) ($15,000/year)
- Training – competitive stipends shared by several students ($10,000/year)

With assistance from the Office of VP (Advancement), we will create a development plan to secure the additional funds necessary to support our inclusive research, training, and engagement programs (Table 1).

Table 1. OH@UC: Investments and Impacts

What does financial success look like for OH@UC?	• Financial support from UCalgary has, by the end of the first 5-year term, resulted in a >15 times leverage in One Health research projects funding • In 5 years, there will be an increase in research and outreach initiatives funded from sources outside UCalgary • OH@UC has a secure source of funds to grow and maintain planned research, training, and engagement programs • Administrative and operational costs are tied to anticipated return in the form of research funds from other sources and donor money • Fundraising is connected to important strategic initiatives

Suggested high-level initiatives	• Increase revenue from diversified, large grant funding sources such as Tri-Council Funding Agencies and Genome Canada
	• Establishment of at least two endowed, externally funded research chairs in One Health priority areas
	• Identify donors through a number of strategies
	  ○ Explore opportunities for endowment with our funding partners to foster long-term sustainability
	  ○ Leverage UCalgary's VP Advancement donor contacts
	  ○ Large donation to OH@UC with naming rights
	  ○ Crowd sourcing

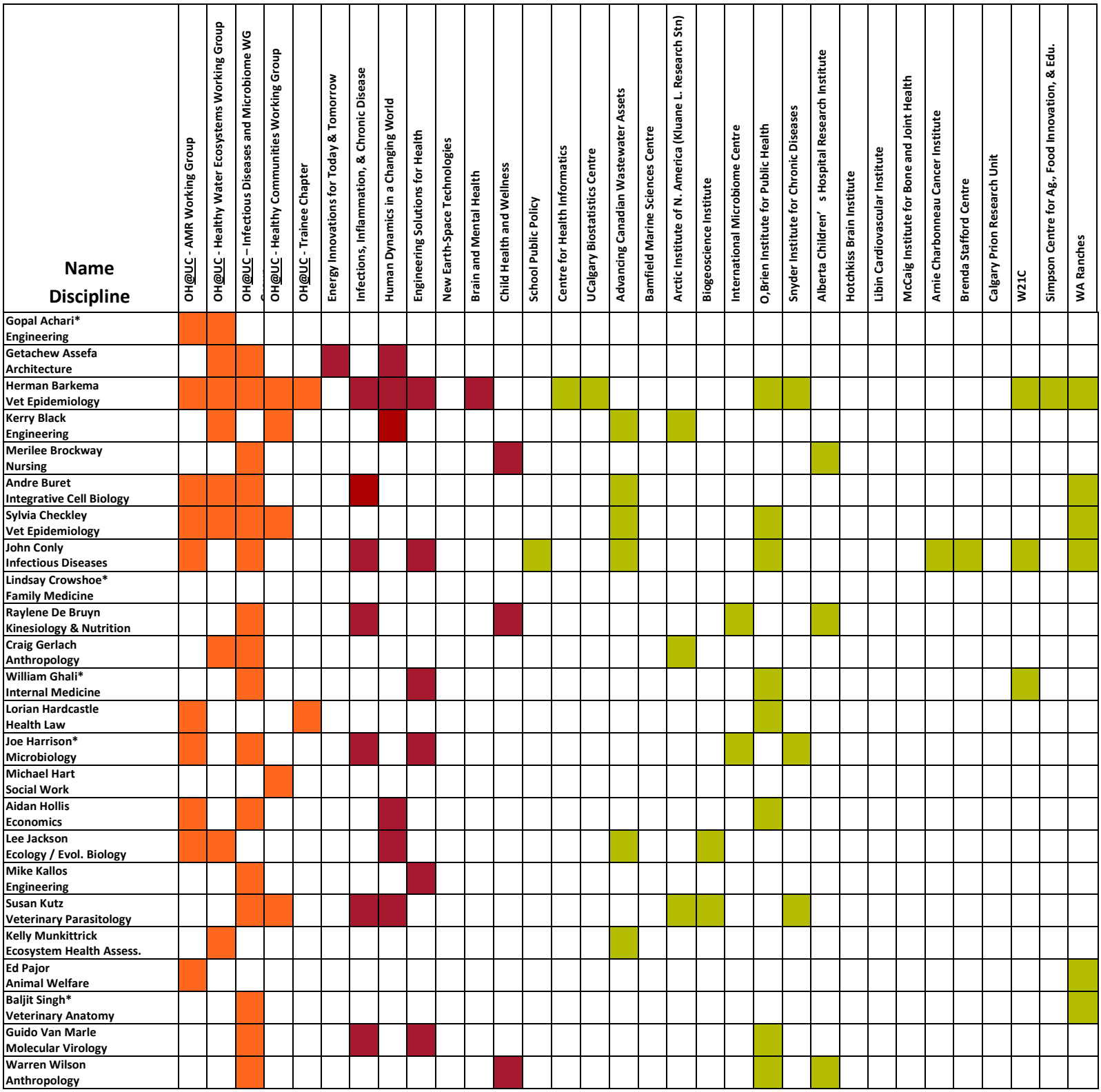
Strategy	Research	Training	Engagement
Investment from VP (Research)	• Administrative support to each Working Group • Project management for grants led by OH@UC • Grant writing support • Strategic competitive seed grants • Fundraising programs to identify private industry or individuals interested in supporting scientific research	• Administrative support to Trainee Chapter and its initiatives (seminars, etc.) • Administrative support to training programs • Competitive stipend grants • Fundraising programs to identify private industry or individuals interested in supporting training programs	• Administrative support to engagement programs ○ One Health Circle ○ One Health educational resources for public schools in collaboration with Werklund School of Education ○ Support KT initiatives of team grants • Administrative support to move research to innovation • Fundraising programs to identify private industry, individuals and groups interested in supporting engagement programs
Impacts	• Indigenous research associate on the OH@UC team • Create transdisciplinary teams across UCalgary and beyond • Improved team grant success • Secure large team grants • OH@UC provides management for new projects • Support for research projects that spark philanthropic interest • Increase industry partnerships • Increase community partnerships • Enable innovative transdisciplinary research • Increase number and quality of publications • Drive innovation • Improve wellness (people, animals, and environment) • Build evidence for OH approaches to complex problems • Increase reputation of UH@UC	• Uphold a commitment to Indigenous education • Train culturally competent researchers • Train HQP in One Health • Interdisciplinary Specialization in Epidemiology ○ Non-thesis MSc in OH ○ Summer Institute ○ International Grand Challenge Competition • Develop competent One Health researchers • Drive recruitment • Increase and sustain research capacity and productivity • International trainee support	• Recognize and apply Indigenous knowledge and culturally responsive pedagogies and practices • Increase community and industry communication, collaboration, and partnerships • Increase funding by community and industry • Sustainability • Impact evaluation

Summary

Through the input of Thought Leaders, we identified the four *Grand Challenges* research areas of antimicrobial resistance, infectious diseases and microbiome, healthy water ecosystems, and healthy communities. Researchers within the Working Groups have proposed research questions that each represent a complex problem affecting health of people, animals, and the environment. These Grand Challenges cannot be resolved through a singular disciplinary approach. Rather, they demand an integrated and transdisciplinary One Health approach to develop solutions that are feasible for the present and sustainable for the future.

OH@UC is committed to contributing to solving complex, global problems through inclusive collaboration, diverse world views and perspectives, research excellence, and a focus on sustainable, innovative solutions. Serving as a hub for transdisciplinary research, training, and engagement, we are committed to addressing complex problems at the convergence of people, animals, and the environment and the underlying economic and social factors that determine opportunities for health across all ecosystems.

Appendix 1. Affiliations of OH@UC's Thought Leaders



Appendix 2. Affiliations of OH@UC's Thought Leaders

THOUGHT LEADERS	FACULTY	OH – WORKING GROUP(S)	STRATEGIC RESEARCH THEME(S)	OTHER UCALGARY RESEARCH CENTERS & INSTITUTES
Gopal Achari	Schulich School of Engineering	AMR; Healthy Water Ecosystems		
Getachew Assefa	School of Architecture, Planning and Landscape	Healthy Water Ecosystems; ID&M	Energy Innovations for Today & Tomorrow; Human Dynamics in a Changing World	
Herman Barkema	Faculty of Veterinary Medicine	AMR; Healthy Water Ecosystems; ID&M; Healthy Communities; Trainee Chapter	Infections, Inflammation & Chronic Disease; Human Dynamics in a Changing World; Engineering Solutions for Health; Brain & Mental Health	Centre for Health Informatics; UCalgary Biostatistics Centre; O'Brien Institute; Snyder Institute; W21C; Simpson Centre; WA Ranches
Kerry Black	Schulich School of Engineering	Healthy Water Ecosystems; Healthy Communities	Human Dynamics in a Changing World	ACWA; Arctic Institute
Merilee Brockway	Faculty of Nursing	ID&M	Child Health & Wellness	AB Children's Hospital Research Institute
Andre Buret	Faculty of Science	AMR; Healthy Water Ecosystems; ID&M	Infections, Inflammation & Chronic Disease	ACWA; WA Ranches
Sylvia Checkley	Faculty of Veterinary Medicine	AMR; Healthy Water Ecosystems; ID&M; Healthy Communities		ACWA; O'Brien; WA Ranches
John Conly	Cumming School of Medicine	AMR; ID&M	Infections, Inflammation & Chronic Disease; Engineering Solutions for Health	School of Public Policy; ACWA; O'Brien; Arnie Charbonneau Cancer Institute; Brenda Stafford Centre; W21C; WA Ranches
Lindsay Crowshoe	Cumming School of Medicine			
Raylene De Bruyn	Faculty of Kinesiology	ID&M	Infections, Inflammation & Chronic Disease; Child Health & Wellness	International Microbiome Centre; AB Children's Hospital Research
Craig Gerlach	Faculty of Arts	Healthy Water Ecosystems; ID&M		Arctic Institute of North America
William Ghali	Vice-President (Research)	ID&M	Engineering Solutions for Health	O'Brien; W21C
Lorian Hardcastle	Faculty of Law	AMR; Trainee Chapter		O'Brien Institute for Public Health
Joe Harrison	Faculty of Science	AMR; ID&M	Infections; Inflammation & Chronic Disease; Engineering Solutions for Health	International Microbiome Centre; Snyder Institute
Michael Hart	Vice-Provost (Indigenous Engagement)	Healthy Communities		
Aidan Hollis	Faculty of Arts	AMR; ID&M	Human Dynamics in a Changing World	O'Brien Institute for Public Health
Lee Jackson	Faculty of Science	AMR; Healthy Water Ecosystems	Human Dynamics in a Changing World	ACWA; Biogeoscience Institute
Mike Kallos	Schulich School of Engineering	ID&M	Engineering Solutions for Health	
Susan Kutz	Faculty of Veterinary Medicine	ID&M; Healthy Communities	Infections, Inflammation & Chronic Disease; Human Dynamics in a Changing World	Arctic Institute; Biogeoscience Institute; Snyder Institute
Kelly Munkittrick	Faculty of Science	Healthy Water Ecosystems		ACWA
Ed Pajor	Faculty of Veterinary Medicine	AMR		WA Ranches
Baljit Singh	Faculty of Veterinary Medicine	ID&M		WA Ranches
Guido Van Marle	Cumming School of Medicine	ID&M	Infections, Inflammation & Chronic Disease; Engineering Solutions for Health	O'Brien Institute for Public Health
Warren Wilson	Faculty of Arts	ID&M	Child Health & Wellness	O'Brien; AB Children's Hospital Research Institute

Appendix 3A. Antimicrobial Resistance Working Group

Full Name	Faculty/ Department
Gopal Achari	Schulich School of Engineering
Marie-Claire Arrieta	Cumming School of Medicine
Herman Barkema	Faculty of Veterinary Medicine
Johanna Blaak	Cumming School of Medicine
Andre Buret	Faculty of Science (Biological Sciences)
Sylvia Checkley	Faculty of Veterinary Medicine, Provincial Laboratory for Public Health
Eduardo Cobo	Faculty of Veterinary Medicine
John Conly	Cumming School of Medicine
Susan Cork	Faculty of Veterinary Medicine
Tao Dong	Faculty of Veterinary Medicine
Rose Geransar	One Health at UCalgary
Lorian Hardcastle	Faculty of Law, Cumming School of Medicine
Joe Harrison	Faculty of Science (Biological Sciences)
Aidan Hollis	Faculty of Arts (Economics)
Leland (Lee) Jackson	Faculty of Science (Biological Sciences)
Jim Kellner	Cumming School of Medicine
Jenine Leal	O'Brien Institute for Public Health, Cumming School of Medicine
Myles Leslie	School of Public Policy
Ian Lewis	Faculty of Science (Biological Sciences)
Tarah Lynch	Cumming School of Medicine
Kathy McCoy	Cumming School of Medicine
Dongyan Niu	Faculty of Veterinary Medicine
Karin Orsel	Faculty of Veterinary Medicine
Ed Pajor	Faculty of Veterinary Medicine
Alka Patel	Cumming School of Medicine
Dylan Pillai	Cumming School of Medicine
Johann Pitout	Cumming School of Medicine
Elissa Rennert May	Cumming School of Medicine
Alexei Savchenko	Cumming School of Medicine
Anthony Schryvers	Cumming School of Medicine
Ranjani Somayaji	Cumming School of Medicine
Laura Sycuro	Cumming School of Medicine
Raymond Turner	Faculty of Science (Biological Sciences)
Frank Van der Meer	Faculty of Veterinary Medicine

Appendix 3B. Healthy Water Ecosystems Working Group

Full Name	Faculty/ Department
Gopal Achari	Schulich School of Engineering
Getachew Assefa	School of Architecture, Planning and Landscape
Herman Barkema	Faculty of Veterinary Medicine
Kerry Black	Schulich School of Engineering
Andre Buret	Faculty of Science (Biological Sciences)
Edwin Cey	Faculty of Science (Geosciences)
Sylvia Checkley	Faculty of Veterinary Medicine, Provincial Laboratory for Public Health
Angus Chu	Schulich School of Engineering
Gordon Chua	Faculty of Science (Biological Sciences)
Jan Ciborowski	Faculty of Science (Biological Sciences)
Conny Davidsen	Faculty of Arts (Geography)
Tao Dong	Faculty of Veterinary Medicine
Peter Dunfield	Faculty of Science (Biological Sciences)
Brent Else	Faculty of Arts (Geography)
Jeremy Fox	Faculty of Science (Biological Sciences)
Craig Gerlach	School of Architecture, Planning and Landscape
Lisa Gieg	Faculty of Science (Biological Sciences)
Hamid Habibi	Faculty of Science (Biological Sciences)
David Hall	Faculty of Veterinary Medicine
Quazi Hassan	Schulich School of Engineering
Masaki Hayashi	Faculty of Science (Geosciences)
Jianxun (Jennifer) He	Schulich School of Engineering
Joseph Hettiaratchi	Schulich School of Engineering
Leland (Lee) Jackson	Faculty of Science (Biological Sciences)
David Layzell	Faculty of Science (Biological Sciences)
Gregory Lowan-Trudeau	Werklund School of Education
Qingye Lu	Schulich School of Engineering
Shawn Marshall	Faculty of Arts (Geography)
Yvonne Martin	Faculty of Arts (Geography)
Bernhard Mayer	Faculty of Science (Geosciences)
Ed McCauley	Faculty of Science (Biological Sciences)
Brian Moorman	Faculty of Arts (Geography)
Douglas Muench	Faculty of Science (Biological Sciences)
Kelly Munkittrick	Faculty of Science (Biological Sciences)
Maribeth Murray	Faculty of Arts (Earth Science)
Karin Orsel	Faculty of Veterinary Medicine
Ehsan Panjeshahi	Faculty of Science (Biological Sciences)
John Post	Faculty of Science (Biological Sciences)
Elmar Prenner	Faculty of Science (Biological Sciences)
Ron Read	Cumming School of Medicine
Edward (Ted) Roberts	Schulich School of Engineering
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Cathryn Ryan	Faculty of Science (Geoscience)
Michael Sideris	Schulich School of Engineering
Judit Smits	Faculty of Veterinary Medicine
Raymond Turner	Faculty of Science (Biological Sciences)

Full Name	Faculty/ Department
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Matt Vijayan	Faculty of Science (Biological Sciences)
Fred Wrona	Faculty of Science (Biological Sciences)
John Yackel	Faculty of Arts (Geography)
Orly Yadid-Pecht	Schulich School of Engineering

Appendix 3C. Infectious Diseases and the Microbiome Working Group

Full Name	Faculty/ Department
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Rebecca Archer	Faculty of Veterinary Medicine
Getachew Assefa	School of Architecture, Planning and Landscape
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Sandra Black	Faculty of Veterinary Medicine
Gwendolyn Blue	Faculty of Arts (Geography)
Merilee Brockway	Faculty of Nursing
Andre Buret	Faculty of Science (Biological Sciences)
Niamh Caffrey	Faculty of Veterinary Medicine
Faizal Careem	Faculty of Veterinary Medicine
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Eduardo Cobo	Faculty of Veterinary Medicine
John Conly	Cumming School of Medicine
Susan Cork	Faculty of Veterinary Medicine
Jennifer Davies	Faculty of Veterinary Medicine
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Jeroen De Buck	Faculty of Veterinary Medicine
Rebekah DeVinney	Cumming School of Medicine
Tao Dong	Faculty of Veterinary Medicine
Peter Dunfield	Faculty of Science (Biological Sciences)
Peter Facchini	Faculty of Science (Biological Sciences)
Jeremy Fox	Faculty of Science (Biological Sciences)
Angelica Galezowski	Faculty of Veterinary Medicine
Paul Galpern	Faculty of Science (Biological Sciences)
Craig Gerlach	School of Architecture, Planning and Landscape
William Ghali	Cumming School of Medicine
Lisa Gieg	Faculty of Science (Biological Sciences)
Sabine Gilch	Faculty of Veterinary Medicine
John Gilleard	Faculty of Veterinary Medicine
David Hall	Faculty of Veterinary Medicine
Joe Harrison	Faculty of Science (Biological Sciences)
Rita Henderson	Cumming School of Medicine
Aidan Hollis	Faculty of Arts (Economics)
Casey Hubert	Faculty of Science (Biological Sciences)
Michael Hynes	Faculty of Science (Biological Sciences)
Craig Jenne	Cumming School of Medicine
Mike Kallos	Schulich School of Engineering
Jim Kellner	Cumming School of Medicine
Cameron Knight	Faculty of Veterinary Medicine
Paul Kubes	Cumming School of Medicine
Susan Kutz	Faculty of Veterinary Medicine, Arctic Institute of North America
David Layzell	Faculty of Science (Biological Sciences)
Michel Levy	Faculty of Veterinary Medicine
Ian Lewis	Faculty of Science (Biological Sciences)
Karen Liljebjelke	Faculty of Veterinary Medicine
Thomas Louie	Cumming School of Medicine

Full Name	Faculty/ Department
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Alessandro Massolo	Faculty of Veterinary Medicine
Ed McCauley	Faculty of Science (Biological Sciences)
Christopher Mody	Cumming School of Medicine
Doug Morck	Faculty of Veterinary Medicine, Faculty of Science (Biological Sciences)
Douglas Muench	Faculty of Science (Biological Sciences)
Greg Muench	Faculty of Veterinary Medicine
Marco Musiani	Faculty of Veterinary Medicine, Faculty of Science (Biological Sciences)
Christopher Naugler	Cumming School of Medicine
Dongyan Niu	Faculty of Veterinary Medicine
Karin Orsel	Faculty of Veterinary Medicine
Nathan Peters	Faculty of Veterinary Medicine, Cumming School of Medicine
Dylan Pillai	Cumming School of Medicine
Johann Pitout	Cumming School of Medicine
Jocelyn Poissant	Faculty of Veterinary Medicine
Elmar Prenner	Faculty of Science (Biological Sciences)
Ron Read	Cumming School of Medicine
Carl Ribble	Faculty of Veterinary Medicine
Sean Rogers	Faculty of Science (Biological Sciences)
Jamie Rothenburger	Faculty of Veterinary Medicine
Kathreen Ruckstuhl	Faculty of Science (Biological Sciences)
Cathryn Ryan	Faculty of Science (Geoscience)
Alexei Savchenko	Cumming School of Medicine
Hermann Schaetzl	Faculty of Veterinary Medicine
Anthony Schryvers	Cumming School of Medicine
Baljit Singh	Faculty of Veterinary Medicine
Douglas Storey	Faculty of Science (Biological Sciences)
Laura Sycuro	Cumming School of Medicine
Karen Tang	Cumming School of Medicine
Tuan Trang	Faculty of Veterinary Medicine
Steven Vamosi	Faculty of Science (Biological Sciences)
Frank Van der Meer	Faculty of Veterinary Medicine
Guido Van Marle	Cumming School of Medicine
Otto Vanderkooi	Cumming School of Medicine
Peter Vize	Faculty of Science (Biological Sciences)
Hans Vogel	Faculty of Science (Biological Sciences)
Amy Warren	Faculty of Veterinary Medicine
James Wasmuth	Faculty of Veterinary Medicine
Ashley Whitehead	Faculty of Veterinary Medicine
Doug Whiteside	Faculty of Veterinary Medicine
Warren Wilson	Faculty of Arts (Archaeology)
Claire Windeyer	Faculty of Veterinary Medicine
Robin Yates	Faculty of Veterinary Medicine
Samuel Yeaman	Faculty of Science (Biological Sciences)
Kunyan Zhang	Cumming School of Medicine

Appendix 3D. Healthy Communities Working Group

First Name	Faculty/ Department
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Cindy Adams	Faculty of Veterinary Medicine
Tessa Baker	Faculty of Veterinary Medicine
Herman Barkema	Faculty of Veterinary Medicine
Kerry Black	Schulich School of Engineering
Sylvia Checkley	Faculty of Veterinary Medicine, Provincial Laboratory for Public Health
Michael Hart	Provost and Vice-President (Academic)
Jennifer Hewson	Faculty of Social Work
Susan Kutz	Faculty of Veterinary Medicine, Arctic Institute of North America
Tanya Mudry	Werklund School of Education
Melanie Rock	Cumming School of Medicine
Marit Rosol	Faculty of Arts (Geography)
Ann Toohey	Cumming School of Medicine
Vanessa Vegter	Werklund School of Education
Jean Wallace	Faculty of Arts (Sociology)