



One Health

PLANTS & ANIMALS

PEOPLE

ENVIRONMENT



ONE HEALTH INSTITUTE



**REPORT
2021**

Welcome to One Health



The One Health concept is fundamental to the University of Guelph. It is embedded in everything that we do—teaching, research and outreach. The One Health Institute formalizes our commitment to this concept.

Charlotte Yates
PRESIDENT AND
VICE-CHANCELLOR
UNIVERSITY OF GUELPH



The One Health Institute provides a phenomenal nexus for key, differentiating research and innovation strengths at the University of Guelph. Our One Health researchers propel discoveries that realize our aim to improve life.

Malcolm Campbell
VICE-PRESIDENT (RESEARCH)
UNIVERSITY OF GUELPH



The current pandemic has underscored an urgent need for comprehensive One Health approaches to the complex health issues we have seen arising at the intersection of animal, human and environmental health.

Cate Dewey
DIRECTOR
ONE HEALTH INSTITUTE
UNIVERSITY OF GUELPH



Climate change and habitat destruction have wreaked devastation upon animals and ecosystems. We need leaders to think across disciplines and consider the impact of social and economic factors, as well as biological ones, to develop successful solutions. Not only from a moral imperative, but from an existential one, as well.

Jeff Wichtel
DEAN
ONTARIO VETERINARY COLLEGE
UNIVERSITY OF GUELPH



Improving Life through One Health

Tackling today's biggest health challenges—new infectious diseases, climate change, antimicrobial resistance, food security—calls for a comprehensive and integrated approach.

Comprehensive, because of the wide range of socioeconomic, political, biological and environmental conditions from which these challenges have arisen. And integrated, because of the intrinsic, reciprocal link between many of them.

The reality is that human, plant and animal, and environmental health are connected in more ways than we ever imagined. So much so, that global examples abound of disruptions in one species or ecosystem component reverberating throughout the rest of the “system,” even half a world away.

This interconnectedness is called One Health.

The fundamentals of One Health aren't new to the University of Guelph. From its beginnings, researchers at the Ontario Veterinary College, Ontario Agricultural College and the MacDonald Institute observed the inherent relationships between soil and water, crops and livestock, and farm families' health.

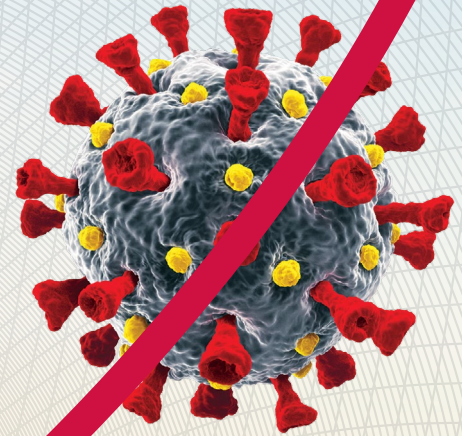
Today, the University of Guelph has grown into one of Canada's top-ranked comprehensive universities, and among the best five veterinary medical schools in the world, but its One Health approach to research and affected communities has continued.

In 2018, the University formally adopted a One Health Agenda as an institution-wide priority, and “fundamental to all that we do.” It established the **One Health Institute** to encourage scholarship and develop graduates who could lead One Health approaches to the challenges we see today.

Significant strides have been made thanks to the efforts across campus and from key partners including Ontario Veterinary College, College of Biological Sciences and College of Social and Applied Human Sciences.

Notable is the development of a graduate-level “collaborative specialization” in One Health, and a new undergraduate program led by the College of Biological Sciences. Unique in Canada, the University will begin offering a Bachelor of One Health in Sept. 2022.

Browse this and other highlights on the following pages and see why One Health is truly at the centre of the University of Guelph's purpose—To Improve Life.



“For many people, One Health may have once seemed simply a concept. It is no longer. We cannot protect human health without considering the impact of human activities that disrupt ecosystems, encroach on habitats and further drive climate change.”

Dr. Tedros Adhanom
Ghebreyesus
CHAIR OF WORLD HEALTH
ORGANIZATION

A One Health approach to global challenges

Fighting the superbugs

The rise of antimicrobial resistance (AMR) and the so-called superbugs pose significant threats to human and animal health.

The University of Guelph, with its strength in environmental and veterinary-medical sciences, is a leading Canadian contributor to the federal antimicrobial strategy, which is grounded in a One Health approach.

Dr. Scott Weese, director of Guelph's Centre for Public Health and Zoonoses, is now coordinating a campus-wide mobilization of expertise in social and economic, as well as biological factors of AMR.

A fellow of the Canadian Academy of Health Sciences, Dr. Weese was recently named to the United Nations' TriPartite Global Leaders Group on AMR, an initiative of the WHO, OIE and FAO.

Reducing consumer health risk

Every year, at least 88,000 Canadians become sick from consuming food contaminated with *Salmonella*. The food-borne pathogen can come from animal, plant, environmental or human sources, and getting a jump on outbreaks calls for a One Health approach.

Food safety expert **Dr. Lawrence Goodridge's** *Salmonella* Syst-OMICS project does just that, and has biomarkers in thousands of different *Salmonella* strains to identify ones that are linked to serious human illness.

With that information, food regulators and the food industry can act sooner to address foods that are contaminated with highly virulent strains of *Salmonella*, reducing costs and consumer exposure.

Tracking coronaviruses in the wild

Wildlife are often the reservoir for viruses that infect livestock or people when they come into contact with each other. Researchers know there are vast numbers and types of viruses circulating in wild populations, and surveillance programs help to give early warning indications of which wildlife species, what type of virus and where a zoonotic outbreak may occur.

Drs. **Clow**, **Jardine** and **Parmley** of the Ontario Veterinary College are working with colleagues at Sunnybrook Health Sciences Centre, the Canadian Food Inspection Agency, the Canadian Wildlife Health Cooperative and other agencies to collect and test coronavirus samples from wild mammals, and to improve data and knowledge sharing between human, ecosystem and animal health organizations in Canada.



Clear data for clean water

Sanitation and the treatment of sewage is a complex challenge in low income countries.

Dr. Heather Murphy is a water engineer and a One Health researcher. She and her multi-university international team are part of the Global Water Pathogen Project, and they've just completed work with sanitation officials in Uganda.

They developed user-friendly information tools about pathogens in sewage, and improved access to management and treatment data for sewage and fecal sludge in Uganda's complex urban environments.

With this information, local governments and wastewater utilities can make important decisions using scientific evidence to benefit the health of people and their environment.

Predicting influenza outbreaks

Social media and Google may have a role with artificial intelligence and machine learning tools to track and model avian influenza outbreaks.

In a One Health approach, Drs. **Rozita Dara** and **Shayan Sharif** combined human, animal and environmental data such as weather records, wild bird migration routes, and global poultry distribution maps. Together with locations of social media reports and Google searches about cases of avian influenza, they've predicted outbreaks three days to two weeks before they actually occurred.

The next step is to invite epidemiologists and policy makers for a test drive of the surveillance software tool to evaluate its accessibility and usefulness in public health decision making.

No cost to nature

Sustainability can be more than just *maintaining* the health of ecosystems. Actually *improving* ecosystems doesn't have to be at the expense of the human communities that live there.

Just ask **Dr. Phil Loring** of the Arrell Food Institute. He's worked with communities around the world to understand how they've achieved win-win scenarios for themselves and their environment, from winter grazing of cattle in Ireland, to Canadian First Nations restoring ancient clam gardening in British Columbia.

For some, it involved reviving practices lost with the intensification of agriculture. For all, it's an opportunity to benefit from the ecosystem they're supporting.



Starting Fall 2022! Bachelor of One Health Undergraduate Degree

The Bachelor of One Health Undergraduate Degree, offered by the University of Guelph, will prepare students to tackle complex health issues with a dynamic, multidisciplinary approach.

The One Health undergraduate degree focuses on the interrelationships between plants and animals, humans and their environment. The program will provide the skills, knowledge and ability to succeed in research or as a practitioner in the fields of human or animal health, agri-food, health technology, health promotion and environmental stewardship across private industry, governmental and non-governmental organizations.

Students are also well prepared to pursue professional programs including human or veterinary medicine, law, or enter graduate work.

- Co-op option available.

Key features of the degree

- Courses that promote a holistic understanding of the scientific and social determinants of health in individuals, populations, and ecosystems.
- Specialized One Health courses focused on core skill development of a One Health approach in the context of complex health challenges.
- Four areas of emphasis to dive deeper into the uses and application of a One Health approach from either a scientific or socio-cultural perspective. These are:
 - Culture, society and health
 - Disease, complexity and health
 - Environment, food and health
 - Policy, economics and health



CULTURE, SOCIETY AND HEALTH

Planet Madagascar works to conserve endangered lemurs

Most people know lemurs only through the movie Madagascar, which doesn't accurately represent the complex dangers these species face and how their environment and interaction with humans threaten them. That's where University of Guelph primatologist [Dr. Travis Steffens](#), comes in. He travelled to Madagascar to study lemurs and how they were impacted by habitat loss and fragmentation. But he soon realized that studying lemurs without considering the needs of people wouldn't lead to a long-term conservation solution. So in 2015, he started Planet Madagascar, an organization aimed at working with local communities to combat poverty, create sustainable forests...and to protect lemurs.

Fields of potential employment

- Public Health Officer—local, provincial or federal governments
- Policy Analyst—environmental, health, economics
- Community Engagement Manager for mental health, citizen issues
- Resource Management and Conservation
- Food Security Officer



DISEASE, COMPLEXITY AND HEALTH

National Institutes of Health clinical trials at OVC

Clinical trials are underway at the Ontario Veterinary College for bone cancer (osteosarcoma) treatment in large breed dogs that has a human equivalent in young children. Researchers, including OVC veterinary medical oncologist [Dr. Paul Woods](#), are working with 10 American veterinary colleges as members of the National Institutes of Health comparative oncology trials consortium. This group studies cancers similarly found in humans and animals. Woods and others are conducting trials in dogs for a novel immune therapy that may stop or delay metastasis of bone cancer from limbs to critical organs. If the treatment succeeds, it could translate to help child patients.



ENVIRONMENT, FOOD AND HEALTH

Restored farmland supports more songbird biodiversity

As grassland ecosystems are lost to urban sprawl, songbird populations in southwestern Ontario have drastically declined. But as University of Guelph integrative biologist [Dr. Amy Newman](#), has shown, farms can be part of the solution. Those with restored or undisturbed natural habitat support greater avian biodiversity than conventional farms. These results come from Newman's work with 10 Norfolk County farms affiliated with the ALUS Canada organization, which helps farmers restore and create healthy ecosystems on agricultural land while sustaining food production. Her results reaffirm the holistic One Health idea that increased ecological health favourably impacts animal and human health.



POLICY, ECONOMICS AND HEALTH

Public policy to reduce health inequities

Governments often profess a concern for marginalized groups—but they tend to respond to the needs of powerful groups, such as the rich or politically connected. Under what conditions do governments serve marginalized groups? Political scientist [Dr. Carmen Jacqueline Ho](#) is trying to find out. Ho has applied a One Health approach by collaborating with epidemiologists and public health experts to understand the factors that push governments to serve marginalized groups. This work forms the basis for her Health Politics and Policy Lab at the university, which examines social policies that can reduce health disparities.

Robert W. Woolner studentship

An experiential learning opportunity in research is available for two U of G undergraduate students (in DVM or related field) interested in One Health and available to work full time from May 1 to Sept. 1. See page 11 for student internships.

Graduate studies grow One Health solutions

Want to supplement your graduate degree with more skills and knowledge about One Health? The University's [Collaborative Specialization in One Health](#) (CSOH) graduate program is available across 18 graduate disciplines at Guelph to eligible doctoral or master's students who would like to focus on a topic in their core program with a One Health application.

Through the CSOH, graduates learn to work across disciplines and communities to foster cooperation and shared, successful outcomes.

Beginning in 2022, veterinary medical (DVM) students can take advantage of a new opportunity to earn a [Master's of Public Health](#) in a reduced number of semesters, after they complete the third year DVM One Health module.



Countering climate change's effect on cattle

Tianna Sullivan is a Master's student in Animal Breeding and Genetics, with a Collaborative Specialization in One Health. Her research is responding to an important and immediate need in the dairy industry in the face of global warming—increased heat and bacterial stress among cattle.

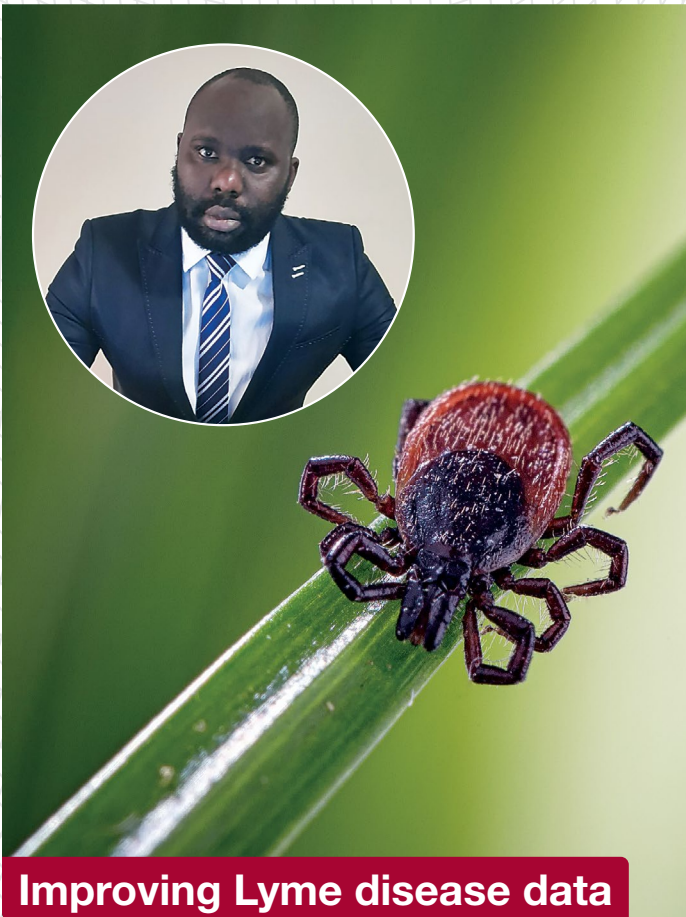
Sullivan's research aims to genetically identify those animals that can better handle bacterial infections without the need for antibiotics. This supports the sustainability of the industry and is an important strategy in fighting antimicrobial resistance in animals, people and the environment.

Participating programs

- Computational Sciences
- Animal Biosciences
- Biomedical Sciences
- Computer Science (MSc)
- Engineering
- Environmental Sciences
- Food Science
- Geography
- History
- Human Health and Nutritional Sciences
- Integrative Biology
- Molecular and Cellular Biology
- Pathobiology
- Political Science
- Population Medicine
- Philosophy
- Public Issues Anthropology
- Rural Planning and Development

DVM / Master of Public Health awards

Stipend support is available for up to five DVM graduates per year who enroll in the DVM/MPH concurrent program.



Improving Lyme disease data

Rates of Lyme disease in Canada are increasing, so it's important to monitor the spread of the disease-causing vector, the blacklegged tick. University of Guelph is a key contributor to the Canadian Lyme Disease Research network.

Cyril Akwo, a PhD candidate at the Ontario Veterinary College is using a One Health approach to develop improved tick surveillance measures. He's collaborating with public health agencies and other stakeholders across the country to identify challenges in current monitoring programs. Akwo hopes his work can lead to better information for Lyme disease policies and programs, and ultimately, reduced public health risk.



Global insights shape Guelph grads

To ensure One Health graduates are equipped for success, Drs. Katie Clow and Jane Parmley are leading a team of medical, veterinary medical, and public health experts from across Canada to identify the core competencies needed most. They looked to Canadian and global One Health leaders, literature reviews and scans of existing One Health post-secondary programs around the world.

The draft competencies have been used to guide development of Guelph's One Health master's and bachelor's level programs, so that graduates' skills and knowledge effectively match current and future needs.

Photo: Tyler Black, Collaborative Specialization in One Health and PhD student, is using a One Health approach to study the effects of oil spills on intertidal clams.

Responsible AI in One Health grant

Two years of support is being provided to two master's level students for research that integrates a One Health application in the field of artificial intelligence (AI). Offered by the One Health Institute in cooperation with the School of Computer Science's Centre for Advancing Responsible and Ethical Artificial Intelligence (CARE-AI).

Students embrace One Health

The One Health Student Committee offers a calendar-packed series of events to about 400 student members and others around the world.

ALL ABOUT EXPLORING ONE HEALTH

OHSC

Read about the impact of your participation in this series!

WE REACHED PEOPLE AROUND THE GLOBE
We had participants from about 30 different countries complete the series.

WE ENGAGED PEOPLE OF VARYING EDUCATION LEVELS
We had participants from about 3 different levels of study complete the series.

WE STARTED WITH VARIOUS LEVELS OF ONE HEALTH KNOWLEDGE
We had many participants start the series with no knowledge of One Health.

WE FINISHED WITH A VASTLY DIFFERENT SITUATION
All of our participants who completed the series left more knowledgeable than when they started.

WE ENSURED SATISFACTION OF OUR PARTICIPANTS
None of our participants completed the series with dissatisfaction.

THANK YOU!

The week-long Exploring One Health event attracted over 100 students from 18 countries

Topics in the Coffee House student presentation series range from zoonoses in rats to sustainable communities in Peru



Fundraising for the Iqaluit Humane Society and One Health scholarships

Networking Wednesdays with research, government and industry leaders who are tackling issues with a One Health approach

One Health Poster Day with the Centre for Public and Zoonoses and students from Western, Waterloo and McMaster universities



Participation in International Student One Health Alliance



Student internships with Planet Madagascar and One Health Lessons

Connect with the One Health Student Committee on Instagram, YouTube and at onehealthstudents@uoguelph.ca. Join the OHSC Calendar or OH Student Listserv for upcoming events.

Building One Health awareness and a community of practice

Over 150 University of Guelph faculty, across all seven university colleges, consider themselves to be One Health researchers and/or teachers in their approach to the issues they tackle. Here are some of the ways the One Health Institute has been reaching out to build awareness and a community of practice for One Health, within and outside of the University.

PANEL TALK:
Biology and control of SARS-CoV-2
 November 9, 2020
 1-3 pm EST
 FREE EVENT. EVERYONE WELCOME
QUESTIONS? EMAIL: ovcas_research@uoguelph.ca

DISTINGUISHED PANELISTS:

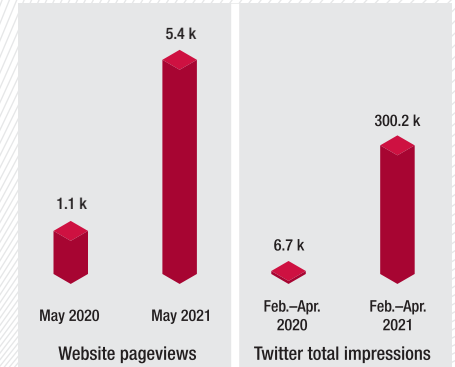
DR. MATTHEW S. MILLER
 Associate Professor and Associate Chair (Grad Education), Department of Biochemistry and Biomedical Sciences at McMaster University

DR. SAMIRA MUBAREKA
 Virologist, medical microbiologist and infectious disease physician, Sunnybrook Health Sciences Centre and in the Department of Laboratory Medicine and Pathobiology at the University of Toronto

ONE HEALTH WINTER 2021 SEMINAR SERIES
WILDLIFE, WILD PLACES, & SPILLOVER: INSIGHTS FROM THE FIELD
FEBRUARY 12 | 9:30-10:30 AM
 JOIN USING THIS LINK:
[HTTPS://ZOOM.US/J/996433107917](https://zoom.us/j/996433107917)
 PWD=AHNMDI9SAKHURWPXBGICKWSVOY3UT09



EMILY DENSTEDT, DVM, MPH
 VETERINARY TECHNICAL ADVISOR (LAD PDR)
 WILDLIFE CONSERVATION SOCIETY



Monthly research webinars available on our [One Health YouTube channel](#)

Increase in [website traffic](#) and [social media reach](#) over past year

One Health Institute video

ONE HEALTH at The Royal Agricultural Virtual Experience
 University of Guelph One Health Virtual Pavilion
 November 10 - November 14
 Panel: *Plants, and Animals, and Humans, Oh My! What is One Health and what does it have to do with your future career?*
 Featured panelists: Dr. Deb Stork, Dr. Heather Murphy, Dr. Travis Giffers & Dr. Samira Mubareka
 Moderated by: Dr. Jeff Wisler
November 11 | 5:45PM - 6:45PM EST

Participation at [Royal Agricultural Winter Fair](#), [U of G College Royal](#), [U of G Science Olympics](#)



University of Guelph campus

One Health HACKATHON
 International events sponsor

One Health Happenings

Contributions to international websites

New website features:

- [Faculty Focus and Student Spotlight](#)
- [One Health research stories](#)

One Health Institute bi-weekly newsletter

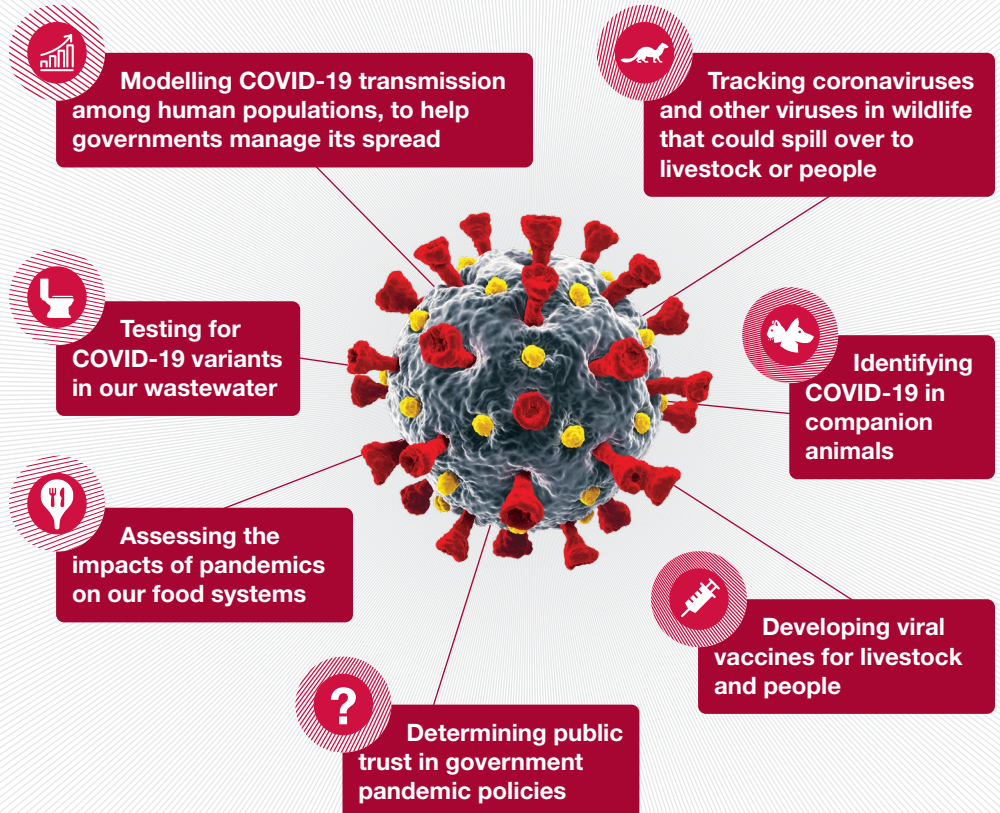
COVID-19 makes the case for coordinated One Health approach

COVID-19 is one of an increasing number of diseases that have emerged in animal populations and become infectious to humans. These are called zoonotic diseases and this phenomenon is happening globally, as animals and their natural environments are increasingly disrupted by human actions and our presence. The University of Guelph has long been a leader in zoonotic research. Faculty are now applying the same expertise to COVID-19, including:

70% of new and emerging human infectious diseases are zoonotic in origin (transmitted from animals).

Examples of recent zoonotic infectious diseases:

- West Nile virus
- Lyme disease
- Avian influenza
- SARS (Severe Acute Respiratory Syndrome)
- Ebola virus
- Zika virus
- MERS (Middle East Respiratory Syndrome)



A One Health approach that supports animal health and their natural environment is our best strategy to protect human health, and mitigate the impacts of future pandemics.

One Health Institute Advisory Team

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