

One Health Influences

HÉLÈNE CARABIN DVM, PhD

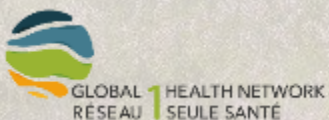
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Canadian Research Chair in Epidemiology and One Health

Director, Groupe de Recherche en Épidémiologie des Zoonoses et Santé Publique (GREZOSP)

Codirector, Global One Health Network (G1HN)

Codirector, One Health Modelling Network for Emerging Diseases(OMNI)





Bienvenue	Français
Welcome	English
Wa'tkwanonhwerá:ton	Mohawk/kanienke : haka
K'wlipai8	Bénaki
Yiheh	Wendat
Mino pijaok	Algonquin/anie
Mirokeicakw	Atikamekw/nehirowisiw
Wachiya	Cri/eeyou
Minu-Takushini	Innu
Ai	Inuktitut
Weltasualulnog	Mi'kmaq
Nimiwaitan takuasenen	Naskapi
Ulasuweltomon	Malécite

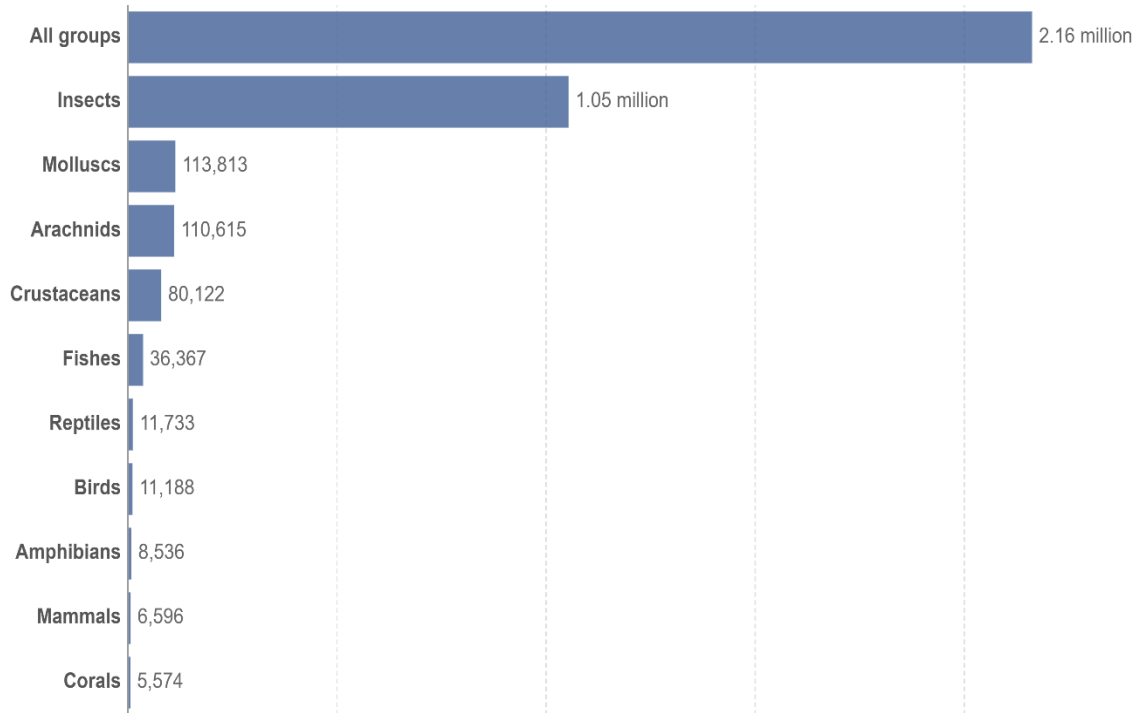
The **University of Montreal** acknowledges the **Indigenous nations** that, prior and even after the establishment of the French, encountered one another on the territory of the Island of Montreal. It also honours the memory of the Great Peace of 1701, a treaty that fostered peaceful relationships between France, its Indigenous allies and the Haudenosaunee federation. The spirit of fraternity that inspired this famous treaty serves as a model for our own university community.

ONE HEALTH PERSPECTIVE & HISTORY

PERSPECTIVE

Number of described species

The number of identified and named species in each taxonomic group¹, as of 2022. Since many species have not yet been described, this is a large underestimate of the total number of species in the world.



Source: IUCN Red List (2022)

OurWorldInData.org/biodiversity • CC BY

1. **Taxonomic group:** A taxonomic group is a category in the scientific classification of living things, based on shared characteristics and genetic similarity. It is arranged in a hierarchical system, with each group being more specific than the one above it, and all groups forming the entire classification of living things.

<https://ourworldindata.org/biodiversity-and-wildlife#how-many-species-are-there>

Kingdom	Number of species (Total)	Number of species (Ocean)	Number of species (Terrestrial)
Animals	7,770,000	2,150,000	5,620,000
Chromists	27,500	7400	20,100
Fungi	611,000	5320	605,680
Plants	298,000	16,600	281,400
Protozoa	36,400	36,400	0
Archaea	455	1	454
Bacteria	9680	1320	8360
Total species	8,750,000	2,210,000	6,540,000

Estimated number of species on Earth from Mora et al. (2011)¹⁸

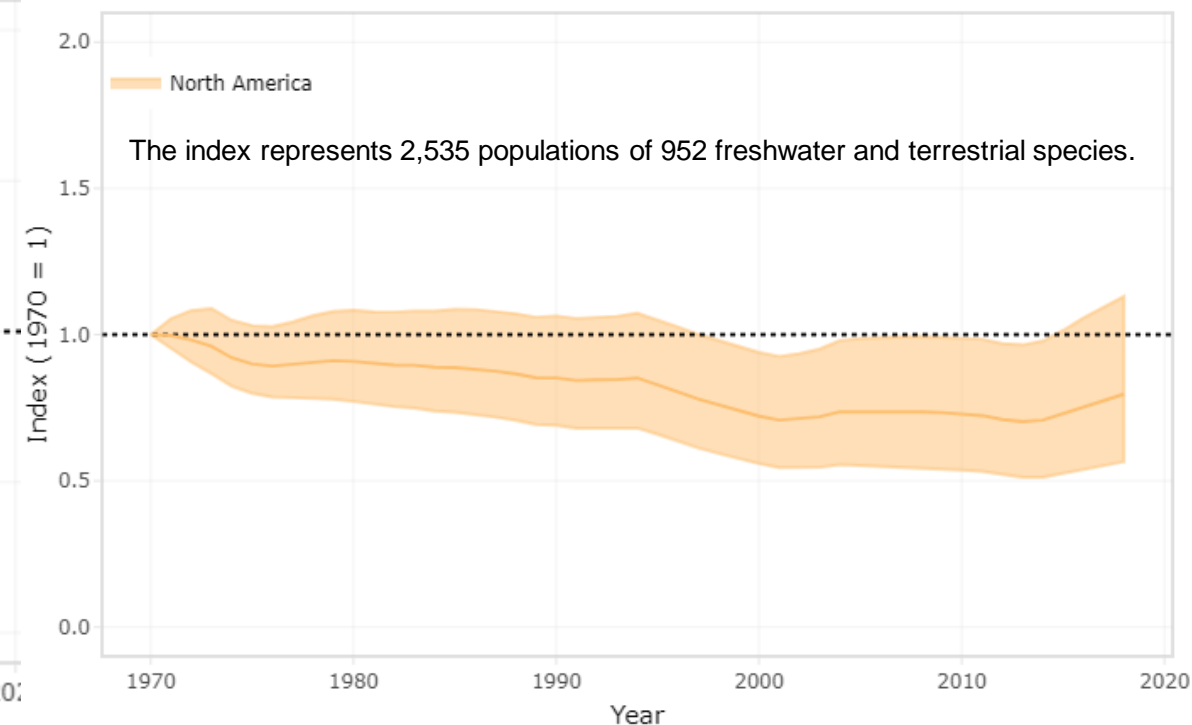
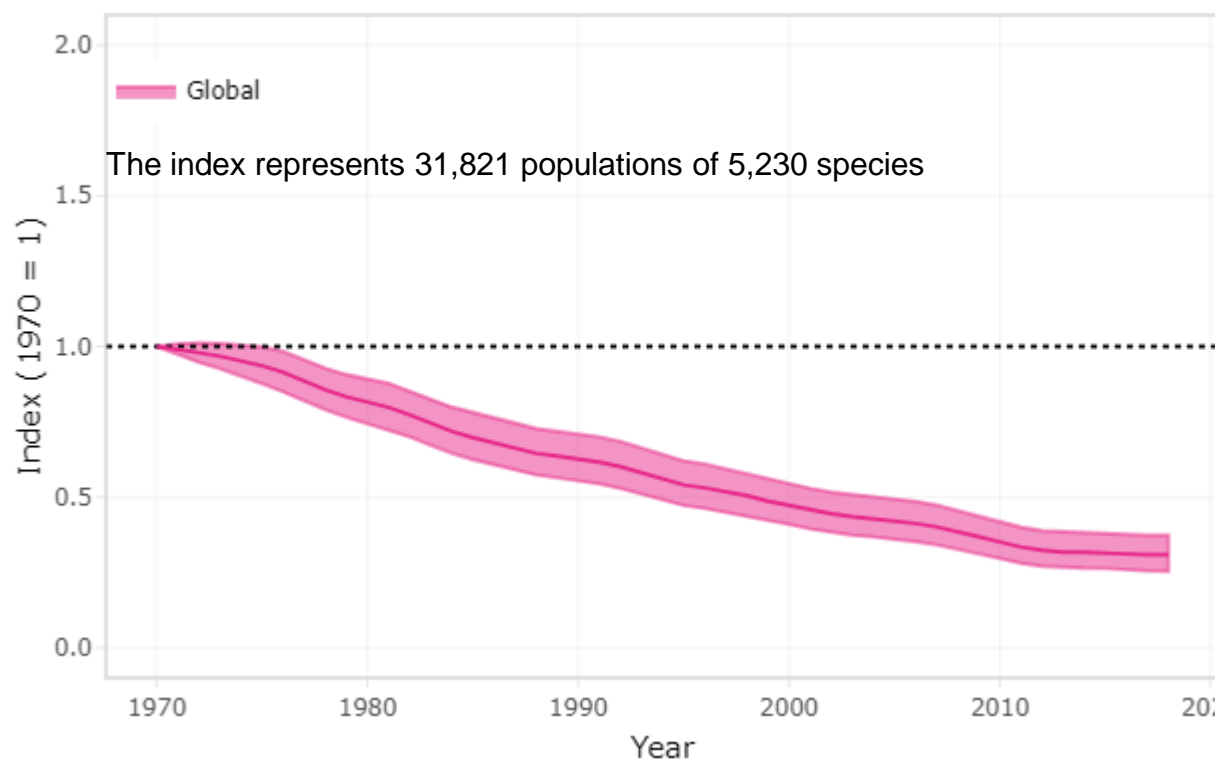
Living Planet Index



[Home](#) [About Us](#) [The Index](#) [Data](#) [Indicators](#) [Projects](#) [Publications](#)

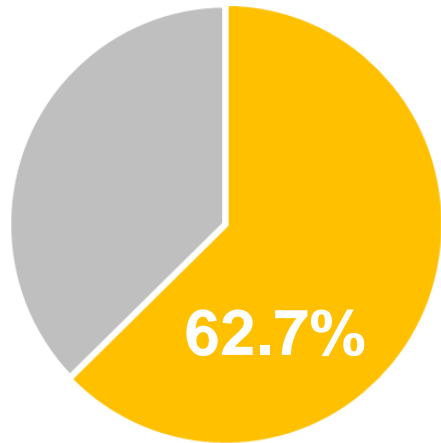
Latest Results

The global Living Planet Index is the main indicator derived from our data. The Living Planet Index (LPI) is a measure of the state of the world's biological diversity based on population trends of vertebrate species from terrestrial, freshwater and marine habitats. The LPI has been adopted by the Convention of Biological Diversity (CBD) as an indicator of progress towards its 2011-2020 targets and can play an important role in monitoring progress towards the post-2020 goals and targets negotiated at COP15 this December.



https://www.livingplanetindex.org/latest_results

PERSPECTIVE - Infections have few species frontiers



1205/1922 species of infectious agent (in database reviewed) **infect more than one host species**

1415

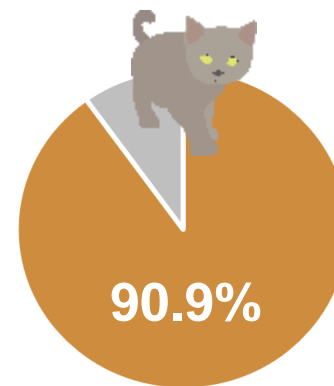
pathogens infect humans

Diseases of humans and their domestic mammals: pathogen characteristics, host range and the risk of emergence

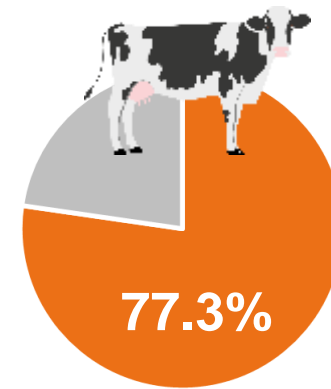
Phil. Trans. R. Soc. Lond. B (2001) **356**, 991–999

S. Cleaveland*, M. K. Laurenson and L. H. Taylor

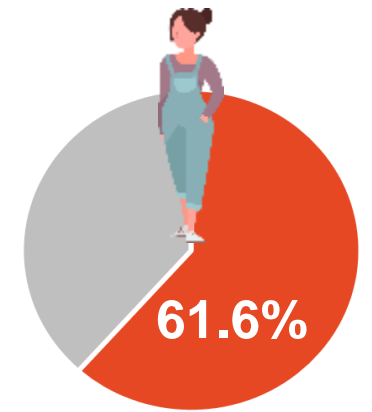
Agents infectious to:



Domestic carnivores



Livestock



Human

infect **more than one** host species

ONE HEALTH – THE ORIGINS...

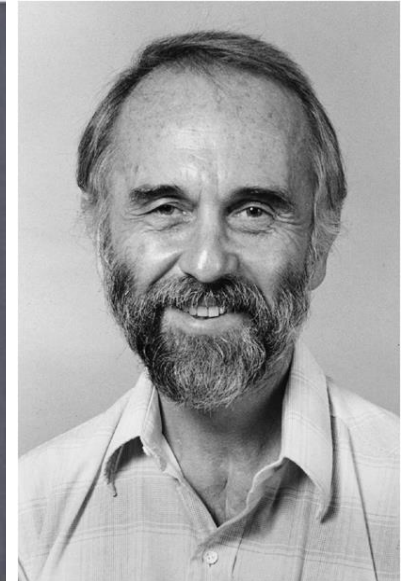
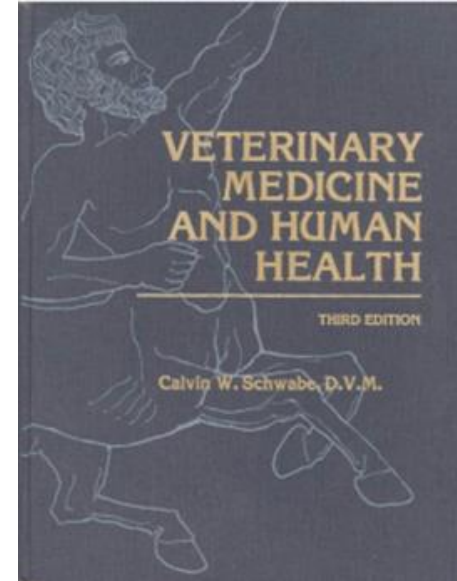
Rudolph Virchow
(1821-1902)



William Osler
(1849-1919)



1st edition - 1969



« There are not scientific barriers between veterinary and human medicine, and there should not be one. The experiences of one should be used for the development of the other. »»

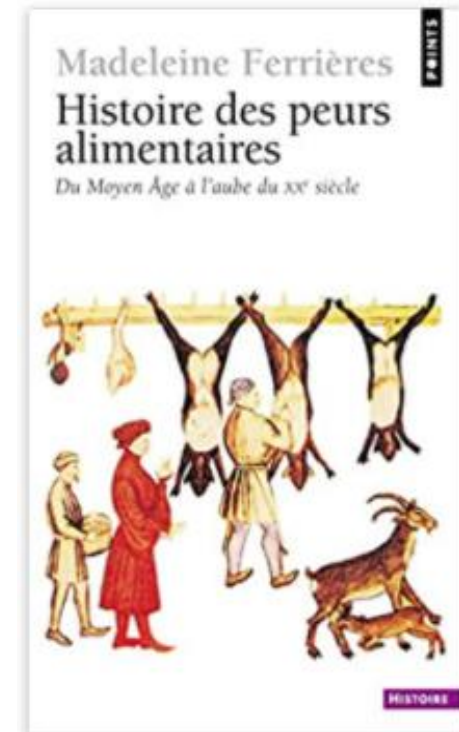
« Veterinary and human medicine are complementary and should be considered as one medicine »

« There is no difference in paradigm between human and veterinary medicine. Both sciences share a common corpus of knowledge in anatomy, physiology, pathology and origin of disease in all species »»

BUT IT IS A LOT OLDER THAN THAT!

LA CHARTRE DE MIREPOIX, 1303

- Act of 24 articles on how to work as a butcher
- Recognises the « perils » of consuming meat, but that this is uncertain (notion of « risk »).
- Ensures the livelihood of butchers in a Cathare city.
- Inspection of meat in markets and of all animals!
- Art. 8 - « on vendra donc du mouton, du bœuf et du porc, mais à une condition : que leurs chairs soient *bonnes, utiles, non malades* ».



Ferrières M. Histoire des peurs alimentaires. Seuil 2002.

MORE RECENTLY

Manhattan Principles

« 12 recommendations to establish a more holistic approach to prevent epidemic and epizootic diseases et to maintain the integrity of ecosystems for the benefits of humans, their domestic animals and the biodiversity which is essential to all ».



One Health Initiative Task Force :
Final Report

July 15, 2008



THE BERLIN PRINCIPLES 2019 – UPDATED PRINCIPLES

WCS NEWS RELEASE

Global Health Leaders Issue Urgent Call for United Effort to Stop Diseases Threatening All Life on Earth

- The Berlin Principles were developed and issued today at the [One Planet, One Health, One Future conference](#) organized by the Wildlife Conservation Society and the German Federal Foreign Office
- The conference included the top minds from around the globe addressing how human development and interference on nature are generating threats affecting all life on Earth

BERLIN , GERMANY | OCTOBER 25, 2019



UPDATE: THE BERLIN PRINCIPLES 2019

What?

- 1) Integrate protection of biodiversity as a solution for health**
- 2) Protect biodiversity
- 3) Protect natural environments, water, sea, air
- 4) Actively fight climate change
- 5) Institutionalize One Health**
- 6) Adopt systems approaches and resilient systems
- 7) Invest in intersectoral systems and global solutions
- 8) Transdisciplinarity and cooperation among institutions (governments, NGOs, academia, industry)
- 9) Invest in educating and raising awareness on ecosystem approaches for a healthy planet**
- 10) Adopt a participatory and collaborative approach, among institutions and with Indigenous Peoples and local communities

How?

**Recognize
One Health**

Systems approach

Knowledge sharing

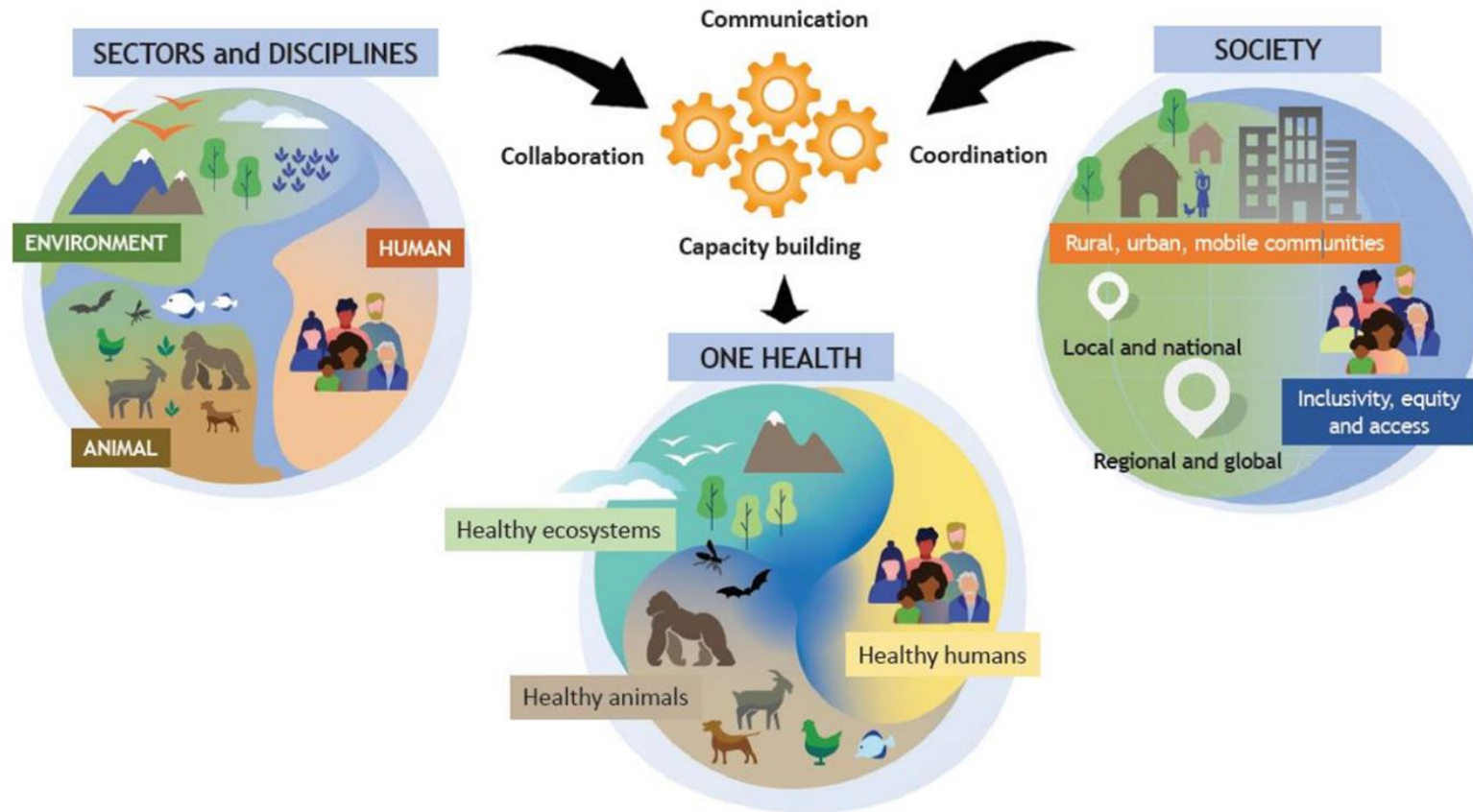
DEFINITION, EXISTING STRUCTURES AND GOVERNANCE

WE FINALLY HAVE A DEFINITION FOR OH!

ONE HEALTH is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems.

- It recognizes the health of **humans**, domestic and wild **animals**, **plants**, and the wider **environment** (including ecosystems) are closely linked and **INTER-DEPENDENT**.
- The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to **work together** to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development.

WE FINALLY HAVE A DEFINITION FOR OH!



IMPACT OF THE PANDEMIC ON GOVERNANCE

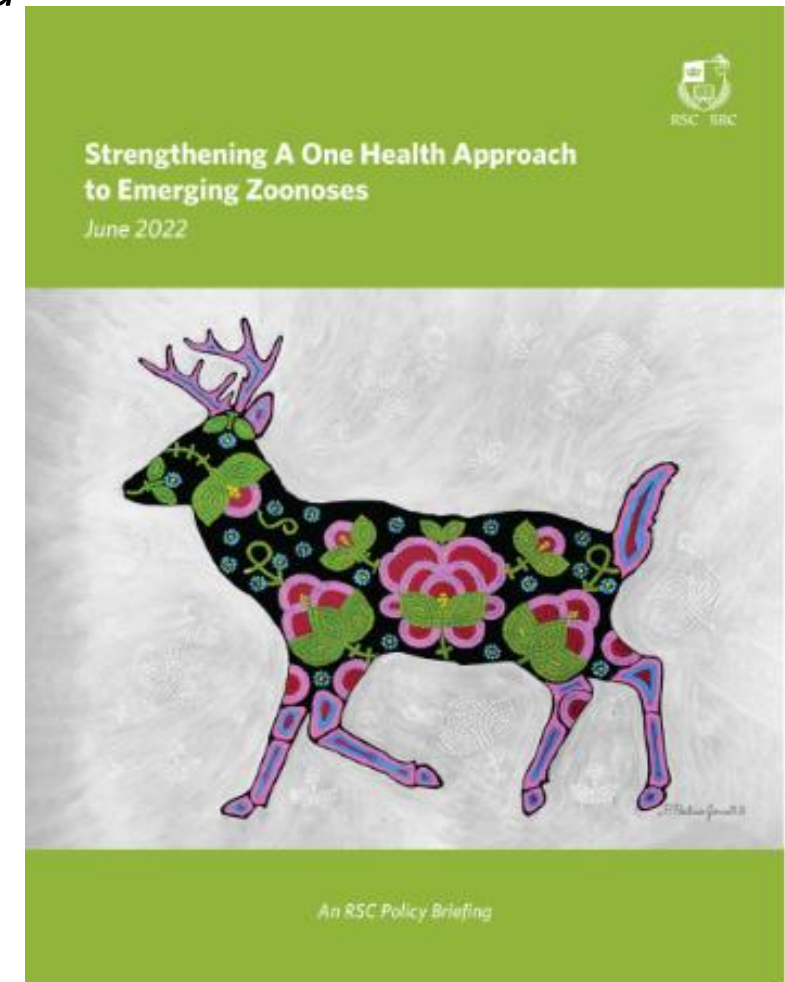
CORRESPONDENCE | 03 January 2023

Pandemic treaty: incorporate a One Health framework

[David T. S. Hayman](#) & [Katie Woolaston](#)



“Public health is a component of One Health, and not vice versa”



IMPACT OF THE PANDEMIC ON GOVERNANCE

ONE HEALTH HIGH-LEVEL EXPERT PANEL

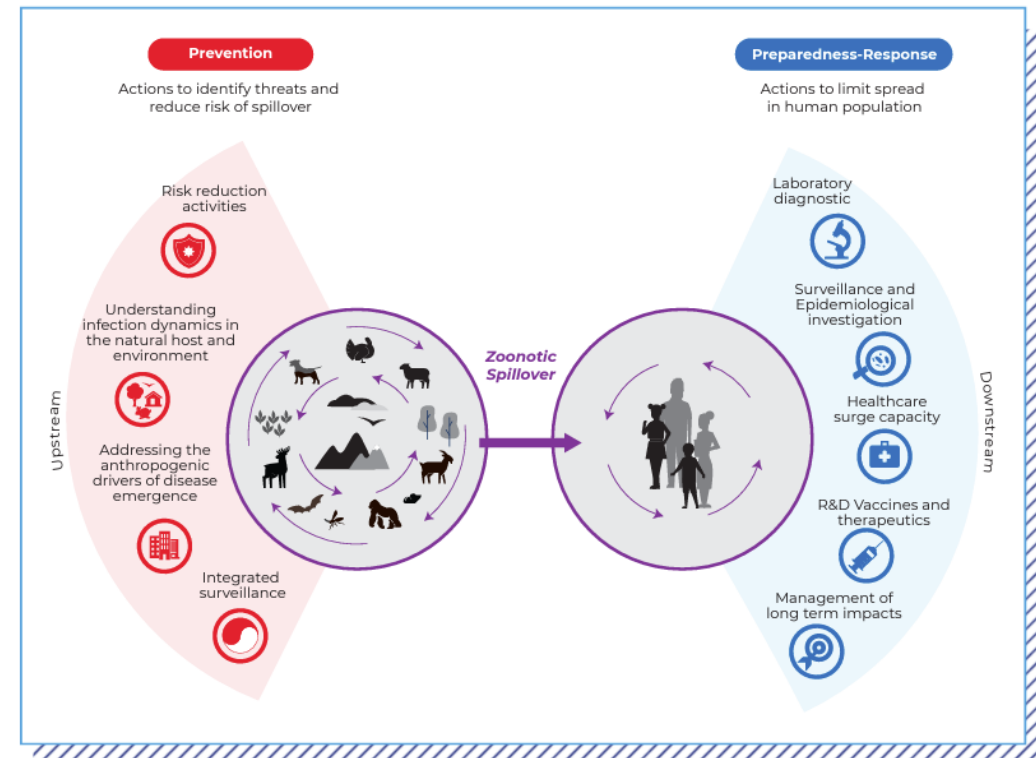
PREVENTION OF ZOOONOTIC SPILLOVER

FROM RELYING ON RESPONSE TO REDUCING THE RISK AT SOURCE

OHHLEP whitepaper/Opinion piece

<https://www.who.int/publications/m/item/prevention-of-zoonotic-spillover>

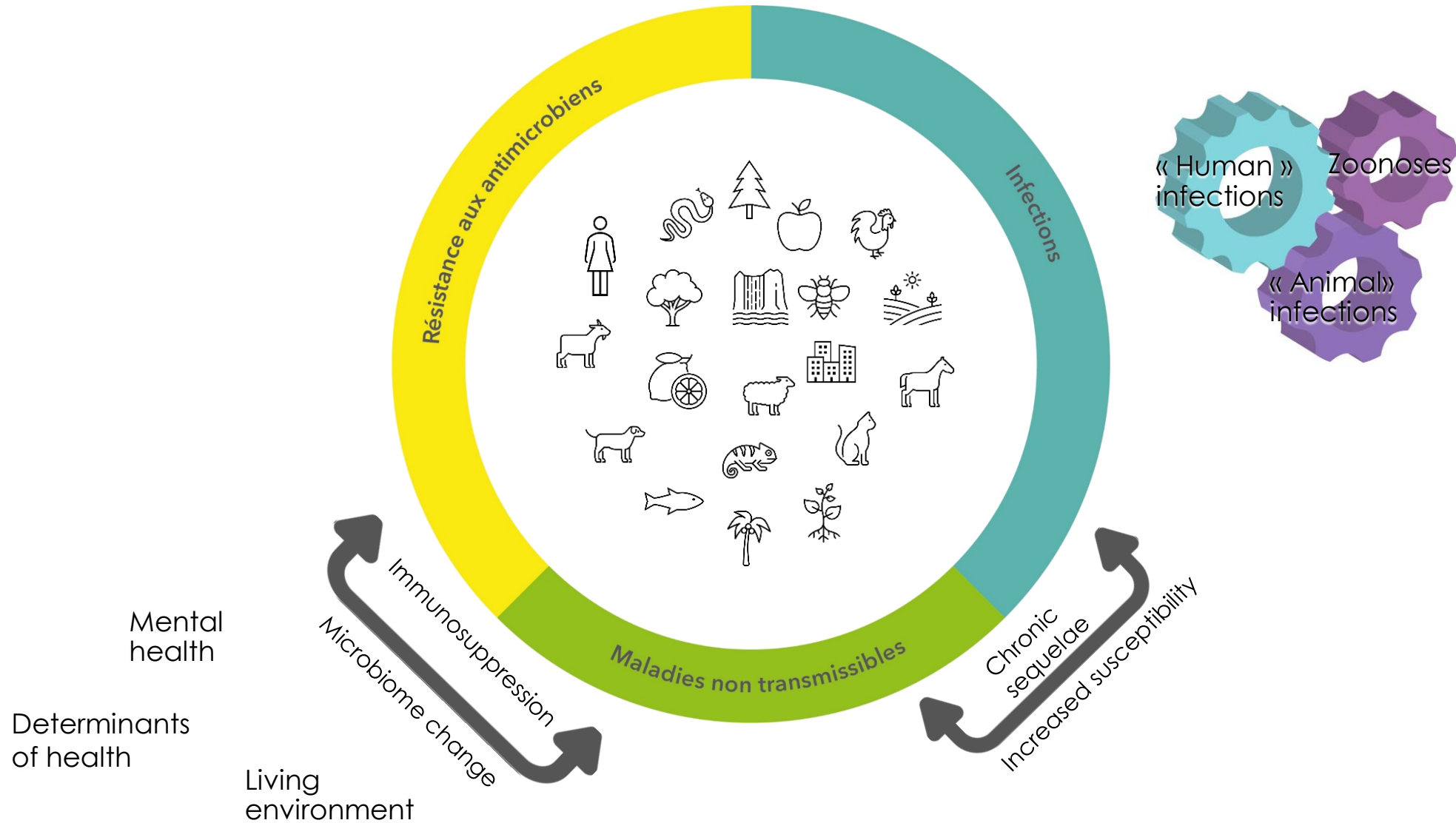
FIGURE 1. PREVENTION OF ZOOONOTIC SPILLOVER TO HUMANS



“Prevention of pathogen spillover from animals to humans means shifting the infectious disease control paradigm from reactive to proactive (primary prevention). Prevention includes addressing the drivers of disease emergence, namely ecological, meteorological and anthropogenic factors and activities that increase spillover risk, in order to reduce the risk of human infection. It is informed by, amongst other actions, biosurveillance in natural hosts, people and the environment, understanding pathogen infection dynamics and implementing intervention activities.”

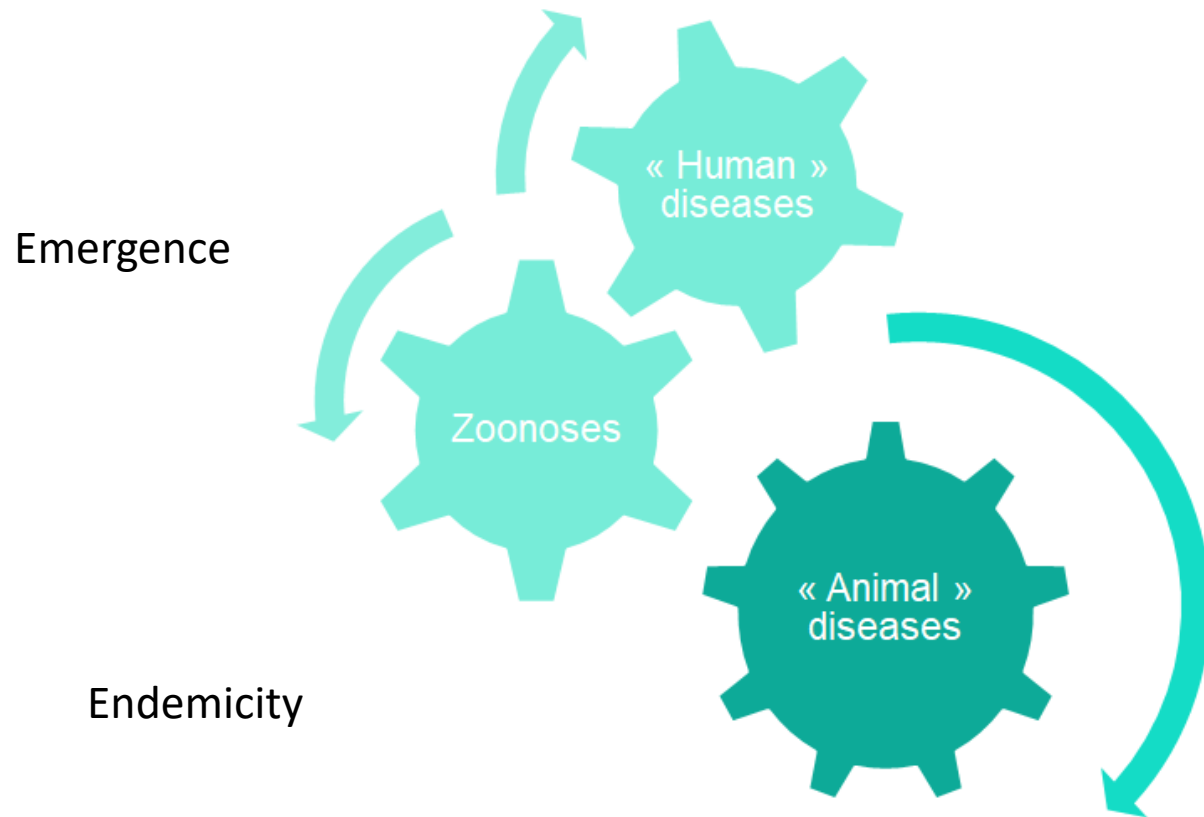
AREAS OF APPLICATION OF ONE HEALTH

AREAS OF APPLICATION



ZOONOTIC INFECTIOUS DISEASES

Source: A tripartite guide to addressing zoonotic diseases

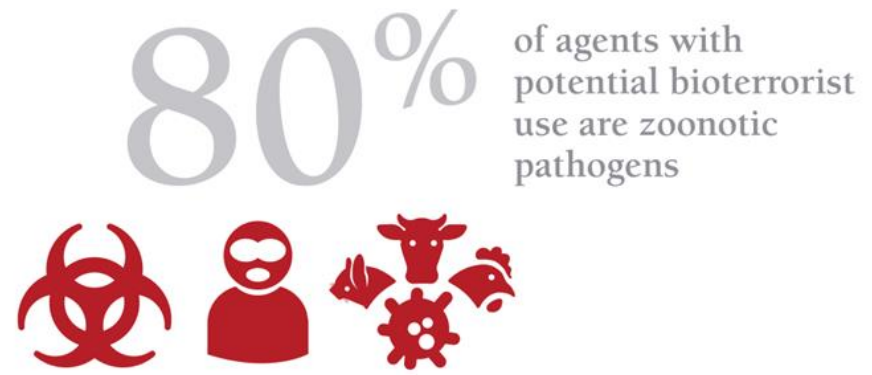
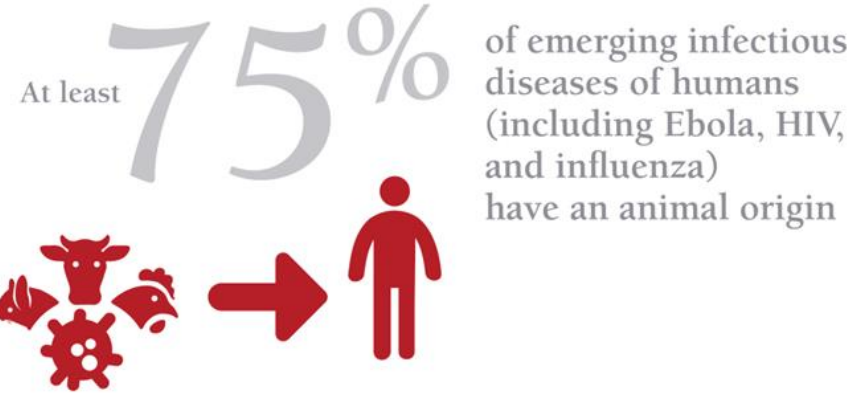
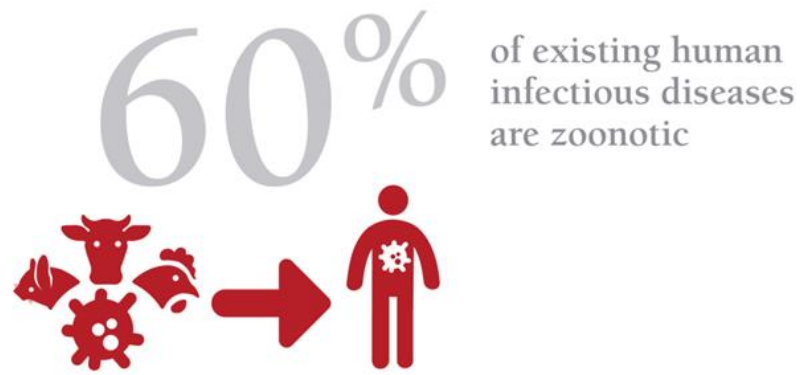


Zoonotic diseases (zoonoses): Infectious diseases that can be spread between animals and humans; can be spread by food, water, fomites, or vectors.

Emerging zoonotic disease: Zoonotic disease due to known pathogens but that have not yet occurred in a specific geographic area, in a specific species, or that are increasing in prevalence (here, different from new pathogens, see definition below).

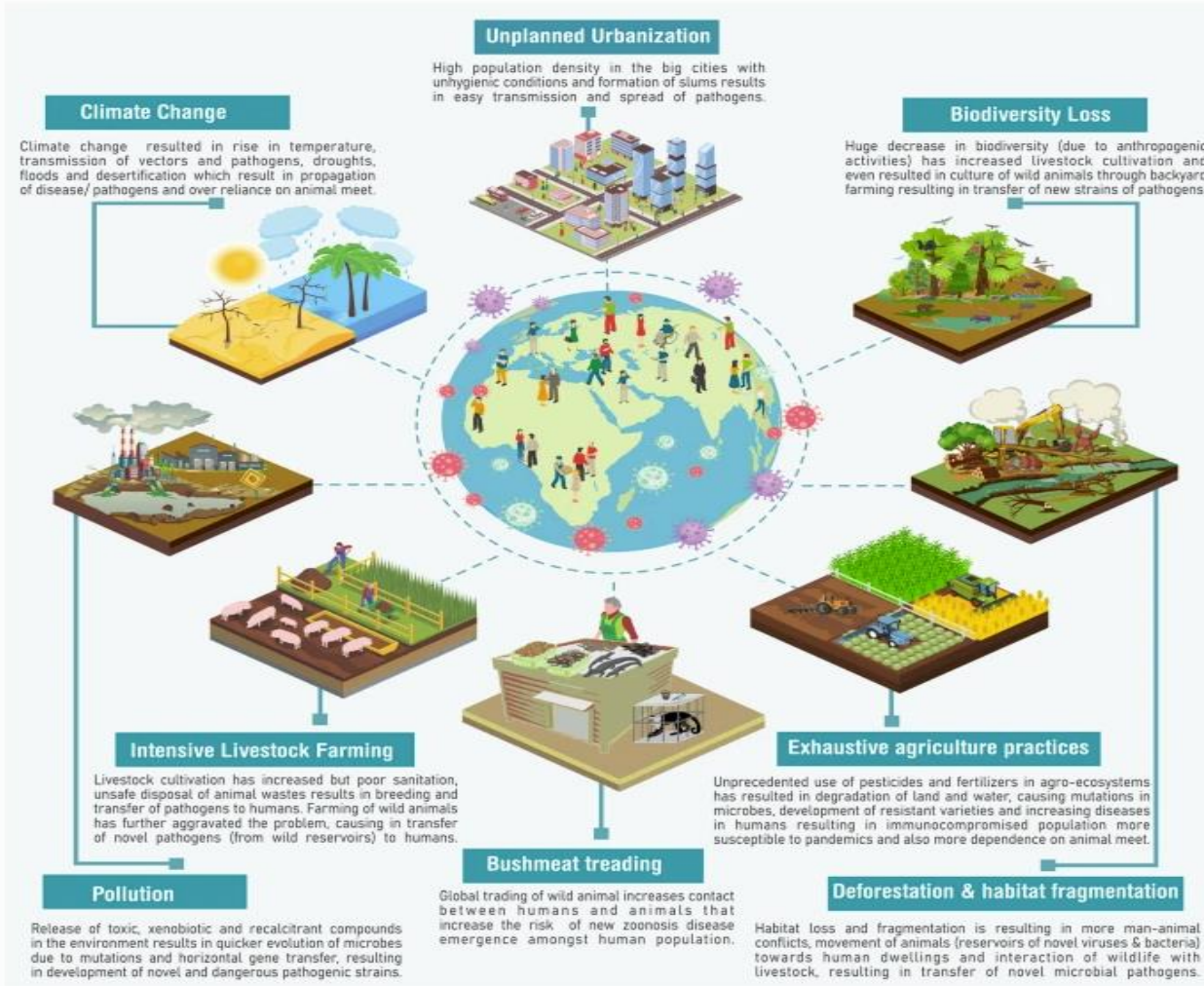
Endemic zoonotic disease: Zoonotic disease that exist continually or continuously in a geographic area, so that cases of disease could be expected.

MOST EMERGING INFECTIONS ARE ZOO NOTIC



EMERGING FACTORS LINKED TO THE ENVIRONMENT

Fig. 2



Source: Muishara J, Mishra P and Aora NK. Linkages between environmental issues and zoonotic diseases: with reference to COVID-19 pandemic. Environmental Sustainability 2021; 4: 455-67

<https://link.springer.com/article/10.1007/s42398-021-00165-x>

REVERSE SPILLOVER – INTEGRATED SURVEILLANCE IS KEY

Highly divergent white-tailed deer SARS-CoV-2 with potential deer-to-human transmission

Bradley Pickering^{1,9,10*}, Oliver Lung^{1,11*}, Finlay Maguire^{2,12,13*}, Peter Kruczkiewicz¹, Jonathan D. Kotwa³, Tore Buchanan⁴, Marianne Gagnier⁵, Jennifer L. Guthrie^{6,16}, Claire M. Jardine⁷, Alex

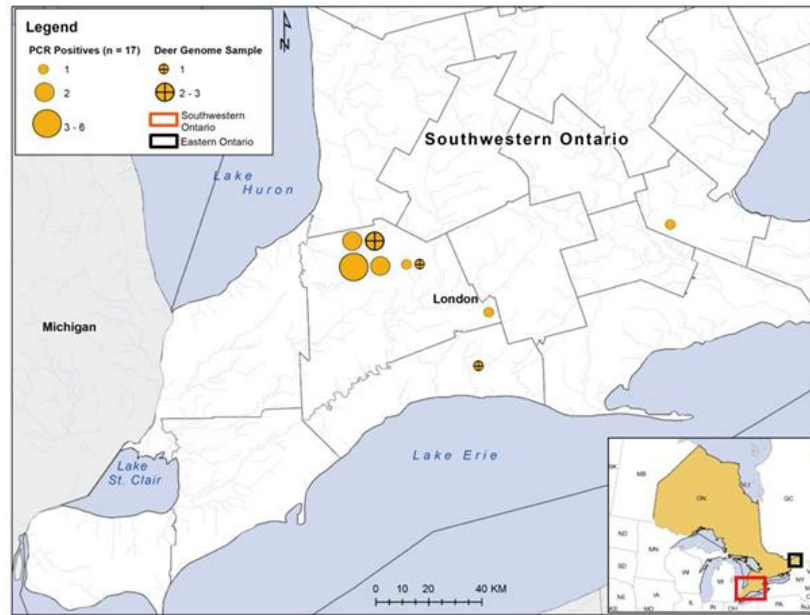


Figure 1: SARS-CoV-2 RNA detection in WTD sampled in Southwestern and Eastern Ontario in 2021. Circle size indicates the relative number of positive WTD (n=17/298), with crosses showing samples from which high quality viral genomes were recovered (n=5). The detailed map depicts Southwestern Ontario (the red rectangle on the inset map). SARS-CoV-2 RNA was not detected in samples from Eastern Ontario.

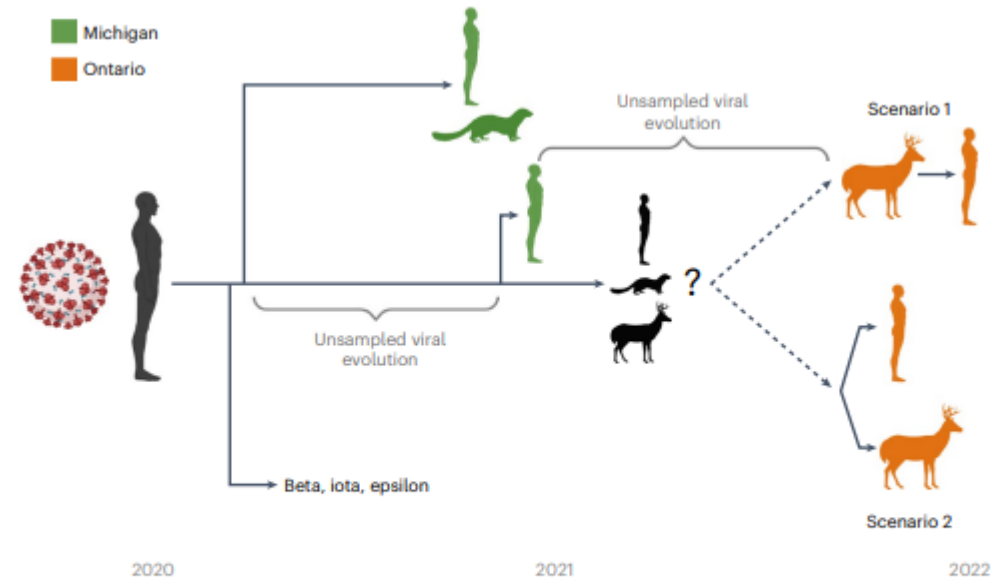


Fig. 6 | Hypothetical zoonoses and evolution of the B.1.641 lineage. The timeline and approximate relationship between the Beta VOC (bold), Iota/Epsilon former VULs, and viral samples in white-tailed deer, humans and mink from both Michigan (green) and Ontario (orange) are displayed. As it likely emerged during one of the indicated poorly sampled periods of viral evolution,

it is unclear whether the viral ancestor of B.1.641 was from an unknown animal (for example, mink, white-tailed deer or other species) or human reservoir. From this ancestor, there was either a spillback transmission from deer to human (scenario 1) or the emergence of a virus infecting both human and deer (scenario 2).

[Divergent SARS-CoV-2 variant emerges in white-tailed deer with deer-to-human transmission | Nature Microbiology](#) Nov 2022

BEYOND EMERGING ZOOONOSES

TYPES OF ZOOONOSES

TRANSMISSION

EXAMPLES



BACTERIAL

Mostly **food/waterborn**



Salmonella, E. coli, Leptospira, etc.



VIRAL

Mostly **aerosol**, direct **contact** and **vectorborne**



SARS, monkeypox, avian flu, rabies



PARASITIC

Mostly **food/waterborn**



Cryptosporidium, Giardia, cysticercosis, echinococcosis, Toxocara



FUNGAL

Mostly **direct contact**



Scabies



PRIONS

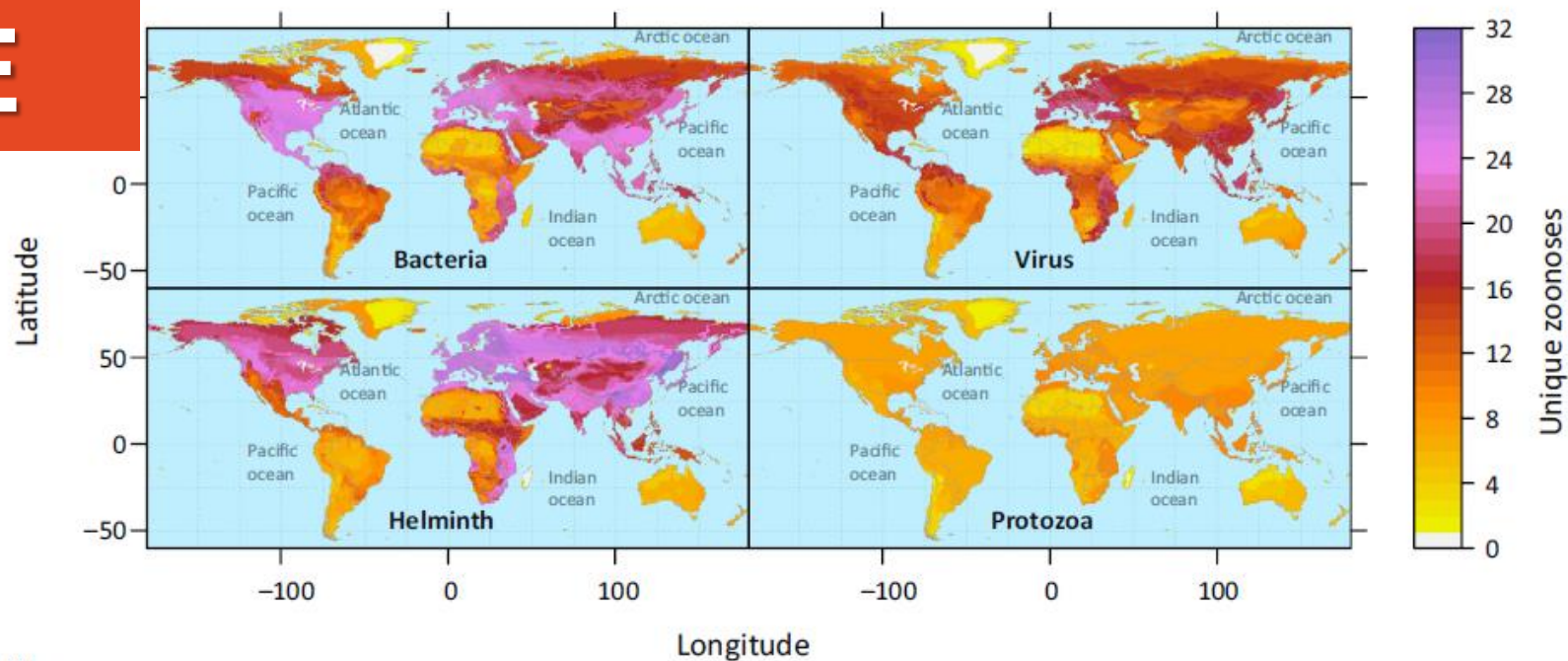
BSE/CJD, TSE???

ZOONOSES ARE EVERYWHERE

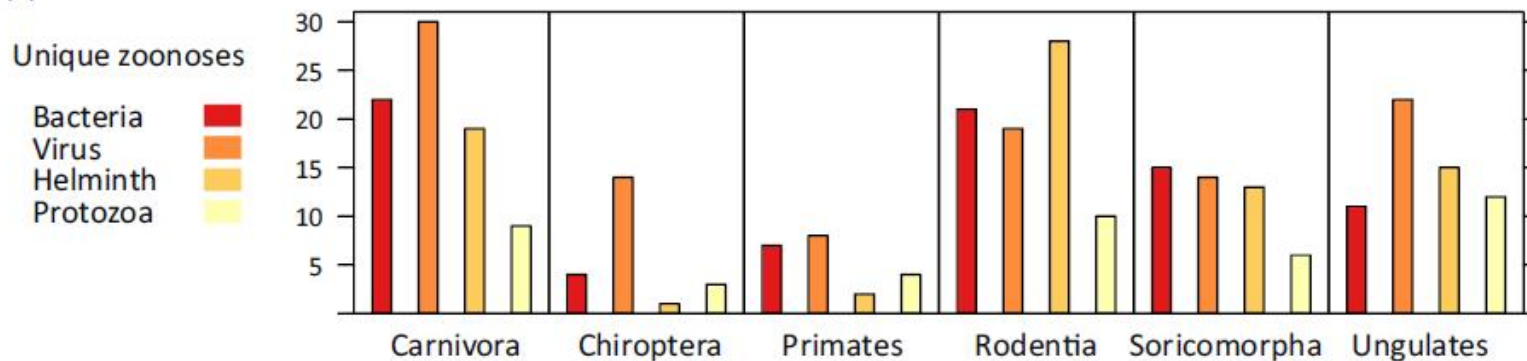
Review

Global Patterns of Zoonotic Disease in Mammals

Barbara A. Han,^{1,*} Andrew M. Kramer,² and John M. Drake^{2,3}



(B)



Trends in Parasitology

Figure 5. Zoonoses Caused by the Four Major Pathogen Types Are Globally Distributed, with Notable Hotspots for Bacteria and Helminths in North America and Eurasia. (A) Richness patterns are depicted by pathogen type in descending order: bacteria, viruses, helminths, protozoa. (B) A histogram showing the number of unique zoonoses caused by each pathogen types in the six most species-rich mammal groups: the carnivores, bats (Chiroptera), primates, rodents, shrews and moles (Soricomorpha), and the hoofed mammals (ungulates, which combine the orders Perissodactyla and Artiodactyla and exclude domesticated species).

ENDEMIC ZOOONOSES

WHO recognises
more than **200**
zoonoses

A large number are
neglected or not on the
list of those neglected



FOODBORNE INFECTIONS ARE OLD BUT STILL H

D BUT

CALGARY News

E. coli outbreak spotlights daycare food safety, experts say

COLLECTION REVIEW

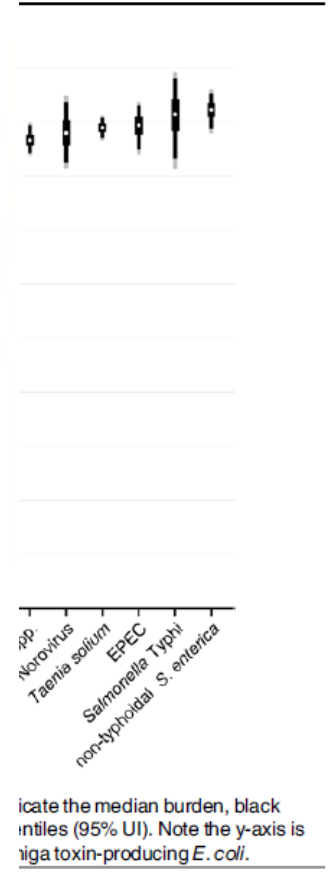
World Health Organization and Regional Comparison of Foodborne Disease in :

Arie H. Havelaar^{1,2,3*}, Martyn D. Kirk⁴, Paul F. Robin J. Lake⁹, Nicolas Praet⁹, David C. Belli Neyla Gargouri¹², Niko Speybroeck¹³, Amy C. Frederick J. Angulo¹⁶, Brecht Devleeschauw Organization Foodborne Disease Burden Ep

“The burden of FBD (3 similar order of magnitude) “big three” infectious diseases: malaria and tuberculosis



A microbiologist points out an isolated E. coli growth on an agar plate from a patient specimen at the Washington State Dept. of Health Tuesday, Nov. 3, 2015, in Shoreline, Wash. (AP Photo/Elaine Thompson)



indicate the median burden, black vertical lines (95% UI). Note the y-axis is log10 CFU/g of toxigenic E. coli.

ANIMAL INFECTIONS AND DISEASES ARE ALSO PART OF THE ONE HEALTH APPROACH



Journal of Agromedicine



ISSN: 1059-924X (Print) 1545-0813 (Online) Journal homepage: <https://www.tandfonline.com/loi/wagr20>

Recent Animal Disease Outbreaks and Their Impact on Human Populations

Jeffrey B. Bender DVM, MS , Will Hueston DVM, PhD & Mike Osterholm PhD, MPH, DVM, MS, DACVPM

To cite this article: Jeffrey B. Bender DVM, MS , Will Hueston DVM, PhD & Mike Osterholm PhD, MPH, DVM, MS, DACVPM (2006) Recent Animal Disease Outbreaks and Their Impact on Human Populations, Journal of Agromedicine, 11:1, 5-15, DOI: [10.1300/J096v11n01_02](https://doi.org/10.1300/J096v11n01_02)

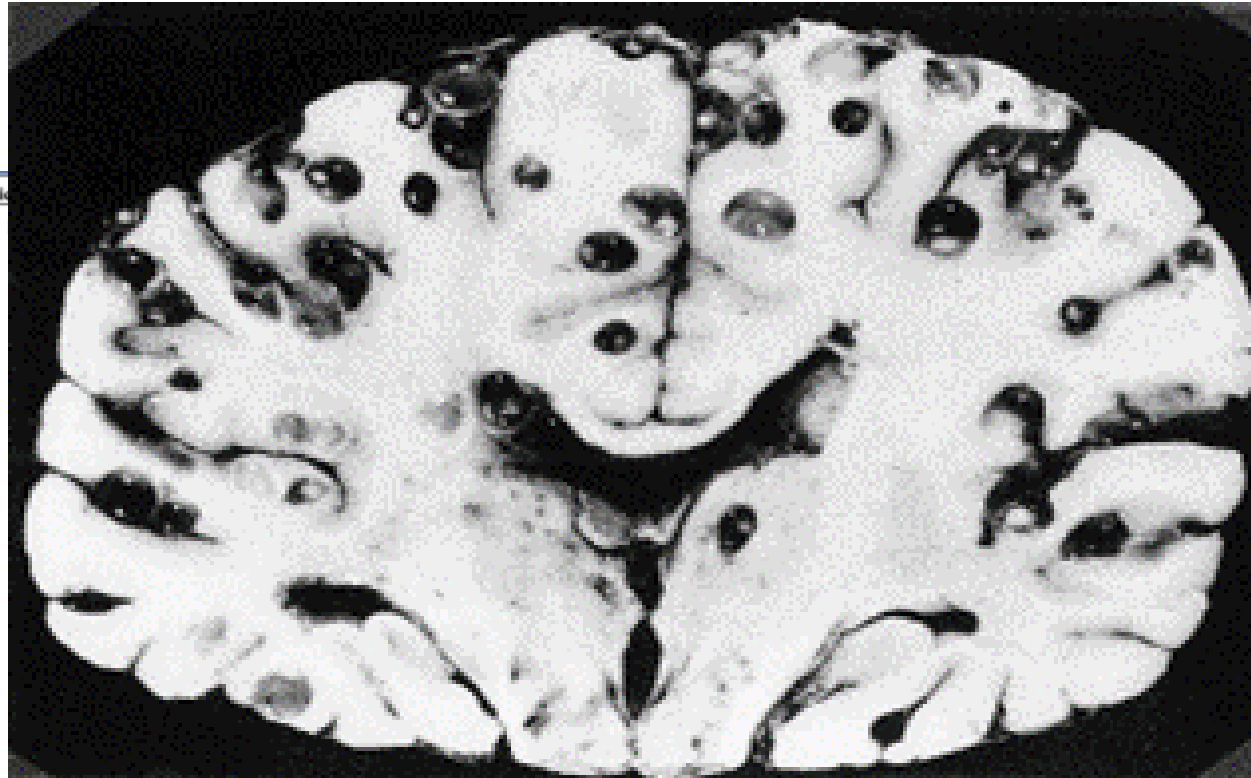
To link to this article: https://doi.org/10.1300/J096v11n01_02

FIGURE 2. Culling sheep during the foot-and-mouth outbreak in France, 2001.



“In 1994, canine distemper jumped the “species-barrier” infecting African lions of the Serengeti. The resulting infection killed more than one-third of the Serengeti lions within six months.” (Nature. 1996 Feb 1;379(6564):441-5)

ZOONOSES CAUSE SEVERAL "NON COMMUNICABLE DISEASES"



Study name	Outcome	Statistic
		Odds ratio
Daryani et al., 2010	Toxoplasmosis	1.594
Alpour et al., 2011	Toxoplasmosis	3.561
Alvarado-Esquivel et al., 2014	Toxocariasis	0.660
Cetinkaya et al., 2007	Toxoplasmosis	3.941
Emelin et al., 2012	Toxocariasis	1.163
Kaplan et al., 2008	Toxocariasis	41.604
Khademvatan et al., 2014	Toxoplasmosis	1.429
Kheirandish et al., 2016*	Toxoplasmosis	2.199
Kheirandish et al., 2016**	Toxoplasmosis	2.814
Omar et al., 2015	Toxoplasmosis	4.776
Tamer et al., 2008	Toxoplasmosis	4.267
Alvarado-Esquivel et al., 2011	Toxoplasmosis	4.440
Esshili et al., 2016	Toxoplasmosis	2.540
Hamidnejat et al., 2010	Toxoplasmosis	2.990
Juanah et al., 2013	Toxoplasmosis	2.010
Karabulut et al., 2015	Toxoplasmosis	1.008
Khademvatan et al., 2013	Toxoplasmosis	0.780
		2.329

proportion	95%-CI
0.28	[0.19; 0.37]
0.24	[0.21; 0.26]
0.14	[0.11; 0.17]
0.54	[0.33; 0.73]
0.26	[0.09; 0.51]
0.37	[0.27; 0.47]
0.38	[0.23; 0.55]
0.35	[0.25; 0.45]
0.18	[0.09; 0.30]
0.38	[0.35; 0.41]
0.25	[0.15; 0.37]
0.37	[0.27; 0.48]
0.18	[0.13; 0.24]
0.29	[0.23; 0.35]

Fig. 3 Forest plot of the pooled odds ratio of toxoplasmosis and/or toxocariasis in people with schizophrenia and/or bipolar disorders, Heterogeneity: $Q = 62.67$, $df = 16$, $p < 0.0001$, $I^2 = 74.47$, Kheirandish et al., 2016*: Schizophrenia, Kheirandish et al., 2016**: Bipolar disorders

groups. *Indicates studies among people with epilepsy and seizures. ** Indicates studies among people with active epilepsy only. doi:10.1371/journal.pntd.0000870.g004

people with epilepsy from 12 studies reporting from cases in all age

**ONE HEALTH,
ENVIRONMENT, AND NON
COMMUNICABLE DISEASES**

ENVIRONMENT IN OH INTERVENTIONS

One Health 14 (2022) 100380



Contents lists available at [ScienceDirect](#)

One Health

journal homepage: www.elsevier.com/locate/onehlt



How are large-scale One Health initiatives targeting infectious diseases and antimicrobial resistance evaluated? A scoping review

Léa Delesalle^{a,d,e,1}, Margaux L. Sadoine^{b,d,1}, Sarah Mediouni^{a,d,e}, José Denis-Robichaud^c,
Kate Zinszer^{b,d}, Christina Zarowsky^{b,d}, Cécile Aenishaenslin^{a,d,e}, Hélène Carabin^{a,b,d,e,*}

^a Département de Pathologie et Microbiologie, Faculté de Médecine Vétérinaire de l'Université de Montréal, Canada

^b Département de Médecine Sociale et Préventive, École de Santé Publique de l'Université de Montréal, Canada

^c Independent researcher, Amqui, Canada

^d Centre de Recherche en Santé Publique (CReSP), Montréal, Canada

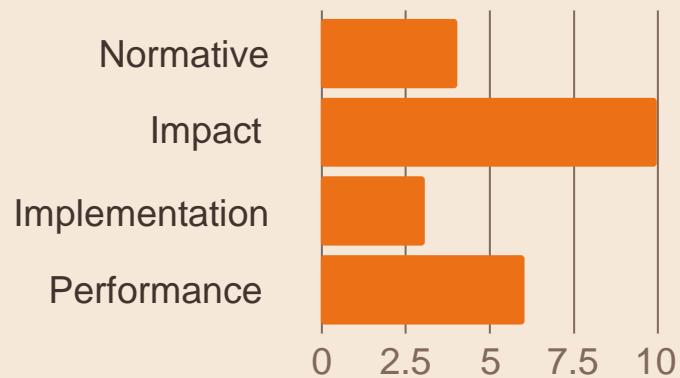
HOW ARE ONE HEALTH INITIATIVES EVALUATED?

Insights from the literature

L. Delesalle, M. L. Sadoine, S. Mediouni, J. Denis-Robichaud, K. Zinszer, C. Zarowsky, C. Aenishaenslin, H. Carabin.

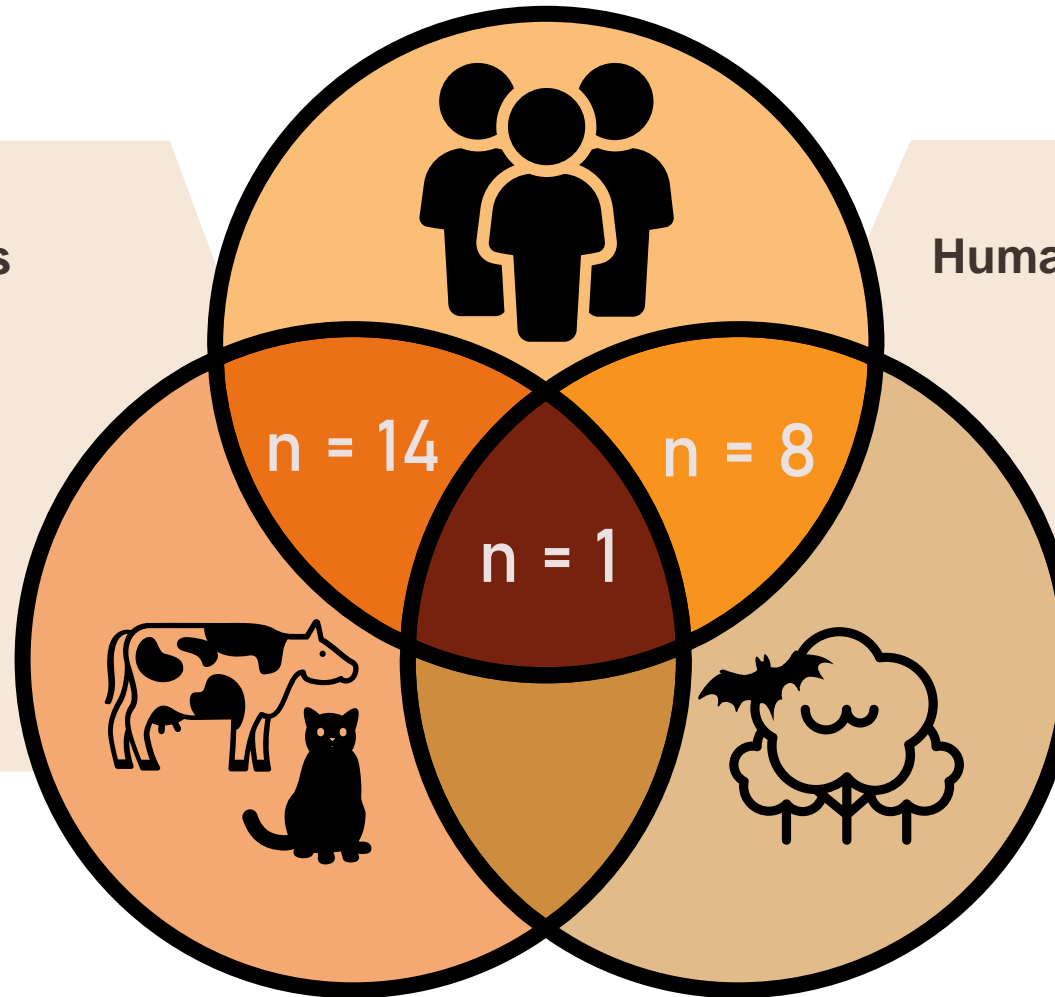
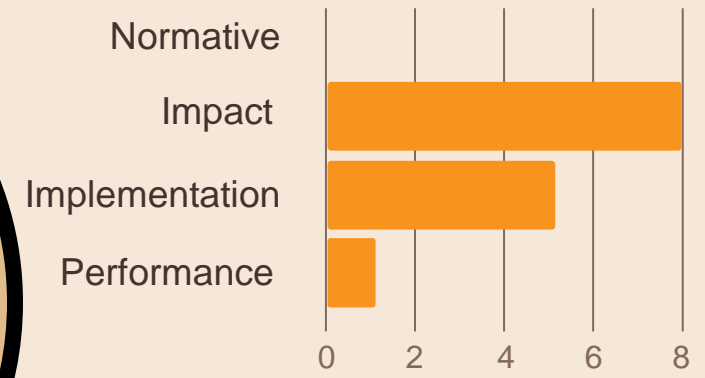
Types of evaluation

Human & animal stakeholders



Types of evaluation

Human & environment stakeholders



 Scoping review (PRISMA)

12 databases, 3 219 screened, 182 assessed for eligibility



Large scale initiatives

Infectious diseases and antimicrobial resistance

ENVIRONMENT – AN EXAMPLE WITH TOXOPLASMOSIS

Acta Tropica 231 (2022) 106432

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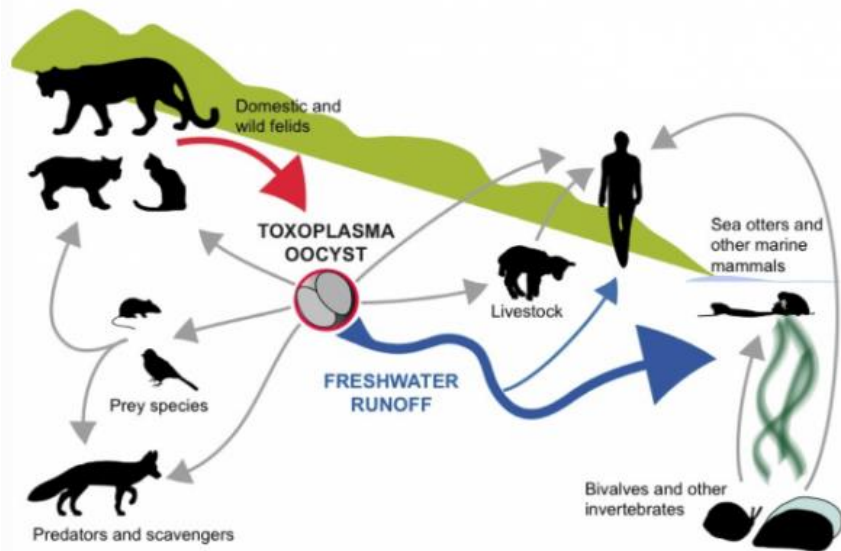
Acta Tropica

journal homepage: www.elsevier.com/locate/actatropica



Toxoplasmosis in Human and Animals Around the World. Diagnosis and Perspectives in the One Health Approach

Rosangela Aparecida Müller de Barros^{a,b,1}, Ana Claudia Torrecilhas^{c,2},
 Maria Aparecida Moraes Marciano^{d,3}, Monica Leszkowicz Mazuz^{f,4},
 Vera Lucia Pereira-Chioccola^{e,5,**}, Blima Fux^{a,b,6,*}



The life cycle of the parasite, *Toxoplasma gondii*, how it contaminates coastal waters and infects wild sea otters. (Credit: Karen C Drayer Wildlife Center, University of California, Davis) [-] KAREN C DRAYER WILDLIFE CENTER, UCDAVIS

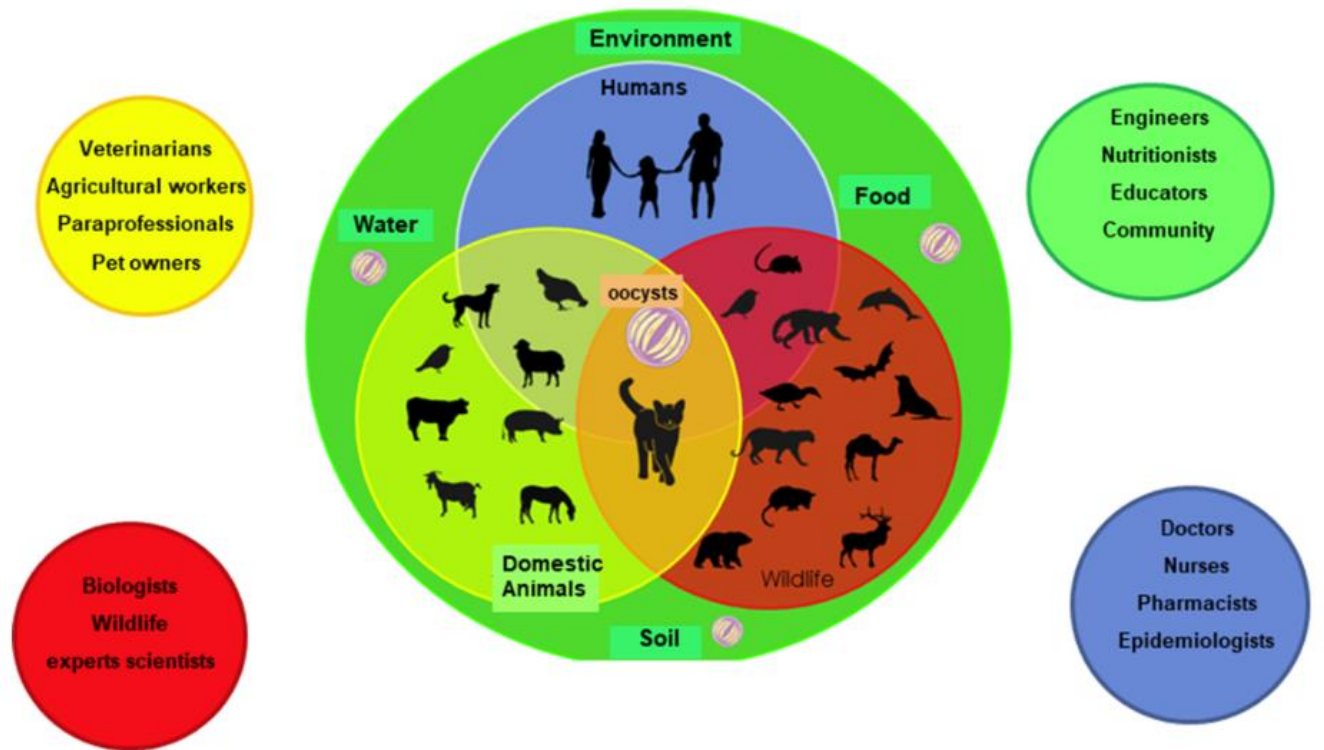


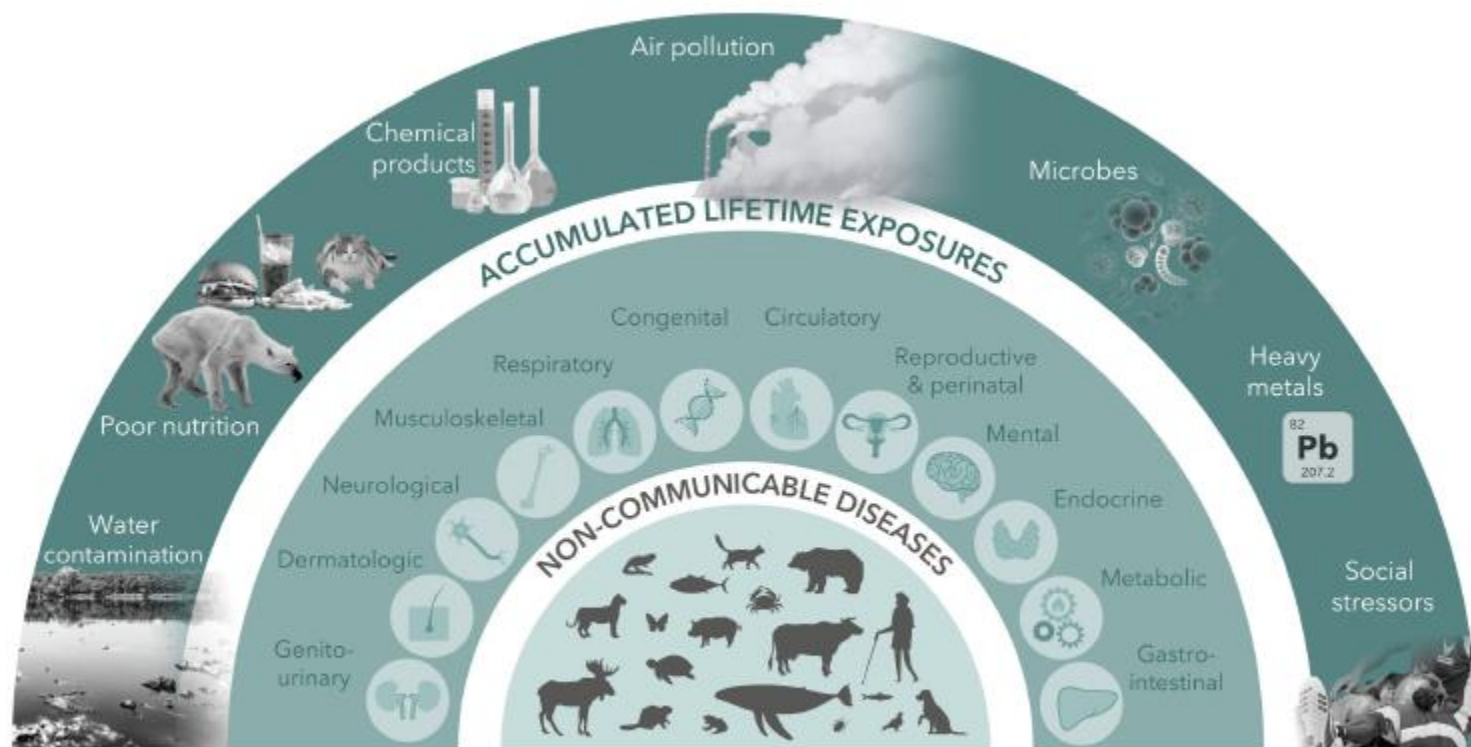
Fig. 1. One Health an interdisciplinary approach for toxoplasmosis control. *T. gondii* lives in ecosystems, as water, soil and food. Due to its successful ability to spread throughout the ecosystem and on many hosts, *T. gondii* has become one of the most successful parasites on the planet. Successful public health interventions require the cooperation of partners working with human and animal health, as well as, the environmental actions. The One Health concept proposes collaborative multi-sectorial and interdisciplinary approaches with the goal of achieving optimal health outcomes. Efforts to better understand toxoplasmosis and its real epidemiology are crucial for controlling of this infection. The collaboration between professionals from different areas, such human health professionals (physicians, nurses, biologists, epidemiologists and others), animal health (veterinarians, pet owners, paraprofessionals, agricultural workers), environment (biologists, ecologists, educators, wildlife specialists), and other areas of expertise need to communicate, collaborate and coordinate activities to better understand the ecological interactions and impacts of this zoonotic disease. Other relevant actors include policy makers, farmers and different communities.



FUTURE OF OH INCLUDES TACKLING NCDs— ENVIRONMENT AND AHW ARE KEY

Beyond Zoonoses in One Health: Non-communicable Diseases Across the Animal Kingdom

B. Natterson-Horowitz^{1,2*}, Marion Desmarchelier^{3†}, Andrea Sylvia Winkler^{4,5†} and
Hélène Carabin^{6,7,8,9†}



Aida Minguez-Menendez

FIGURE 1 | Shared environmental exposures contribute to NCDs across species.

**USING ONE HEALTH FOR
PREVENTION (AND NOT
REACTION)**

CASE STUDY (SWINE) INFLUENZA H1N2V

ONE HEALTH HIGH-LEVEL EXPERT PANEL

PREVENTION OF ZOOONOTIC SPILLOVER

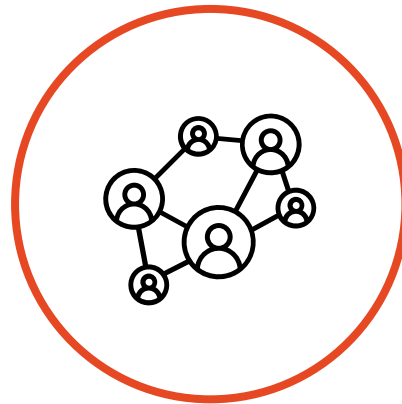
FROM RELYING ON
RESPONSE TO REDUCING
THE RISK AT SOURCE

OHHLEP whitepaper/Opinion piece

“It is often claimed that allocating resources to prevent something from happening is politically difficult as the value of prevention is largely “invisible” (prevention paradox), or it will take a long time to show effects. “

CASE STUDY (SWINE) INFLUENZA H1N2V - OBJECTIVES

Describe OH communication channels & flow among stakeholders involved in human and swine influenza surveillance and response in Alberta



Identify elements supporting OH communication, especially related to information sharing between animal and PH professionals

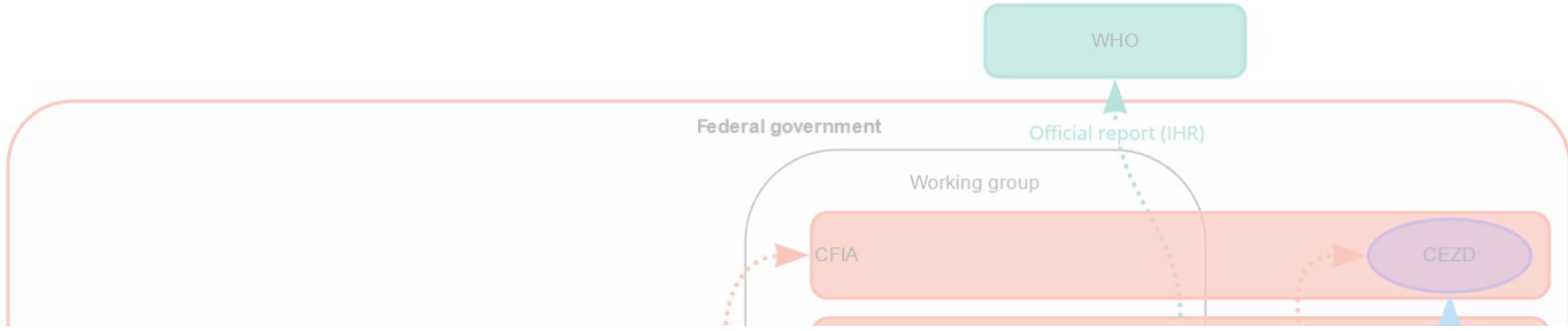
J Denis-Robichaud, S Hindmarch, C Zarowsky, E Rees, JC Mutabazi, N Nson Nswal, M D'Astous, A Osborn, H Carabin

METHODS

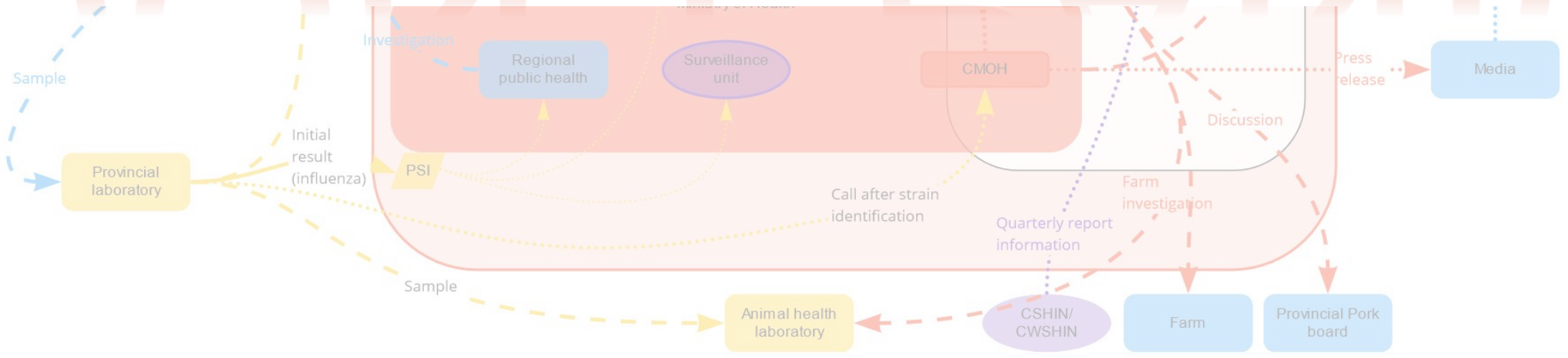
- One human case of swine influenza (Oct 2020, Alberta)
 - Document review (e.g CAHSS, CWSHIN)
 - 15 semi structured interviews (Oct-Dec 2021)
 - Participants: snowballing and chain recruitment
 - Descriptive and thematic analyses

Human case of swine influenza in Oct 2020

Alberta, Canada



DON'T PANIC



Mid-October 2020: Human patient with respiratory symptoms (surveillance) → October 29, 2020: Unusual influenza strain, initial calls → October 29, 2020 evening: Working group creation → From October 30, 2020: Investigation → November 4, 2020: Press release

Government stakeholders

- Lead by human / public health
- Collaboration with animal health



Industry and animal health stakeholders

Mid-October 2020: Human patient with respiratory symptoms (surveillance)

October 29, 2020
Unusual *influenza* strain, initial calls

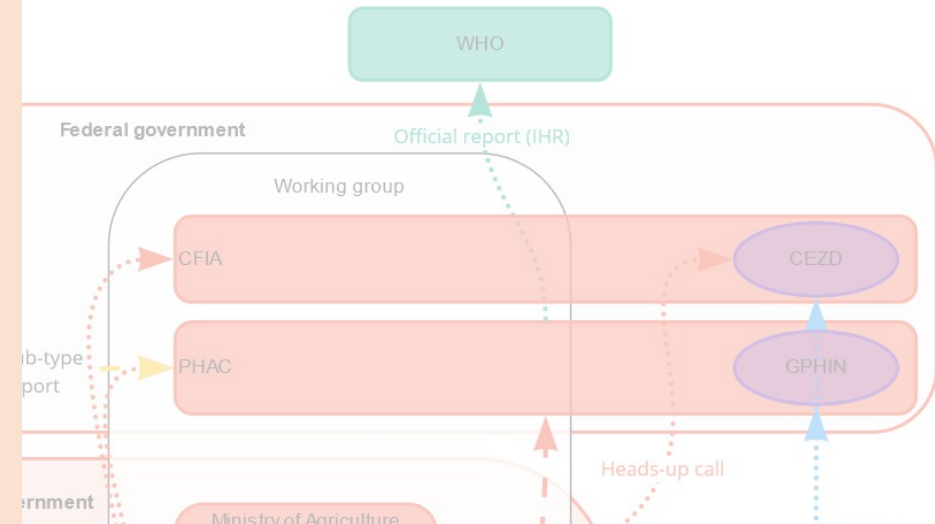
October 29, 2020 evening
Working group creation

From October 30, 2020:
Investigation

November 4, 2020:
Press release

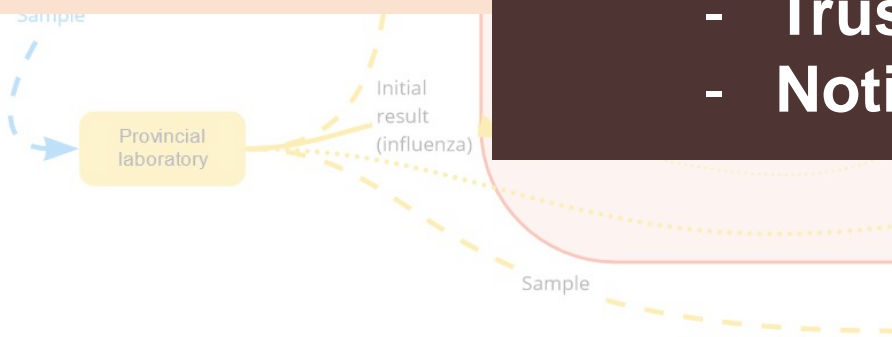
Government stakeholders

- Lead by human / public health
- Collaboration with animal health



Facilitators:

- Data availability
- Pre-existing relationship
- Shared position (public health veterinarian)
- Trust
- Notifiable disease



Industry and animal health stakeholders

WHO

Information sharing should be reciprocal within and between organizations/agencies involved in human, animal, and environmental health surveillance

*“Your perspective here is spread or transmission from swine to humans, but I think what happens more frequently actually is spread from humans to swine. I don't see that we could get anywhere closer before **we also start to think about the danger that people actually have to the health of swine** [...] all the time you have transmission the other way [from human to pigs], and that's sort of ignored”*

Sample

Animal health laboratory

CSHIN/
CWSHIN

Farm

Provincial Pork board

Mid-October 2020: Human patient with respiratory symptoms (surveillance)

October 29, 2020
Unusual influenza strain, initial calls

October 29, 2020 evening
Working group creation

From October 30, 2020:
Investigation

November 4, 2020:
Press release

Trust and reciprocal data access is key

“I feel like it's a little bit of a one-way street. So PHAC wants access to what's happening in agriculture, but they don't have the information or the willingness to be able to share that information back with agriculture. [...] So that's also a problem when you build [an animal health network], you build it based on trust. And with trust comes: I share, you share.” (I22)

“....I think there should be interaction between different agencies....”

RECOMMENDATIONS LINKED TO OH

*“We have a lot of zoonotic diseases that, when we're looking at animals, those are our **early predictors**. So, if I use West Nile virus as an example, you see it in the mosquito pools, you see it in horses, before you start seeing it in the human populations.”*



Take home message

- Rapid, open communication is essential
 - This requires trust
- Requires formal and information relations, communication channels
 - Takes time to develop and needs to be ongoing

BUT – IT NEEDS TO BE “FAIR”

Key supporting elements	Key operational elements
1. Political will & high-level commitment	A. Joint cross-sectoral coordination mechanisms
2. Trust	B. Routine communications
3. Shared objectives and priorities	C. Joint simulation exercises
4. Shared benefits	D. Data sharing
5. Strong governance structures	E. Joint risk assessment
6. Adequate and equitable resources	F. Active cooperation on disease control programmes
7. Identification and involvement of all relevant partners	
8. Coordinated planning of activities	
9. Guidance on implementation and cross-sectoral coll.	
10. Capacity development	
11. Strong and effective health systems within the ind. sectors	

THE TRUST EQUATION BY CHARLES GREEN

The diagram illustrates the Trust Equation: **T** (Trustworthiness) = $\frac{\text{Credibility} + \text{Reliability} + \text{Intimacy}}{\text{Self-Orientation (S)}}$. The variables are color-coded: C (Credibility) in brown, R (Reliability) in green, I (Intimacy) in orange, and S (Self-Orientation) in grey.

<https://trustedadvisor.com/articles/the-trust-equation-a-primer/>

From Katinka de Balogh (retired, FAO)

BEYOND INFECTIONS: COVID-19, MENTAL HEALTH, COMPANION ANIMALS, PHYSICAL ACTIVITY, AND AHW





International Journal of
*Environmental Research
and Public Health*



Article

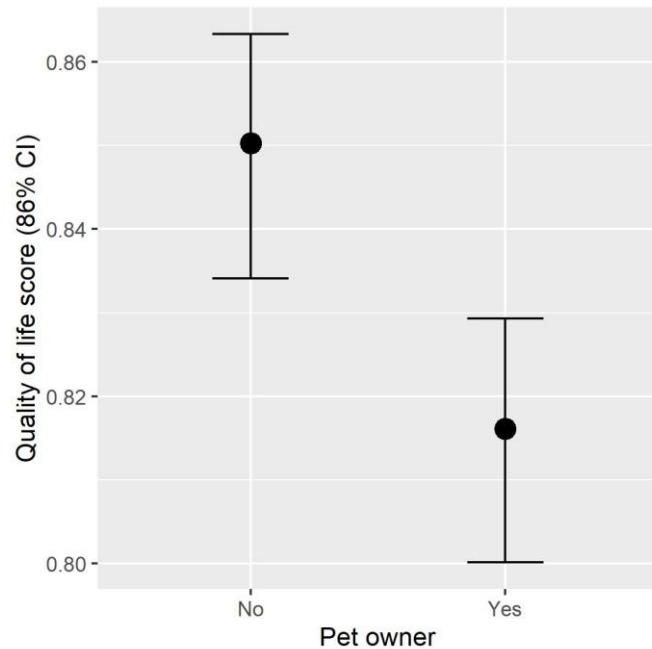
Association between Pet Ownership and Mental Health and Well-Being of Canadians Assessed in a Cross-Sectional Study during the COVID-19 Pandemic

José Denis-Robichaud ¹ , Cécile Aenishaenslin ^{2,3,4}, Lucie Richard ^{3,5}, Marion Desmarchelier ⁶
and Hélène Carabin ^{2,3,4,7,*} 

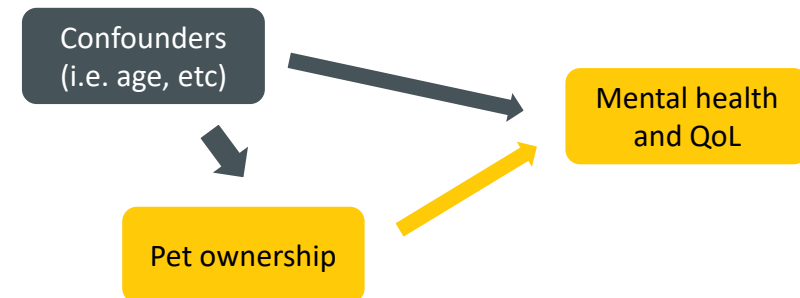
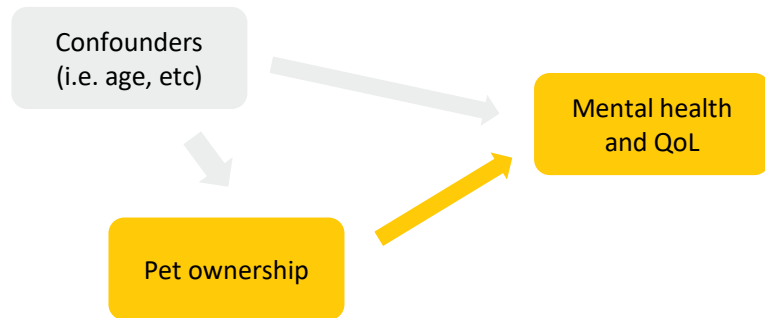
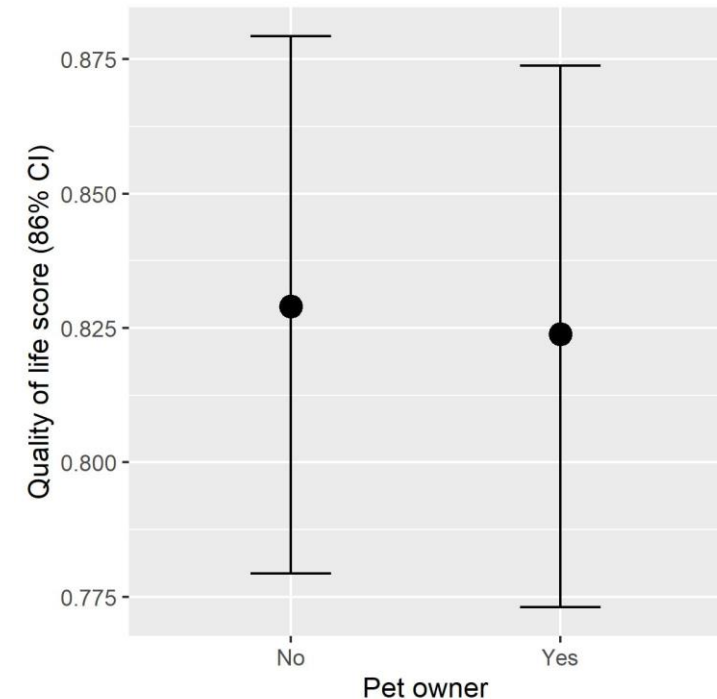
- Survey of 1500 Canadians in Apr-May 2021
- 750 pet owners and 750 non owners
- 80 questions: SES, health, QoL, stress and anxiety, loneliness, social support
- Further questions to pet owners

BEYOND INFECTIONS: COVID-19, MENTAL HEALTH, COMPANION ANIMALS, PHYSICAL ACTIVITY, AND AHW

Crude association



Adjusted association



BEYOND INFECTIONS: COVID-19, MENTAL HEALTH, COMPANION ANIMALS, PHYSICAL ACTIVITY, AND AHW

OPEN Pet ownership and psychological well-being during the COVID-19 pandemic

Catherine E. Amiot¹, Christophe Gagné¹ & Brock Bastian²

Scientific Reports | (2022) 12:6091

“Pet owners reported lower well-being than non-pet owners on a majority of well-being indicators; Compared to owners of other pets, dog owners reported higher well-being.

When examining the effect of pet ownership within different socioeconomic strata, being a pet owner was associated with lower well-being among: women; people who have 2+ children living at home; people who are unemployed”

Links between pet ownership and exercise on the mental health of veterinary professionals

Elliot T. Smith | Ana Maria Barcelos  | Daniel S. Mills 

Vet Rec Open. 2023;10:e62.

- 1088 participants (convenience sampling), >86% pet owners
- Pet owners were more depressed,
 - dog owners less anxious and less suicidal ideations than other owners
 - Cat owners more depressed and with suicidal ideation than other owners
 - Horse owners better scores than other owners
- **These analyses were not adjusted for confounding**
- Exercising (running, walking, sitting less) was associated with less depression.

BEYOND INFECTIONS: COVID-19, MENTAL HEALTH, COMPANION ANIMALS, PHYSICAL ACTIVITY, AND AHW

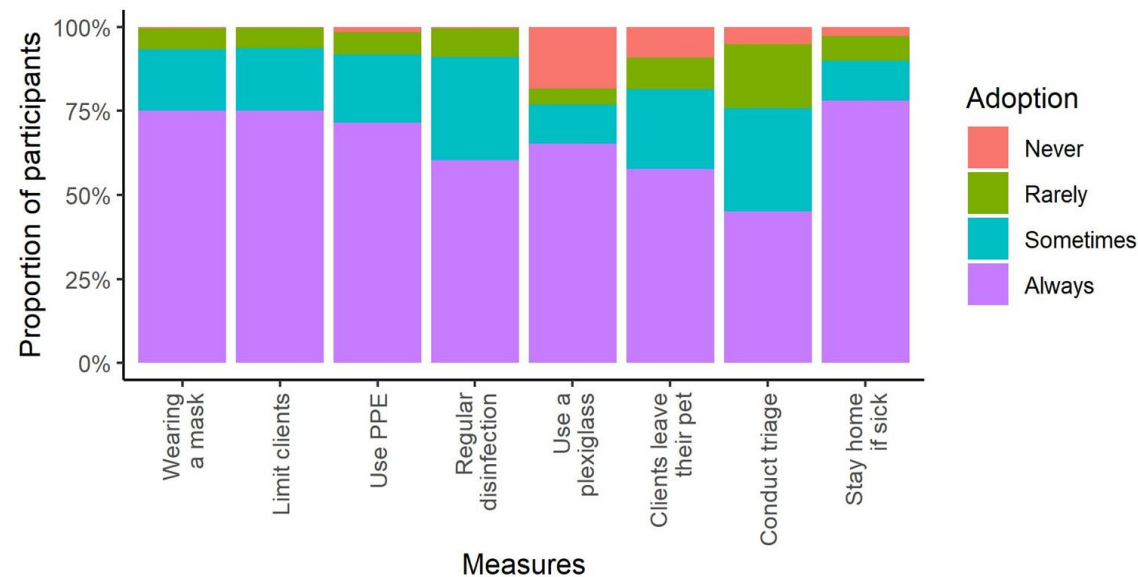
Professional characteristics, attitudes, and practices associated with stress and quality of life among Canadian animal health workers

CVJ 2023; 64(9)

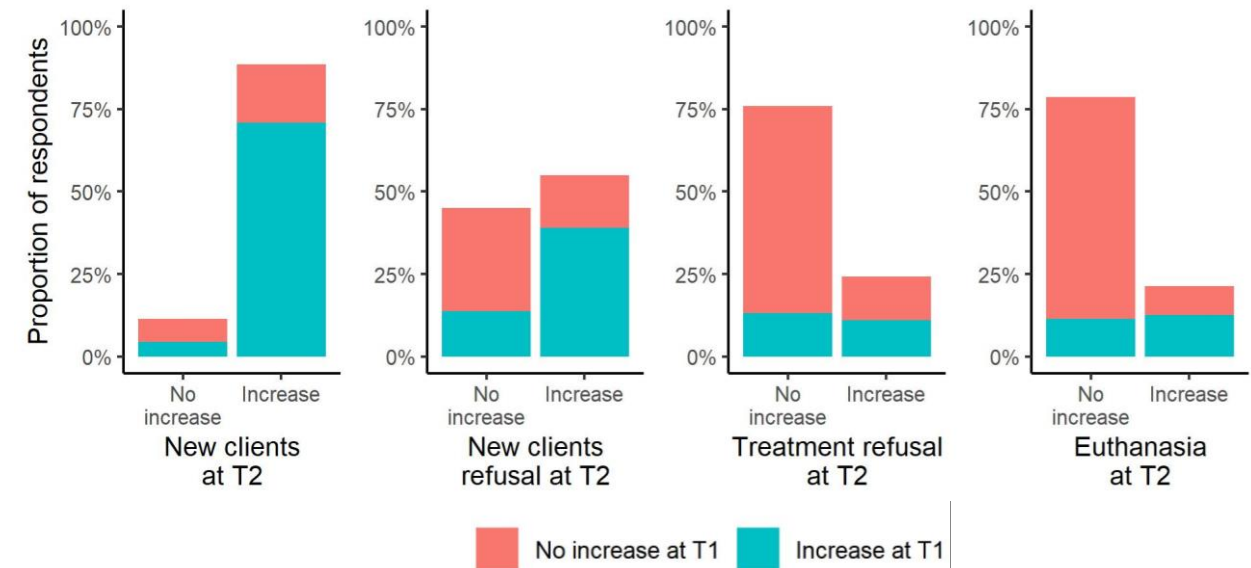
José Denis-Robichaud, Nikky Millar, Valérie Hongoh, Hélène Carabin, Lucie Richard, Cécile Aenishaenslin (page 854)

- 436 Canadian companion animal AHW
- Aug-Dec 2020 (T1) & May-Jul 2021 (T2)
- Professional characteristics, COVID-19 KAP, perceived stress, QoL

- About 1/3 vets, 2/3 AHT
- Perceived increases in new clients (~75%), refused new clients (~52%), refused treatment (~25%) & in euthanasia (~24%)



Distribution of frequency of adoption of measures against COVID-19 at work by Canadian animal health workers (n = 317 to 413) during the COVID-19 pandemic (August to December 2020).



Proportion of Canadian animal health workers (n = 189) who perceived an increase in clients, clients refusal, treatment refusal, and euthanasia in their practice at T2 (May and July 2021), with the perception they had at T1 (August to December 2020).

BEYOND INFECTIONS: COVID-19, MENTAL HEALTH, COMPANION ANIMALS, PHYSICAL ACTIVITY, AND AHW

Table 3. Estimates and 95% confidence intervals (CI) from linear regression models for variables associated^a with perceived stress of animal health workers in Canada during the COVID-19 pandemic (August to December 2020).

Variables	Crude estimate (95% CI)	Adjusted estimate (95% CI)	Confounders included in models
Adoption of measures against COVID-19 index	-3.35 (-4.74; -1.96)	-2.81 (-4.18; -1.44)	Age
Increased new client refusal	1.90 (0.69; 3.12)	1.56 (0.36; 2.76)	Occupation and increase in new clients
Increased euthanasia	2.27 (0.84; 3.69)	1.44 (0.04; 2.83)	Age, occupation, and increase in new clients

^a Only adjusted associations with $P < 0.05$ are presented (all models are available in Appendix III, available online from: www.canadianveterinarians.net).

- Adoption of measures against COVID-19 was associated with less “high burnout” and “low compassion index” on the professional QoL scale.
- Perceived increase in euthanasia and new clients were associated with more “high burnout” and “high secondary traumatic stress”, respectively

**ONE HEALTH IN ANIMAL
HEALTH PRACTICE: WHAT
WILL BE YOUR ROLE?**



QUESTIONS
