

Implementing One Health approaches

David T S Hayman

d.t.s.hayman@massey.ac.nz



Thanks

- Bryce Carmine & Anne Carmine (Percival)
- Co-authors (citations throughout)
- One Health Aotearoa and the symposium organisers



OHHLEP

One Health High Level
Expert Panel

AUGUST 2021



Food and Agriculture
Organization of the
United Nations



World Health
Organization

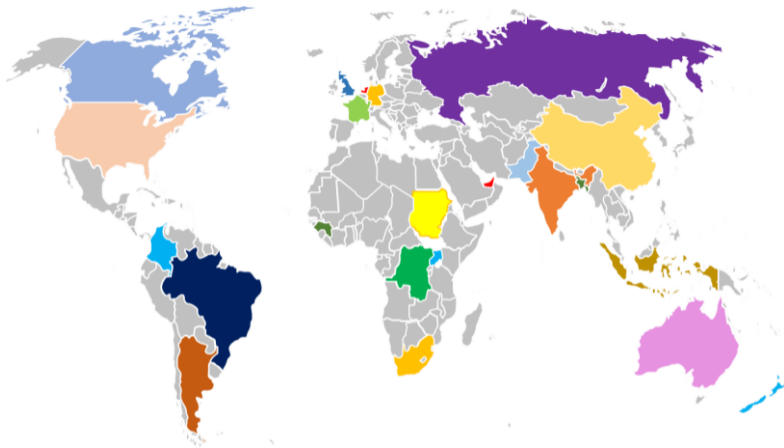


Figure: National composition on OHHLEP members (2021)

Definition

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

Key underlying principles including

1: equity between sectors and disciplines;

2: sociopolitical and multicultural parity ... and inclusion and engagement of communities and marginalized voices;

3: socioecological equilibrium that seeks a harmonious balance between human–animal–environment interaction

.... acknowledging the importance of biodiversity, access to sufficient natural space and resources, and the intrinsic value of all living things within the ecosystem;

Key underlying principles including

4: stewardship and the responsibility of humans to change behavior and adopt sustainable solutions that recognize the importance of animal welfare and the integrity of the whole ecosystem,

....thus securing the well-being of current and future generations; and

5: transdisciplinarity and multisectoral collaboration, which includes all relevant disciplines, both modern and traditional forms of knowledge and a broad representative array of perspectives.

Partnerships for the goals (SDG 17)

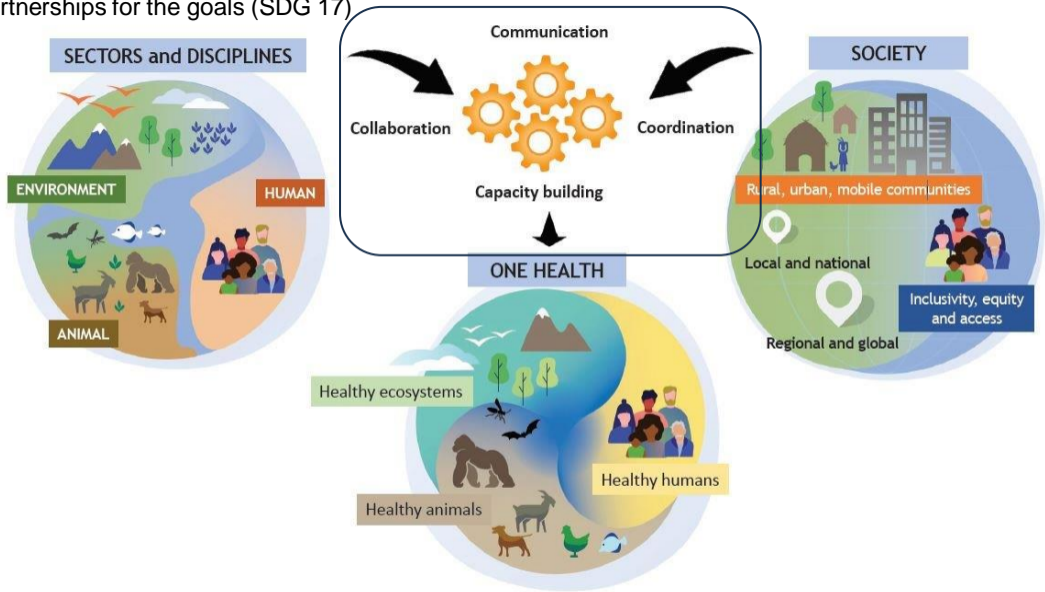
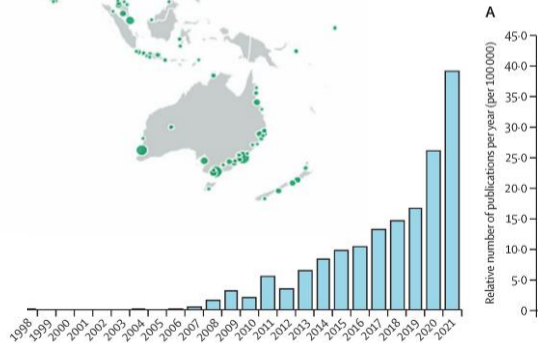


Figure: One Health - definition
OHHLEP, *PLoS Pathogens* (2022)

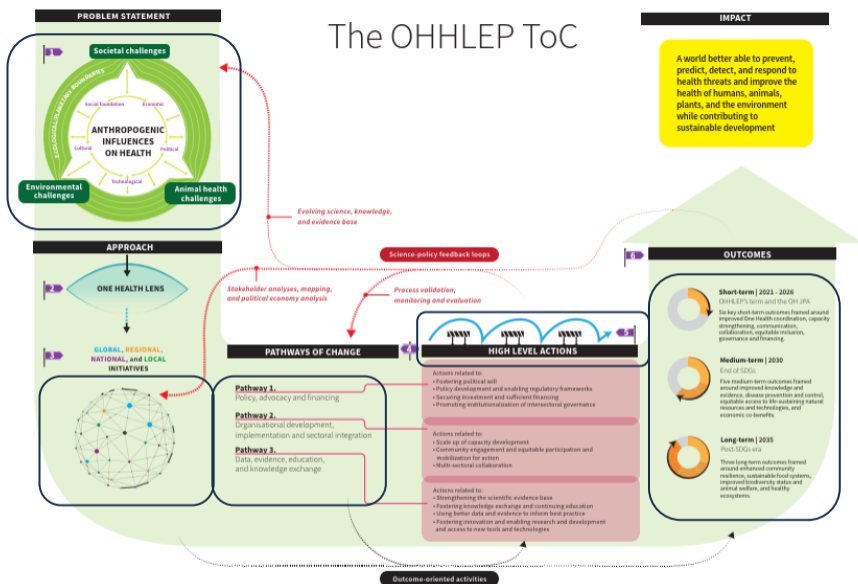
One Health publications



Figure: de Castañeda et al, *The Lancet Planetary Health* (2023)



The OHHLEP ToC



OHHLEP, *The Lancet* (2023)

Underlying principles

- Equity between sectors and disciplines
- Sociocological equilibrium
- Sociopolitical Parity
- Stewardship and responsibility
- Transdisciplinarity

Barriers

Factors inhibiting collaboration, communication, coordination, and capacity building across sectors and society in progressing towards the desired outcomes

Assumptions/enablers

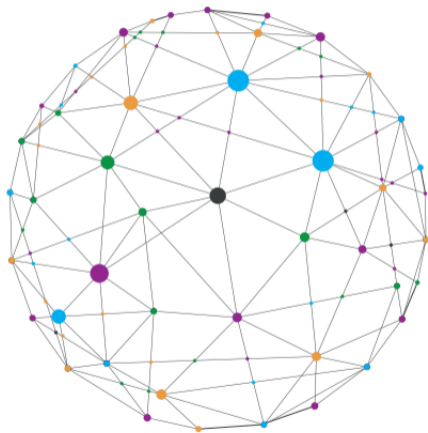
Internal and external factors necessary to enable achievement of the target outcomes

Signposts

Corresponding explanatory points accompany this Theory of Change



GLOBAL, REGIONAL, NATIONAL, and LOCAL INITIATIVES



Pathway 1: Policy, legislation, advocacy and financing –

- political science, law
- economics and finance
- social and behavioural sciences, anthropology, ethics and gender studies

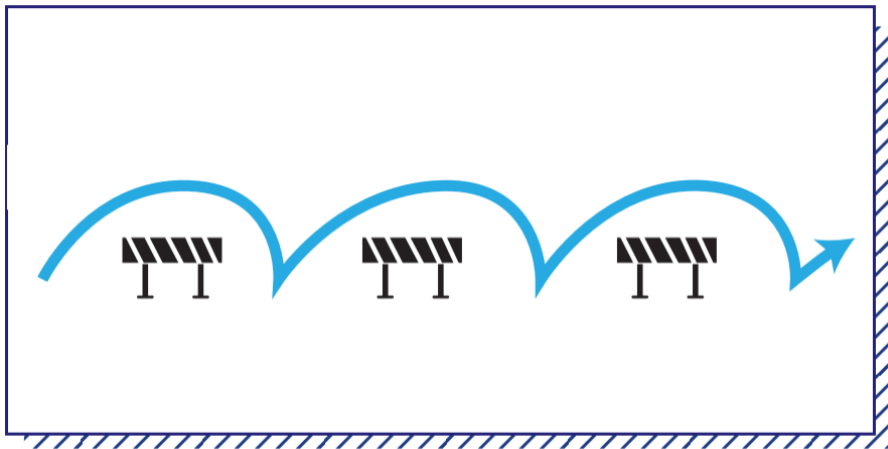
Pathway 2: Organizational development, implementation and sectoral integration –

- health systems policy and practice, pandemic prevention and preparedness
- environmental, forestry, biodiversity, agriculture, and ecosystem sciences
- food systems and their interlinkages with health

Pathway 3: Data, evidence and knowledge –

- emerging infectious diseases and zoonoses
- viral diversity, surveillance and risk assessment for emerging pandemic threats
- infectious disease epidemiology, informatics, modelling, prediction and foresight relevant to assessing impacts of environmental and other changes in emerging diseases and health

Barriers and assumptions



Assumptions

- Political will and financing is in place and can be mobilised at the global, national and local levels.
- Funding can be mobilised flexibly to ensure all action tracks are sufficiently funded
- The organizations and associated sectors can collaborate and harmonise their practices without territorialism, competition and silos adversely impacting on the work
- OH enhances equity and empowers stakeholders, including civil society, disadvantaged groups and indigenous communities
- Learning, innovation, and adaptation are intensified by collaborative and cross sectoral work
- OH can effectively disseminate and foster a wider understanding of One Health approaches and concepts across relevant segments of society and at all levels

Barriers

- Wider socio-political context: climate crisis, emerging threats, conflict, global hunger and inequalities
- Powerful donors/stakeholders having undue influence over prioritisation and resource allocation
- Limited availability and inadequate use of legal and regulatory frameworks to support One Health practices
- Poor communication: language and cultural barriers among disciplines and sectors, and between countries
- Insufficient community inclusion
- Lack of cooperation between internal and external stakeholders, limited engagement with the environmental sector and professional segregation
- Limited standardisation around One Health curricula and competency-based frameworks to support education of the One Health workforce
- Commercial, academic, reputational and profit motives, supersede knowledge sharing, technology transfer and collaborative capacity building approaches
- Limited evidence of scalable, effective implementation of One Health initiatives



Short-term | 2021 - 2026

OHHLEP's term and the OH JPA

Six key short-term outcomes framed around improved One Health coordination, capacity strengthening, communication, collaboration, equitable inclusion, governance and financing.



Medium-term | 2030

End of SDGs

Five medium-term outcomes framed around improved knowledge and evidence, disease prevention and control, equitable access to life-sustaining natural resources and technologies, and economic co-benefits.



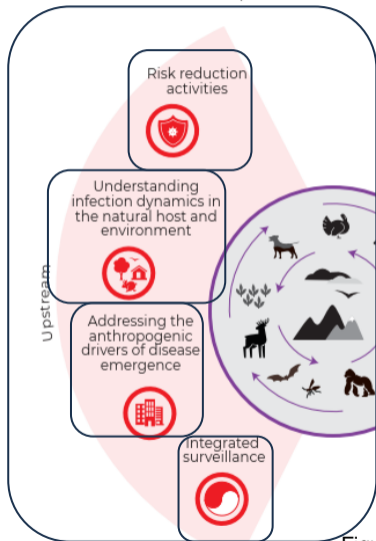
Long-term | 2035

Post-SDGs era

Three long-term outcomes framed around enhanced community resilience, sustainable food systems, improved biodiversity status and animal welfare, and healthy ecosystems.

Prevention

Actions to identify threats and reduce risk of spillover

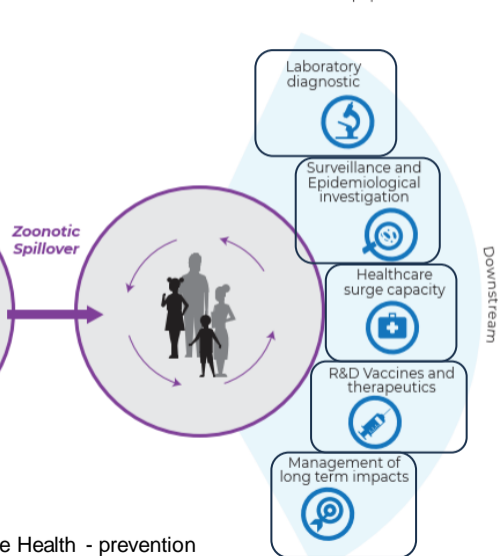


Upstream

Zoonotic Spillover

Preparedness-Response

Actions to limit spread in human population



Downstream

Figure: One Health - prevention
OHHLEP, *PLoS Pathogens* (2023)

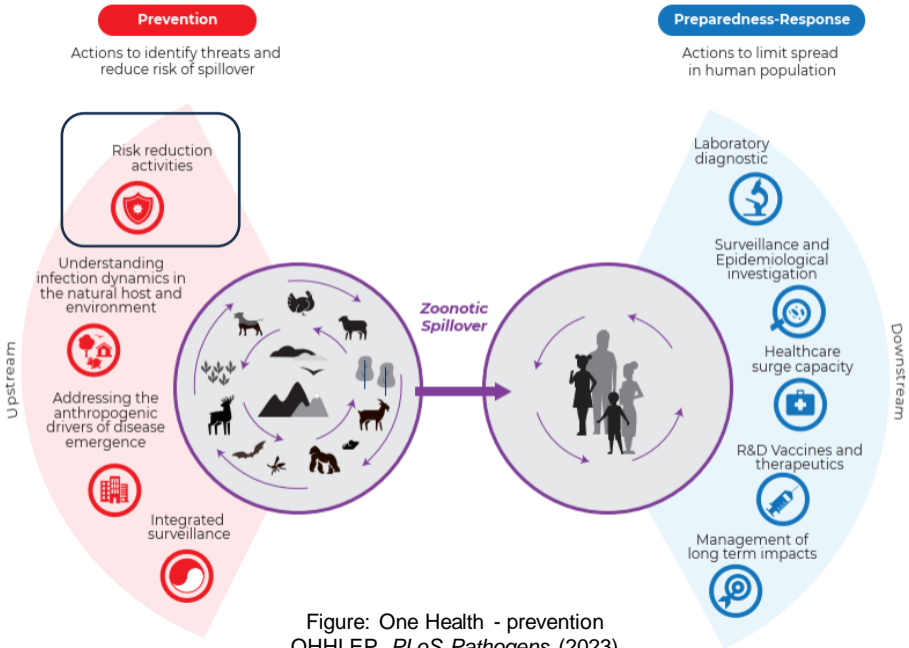


Figure: One Health - prevention
 OHHLEP, *PLoS Pathogens* (2023)



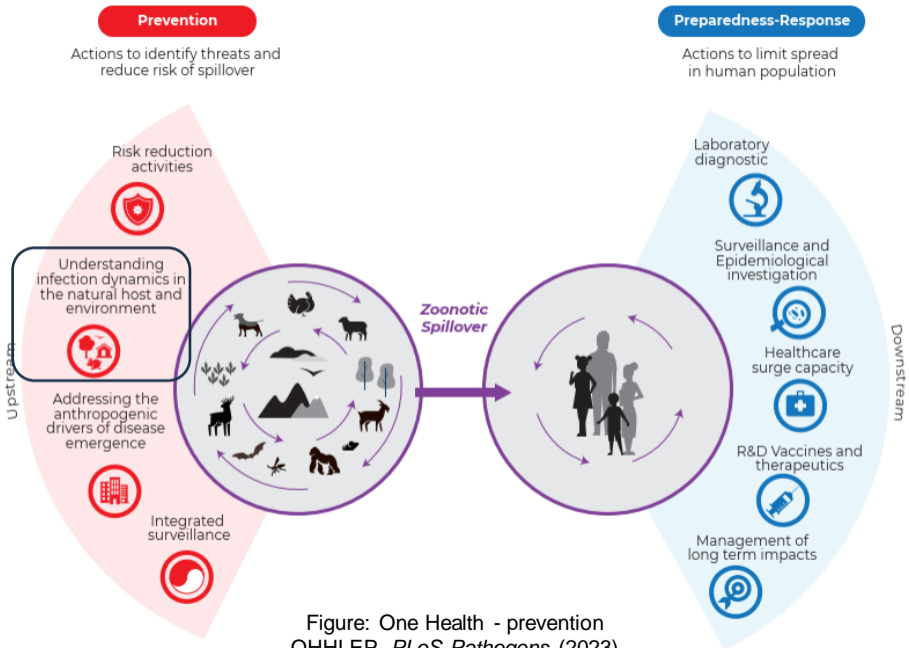
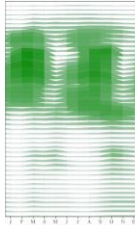
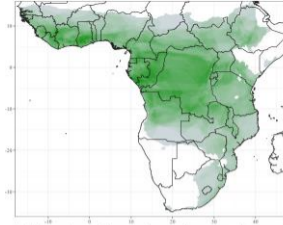
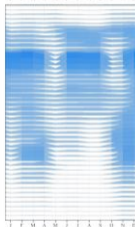
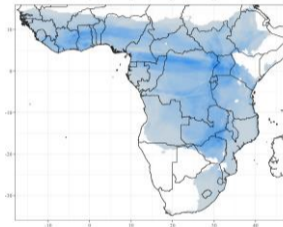


Figure: One Health - prevention
 OHHLEP, *PLoS Pathogens* (2023)

Predicted fruit bat birthing



Predicted molossid bat birthing



Predicted non-molossid bat birthing

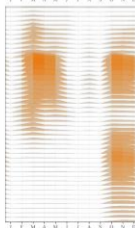
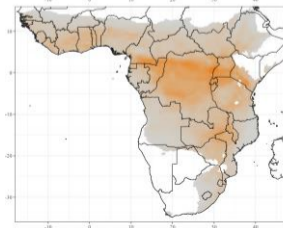


Figure: Predicted bat birthing
Hranac *et al*, *Epidemics* (2019)

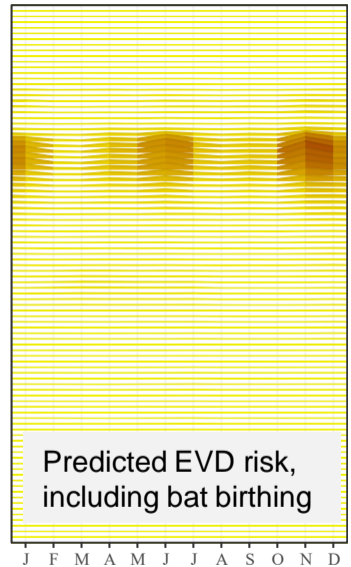
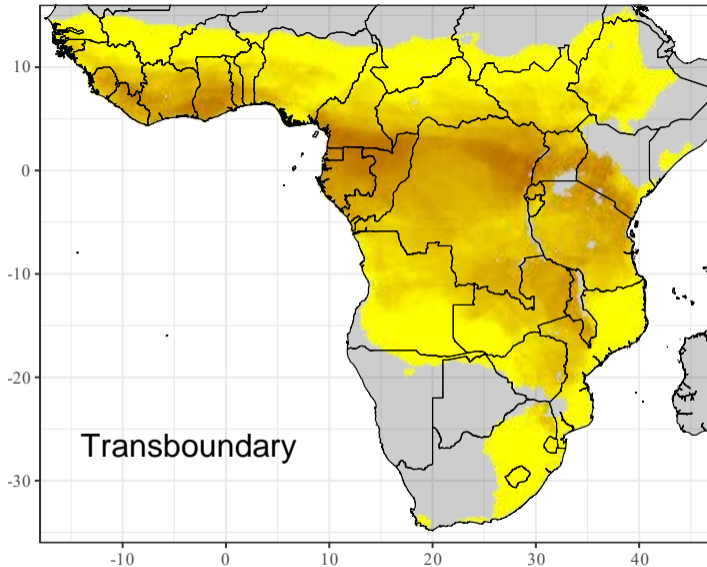
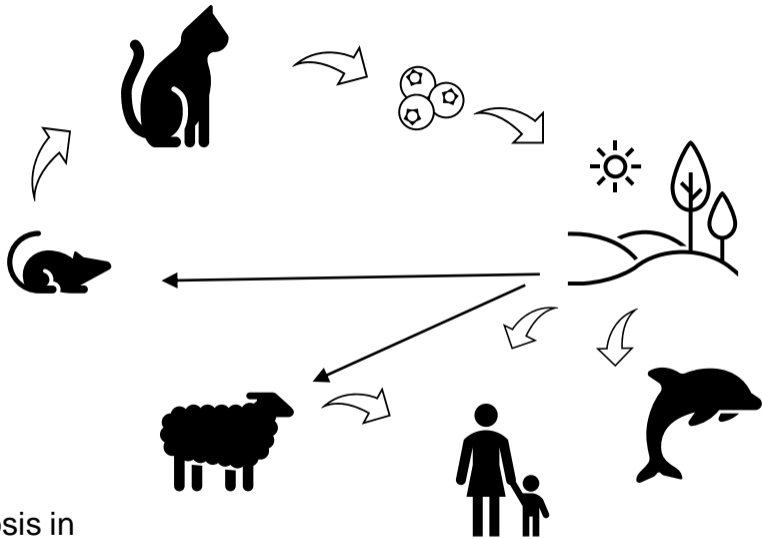


Figure: Predicted Ebola virus disease outbreak risk
 Hranac *et al*, *Epidemics* (2019)



Toxoplasmosis in
Aotearoa

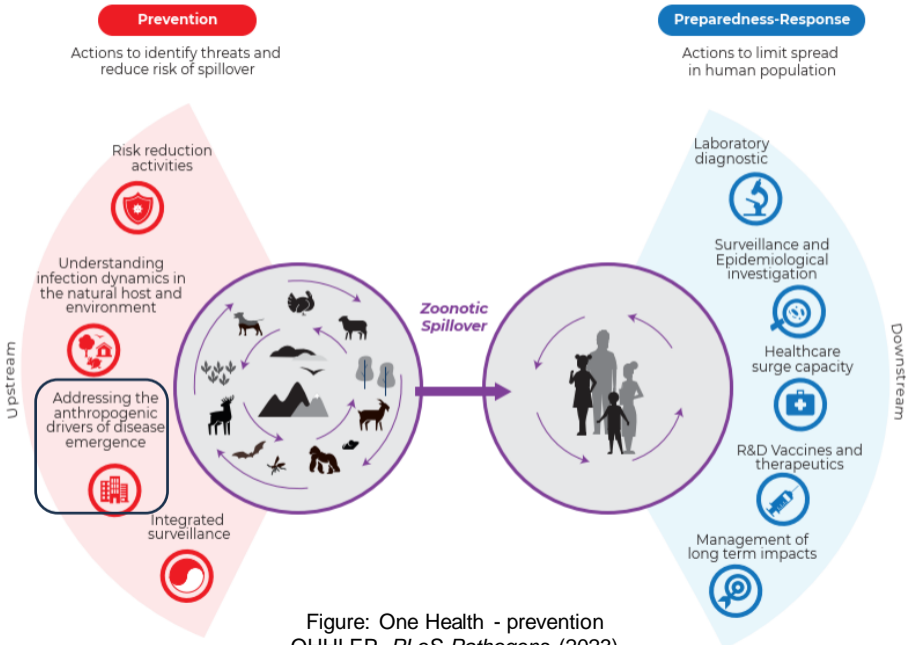
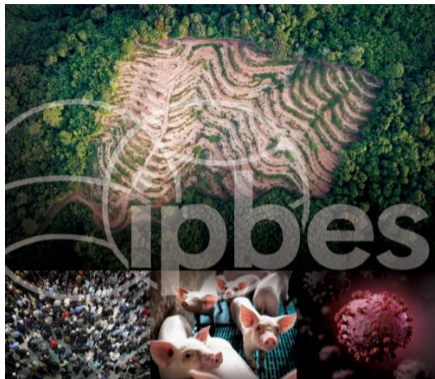


Figure: One Health - prevention
 OHHLEP, *PLoS Pathogens* (2023)



IPBES WORKSHOP ON BIODIVERSITY AND PANDEMICS

WORKSHOP REPORT

Intergovernmental Science-Policy Platform
on Biodiversity and Ecosystem Services



Drivers

“a factor which causes a particular phenomenon to happen or develop.”

Direct

Direct driver factor → Outbreak

Indirect

Indirect driver factor → Direct driver factor → Outbreak

“social determinants of health”

Direct driver



Figure: Forest edges
Muylaert *et al*, *PLoS One* (2021)

Direct driver

Forest fragmentation
linked to viral
emergence

Indirect & direct driver

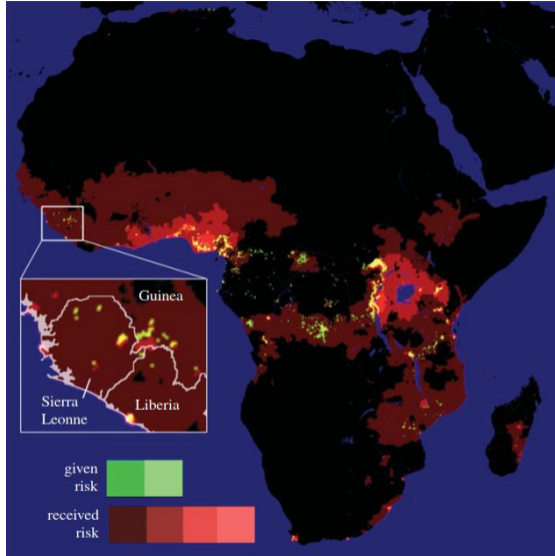
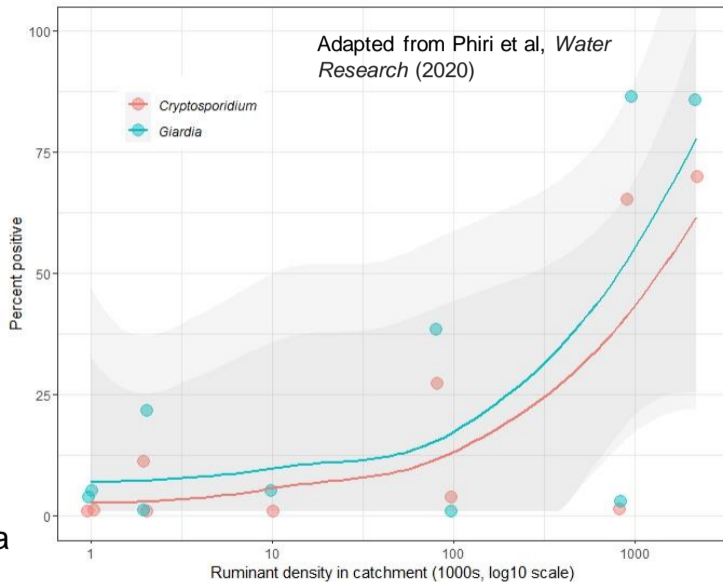
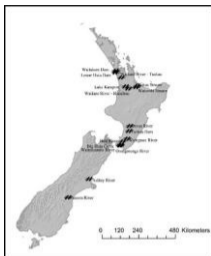


Figure: Emergence risk and spread
Wilkinson *et al*, *Journal of the Royal Society Interface* (2018)



Pathogenic protozoa
in Aotearoa's water

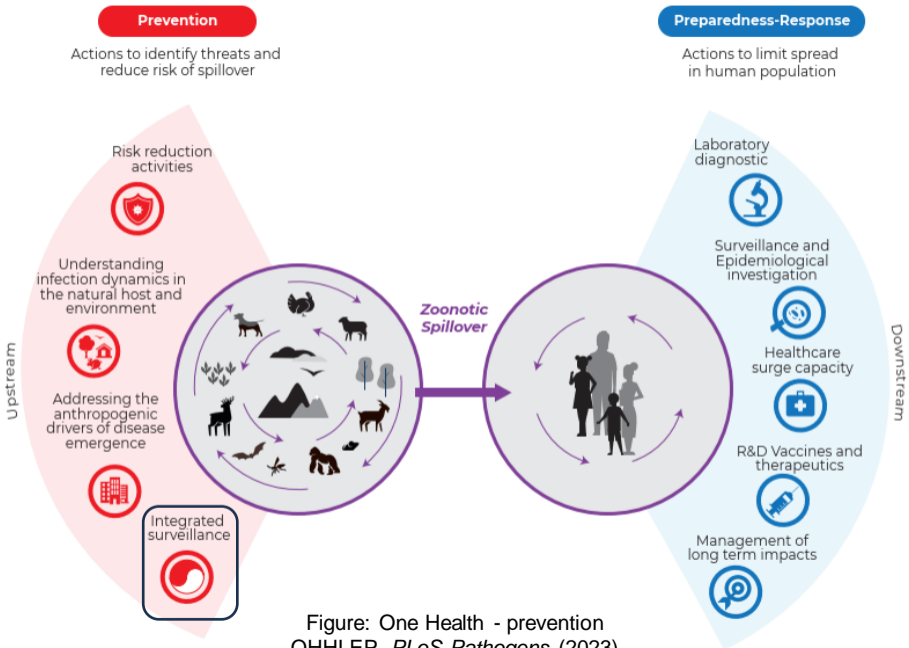
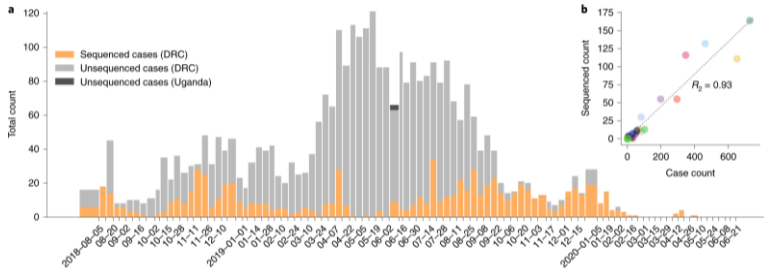


Figure: One Health - prevention
 OHHLEP, *PLoS Pathogens* (2023)

Integrating genomics



ARTICLES

<https://doi.org/10.1038/s41591-021-01302-z>

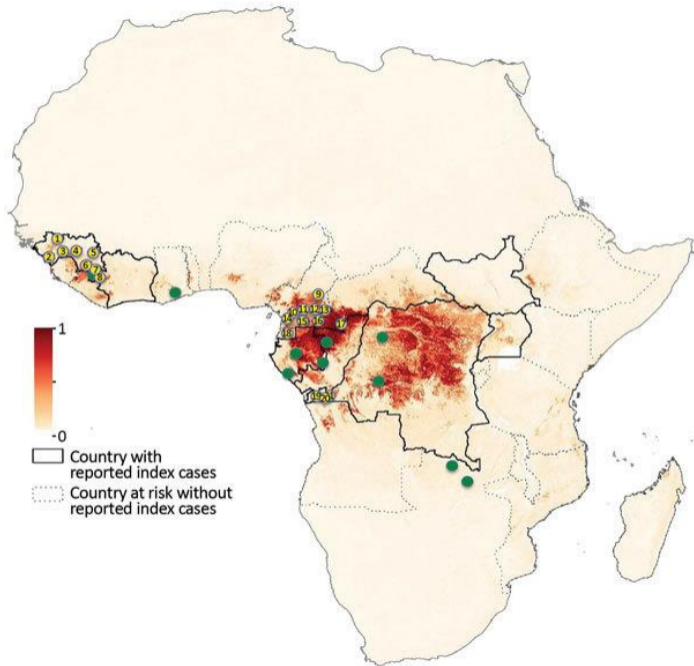
nature
medicine

Check for updates

Integration of genomic sequencing into the response to the Ebola virus outbreak in Nord Kivu, Democratic Republic of the Congo

Eddy Kinganda-Lusamaki^{1,2,3,4,5}, Allison Black^{1,4,5,6}, Daniel B. Mukadi^{1,2,3}, James Hadfield^{4,5,6}, Placide Mbala-Kingebeni^{1,2,3,4}, Catherine B. Pratt^{1,2,3,4}, Amuri Aziza^{1,2}, Moussa M. Diagne¹, Bailey White¹, Nella Bisento¹, Bibiche Nsunda¹, Marceline Akonga¹, Martin Faye¹, Ousmane Faye¹, Francois Edidi-Atani^{1,2}, Meris Matondo-Kuamfumu^{1,2}, Fabrice Mambu-Mbika^{1,2}, Junior Bulabula^{1,2}, Nicholas Di Paola¹, Matthias G. Pauthner^{1,2}, Kristian G. Andersen¹, Gustavo Palacios^{1,2,3}, Eric Delaporte^{1,2,3}, Amadou Alpha Sall^{1,2}, Martine Peeters^{1,2}, Michael R. Wiley^{1,2}, Steve Ahuka-Mundeke^{1,2,3}, Trevor Bedford^{4,5,6,7} and Jean-Jacques Muyembe Tamfum^{1,2,3}

Risk based surveillance

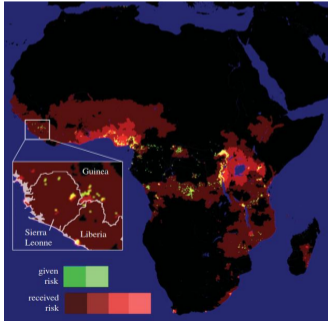


RESEARCH

Survey of Ebola Viruses in Frugivorous and Insectivorous Bats in Guinea, Cameroon, and the Democratic Republic of the Congo, 2015–2017

Helene M. De Nys,¹ Flacide Mbala Kingebeni,¹ Alpha K. Kette,¹ Christelle Butel,¹ Guillaume Thuangnic,¹ Christian-Julian Villabona-Arenas,¹ Thomas Lemarche,¹ Mare Geertzts,¹ Nicole Vidal,¹ Armandine Esteban,¹ Mathieu Bourgerel,¹ François Roger,¹ Fabien Lewendertz,¹ Ramadan Diallo,¹ Simon-Pierre Ndimbo-Kumugo,¹ Justus Nsio-Mbeta,¹ Nikki Tagg,¹ Lamine Koivogui,¹ Abdoulaye Toure,¹ Eric Delaporte,¹ Steve Ahuka-Mundeke,¹ Jean-Jacques Muyembe Tamfum,¹ Etzel Mpoudi-Etanga,¹ Abidjo Ayoubu,¹ Martine Peeters¹

Driver monitoring



Step 1

Develop the surveillance system scope

- Develop and agree the One Health scope
- Preliminary system mapping to include all stakeholders and policy makers and obtain consensus on the scope

Step 2

Identify the data requirements

- Include disease/pathogen based surveillance
- Include driver-based surveillance

Step 3

Develop the system design

- Develop 'whole of system' approaches to identify points of commonality and feedbacks
- Incorporate flexibility to cope with change, including novel pathogens, disasters, and technological advances

Step 4

Develop the system's governance

- Consider all political, ethical, administrative, regulatory and legal (PEARL) aspects

Step 5

Develop integrated protocols

- Develop a strategy for collaboration across fields and domains.
- Perform multisectoral exercises, including considering feedback loops and impacts on all the One Health domains.

Step 6

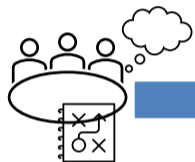
Develop a joint implementation roadmap

- Develop an implementation roadmap dependent on the current capacity.
- Build communities of practice for networking, partnership building, and collaboration.
- Develop communication strategies about the approach and the societal benefits

Figure: One Health surveillance
OHHLEP, *One Health* (2023)

Surveillance system

Planning & design



Data collection

(sample size,
biases...)



Data analysis & interpretation

(longitudinal
analyses,
reproducibility...)

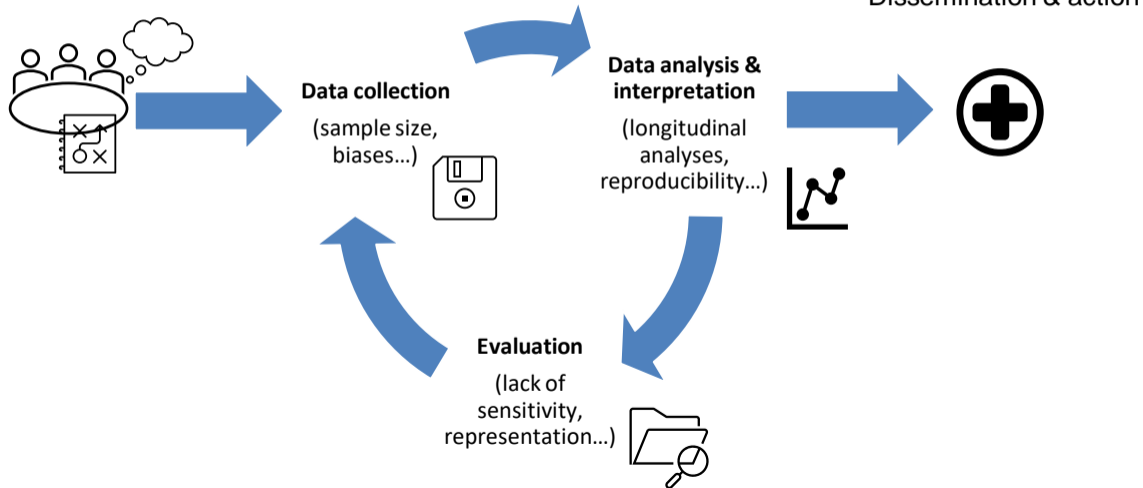


Dissemination & action



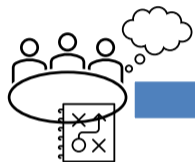
Evaluation

(lack of
sensitivity,
representation...)

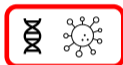


Integrated surveillance systems

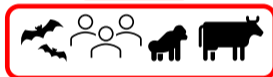
Planning & design



Data collection



Data analysis & interpretation



Evaluation



Dissemination & action



“There appears to be an assumption that there is abundant elasticity and available capacity within the [healthcare] work setting,... yet years of study of innovation diffusion, change management and behaviour change have demonstrated that increasing workload ... —especially when not understood, perceived to be unneeded or felt unlikely to lead to improvement.... —leads to change fatigue and resistance, cynicism, burnout and turnover.”

Hayes, Batalden and Goldmann (2014)

A ‘work smarter, not harder’ approach to improving healthcare quality

Questions & discussion

David T S Hayman

d.t.s.hayman@massey.ac.nz

