



Otago Spotlight Series

# Infectious Disease Research

## **The One Health Concept: An integrative approach to understanding, preventing, and controlling infectious diseases**

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*with thanks to David Murdoch*

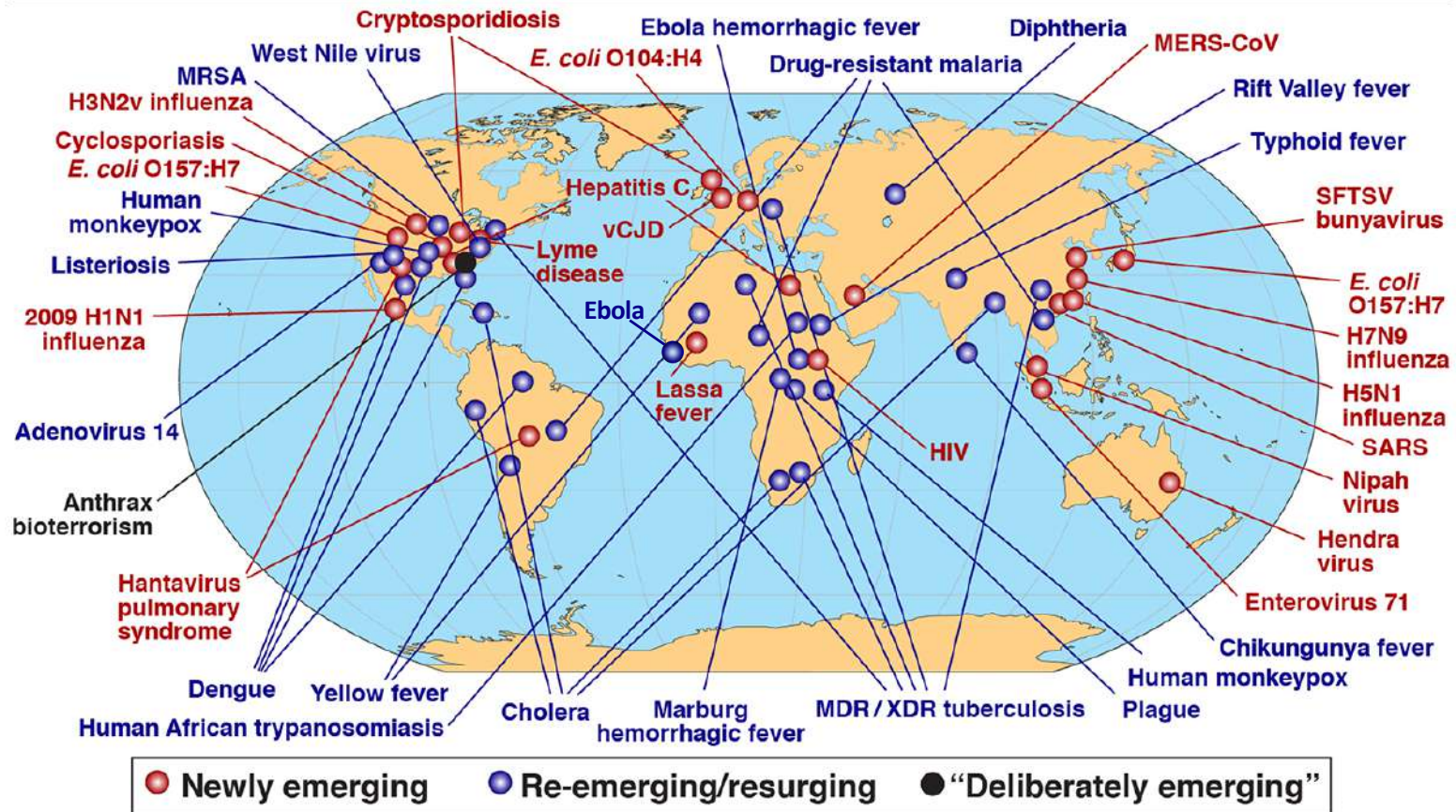
[otago.ac.nz/infectious-disease](http://otago.ac.nz/infectious-disease)



THEINFECTIONGROUP



# Global Examples of Emerging and Re-Emerging Infectious Diseases





# West African Ebola epidemic, 2013-2016

## *Scientific insights from many disciplines were integrated*

- **Epidemiology and modelling**
  - triggered the international response and guided where response efforts were directed
- **Virology, engineering and clinical science**
  - helped reduce deaths and transmission in and from hospitals and treatment centres
- **Social sciences**
  - were key to reducing deaths from funerals and in the community
- **Diagnostic and operational research**
  - made the response more efficient
- **Immunology and vaccine research**
  - contributed to the final stages of the epidemic and will help prevent future epidemics

*Whitty CJM. Phil Trans R Soc B 2017; 372: 20160293*

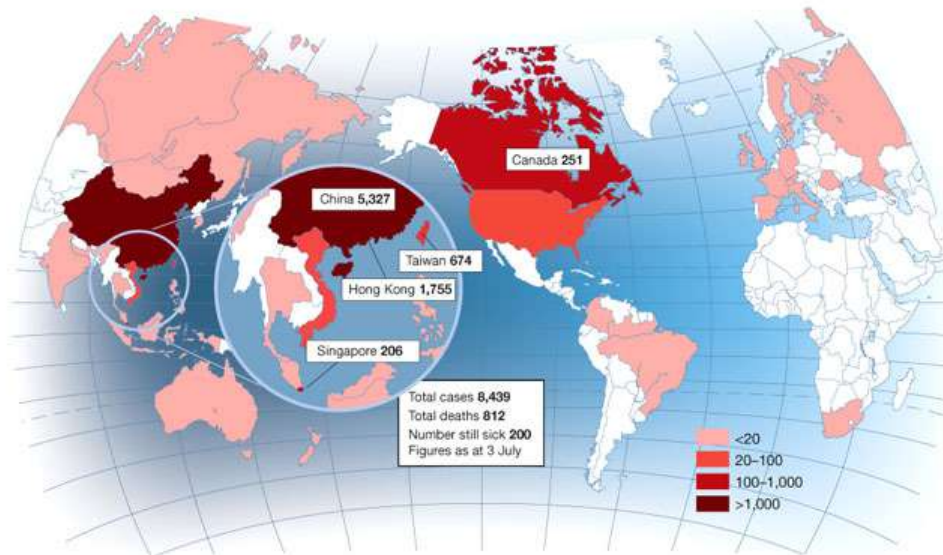
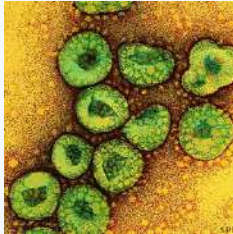
# The One Health Concept

“One Health is dedicated to improving the lives of all species—human and animal—through the integration of human medicine, veterinary medicine and environmental science.”



Source: [www.onehealththiniative.com](http://www.onehealththiniative.com)

# SARS Coronavirus



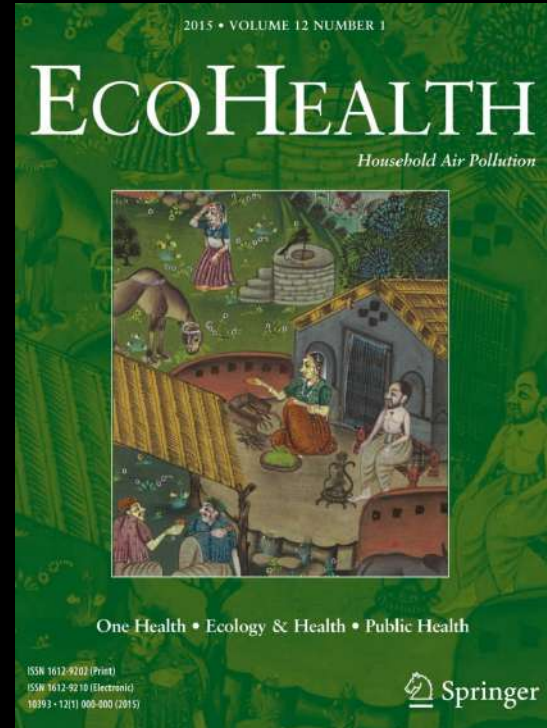




# Organisations Working on 'One Health'

- World Health Organization (WHO)
- Food and Agriculture Organization (FAO)
- World Organization for Animal Health (OIE)
- One Health Initiative
- US Centers for Disease Control
- One Health Platform
- EcoHealth Alliance





# One Health

- Aims to improve health and well-being through the prevention of risks and the mitigation of effects of crises that originate at the interface between humans, animals and environments.
- Promotes coordinated, collaborative, cross-sectoral, and ‘whole-of-society’ approaches to health hazards.

# EcoHealth

- Aims to improve the health of people, animals and ecosystems to address complex challenges facing our Planet.
- Emphasises understanding of social and ecological systems and drivers of social determinants of health and ecosystem changes holistically.



# One Health in New Zealand



# Zoonoses

“Infections of animals that are naturally transmitted to humans”



# List of New Zealand Notifiable Diseases

## Notifiable Infectious Diseases Under the Health Act 1956

### Section A – Infectious Diseases Notifiable to a Medical Officer of Health and Local Authority

#### Acute gastroenteritis \*\*

Cholera  
Giardiasis  
Legionellosis  
Meningoencephalitis – primary amoebic

#### Shigellosis

#### Yersiniosis

### Section B – Infectious Diseases Notifiable to Medical Officer of Health

Acquired Immunodeficiency Syndrome

#### Arboviral diseases

#### Creutzfeldt-Jakob disease and other spongiform encephalopathies

Diphtheria

Hepatitis (viral) not otherwise specified

#### Hydatid disease

Invasive pneumococcal disease

#### Leptospirosis

Measles

Mumps

#### Non-seasonal influenza (capable of being transmitted between human beings)

#### Plague

#### Q fever

Rheumatic fever

Rubella

Tetanus

#### Viral haemorrhagic fevers

#### Campylobacteriosis

#### Cryptosporidiosis

Hepatitis A

Listeriosis

#### Salmonellosis

Typhoid and paratyphoid fever

#### Anthrax

#### Brucellosis

*Cronobacter* species

Haemophilus influenzae b

Hepatitis B

Hepatitis C

#### Highly Pathogenic Avian Influenza (including HPAI subtype H5N1)

Leprosy

Malaria

#### Middle East Respiratory Syndrome

*Neisseria meningitidis* invasive disease

Pertussis

Poliomyelitis

#### Rabies and other lyssaviruses

#### Rickettsial diseases

#### Severe Acute Respiratory Syndrome (SARS)

#### Verotoxin-producing or Shiga toxin-producing *Escherichia coli*

#### Yellow fever

## Diseases Notifiable to Medical Officer of Health (Other than Notifiable Infectious Diseases)

### Notifiable to the Medical Officer of Health

#### Cysticercosis

Decompression sickness

Lead absorption equal to or in excess of 0.48 μmol/l (10 μg/dl)\*\*\*

Poisoning arising from chemical contamination of the environment

#### Taeniasis

#### Trichinosis

## Notifiable Diseases Under Tuberculosis Act 1948

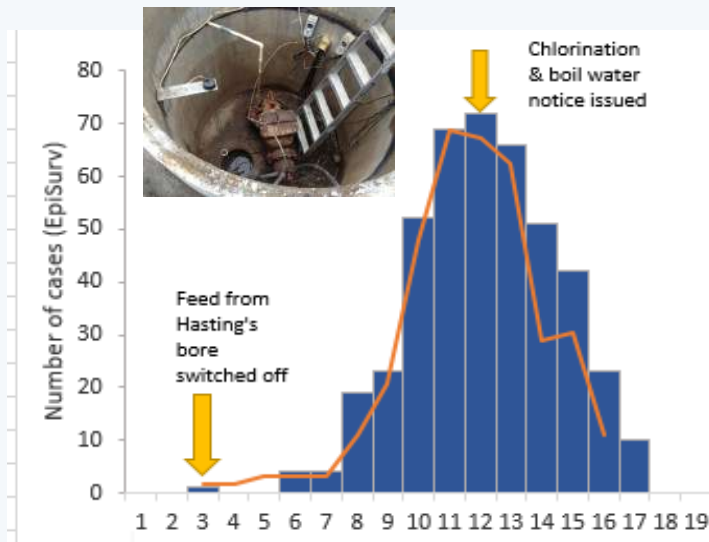
### Notifiable to the Medical Officer of Health

#### Tuberculosis (all forms)

Zoonotic diseases are highlighted in yellow

# One Health, One Water

## The Havelock North incident



>5000 people affected  
*Campylobacter* was the predominant cause

# CAUSES OF ANTIBIOTIC RESISTANCE



Antibiotic resistance happens when bacteria change and become resistant to the antibiotics used to treat the infections they cause.



Over-prescribing  
of antibiotics



Patients not finishing  
their treatment



Over-use of antibiotics in  
livestock and fish farming



Poor infection control  
in hospitals and clinics



Lack of hygiene and poor  
sanitation



Lack of new antibiotics  
being developed

[www.who.int/drugresistance](http://www.who.int/drugresistance)

**#AntibioticResistance**









# One Health AOTEAROA

An integrative approach to understanding,  
preventing, and controlling infectious disease





**Professor David Murdoch**

*Co-director*

Professor David Murdoch is Dean of the University of Otago,



**Distinguished Professor Nigel French**

*Co-director*

Professor Nigel French is Director of the New Zealand Food Safety



**Associate Professor Patricia Priest**

*Management Group*

Associate Professor Patricia Priest works in the Department of



**Professor Michael Baker**

*Management Group*

Michael Baker is a public health physician and professor in the



**Associate Professor Jackie Benschop**

*Management Group*

Associate Professor Jackie Benschop is an epidemiologist



**Dr Rob Lake**

*Management Group*

Dr Rob Lake is the Manager of the Risk, Response, and Social Systems Group of the Environmental Science Business Group at ESR. Based in Christchurch, ...

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**Professor Iain Lamont**

*Management Group*

Professor Iain Lamont is based at the Department of Biochemistry of the University of Otago in Dunedin. He is originally from Scotland but after a ...

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**Alice Milnes**

*Centre Coordinator*

Alice Milnes is the One Health Aotearoa Centre Co-ordinator. As the Centre Coordinator, Alice manages the organisation of our annual symposium, maintains the content for ...

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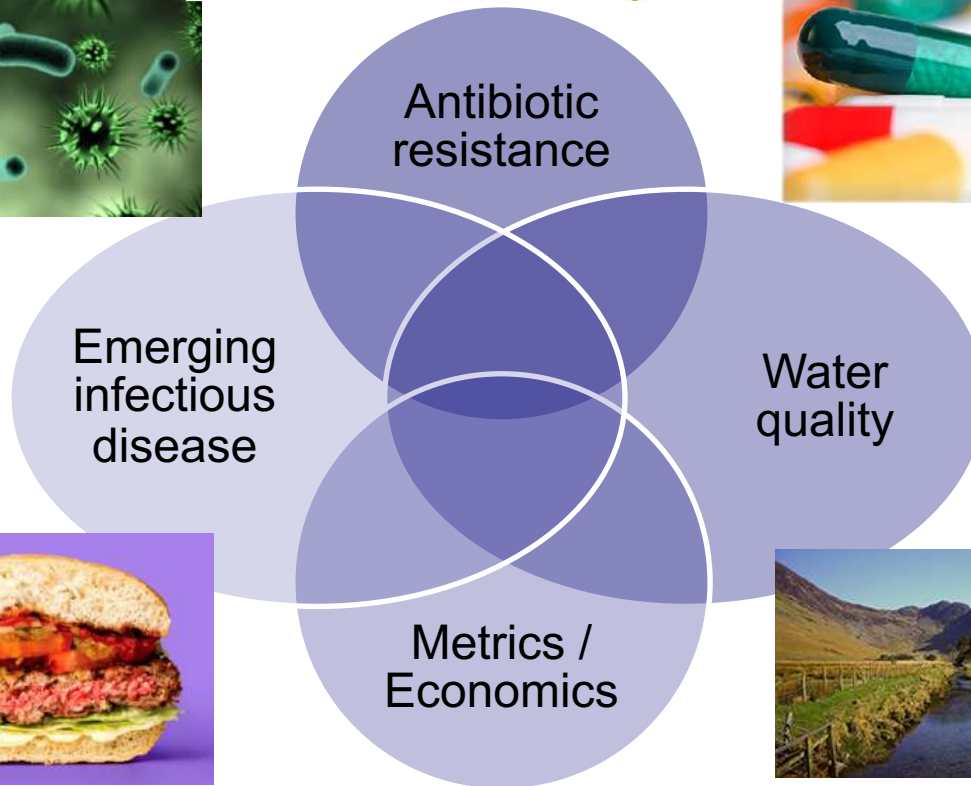


**Dr James Ussher**

*Management Group*

Dr James Ussher research interest

# One Health AOTEAROA





# One Health AOTEAROA 4<sup>th</sup> Symposium

Bringing together infectious diseases scientists and professionals from the fields of human, animal and environmental health

**12-13 December 2018**  
**Nordmeyer Theatre**  
**University of Otago, Wellington**

Antimicrobial resistance | One Health science & policy  
Emerging infectious diseases | One Health economics  
Mahinga kai & Mātauranga Māori | Food safety & security  
Water quality | Infectious diseases & inequality

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**[onehealth.org.nz](http://onehealth.org.nz)**

EARLY BIRD REGISTRATION CLOSES 14 SEPTEMBER

[otago.ac.nz/infectious-disease](http://otago.ac.nz/infectious-disease)

