

# Challenges and Preparedness for Emerging Zoonotic Diseases

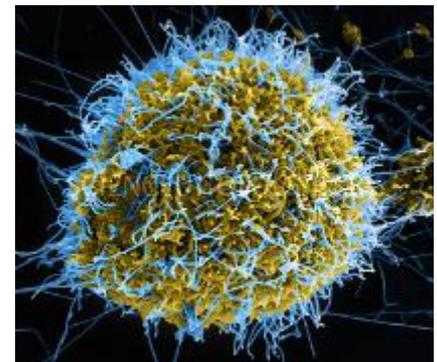


SESSION VII - Emergency Management of Infectious Disease Outbreaks

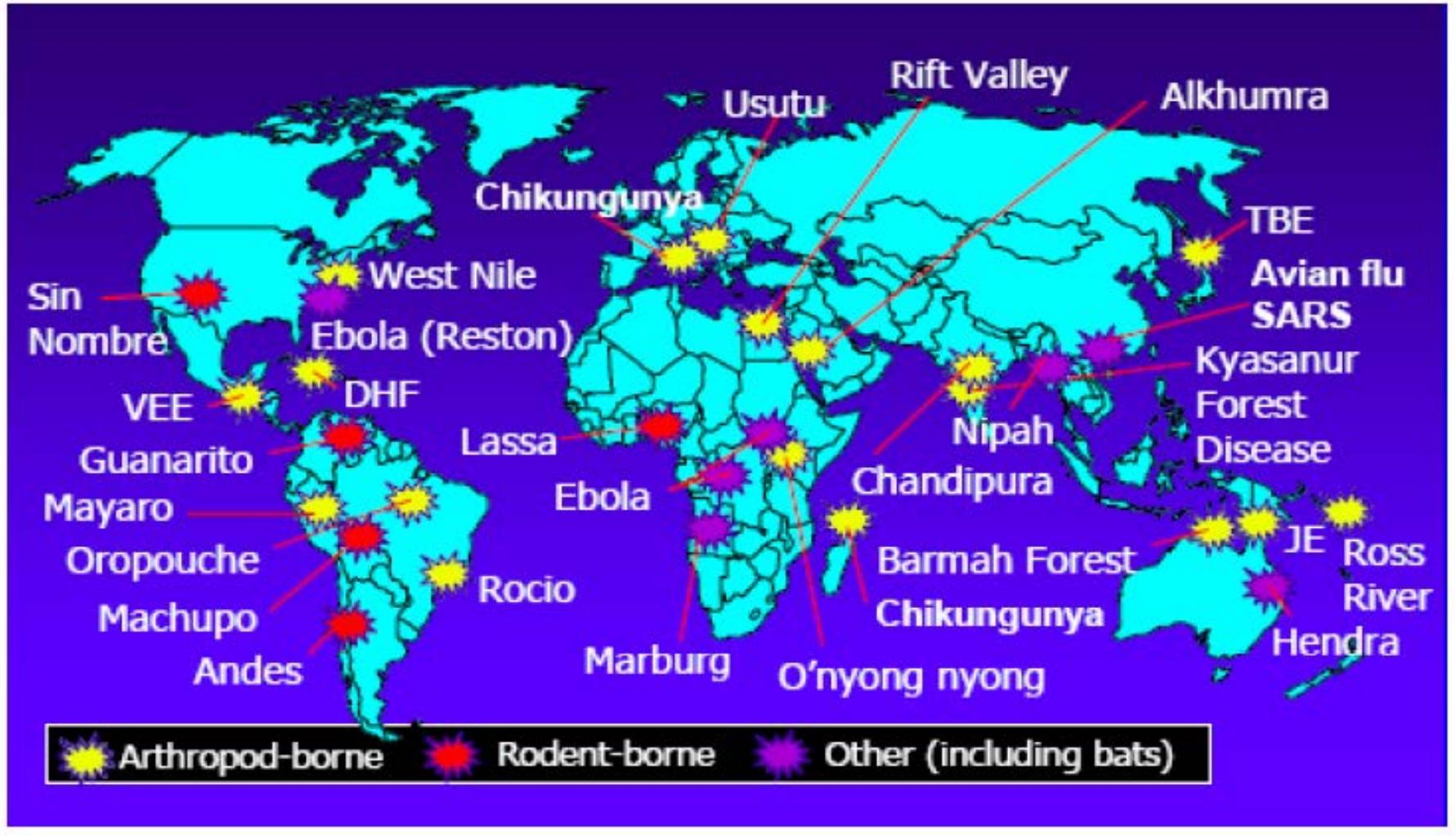
“Disaster and Emergency Management in the Health Care Sector”

Dr Heidi Carroll, Medical Director  
Communicable Diseases, QLD Dept of Health

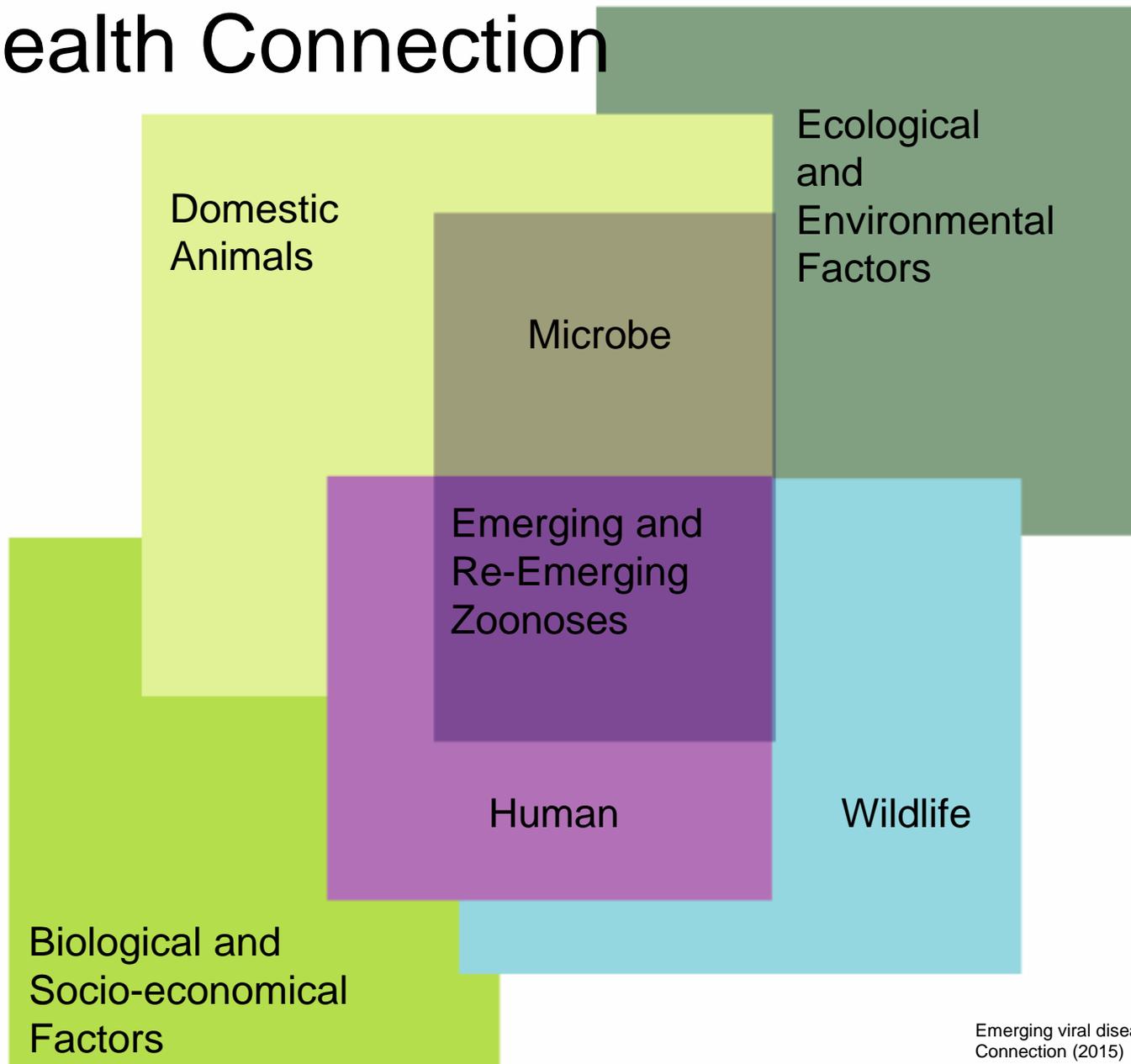
23 Feb 2016



# One Health and Communicable Disease



# One Health Connection



# Factors that underlie disease emergence and reemergence

The Microbial Agent	The Human Host	Ecological/Environmental
Genetic adaptation and change	Human susceptibility to infection	Climate and weather
Poly-microbial diseases	Human demographics and behaviour	Changing ecosystems
	International trade and travel	Economic development and land use
	Bioterrorism – intent to harm	Technology and industry
	Occupational exposures	Poverty and social inequalities
	Inappropriate use of antibiotics	Lack of public health infrastructure and services
		Animal populations
		War and famine
		Political will

# Management of Communicable Diseases in Queensland

## POLICY

Public Health Units (local)

- Communicable Disease
- Environmental Health

Communicable Disease Branch (State)

Communicable Disease Network of

Australia

- National Arbovirus & Malaria Advisory Committee
- National Immunisation Committee
- National TB Advisory Committee

## RESPONSE

Surveillance

Case management (local)

Outbreak response (local/State)

Incident Management Team (State)

Multi-agency response or Multi-agency

Threat Assessment Team (MATAT)

- Comprised of relevant State agencies

National Incident Room (Commonwealth)

PHEIC - WHO DG

# Mosquito borne diseases in Queensland

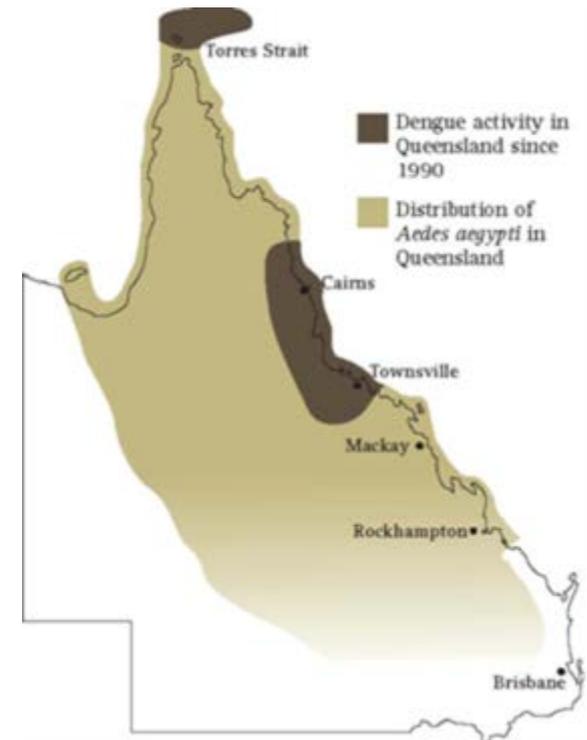
## Vectors of importance



*Aedes aegypti*



*Aedes albopictus*



# Drivers of arbovirus emergence/re-emergence

- Growth in international air travel
- Genetic changes in viruses
- Increased urbanisation particularly in coastal areas
- Environmental and meteorological events
- Pesticide resistance
- Drug resistance
- Human behaviour



# Mosquito-borne diseases in Queensland

## Common MBD

Dengue serotypes:1,2,3,4

Ross River virus

Barmah Forest virus

## Less common MBD

Chikungunya virus

Zika virus (**declared PHEIC – 1 Feb 2016**)

Murray Valley encephalitis virus

West Nile virus Kunjin subtype

Japanese encephalitis virus

Malaria

# Current response to mosquito-borne diseases in Queensland

- Queensland Health has a state-wide Mosquito-borne Disease Prevention and Control Program
- Emerging Infectious Disease Committee
- Undertakes case surveillance and follow-up
- Queensland Health works in partnership with:
  - Local government municipal councils
  - Commonwealth Department of Agriculture and Water Resource's

# Queensland Health Response to Zika

- Work collaboratively with Local, State and Commonwealth Government with regards vector surveillance and control
- Revised health advice for travellers (in consultation with national body CDNA, NAMAC)
- Development of local response guidelines
- Draft public communication & education campaign
- Increase Pathology Queensland capacity

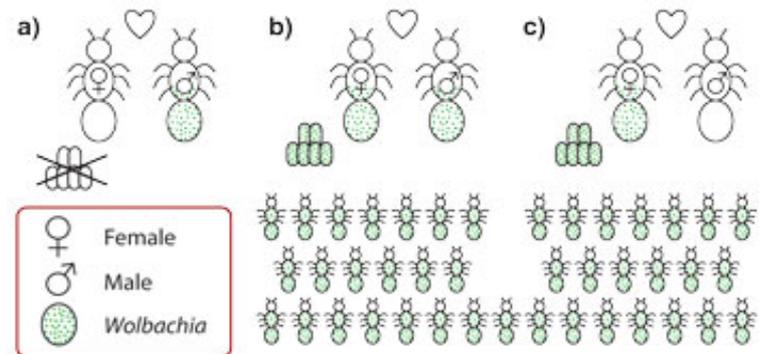


# Eliminate Dengue Program

(<http://www.eliminatedengue.com>)

- Funded by Bill Gates Foundation, Research bodies, Qld govt
- Wolbachia is a bacteria present in up to 60% of all insects - including some biting mosquitoes
- Not naturally present in *Aedes Aegypti*
- Blocks dengue replication/transmission
- Cytoplasmic Incompatibility - releasing a limited number of mosquitoes with Wolbachia to breed with wild mosquitoes, over a small number of generations, will result in all the mosquitoes having Wolbachia
- Community engagement required

How *Wolbachia* spreads in the wild mosquito population



# Australian Bat Lyssavirus (ABLV)

- Rabies virus, ABLV, and other lyssaviruses such as European bat lyssavirus (EBLV) 1 and EBLV 2, are members of the Rhabdoviridae family, genus Lyssavirus.
- first identified in Australia in 1996 from the brain of a black flying fox
- infection has been documented in several species of flying foxes (also known as fruit bats) and insectivorous microbats
- it is assumed that **all** Australian bat species have the potential to carry and transmit ABLV

# Transmission

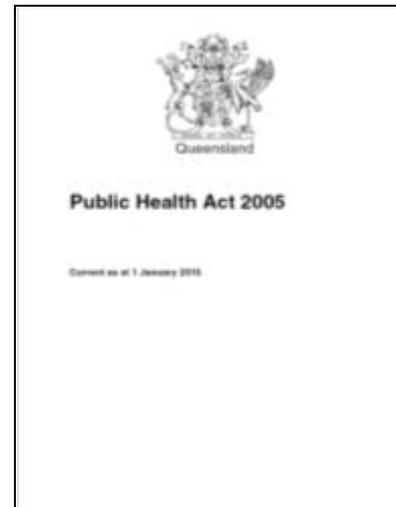
From the virus-laden saliva or neural tissue of an infected bat:

- to humans through direct contact from the bat through a bite or scratch (resulting in broken skin) or
- through contamination of mucous membranes (e.g. mouth), conjunctiva or broken skin



# Notification

- Under Queensland's *Public Health Act 2005*, potential exposure to ABLV is a notifiable condition requiring immediate notification by telephone call, email or facsimile to the local public health unit.



# Bat testing

- QH performs testing for ABLV on bats that are the source of exposure and are available for testing
  - 398 bats were tested over the 5 year period 2009-2014
  - 20 (5%) had ABLV detected in 5 different species
  - Bat testing guides post exposure management of the person potentially exposed
- 

# ABLV and Animal Cases

- 2 horses tested positive for ABLV in 2013
- Both horses were euthanatised following 4 – 5 day illness
- Sequencing of target gene of the ABLV detected in the horses was consistent with other sequences isolated from yellow belly sheath tail bats
- there is no evidence that ABLV is transmitted from horses to humans

# Hendra Virus: A new challenge



Source: Baker GB. From Tang KL, Divljan A. Australian Museum: Australian *Pteropus* species fact sheet, version 1.1 [internet]. Australian Museum 2013 [cited October 2014]. Available from URL: <http://aawhg.org/assets/News/Science-and-Research/Australian-Pteropus-species-fact-sheets-v1.1.pdf>

- Discovered in Queensland 1994
- **Reservoir host:** *Pteropus* bats (20-50% sero-positive)
- **Intermediate host:** horses
- **Human infection** linked with exposure to infected horses.
- **High case fatality**

# Equivac<sup>®</sup> HeV

- Since **2012**
- **International collaboration**
- Effective way of **reducing infection** in horses
- **One Health:** reduces human infection

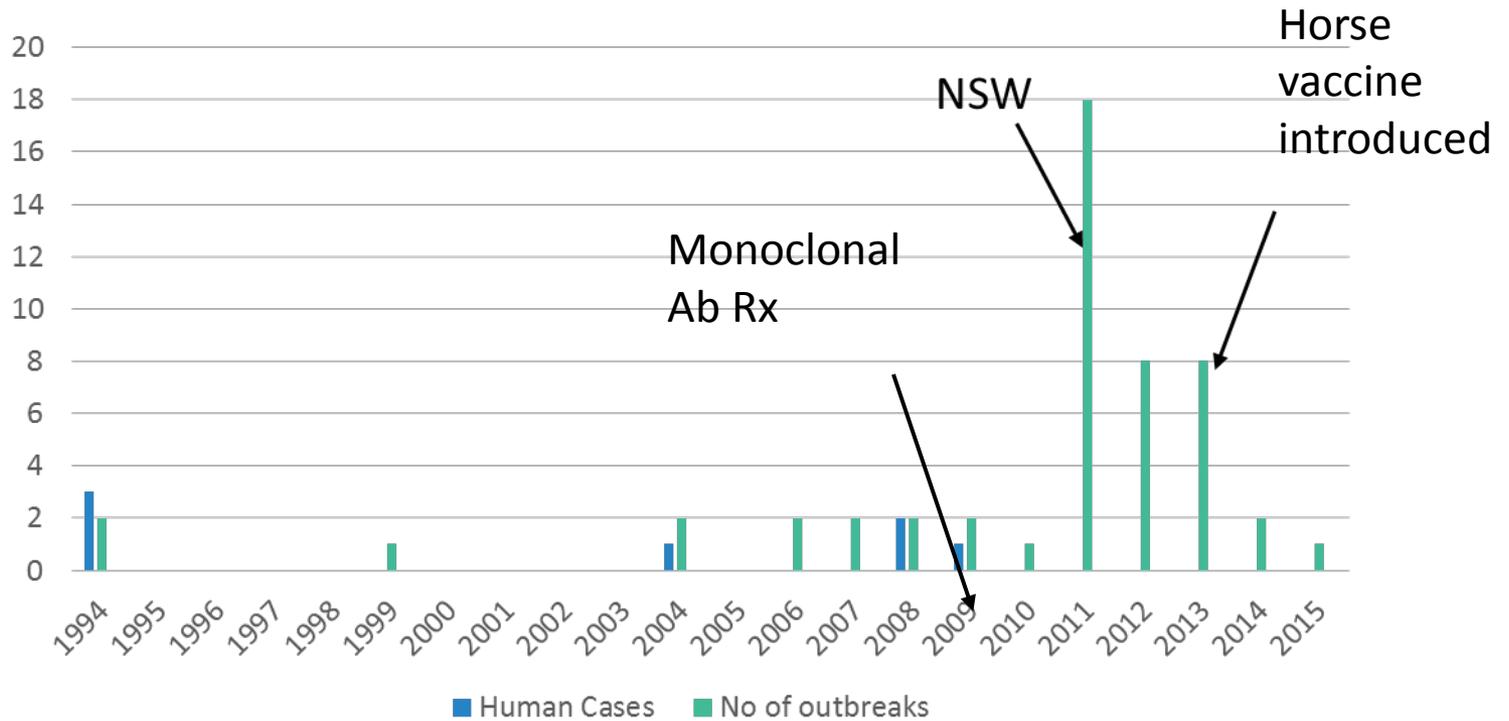


Source: Warren A. Vaccine arrives to boost the frontline fight against Hendra Virus. Csiro News 2012 [cited October 2014]. Available from URL: <http://csironewsblog.com/tag/equine/>

# Human monoclonal antibody to treat Hendra Virus

- Successful in animal models
- Considered for **high risk human contacts**
- World first trial of monoclonal antibody:
  - Test safety
  - Collaboration between groups in Queensland, NSW and the United States
  - May save lives

# HeV Outbreaks





International Network for Health Promoting Hospitals & Health Services

## The Task Force on Health Promoting Hospitals and Environment

Asia-Pacific Regional Symposium 2016

### Eco-Friendly Hospitals For a Sustainable World

22-23 February 2016 | Griffith University | Brisbane | Queensland | Australia



## Program BOOKLET



AN INTERNATIONAL FORUM ON

## “DISASTER and EMERGENCY MANAGEMENT in the HEALTH CARE SECTOR”

TUESDAY, Feb 23rd 2016

Griffith University, Southbank Campus

Hosted by Centre for Environment and Population Health, Griffith University  
and co-hosted by Tzu Chi Medical Foundation, Tzu Chi University

Venue: Griffith University South Bank Campus, Griffith Graduate Centre Building (S07) Room 1.23

Dr Heidi Carroll

Medical Director

Communicable Diseases

QLD Dept of Health

[Heidi.Carroll2@health.qld.gov.au](mailto:Heidi.Carroll2@health.qld.gov.au)