



The Geelong Centre for  
Emerging Infectious Diseases  
(GCEID)

Strategic Plan  
2017-2021

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# Introduction and Context

Welcome to the first Strategic Plan of the Geelong Centre for Emerging Infectious Diseases (GCEID).

The Geelong Centre for Emerging Infectious Diseases (GCEID) takes a “One Health” approach to understanding and mitigating the risks posed by infectious diseases. GCEID combines specialised research facilities and highly skilled staff to combat infectious diseases through a collaborative, multidisciplinary partnership between Deakin University, Barwon Health and Commonwealth Scientific and Industrial Research Organisation (CSIRO) - Australian Animal Health Laboratory (AAHL).

From this unique ‘One Health’ platform, GCEID delivers innovative research outcomes, providing practical solutions to the risks posed by emerging infectious diseases to the health of our region, nationally and internationally.

## Emerging Infectious Diseases (EIDs)

The term EID has become synonymous with:

1. newly recognised infectious diseases (such as Severe Acute Respiratory Syndrome (SARS) that first appeared suddenly and unexpectedly in 2003).
2. known infections that are:
  - a) increasing in incidence
  - b) increasing geographically (such as the Zika virus) or
  - c) expanding their host range (such as H5N1 and H7N9 avian influenza)
3. infectious diseases considered to be re-emerging, e.g. tuberculosis due to development of resistance to known antimicrobials.

Global health security, particularly the emergence and spread of EIDs, has become a major international concern impacting population level human health, animal health and food security. EID outbreaks are also a significant financial threat to the global economy (Fig 1, source – Bio-Era, 2008). Recent outbreaks have cost billions of dollars, including Middle East Respiratory Syndrome (MERS) estimated to have cost South Korea from \$1-10 billion, the Ebola outbreak in West Africa estimated to have cost \$2.2 billion in the 3 affected countries in 2015, and the current Zika virus epidemic, estimated to cost at least \$3.5 billion in 2016 (The World Bank and Centre for Disease Control).

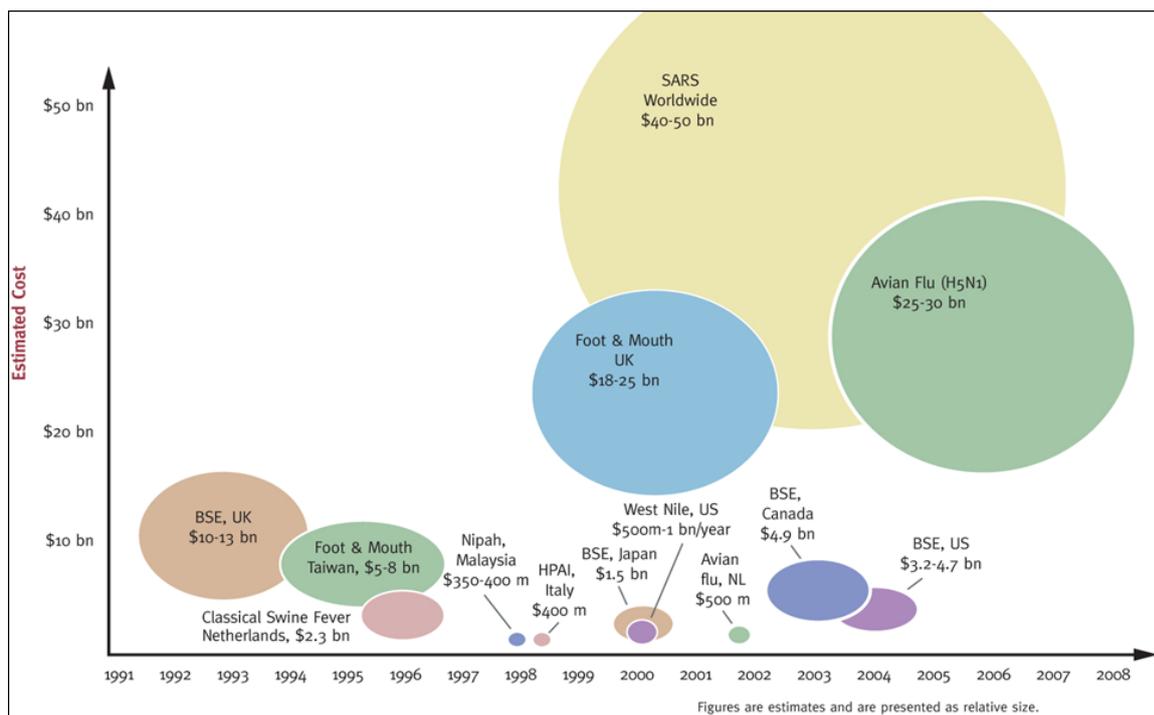


Fig 1.

Three important factors contribute to this global threat and the increased incidence, impact and severity of EIDs.

- The enormous increase in travel and trade has created a global village with the potential for rapid spread of EIDs among not only human but also animal populations,
- The consequences of climate change, an increase in human and livestock populations as well as other changes caused by increased and changing human activities, including severe ecological disturbances resulting in changed relationships between people, wildlife and disease vectors,
- The realisation that most emerging diseases originate in animals and are zoonotic in nature – that is they can infect both animals and people. Recent examples include Zika, SARS, Hendra virus, MERS and H5N1 avian influenza.

## The 'One Health' Concept

GCEID encompasses a holistic "One Health" approach to these challenges, recognizing that human, animal and ecosystem health are inextricably linked.

Three clear areas of GCEID activity are:

1. undertaking EID research from bench to bedside
2. developing and defining EID policy
3. shaping EID risk management within Australia and globally

GCEID's One Health approach, with multidisciplinary and multi-sectoral collaboration and partnership, is positioned to accelerate our understanding of EID's and reduce their impact on human health at a population level, animal health at an ecological level and global health as a result. GCEID will inform and guide policy, and policy will in turn lead to and shape operational risk management activities.

## Our Partners

GCEID combines the unique and world-class research facilities and people located in Geelong to create a 'One Health' EID collaboration. By linking an education and medical research institute (Deakin University), a human health care and research institute (Barwon Health) and an animal health research institute (AAHL), GCEID will provide practical and innovative solutions to the risks posed by EID's to the local, national and global community.

Deakin University, Barwon Health and CSIRO/AAHL share a fundamental commitment to innovation that addresses regional, national and global challenges and opportunities. They share a culture of discovery, and postgraduate teaching excellence, a geographic proximity that encourages interactions and a significant history of successful collaborations.

GCEID's local presence in Geelong has cemented a strong relationship with the City of Greater Geelong as an advocacy partner and strategic funding support.

### Australian Animal Health Laboratory (AAHL)

The Australian Animal Health Laboratory (AAHL) in Geelong, has become a world-leading 'One Health' laboratory due to the extent of research into both animal and human infectious diseases such as avian influenza, SARS and Hendra viruses. AAHL's high-containment purpose-built facility is one of the most sophisticated laboratory centres in the world, enabling ground breaking research into new vaccines, anti-viral therapeutics and the development of new ways to tackle the transmission of infectious diseases.

### Deakin University

Geelong is the home of Deakin University Waurn Ponds and Waterfront campuses, including its School of Medicine, School of Health and Social Development and School of Life and Environmental Sciences. Deakin University research programs have demonstrated a strong track record in 'One Health' teamed with a broad range of multidisciplinary groups including the Centre for Integrative Ecology and the National Centre for Farmers Health. Research staff from broad backgrounds including human health microbiologists, wildlife experts, epidemiologists, bio-informaticians, ecologists, economists and social scientists combine to support a 'One Health' approach to infectious disease research, education and training.

## Barwon Health

Geelong also hosts Barwon Health – the major health service provider to the human population in Geelong and western Victoria. GCEID is physically located at Barwon Health’s University Hospital Geelong, with designated research space and GCEID specific laboratories. Barwon Health has a considerable clinical research program involving infectious diseases. With an extensive outreach program, a focus on rural health and the development of decentralised health services, Barwon Health offers a unique “health services” component to the GCEID partnership.

The partnership of these three strong entities in the Geelong Centre for Emerging Infectious Diseases (GCEID) creates an unparalleled ‘One Health’ centre for research, education and training excellence focused on creating solutions for the increasing global threat from current and emerging infectious diseases.

## Our Vision

GCEID and its partner organisations deliver world-leading, multidisciplinary “One Health” research, education and training on emerging infectious diseases and are recognised and respected as having unique world-class expertise, facilities and collaborations for vital “One Health” research, capacity-building and translation.

## Our Mission

Foster and facilitate cutting-edge ‘One Health’ research, education and training to strengthen understanding, mitigation and control of emerging infectious diseases.

## First Principles

GCEID activities will:

- embed a ‘One Health’ approach
- demonstrate scientific excellence
- address high priority EID risk areas

Which will be enabled by:

- building on existing successes, intellectual property and skills within the partner organisations
- helping facilitate the optimal and efficient use of the high containment facilities at AAHL

- linking with current research partners and/or establish new collaborations or partnerships
- attracting strong medical technology, pharmaceutical and allied industry support and investment
- supporting the research priorities of key stakeholders including local, regional and national agencies, departments and committees

## Strategic Goals

1. Research
  - a. Identify and facilitate 'One Health' research opportunities that are aligned with GCEID's mission and strategic research programs
  - b. Provide research outcomes which may have the potential for further development and commercialisation by the bio-industry in Geelong or elsewhere as appropriate
2. Partnerships, Collaboration and Outreach
  - a. Facilitate multi-disciplinary collaboration within GCEID
  - b. Foster national and international partnerships and collaborations
  - c. Support GCEID research that will boost the local economy and strengthen its position in the "One Health" and bio-medical sector
3. Training and Education
  - a. Deliver a unique training experience which produces world-class researchers in EID
  - b. Provide distinctive education and training for undergraduate and post-graduate students in the area of EID
4. Funding/Resources/Infrastructure
  - a. Develop our government, industry and business research income by identifying potential partners for long-term effective partnerships
  - b. Identify targets for GCEID that lead to large collaborative research programs
  - c. Facilitate and optimise the use of the human and physical resources available within and between the three partners

## Strategic Programs

GCEID will focus on three distinct programs within the 'One Health' approach.

1. Improved understanding of the EID threat through studies in pathogenesis and pathobiology
  - a. Host pathogen interactions and comparative immunology
  - b. Underlying pathogen and host factors that influence emergence and host switching
  - c. Factors governing virulence and host specificity

2. Research to mitigate the risks of EID entry and spread through:
  - a. Classical epidemiology including:
    - i. surveillance and detection of known and unknown pathogens
    - ii. geographical information systems
    - iii. outbreak investigation and modelling
    - iv. impact of climate and other ecological changes
    - v. wildlife disease investigations
  - b. Molecular epidemiology
    - i. whole genome/Next Generation Sequencing (NGS) and analysis
    - ii. transmission and pathway analysis and e.g. virulence or resistance analysis
  - c. Quarantine measures
  - d. Diagnostics including development of tests for field use
  
3. Enhancement of the capabilities to respond to an EID event, to control or eradicate and to provide more efficient and effective means to mitigate established diseases through:
  - a. Enhancing outbreak response capabilities including managing surge capacity
  - b. Therapeutics
  - c. Vaccines
  - d. Modelling and scenario evaluation
  - e. Community and social impact studies
  - f. Economic modelling
  - g. Understanding of virus change and evolution through an outbreak
  - h. Improving and understanding quarantine requirements for e.g. hospital in-patients and staff
  - i. Public health emergency ethics