

Professor Raina MacIntyre

 research.unsw.edu.au/people/professor-raina-macintyre

My Expertise

Emerging infectious diseases, infection, biosecurity, biodefense, influenza, vaccines, adult vaccination, elderly vaccination, epidemiology, outbreaks, epidemic control, pandemics, travel and border control, HPV, pneumococcal disease, bioterrorism, smallpox, anthrax, Ebola, viral haemorrhagic fevers, MERS coronavirus, COVID-19, coronavirus, health security, health intelligence, modelling, clinical trials, big data, precision harm.

Fields of Research (FoR)

Infectious Diseases, Epidemiology, Aged Health Care, Public Health and Health Services not elsewhere classified, Genomics, Medical Infection Agents (incl. Prions), Preventive Medicine

SEO tags

Public Health (excl. Specific Population Health)

Biography

Professor Raina MacIntyre (MBBS Hons 1, FRACP, FAFPHM, M App Epid, PhD) is **NHMRC Principal Research Fellow** and **Professor of Global Biosecurity**. She heads the Biosecurity Program at the Kirby Institute, which conducts research in epidemiology, vaccinology, bioterrorism prevention, mathematical modelling, genetic epidemiology, public health and clinical trials in infectious diseases. Her research falls under 4 areas: Personal protective...[view more](#)

Professor Raina MacIntyre (MBBS Hons 1, FRACP, FAFPHM, M App Epid, PhD) is **NHMRC Principal Research Fellow** and **Professor of Global Biosecurity**. She heads the Biosecurity Program at the Kirby Institute, which conducts research in epidemiology, vaccinology, bioterrorism prevention, mathematical modelling, genetic epidemiology, public health and clinical trials in infectious diseases. Her research falls under 4 areas: Personal protective equipment, Vaccinology, Epidemic response and emerging infectious diseases, and Bioterrorism prevention. She is a dual-specialist physician with training in epidemiology and modelling. Her research is underpinned by her clinical training, vaccine program experience and extensive field outbreak investigation experience.

Raina has a 28-year track record in pandemics, epidemic infections, serious emerging infections, vaccines and control of respiratory viruses. She has worked as a clinician in hospitals, in health departments on outbreak control, and her PhD research was on screening, surveillance and contact tracing for TB and involved detailed tracking of the risk of infection in high risk contacts.

She worked for 15 years at the National Centre for Immunisation Research, and has conducted many vaccine clinical trials and has expertise in vaccinology and vaccine programs, especially vaccination of adults, at-risk and immunosuppressed populations.

She is a graduate of the Australian Field Epidemiology Training program, the MAE at ANU, and has extensive experience in shoe-leather epidemiology of infectious diseases outbreaks. Her in-depth understanding of the science of outbreak investigation draws from this experience combined with her academic training through a Masters and PhD in Epidemiology. She is best known for research in the detailed understanding of the transmission dynamics and prevention of infectious diseases, particularly respiratory pathogens such as influenza, tuberculosis, bioterrorism agents and vaccine-preventable infections. She has led the largest body of research internationally on face masks and respirators in health care workers. Her research has been influential in informing guidelines for health workers on PPE. She has extensive expertise in vaccination programs, with a particular interest in adult vaccination with a focus on the elderly and vaccines for bioterrorism. Specific vaccination interests include influenza, pneumococcal disease, HPV, smallpox, herpes zoster and SARS-CoV2. She has done a body of work on vaccine effectiveness of influenza vaccine against myocardial infarction. She led a NHMRC Centre for Research Excellence in immunisation for high risk populations, and is now head of UNSW-VIRL, a vaccine research centre focused on adult and high-risk group vaccination. Her face mask research has focused on health care workers and hospitals. Her lab conducts research on aerosol dynamics and movement of respiratory droplets, in collaboration with aerospace and fluid mechanics engineers at UNSW. She has also done research on using risk-analysis methods for analysing emerging infectious diseases outbreaks such as MERS-CoV and is a leader in new approaches to biosecurity through cross-disciplinary response. She is involved in several research studies on COVID-19. She leads Biosecurity in Global Security PLuSand is interested in emerging threats to health security. She also designed and co-convenes a course, Bioterrorism and Health Intelligence, taken by students at UNSW and ASU. She has led a pandemic simulation (Exercise Mataika, 2018 and Pacific Eclipse, 2019) in Australia and the US, which underpinned by modelling research and covers issues such as surveillance, diagnosis, health system capacity, mass quarantine, maritime transport and infected cruise ships, travel bans and the foundations of epidemic control. An online version of this, Unknown Biothreat Simulation, can be done as a self-paced exercise.

She is currently on the Global Accreditation Board for TEPHINET, the network of global field epidemiology programs. She has developed an automated rapid epidemic intelligence platform, Epiwatch, which uses AI to scan open source data for early epidemic signals. She also has an interest in the ethics of medicine, and specifically in dual-use research of concern. and has been on the World Organisation for Animal Health (OIE) committee for developing Guidelines For Responsible Conduct in Veterinary Research Identifying, Assessing and Managing Dual Use Research. She has research collaborations across the PLuS Alliance, with researchers from Arizona State University and Kings College London, and has an adjunct appointments at The College of Public Affairs and Community Solutions and the College of Health Solutions at ASU. She is also an adjunct Professor at Shanghai Jiao Tong University. She started a new cross-disciplinary journal, published by UNSW, Global Biosecurity, launched in February 2019. See Google scholar profile

Interested in Raina's story? Read "First Responder". and Lunch with Raina MacIntyre

Zocalo Public Square (JP Getty Museum) panel "Is Civilisation on the Verge of Collapse" - Raina on pandemics in 2019

Ask the doctor - hygiene measures to prevent infection transmission

Research Highlights:

- o She won many career awards including the Sir Henry Wellcome Medal and Prize, from the Association of Military Surgeons of the United States in 2007 for her work on a risk-priority scoring system for category A bioterrorism agents; and the highest national award in infectious diseases, the Frank Fenner Award for Research in Infectious Diseases in 2003. She was a finalist in the 2020 and 2017 Eureka Prizes, won the the CAPHIA Research Team Prize in 2017, The Public Health Association of Australia National Immunisation Achievement Award in 2014, and also the Peter Baume Public Health Impact Prize in 2014. In 2012 she won the UNSW Medicine Dean's award for outstanding achievement, the highest award in the faculty of Medicine. She has previously held a NHMRC PhD scholarship and a NHMRC Career Development Award, and been a Harkness Fellow. She spent her Harkness fellowship studying the transmission of tuberculosis in prisons in the US, at Johns Hopkins University.
- o She has published the largest body of clinical trials of face masks in prevention of respiratory infections for health workers internationally, which has been a major new contribution to knowledge for pandemic planning.
- o She is an expert in detection and mitigation of bioterrorism and biological warfare, with a deep understanding of epidemic control at the population level following an attack.
- o She initiated and led the creation, funding and training of the Network of Infectious Diseases Modellers of Australia through a NHMRC CBG in Population Health. This is a national network spanning three states and five Universities, which has had a prolific research output. She is interested in applying risk analysis methods to public health.
- o She leads a large program of vaccination clinical research, including studies in frail elderly vaccinology and in immunosuppressed populations such as bone marrow transplant recipients.
- o Led a NHMRC Centre for Research Excellence from 2012-2016, titled "Immunisation in under studied and special risk populations". www.creimmunisation.com.au

Memberships & Professional Activities

- **United States National Academies of Science, Engineering and Medicine Committee on public health interventions and countermeasures for advancing pandemic and seasonal influenza preparedness and response. Member, 2021.**
- Member, NHMRC National COVID-19 Health and Research Advisory Committee 2020-2021
- Member, NSW Health COVID-19 Vaccine Advisory Group 2020-2021
- Member, Group of 8 advisory group on social distancing for COVID-19, 2020
- Member, Global Accreditation Board, TEPHINET 2017-current
- Member, World Organisation for Animal Health (OIE) Ad Hoc Committee on Guidelines for Managing Dual Use Research 2018.
- Fellow, Royal Society of NSW (elected 2016)

- Member, Australian Infection Prevention & Control Ebola Expert Advisory Group - 2014
- Member, WHO SAGE Committee on Varicella and Zoster Vaccine (2013-2014).
- Member, US National Academy of Sciences, Institute of Medicine, Committee on Respiratory Protection for Healthcare Workers Against Novel H1N1 Influenza A, 2009.
- Member of Council, Faculty of Public Health Medicine of Australia (2014-18)
- Member, World Organization of Medical Editors (WAME) (2003-current)
- Member, Australian Society for Infectious Diseases (1998-2013)
- Member, Public Health Association of Australia - PHAA (current)
- One Health Special Interest Group committee, PHAA (current)
- Fellow, Royal Australasian College of Physicians
- Fellow, Australian Faculty of Public Health Medicine
- Member, Specialist Influenza Advisory Group to the Chief Medical Officer of Australia, 2007-2010
- Member, Pandemic Influenza Advisory Group to the Chief Medical Officer of Australia, 2007-2010
- Member, Association of Military Surgeons of the United States (2007-2009)
- Member, Infectious Diseases Subgroup of the Detention Health Advisory Group, Australia, 2007-.2008
- Member, National Health and Medical Research Council (NHMRC) Expert Advisory Group on Antimicrobial Resistance (EAGAR) (2005-2008).
- Member, Hepatitis B working party of the Ministerial Advisory Committee on AIDS, STDs and Hepatitis.
- Member, Working Parties for the Australian Technical Advisory Group on Immunisation: Influenza, Hepatitis A; Pneumococcal disease; Varicella zoster; Rotavirus

Editorial Boards

Epidemiology and Infection

BMJ Open

Vaccine Council of 100

Global Biosecurity

My Grants

2020-2021 MRFF Research Grants A randomised controlled trial of mask use in control of respiratory outcomes during bushfire season MacIntyre, Shah, Chughtai, Seale

2019-2020 RIS Grant "Volumetric LED-based Flow Diagnostic System" C De Silva, C Doolan, T Barber, D Moreau, M Greeb, M Keevers, CR MacIntyre.

2019-2020 anthrax modelling (Commonwealth of Australia government grant by competitive tender) CR MacIntyre, D Heslop, C Doolan

2018-2023 NHMRC Principal Research Fellowship grant number 1137582

2018-2019 IAMI trial, multicentre RCT. MacIntyre CR (Australian PI) on a trial led by O Frobert in Sweden

2018-2019 Influenza modelling studies. MacIntyre CR (industry grants, Seqirus and Sanofi)

2018 Modelling of smallpox. MacIntyre CR (government grant)

2016 NHMRC Centre for Research Excellence. R MacIntyre, M Kirk, A Clements, P Komesaroff, D Heslop, Q Wang, S Sakar, P Debarro, W Rawlinson, M Baker. Intergrated Systems for Epidemic Response.

2015 NHMRC Project grant. R MacIntyre, L Gardner, A Heywood. "Real time models to inform prevention and control of emerging infectious diseases

2015 NHMRC Project grant. A Newall, R MacIntyre, R Menzies, J Wood, P Beutels. Economic evaluation of alternative pneumococcal vaccination strategies

2012 NHMRC Project Grant #1048180. B Liu, A Newall, **R MacIntyre**, P McIntyre. Providing the evidence to guide adult immunisation strategies: a novel approach using a large prospective cohort study and record linkage.

2011 NHMRC Centre for Research Excellence in Population Health

Investigators: CR MacIntyre, PB McIntyre, R Booy, N Woods, C Jones, J Kaldor, P Beutels, R Menzies, D Dwyer.

Subject: Immunisation in under studied and special risk populations: closing the gap in knowledge through a multidisciplinary approach

2011 ARC DP120100189

Investigators: CR MacIntyre, N Zwar, H Worth, A Heywood, H Seale, M Sheikh, M Smith.

Title: "Travellers visiting friends and relatives: new approaches to understanding and reducing infectious disease risks"

2009 NHMRC Urgent H1N1 influenza 2009 grant # 630787

Investigators Prof CR MacIntyre; Prof DE Dwyer; Dr H Seale

Subject Efficacy of face masks against H1N1 swine influenza

2009-2012 ARC Linkage Grant # LP0990749

Investigators Prof CR MacIntyre; Prof DE Dwyer; A/Prof PT Nga; Prof NM Ferguson; A/Prof M McLaws; Prof L Maher; Dr H Seale; Dr JG Wood; Dr AT Newall

Subject Economic, social and cross cultural issues in non pharmaceutical protection of front line responders to pandemic influenza and emerging infections.

2007-2008 ARC Discovery Grant #DP0773987

Investigators CR MacIntyre; AJ Plant; RE Watkins

Subject Who acquires infection from whom across international borders? New approaches for control of emerging infections through understanding travel patterns

2006-2009 ARC Linkage Grant #LP0668279

Subject Economic and Social Benefits of treating and preventing influenza in Aged Care Facilities

Investigators R Booy; CR MacIntyre; D Dwyer; RI Lindley

2006 NHMRC Strategic Research Grant for Potential Avian Influenza-Induced Pandemic — Urgent Research #373646

Subject Pandemic influenza: developing a model to enhance preparedness in the business sector

Investigators Plant, Aileen; MacIntyre, Raina; Merianos, Angela; Donovan, Robert; Watkins Rochelle.

2006 NHMRC Strategic Research Grant for Potential Avian Influenza-Induced Pandemic —Urgent Research #410224

Subject Assessment of interventions for controlling pandemic influenza and determining data needs to inform these assessments

Chief investigators Becker, Niels G; Glass, Kathryn; Mathews, John; Dwyer, Dominic; Nolan, Terrence; MacIntyre, Raina; Barendregt, Jan; Barnes, Belinda; Caley, Peter; McCaw, James; McVernon, Jodie; Philp, David; Wood, James

2005-2009 NHMRC Capacity Building Grant in Population Health #358425

Subject Mathematical modeling of infectious diseases

Investigators MacIntyre CR, Becker N, Law M, Plant AJ, Nolan T, Brown GV

2005-2008 NHMRC Project grant #352337

Subject Clinical trial of pneumococcal conjugate vaccine in hospitalized geriatric patients.

Investigators MacIntyre CR, Lindley R, McIntyre PB, Sullivan J, Gilbert GL.

2005-2008 NHMRC Centre for Clinical Research Excellence #264625

Subject Interdisciplinary clinical and health ethics research and training to improve outcomes in immunosuppressed haematology patients

Investigators Sorrell T, Bradstock K, Kerridge I, Gilbert GL, Gottlieb D, MacIntyre CR, Dwyer D, Ankeny R.

Location Westmead Hospital and NSW Bone Marrow Transplant Network

2006-2007 Commonwealth Department of Health and Aged Care, Office of Health Protection grant

Subject A Cluster Randomised, Controlled clinical trial of surgical masks and particulate respirators in households for Control of Respiratory Virus Transmission.

Investigators MacIntyre CR, Booy R, Plant AJ, Dwyer D, Wang H, Burgess M, Browne, G, Seale H, Iskander M.

My Qualifications

MBBS (1st Class Honours) University of Sydney 1988

Master of Applied Epidemiology, Australian National University 1992

PhD (Epidemiology) Australian National University 1998

Fellow, Royal Australasian College of Physicians (FRACP) 1994

Fellow, Australian Faculty of Public Health Medicine (FAFPHM) 1995

My Awards

2020. Finalist, Australian Eureka Prizes

2017 Finalist, Australian Eureka Prizes

2017 CAPHIA Research Team Prize

2016 Elected a Fellow of The NSW Royal Society

2014 Public Health Association of Australia, National Immunisation Achievement Award.

2014 Peter Baume Public Health Impact Prize

2014 Certificate of Recognition Award to The NHMRC Centre for Research Excellence in immunization from the NSW Refugee Health Service during 2014 Refugee Week, for *Highly valued contribution to the promotion of health and wellbeing of refugees and humanitarian entrants.*

2014 ARM Network shortlisted for Australian Innovations Award

2012 Deans Award for Outstanding Achievement, UNSW Medicine. This is the highest award made by the Faculty of Medicine in recognition of significant achievements, usually over a prolonged period of time, by academic staff in the areas of education, research and community activity. This award recognises achievements of the highest standard that give great credit to the individual and to the Faculty.

2007 Sir Henry Wellcome Medal and Prize from the Association of Military Surgeons of the United States of America. Unsolicited award for the following work: MacIntyre CR, Secull A, Lane M, Plant AJ. Development of a risk priority scores for category A bioterrorism agents as an aid for public health policy. *Military Medicine*. 171(7):589-94, 2006 Jul.

2004 Robert & Elizabeth Albert Study Grant, Royal Australasian College of Physicians.

2003 Frank Fenner Award (Australian Society for Infectious Diseases) for Advanced Research in Infectious Diseases

2001 Royal Australasian College of Physicians, Best poster prize, Division of Adult Medicine

1997 ASID/ICI (Australian Society for Infectious Diseases) travelling scholarship

1995 AEA (Australian Epidemiologic Association) travelling scholarship for outstanding new researchers

1992 Australian Faculty of Public Health Medicine (Victoria) – best advanced trainee presentation.

Undergraduate Medicine and other Prizes - Sydney University

1984 A C Stephen Prize for English prose

1985 David Sugerman Prize for Pathology

1985 Allan Douglas Gillies Memorial Prize for Pathology

1985 Parkinson Memorial Prize for Pathology

1988 1st class honours in medicine

1982 Dux (top ranked student in HSC) of Sydney Girl's High School

1979 & 1980 City of Sydney Eisteddfod medal for debating

1978 & 1979 UNICEF Art awards.

My Research Activities

The Biosecurity Program is focused on global risk analysis, detection, prevention, mitigation, response and control of emerging infectious diseases and bioterrorism. We conduct research on emerging infectious diseases, rapid epidemic surveillance, field response, bioterrorism, bio-intelligence, and health security in a changing biotechnology landscape. We research the rapid detection and prevention of these threats. Our research includes prevention by both pharmaceutical and non-pharmaceutical means such as personal protective equipment and vaccines. The program engages widely with stakeholders from all disciplines involved in large scale epidemic response, such as health, field epidemiology, emergency management, defence, law enforcement, legal and ethics experts. We are working on several research studies of COVID-19 including transmission, modelling and epidemiology. We are continuing our work on face masks and respirators in prevention of infection, and also in prevention of bushfire smoke related health effects.

The re-emergence of smallpox is a credible threat due to advances in synthetic biology and availability of public methods for synthesis of orthopoxviruses, We are doing modelling research on the control of smallpox through various public health interventions.

My Research Supervision

Supervision keywords

Areas of supervision

ILP, PhD, Masters

Infectious diseases epidemiology, modelling, clinical research, epidemic infections, vaccines, influenza, COVID-19, MERS CoV, emerging infections, risk analysis

Currently supervising

PhD, ILP, Masters

My Engagement

National Geographic - origins of SARS CoV 2

Science News - cloth masks

2020 - the year that changed us

Fox News - cloths masks should be washed

Nature News - COVID-19 vaccines

BMJ Blogs - cloth face masks should be washed daily

New York Times - are bubble face shields the way of the future?

Time - masks

CNN news - mask research

CBS news - mask research

Time Magazine - facemasks

The Conversation - masks

new York Times - coronavirus

Politico

What is the threat of coronavirus - The Guardian

Has the coronavirus spread to Australia - Radio National

Should i get a face mask (Forbes)

National Public Radio US - face masks

Universal face mask use (Time magazine)

How worried should I be about masks during COVID 19?

Should patients with suspected coronavirus present to their GP?

Stopping the pandemic of coronavirus - opinion piece, SMH

Lunch with Raina MacIntyre

IFL Science

Pacific Eclipse

New research on smallpox - Homeland Security

Smallpox attack could be catastrophic - Homeland Preparedness News

Panel discussion at The JP Getty Museum, Los Angeles - Is civilisation on the verge of collapse? Public event in Los Angeles, USA.

Are we ready for pandemics (ABC) interview

New journal, Global Biosecurity, launched by UNSW

Simulated smallpox epidemic reveals global challenges

Podcast "Data, disruption and unnatural pandemics". AGSM Activation Event Oct 11 2016

<https://soundcloud.com/unswwbusiness/agsm-activate-data-disruption>

Interview on ABC TV on bird flu

The falling vaccine rates we don't hear about

Social media for disease outbreaks - fad or way of the future?

Global biosecurity threats

Thinking about getting the flu vaccine? here's what you need to know.

Taking the Ouch out of vaccines - the future of needle-free vaccination

Want to boost vaccination? Don't punish the parents

How are nurses becoming infected with Ebola?

Flu jab may halve heart attack risk

Vaccination isn't just for kids - a guide to vaccination for the over 65's

Banning unvaccinated kids from childcare may have unforeseen consequences

Threats in health security

In the news

UNSW VIRL

My Teaching

Course convenor and designer: Bioterrorism and Health Intelligence

Guest lecturer and course designer: Infectious Diseases Intelligence