BIENNIAL REPORT
January 2012 - December 2013

research + surveillance
The National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases (NCIRS) was established in August 1997. Core funding is provided by the Australian Government Department of Health, supplemented by an annual grant from the New South Wales Ministry of Health. NCIRS accommodation and infrastructure are provided by The Children’s Hospital at Westmead and the Centre is affiliated with the Discipline of Paediatrics and Child Health and the School of Public Health of the University of Sydney.

National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases
The Children’s Hospital at Westmead
Cnr Hawkesbury Rd and Hainsworth St, Westmead
Postal Address: Locked Bag 4001, Westmead NSW 2145, Australia
Phone: +61 2 9845 1433
Fax: +61 2 9845 1418
Email: danielle.grant@health.nsw.gov.au
Website: www.ncirs.edu.au

Through my chairmanship of the NHMRC Committee on Immunisation Procedures and National Immunisation Schedule responsible for writing *The Australian Immunisation Handbook* in the 1990s, and subsequently as a member and then Chair for a decade of the Australian Technical Advisory Group on Immunisation (ATAGI), it has been my great pleasure to see Australia move from a fragmented system of immunisation with low coverage and epidemics of measles and pertussis, to a truly world class National Immunisation Program and a landscape where life-threatening diseases such as bacterial meningitis have become rarities in Australian children.

Since joining the Strategic Advisory Group of Experts (SAGE) of the World Health Organization, I have become even more aware of the quality of immunisation service delivery and the comprehensive range of vaccines provided free of charge in Australia, even by comparison with other high income countries. The launch of the second National Immunisation Strategy (NIS) in 2014 provides a road map for Australia to maintain and improve on these achievements and to continue its leading role in the region and internationally, backed by strong national research and evaluation capacity.

In my role on ATAGI, I have been very aware of the volume and quality of the contributions which the National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases (NCIRS) makes to the work of ATAGI. Without the resources and expertise which NCIRS provides, ATAGI would be unable to function adequately – either in its responsibilities for writing of the world class *Australian Immunisation Handbook* or for reviewing emerging vaccine needs. The scope of this work is clear in this report of the Centre’s activities during 2012–13. As outlined in the background information provided with the National Immunisation Strategy, Australia has very strong resources to support its NIP, including the internationally envied Australian Childhood Immunisation Register, comprehensive national notification, hospitalisation and death data, and the National Serosurveillance Program maintained by NCIRS. The contribution of NCIRS to the various elements of the Strategy is evident throughout the 2012–13 report, as is the close alignment of its activities with it.
| CONTENTS |
|------------------|------|
| Foreword                     | i    |
| From the Director           | 1    |
| From the Head of Clinical Research | 3    |
| Mission and Vision, 2011–2016 | 4    |
| Strategic plan              | 5    |
| National Immunisation Strategy | 6    |
| NCIRS staff 2012–2013       | 8    |
| Management and governance   | 12   |
| Collaborations and partnerships | 15  |
| Policy support for the Australian Technical Advisory Group on Immunisation, the Department of Health and other peak immunisation groups in Australia | 18  |
| The Australian Immunisation Handbook, 10th edition | 22  |
| Surveillance of vaccine-preventable diseases | 24  |
| Australian Childhood Immunisation Register | 28  |
| Adverse events following immunisation | 31  |
| Serosurveillance            | 36   |
| Program evaluation          | 38   |
| Indigenous research         | 41   |
| Social science              | 45   |
| Disease modelling           | 49   |
| Clinical studies            | 51   |
| Paediatric Active Enhanced Disease Surveillance (PAEDS) | 58  |
| Centre of Research Excellence – Immunisation in under-studied and special-risk populations | 61  |
| International collaborations and committee memberships | 64  |
| Education and training      | 66   |
| Support for health professionals | 70  |
| Grants awarded in 2012–2013  | 73   |
| Staff awards and achievements | 75  |
| Publications by NCIRS staff 2012–2013 | 77  |
| Presentations by NCIRS staff 2012–2013 | 83  |
As documented in this report, 2012–2013 have been years of continued achievement and development for the National Centre for Immunisation and Research of Vaccine Preventable Diseases (NCIRS).

The National Immunisation Strategy (NIS) 2013–2018 is a landmark document for the Australian National Immunisation Program (NIP) in guiding future priorities. NCIRS has been proactive, over the 16 years since being established in 1997, in making key contributions to almost every area of the eight strategic priorities identified in the NIS. Prominent amongst these are improvements in immunisation coverage (Priority 1), in vaccine safety monitoring (Priority 4), in development of effective communication about immunisation (Priority 5), and particularly in strengthening monitoring and evaluation of the NIP (Priority 6). In addition, NCIRS has made major contributions to training and education of professionals, and has contributed to regional and global initiatives in immunisation (Priorities 7 and 8).

This breadth and depth of activity is reflected in this 2012–13 report. Also evident is the significant leverage we achieve above and beyond that delivered via the generous support received from our core funders – the Australian Government Department of Health, the New South Wales Ministry of Health, the Sydney Children’s Hospitals Network and the University of Sydney. This leverage has been achieved through collaborations, partnerships and successful funding applications.

Technical support from NCIRS staff underpins the central role of the Australian Technical Advisory Group on Immunisation (ATAGI) in the governance of immunisation in Australia (strategic Priority 2). This is both through developing clinical guidelines for immunisation, in The Australian Immunisation Handbook, and in providing advice to the Pharmaceutical Benefits Advisory Committee (PBAC) on vaccines for inclusion into the NIP. During 2012–13, ATAGI convened working parties for eight new and existing vaccines and the internationally recognised 10th edition of the Immunisation Handbook was published in February 2013.

In addition to work for ATAGI, significant contributions to surveillance of vaccine-preventable diseases, evaluation of immunisation coverage and programs, vaccine safety and social science are worthy of special mention and documented in this report. These include work in documenting measles elimination, measuring pertussis vaccine effectiveness, the timeliness of vaccine coverage, extensive evaluation of the rotavirus vaccine program demonstrating highly favourable risk-benefit, and work towards development of a national approach to vaccine hesitancy. The growing contribution of the Paediatric Active Enhanced Disease Surveillance (PAEDS) active hospital surveillance network, jointly managed by NCIRS and the Australian Paediatric Surveillance Unit (APSU), to vaccine effectiveness and vaccine safety monitoring has been through strong collaborations with all partners, strengthened by the addition of a new centre in Queensland. In all these activities, partnerships have been vital, drawing on the wide range of expertise available across Australia to allow Australia to achieve world-class standards in quality assessment and improvement for its NIP.

Evaluation of the unique New South Wales (NSW) program of cocoon vaccination to prevent severe pertussis in young infants was a major collaborative effort between NCIRS and the NSW Ministry of Health, and prompted an invited presentation to the Advisory Committee on Immunization Practices of the United States in 2013.

NCIRS staff have also been active in leadership and support of a number of competitively funded research grants based on collaborative networks in 2012-2013. Dr Nicholas Wood is leading national collaborations to study, first, associations between febrile convulsions and vaccination and, second, the effectiveness and safety of Australia’s unique Q fever vaccine. In recognition of this success, he was awarded a highly competitive Career Development Fellowship by the National Health and Medical Research Council (NHMRC). Professor Robert Booy and Dr Harunor Rashid have obtained funding from a number of sources to further pioneering work in Hajj-related research relevant in Australia and internationally. The Centre for Research Excellence (CRE) in Immunisation in Under-studied and Special-risk Populations has fostered a wide range of collaborative activities, with major contributions from NCIRS staff. In addition, Associate Professor Kristine Macartney, Dr Robert Menzies, Professor Robert Booy, Dr Nicholas Wood and Professor Peter McIntyre are Chief Investigators on collaborative grants with the University of New South Wales, Charles Darwin University, the University of Adelaide and the Sax Institute.

The scope and scale of the activities documented in this report all speak to NCIRS achieving its vision of being a centre of national and international standing in research and translation in vaccine-preventable diseases.
Our clinical research focuses on established, resurgent or newly emergent infections of importance, particularly those afflicting risk groups – the poor, pilgrims, and people vulnerable by age or immunosuppression.

This includes pertussis and influenza, meningococcal and pneumococcal disease, measles, mumps, rubella and varicella, and more recently, home-grown encephalitides (Murray Valley, Henipah) and the exotic Middle East Respiratory Syndrome.

The NCIRS clinical research program regarding the established diseases pertussis and influenza has been driven by concerns that vaccines are only moderately effective (often 50% or thereabouts) and that longevity of vaccine protection could be improved, and the potential for replacement of current vaccines by innovative new vaccines. Strategically identifying diseases of importance for active research has always been directed by weight of morbidity and/or mortality, in the context of both the advent of promising new vaccines and political will at national level.

It is increasingly clear however that the cost–benefit ledger regarding new vaccine implementation must be informed by wider dissection of two critical issues: infectious disease sequelae and vaccine adverse outcomes, be they immediate or delayed, direct or indirect, psychological, physical, educational or vocational. This additional strategic scaffold informs our clinical research program. Summarily, in one word, safety is the goal: protection from vaccine-preventable disease by affordable, well-tolerated vaccines.

Two new strategic areas of research are emerging:

1. Improved surveillance for new or re-emerging diseases
   Annual research with Australian Muslim Haj pilgrims (led by Dr Harunor Rashid and Professor Robert Booy) includes work on vaccine-preventable respiratory infections like influenza and pertussis, meningococcal and pneumococcal disease, as well as infection control measures, especially masks, and their interactions with vaccines to prevent symptomatic viral respiratory infections, especially influenza. Also under study are Middle East Respiratory Syndrome and acquisition of asymptomatic bacterial upper respiratory colonisation by, for example, pneumococcus, meningococcus and MRSA, paying additional attention to multiple antibiotic resistant organisms for which prevention will be increasingly pertinent.

2. Innovation in vaccine delivery
   In collaboration with Professor Mark Kendall, University of Queensland, we are exploring the application of nanopatch technology, figuratively and literally, to protection from existing human diseases like influenza and HPV. Pilot work in Papua New Guinea suggests probable high acceptance of a teenage female HPV vaccine program that could obviate the need for both cold chain deployment and healthcare worker vaccine delivery, and preclude needle phobia, pain of injection and cross-infection.
OUR MISSION

**Our role** is to foster the creation and translation of the evidence needed to inform best practice in the control of vaccine-preventable diseases in Australia.

**Our stakeholders** are our research and funding partners, the advisory committees we support, key professional bodies, and the broader community of health service providers.

**Our scope** of work includes clinical, epidemiologic and social research relevant to vaccine-preventable diseases.

**Our impact** is ultimately measured by how well vaccine-preventable diseases are controlled in Australia.

OUR VISION

To be recognised as a centre of national and international standing in the conduct and translation of research to policy and practice in vaccine-preventable diseases.

To achieve this Vision we:

- Drive and foster high quality research and surveillance relevant to immunisation policy
- Invest in growing our research programs and training capacity
- Play a significant role in the development of the next generation of researchers
- Are proactive in promoting communication and collaboration among key stakeholders
- Provide leadership in identifying emerging issues of relevance to Australia
The NCIRS Strategic Plan was reviewed and an updated version endorsed by the NCIRS Advisory Board in 2011. The Plan emphasises the primary importance of the role that NCIRS has established in initiating and maintaining **Partnerships and Relationships**. Our over-arching aim is to optimise relationships between researchers, policy makers and other stakeholders in vaccine-preventable disease control. Although many other groups in Australia have an important interest in and contribution to **Knowledge Creation**, NCIRS has the central role in **Knowledge Translation**. This arises from the Centre’s responsibilities for technical support to the Australian Government Department of Health (Australian Technical Advisory Group on Immunisation, Immunisation and Health Emergency Planning Branches of the Office of Health Protection, and the Therapeutic Goods Administration) and its contributions in national advisory groups such as the Communicable Diseases Network of Australia and the National Immunisation Committee.

The strategy sets out eight priority areas and is the key document guiding NCIRS work under the Australian government funding agreement. Below are summarised the roles which NCIRS takes in these priority areas, both directly and through collaborative research with other groups nationally and internationally.

**NCIRS ACTIVITIES**

**NIS PRIORITY 1**

*Improve immunisation coverage*

- Analysis and reporting of Australian Childhood Immunisation Register (ACIR) data
- Sources of coverage data outside the ACIR
- Indigenous coverage data
  - Tools to improve Indigenous coverage
- Contribution to CRE research into vaccination in high-risk populations
- Social science expertise/leadership in research to understand vaccine uptake
  - Development of Vaccine-Attitudes, Beliefs and Concerns (V-ABC) measure

**NIS PRIORITY 2**

*Effective governance of the National Immunisation Program*

- Technical support for Department of Health
- Technical support for Australian Technical Advisory Group on Immunisation (ATAGI)
- NCIRS role with Therapeutic Goods Administration (TGA) and Advisory Committee on the Safety of Vaccines (ACSOV)
- NCIRS role on National Immunisation Committee (NIC)
- NCIRS role with Communicable Diseases Network Australia (CDNA)
- Production and updating of The Australian Immunisation Handbook

**NIS PRIORITY 3**

*Efficient use of vaccines for the National Immunisation Program*

- Evaluation of immunisation programs
- Work with NIC in interpretation of national influenza and pneumococcal telephone surveys
- Modelling of program options

**NIS PRIORITY 4**

*Continue to enhance vaccine safety monitoring systems*

- Analysis and use of routinely reported data on adverse events following immunisation
- Development of safety plans for new vaccines
- Paediatric Active Enhanced Disease Surveillance (PAEDS)
- NCIRS role on NIC–TGA review group
- Linkage of ACIR data – collaboration with VaLiD (Vaccine Data Linkage Study)
- Grant-funded projects e.g. vaccine-related convulsions, Q fever study
- International liaison e.g. GBS study liaison with WHO
NIS PRIORITY 5
Maintain community confidence in the National Immunisation Program through effective communication strategies

- Reporting of surveillance data for vaccine-preventable diseases
- National Aboriginal and Torres Strait Islander Immunisation Network
- Social science expertise/leadership in research into communication
- Profile as independent and expert voice in media including social media
- Expert contribution to outside groups e.g. Australian Academy of Science for *Science of Immunisation*
- Publications and media coverage
- Community/public information fora
- Maternal immunisation research through CRE

NIS PRIORITY 6
Strengthen monitoring and evaluation of the National Immunisation Program through assessment and analysis of immunisation register data and vaccine-preventable disease surveillance

- Surveillance methodology and analysis for vaccine-preventable diseases
- Access to new sources and analysis and reporting of vaccine coverage data
- Hospital-based active surveillance
- Data linkage at state and national level
- Serosurveillance program with linkage to modelling
- Modelling of projected program impacts
- Evaluation of immunisation programs and relevant collaborations
  - Linkage to vaccine safety, coverage and impact measurement
- NCIRS role with CDNA
- Grant-funded initiatives e.g. ARC grant on post-implementation economic evaluation, NHMRC grant on adult immunisation, support for CRE bids in adolescent immunisation and modelling

NIS PRIORITY 7
Ensure an adequately skilled immunisation workforce through promoting effective training for immunisation providers

- Production and updating of *The Australian Immunisation Handbook*
- Production of educational resources to accompany *The Australian Immunisation Handbook*
- Workshops and seminars
- Publications
- Postgraduate student and professional training programs
- Maintenance and moderation of online forum for Australian Immunisation Professionals (AIP)
- Educational resources for immunisation providers including online modules
- Other online resources e.g. decision aid, Chain of Protection, website

NIS PRIORITY 8
Maintain Australia’s strong contribution to the region

- Technical support e.g. WHO Measles Elimination Report
- International collaborations with China and Timor Leste
- Mass gatherings WHO collaborating centre
- Contribution to WHO advisory groups – regional/global
- Publications
## NCIRS STAFF
### 2012–2013

**Director**  
Professor Peter McIntyre  

**Head, Clinical Research**  
Professor Robert Booy

**Deputy Director Government Programs**  
Associate Professor Kristine Macartney*

**Deputy Director Surveillance**  
Dr Rob Menzies

**Senior Principal Research Fellow**  
Professor Raina MacIntyre*

**Manager Surveillance**  
Dr Aditi Dey

**Manager Social Research**  
Associate Professor Julie Leask*

**Manager Policy Support**  
Dr Jane Jelfs†

**Medical Manager Vaccine Trials**  
Dr Leon Heron

**Public Health Physician**  
Dr Clayton Chiu

**Senior Clinical Research Fellow**  
Dr Frank Beard†

**Clinical Research Fellow**  
Dr Nick Wood*

**Public Health Registrar**  
Dr Tom Snelling**†

**Senior Research Fellow**  
Dr Rashmi Dixit†

**Research Fellow**  
Dr Jane Ho*

**Epidemiologist**  
Dr Jean Li-Kim-Moy*

**Epidemiologist, Clinical Research**  
Dr Alexa Dierig†

**National Indigenous Immunisation Coordinator**  
Dr Clark Maul†

**Project Officer, Evaluation of Immunisation Programs**  
Dr Derek Snelling**†

**Statistician/Data Manager**  
Dr Andrew Habig†

**Senior Policy Officer**  
Dr Latika Naidu†

**NHMRC Clinical Research Fellow**  
Dr Shopna Bag†

**Senior Research Fellow**  
Dr Andres Wattiaux*†

**Research Fellow**  
Dr Andrew Habig†

**Epidemiologist**  
Dr Andre Wattiaux*†

**Senior Research Fellow**  
Dr Heather Gidding*

**Research Fellow**  
Dr Helen Quinn*

**Epidemiologist**  
Dr Kerrie Wiley*

**Senior Research Fellow**  
Dr Hal Willaby*†

**Epidemiologist, Clinical Research**  
Mr Brynley Hull

**National Indigenous Immunisation Coordinator**  
Mr Brendan Kelaher*

**Project Officer, Evaluation of Immunisation Programs**  
Ms Stephanie Knox*†

**Statistician/Data Manager**  
Ms Kirsten Ward†

**Senior Policy Officer**  
Ms Han Wang

**NHMRC Clinical Research Fellow**  
Dr Sanjay Jayasinghe

**Senior Research Officer**  
Dr Iman Ridda†

**Senior Research Officer**  
Dr Deepika Mahajan

**Senior Research Officer**  
Dr Melina Georgousakis

**Senior Research Officer**  
Dr Lieu Trinh†
Research Officer

Dr Jiehui Kevin Yin
Ms Amy Vassallo†
Ms Maria Chow*
Mr Brett Archer†

Scientific Officer (Laboratory Studies – CIDM)

Ms Linda Hueston
Ms Jennifer Murphy**†
Ms Jocelynne McRae*†

PAEDS Coordinator

CNC Immunisation

Ms Kathryn Cannings
Ms Karen Orr**†

Research Nurse

Ms Pamela Cheung*
Ms Elizabeth Clarke*
Ms Edwina Jacobs*†
Ms Rose Joyce*
Ms Helen Knight*
Ms Laura Rost*
Ms Carol Shineberg*
Ms Sharon Tan†

Information Manager

Ms Catherine King*

Assistant Librarian

Mr Edward Jacyna*

Editing and Publications Officer

Ms Donna Armstrong*

Research Operations Manager

Ms Karyn Phillips*

Communications Officer

Ms Danielle Grant*

Accountant

Ms Rosalind Horner*†

Senior Administrative Officer

Ms Lynda Beaumont

Senior Project Administration Officer

Ms Nicole Jacobs

Ms Danielle Marchant*

Ms Danielle Cuthbert*†

Ms Joanne Perkins

Ms Lyn Benfield

* Part-time
† Employed for part of reporting period

A growing organisation


2010  2012  2013
POSTGRADUATE AND GRADUATE STUDENTS DURING 2012–2013

PhD, University of Sydney

Mr Mohamed Irfan Azeem
Dr Osamah Barasheed
Dr Julia Brotherton
Ms Maria Chow (awarded 2013)
Mr Paul Corben
Dr Fereshteh Dastouri
Dr Rashmi Dixit
Ms Elizabeth Hayles
Dr Sanjay Jayasinghe
Dr Gulam Khandaker (awarded 2013)
Ms Catherine King
Ms Xin Ting (Cynthia) Liu
Dr Jean Li-Kim-Moy
Mr Mohamed Tashani
Ms Kerrie Wiley
Dr Jiehui Kevin Yin (awarded 2013)

Master of Philosophy (Applied Epidemiology),
Australian National University

Ms May Chiew†
Ms Alexis Pillbury†

Master of Philosophy, University of Sydney

Ms Telphia Joseph
Ms Amy Creighton

Master of Public Health, University of Sydney

Dr Deepika Mahajan (awarded 2013)
Dr Melina Georgousakis (awarded 2013)

MBBS, University of Sydney

Ms Alexandra Henry
Mr Victor Ho

University of Sydney, Summer scholars

Ms Vyoma Patel (2013–2014)
Ms Gemma Saravanos (2013–2014)
Mr Andrew Carter
Dr Fereshteh Dastouri (2012–2013)
Mr Victor Ho (2012–2013)
Ms Nikita Randhawa (2012–2013)
Mr Anosh Sivashanmugarajah (2012–2013)
Ms Hatice Tekin (2012–2013)
Ms Diana Wang (2012–2013)
Ms Mandy Wang (2012–2013)
Ms Sophie Hale (2011–2012)
Ms Joanne del Rosario (2011–2012)
Ms Angelina Tjokrowidjaja (2011–2012)

Masters of Public Health and Tropical Medicine,
James Cook University

Ms Jennifer Schaefer
In September 2012, NCIRS staff and special guests gathered to celebrate our 15th anniversary and reflect on the growth and achievements of the Centre over that time.

Since its beginnings in 1997, NCIRS has grown from a group of less than 10 to a staff of over 50 and has become a multifaceted organisation with an extensive network of research relationships, as evidenced by the breadth of work described in the 2012-2013 report.

Special guests at the celebration included Professor Margaret Burgess (NCIRS founding director), Ms Julianne Quaine (Assistant Secretary, Health Protection Programs Branch, Australian Government Department of Health), Dr Jeremy McAnulty (Director, Health Protection, NSW Ministry of Health), Ms Elizabeth Koff (CEO, Sydney Children’s Hospitals Network), Professor Terry Nolan (ATAGI Chair), Professor Kathryn North (Associate Dean, University of Sydney), Professor Glenn Salkeld (Head, School of Public Health, University of Sydney) and Professor Raina MacIntyre (Head, School of Public Health and Community Medicine, University of New South Wales).
NCIRS ADVISORY BOARD

The Advisory Board monitors the governance, growth and financial sustainability of NCIRS and provides advice on the Centre’s strategic direction and organisational development.

Chair
Ms Elizabeth Koff, Chief Executive, Sydney Children’s Hospitals Network (Randwick and Westmead)

External members
Ms Sue Campbell-Lloyd AM, Manager, Immunisation Unit, AIDS/Infectious Diseases Branch, NSW Ministry of Health
Professor Chris Cowell, Director, Kids Research Institute, The Children’s Hospital at Westmead, Sydney Children’s Hospitals Network
Professor Lyn Gilbert, Director, Centre for Infectious Diseases and Microbiology – Public Health, Institute of Clinical Pathology and Medical Research, Westmead Hospital – Chair SAC (until 2012)
Professor Cheryl Jones, Deputy Dean Research, Discipline of Paediatrics and Child Health, Faculty of Medicine, University of Sydney, The Children’s Hospital at Westmead – Chair SAC (from 2012)
Ms Lisa McGlynn, Senior Executive, Health Group, Australian Institute of Health and Welfare (until 2012)
Ms Julianne Quaine, Assistant Secretary, Immunisation Branch, Office of Health Protection, Australian Government Department of Health
Professor Sally Redman, Chief Executive Officer, The Sax Institute
Professor Don Roberton, Pro Vice Chancellor, Division of Health Sciences, Dean, Faculty of Medicine, University of Otago, Division of Health Sciences, Dunedin, New Zealand
Professor Andrew Wilson, Director, Menzies Centre for Health Policy, University of Sydney
Ms Lis Wilson, Director of Finance and Corporate Services, Sydney Children’s Hospitals Network (Westmead) (from 2013)

NCIRS members
Professor Peter McIntyre, Director
Professor Robert Booy, Head, Clinical Research

Secretariat
Ms Karyn Phillips, Research Operations Manager, NCIRS

Observers
Associate Professor Kristine Macartney, Deputy Director Government Programs, NCIRS
Dr Rob Menzies, Deputy Director Surveillance, NCIRS
Ms Brigid Dohnt, Director, Immunisation Policy Section, Immunisation Branch, Office of Health Protection, Australian Government Department of Health (from 2013)
Ms Monica Johns, Director, Immunisation Policy, Targeted Prevention Programs Branch, Population Health Division, Australian Government Department of Health and Ageing (until 2013)
SCIENTIFIC ADVISORY COMMITTEE

The role of the Scientific Advisory Committee is to contribute to and endorse NCIRS’s long-term national research and surveillance strategy; to systematically monitor the performance of NCIRS scientific outcomes; to monitor the quality of the research and surveillance systems and processes used by NCIRS in its work; and to identify emerging matters that should be incorporated into the long-term strategy.

Chair

Professor Lyn Gilbert, Director, Centre for Infectious Diseases and Microbiology, Institute of Clinical Pathology and Medical Research, Westmead Hospital (until 2012)

Professor Cheryl Jones, Deputy Dean Research, Discipline of Paediatrics and Child Health, Faculty of Medicine, University of Sydney, The Children’s Hospital at Westmead (from 2012)

Deputy Chair

Associate Professor Heath Kelly, Head, Epidemiology Division, Victorian Infectious Diseases Reference Laboratory

External members

Previous members

Professor Jonathan Carapetis, Director, Menzies School of Health Research (until 2012)

Ms Stephanie Newall, Consumer representative (until 2013)

Current members

Professor Sandra Eades, Professor of Public Health, School of Public Health, University of Sydney


Professor Elizabeth Elliott, Director, Australian Paediatric Surveillance Unit, The Children’s Hospital at Westmead

Associate Professor Mike Gold, Senior Lecturer, University Department of Paediatrics and the South Australian Immunisation Coordination Unit, Women’s and Children’s Hospital, Adelaide

Professor John Kaldor, Deputy Director, The Kirby Institute for Infection and Immunity in Society

Associate Professor Stephen Lambert, Public Health Physician, Queensland Children’s Medical Research Institute

Associate Professor John Litt, Senior Lecturer, Discipline of General Practice, Flinders University

Associate Professor Ben Marais, Discipline of Paediatrics and Child Health, The Children’s Hospital at Westmead, University of Sydney (from 2013)

Ms Alison Marcus, Consumer Health Forum representative (from 2013)

Associate Professor Helen Marshall, Director, Vaccinology and Immunology Research Trials Unit, Women’s and Children’s Hospital, Adelaide

Associate Professor Jodie McVernon, Deputy Head, Vaccine and Immunisation Research Group, Murdoch Childrens Research Institute and School of Population Health, University of Melbourne

Professor Terry Nolan, Head, School of Population Health, University of Melbourne, Royal Children’s Hospital, Melbourne – ATAGI representative

Associate Professor Peter Richmond, Head, Vaccine Trials Group, Telethon Institute for Child Health Research

Associate Professor Lyndal Trevena, Primary Healthcare, School of Public Health, University of Sydney; General practitioner
| Government representatives | Ms Sue Campbell-Lloyd, Manager, Immunisation Unit, AIDS/Infectious Diseases Branch, NSW Ministry of Health  
Ms Brigid Dohnt, Director, Immunisation Policy Section, Immunisation Branch, Office of Health Protection, Australian Government Department of Health (from 2013)  
Dr Yasmine Gray, Director, Vaccine Preventable Disease Surveillance, Office of Health Protection, Australian Government Department of Health and Ageing (until 2012)  
Ms Rhonda Owen, Director, Vaccine Preventable Diseases Surveillance Section, Office of Health Protection, Australian Government Department of Health (from 2013) |
|---|---|
| NCIRS members | Professor Raina MacIntyre, Head, School of Public Health and Community Medicine, University of New South Wales and Senior Principal Research Fellow, NCIRS  
Professor Peter McIntyre, Director  
Professor Robert Booy, Head, Clinical Research  
Associate Professor Kristine Macartney, Deputy Director Government Programs  
Dr Rob Menzies, Deputy Director Surveillance |
| Secretariat | Dr Melina Georgousakis, Senior Research Officer, NCIRS (from 2013)  
Ms Danielle Marchant, Personal Assistant to Professor Robert Booy, NCIRS (until 2013) |
NCIRS continues to develop and foster a wide range of networks and collaborations with many individuals and organisations at local, state, national and international levels. NCIRS would like to acknowledge the following individuals with whom we collaborated during 2012–2013 and thank them for their input into NCIRS’s research programs.

**Surveillance of vaccine-preventable diseases**

Ms Rhonda Owen, Ms Nicolee Martin, Ms Christina Bareja and Ms Kate Pennington, Vaccine Preventable Disease Surveillance, Department of Health, Canberra
Dr Vicky Sheppeard, Ms Paula Spokes, Ms Robyn Gilmour and Mr Chris Lowbridge, NSW Ministry of Health
Dr James Wood and Dr Heather Gidding, School of Public Health and Community Medicine, University of New South Wales

**Australian Childhood Immunisation Register**

Associate Professor Stephen Lambert, Queensland Children’s Medical Research Institute, Queensland Health Immunisation Program
Dr Anthony Newall, School of Public Health and Community Medicine, University of New South Wales
Ms Karen Peterson, Queensland Health
Dr Sarah Sheridan, Queensland Children’s Medical Research Institute, University of Queensland

**Adverse events following immunisation**

Professor Julie Bines, Dr Jim Buttery and Dr Nigel Crawford, Murdoch Childrens Research Institute, Melbourne
Ms Sue Campbell-Lloyd, Dr Sarah Moberley and Ms Su Reid, NSW Ministry of Health
Professor John Carlin and Dr Katherine Lee, Murdoch Childrens Research Institute, Melbourne
Dr Jane Cook, Dr Bronwen Harvey and Dr Richard Hill, Therapeutic Goods Administration, Canberra
Dr Michael Crampton, WentWest Limited, Blacktown, New South Wales
Dr Stephanie Davis, Australian National University, Canberra
Associate Professor Mike Gold, University of Adelaide
Dr Glenda Lawrence, University of New South Wales
Associate Professor Peter Richmond and Associate Professor Christopher Blyth, Princess Margaret Hospital for Children, Perth

**Adverse events clinical service**

Dr Jim Buttery, Monash Medical Centre, Melbourne
Dr Nigel Crawford and Dr Jenny Royle, Royal Children’s Hospital, Melbourne
Associate Professor Mike Gold, Women’s and Children’s Hospital, Adelaide
Associate Professor Michael Nissen, Royal Children’s Hospital, Brisbane
Associate Professor Peter Richmond, Princess Margaret Hospital for Children, Perth
Serosurveillance

Professor Dominic Dwyer, Dr Linda Hueston, Ms Katherine Tuda, Ms Fiona Blyth, Ms Samantha Lesic and Mr Laurence McIntyre, Centre for Infectious Diseases and Microbiology (CIDM) Public Health
Professor Raina MacIntyre, Dr James Wood, Dr David Philp, Dr Zhanhai Gao and Mr Ning Song, School of Public Health and Community Medicine, University of New South Wales

A list of participating laboratories is included in the ‘Serosurveillance’ section of this report.

Program evaluation

Mr Michael Batchelor and Ms Helen Pitcher, Immunisation Unit, Department of Health Victoria
Ms Carolyn Banks, Communicable Disease Control, ACT Health
Dr Tracey Bessell, Screening, Cancer and Palliative Care Branch, Australian Government Department of Health
Ms Michelle Bradley, Ms Emma Hill and Mr Joel Willis, Australian Government Department of Health
Dr Julia Brotherton, Victorian Cytology Service, Melbourne
Dr Alison Budd and Mr Justin Harvey, Australian Institute of Health and Welfare, Canberra
Ms Sue Campbell-Lloyd, Immunisation Unit, NSW Ministry of Health
Dr Jane Cook, Dr Bronwen Harvey and Dr Richard Hill, Therapeutic Goods Administration, Canberra
Dr Rosemary Lester, Communicable Diseases Network Australia
Dr Bette Liu, Ms Megan Smith and Associate Professor Karen Canfell, University of NSW
Ms Kerry Nettle and Mr David Coleman, Department of Health and Human Services, Tasmania
Ms Karen Peterson, Queensland Health Immunisation Program
Ms Megan Skully, Communicable Disease Control Directorate, WA Health
Ms Maureen Watson, Immunisation Section, SA Health
Ms Helena White and Ms Sharon Murray, Centre for Disease Control, Northern Territory Department of Health

Indigenous research

Dr Penny Abbott, Western Sydney Aboriginal Medical Service
Ms Melinda Hassall and Dr Aaron Hollis, Queensland Aboriginal and Islander Health Council
Dr Ann Koehler, Communicable Disease Control Branch, South Australian Department of Health and Ageing
Dr Peter Markey and Ms Rowena Boyd, Centre for Disease Control, Northern Territory Department of Health
Professor Neil Thomson, Edith Cowan University, Perth

Disease modelling

Professor Raina MacIntyre, Dr James Wood, Dr Anthony Newall, Dr Zhanhai Gao, Dr Anita Heywood and Dr Heather Gidding, School of Public Health and Community Medicine, University of New South Wales
Associate Professor Jodie McVernon and Ms Patricia Campbell, School of Population Health, University of Melbourne
Associate Professor Philippe Beutels and Dr Niel Hens, University of Antwerp, Belgium

Social research

Dr Helen Bedford, University College, London
Dr Richard Bellingham, Westmead Hospital Department of Obstetrics and Gynaecology
Professor Francine Cheater, University of East Anglia, UK
Dr Spring Cooper Robbins, Discipline of Sexual Health, University of Sydney
Dr Margie Danchin, Murdoch Childrens Research Institute, Melbourne
Dr Claire Hooker and Associate Professor Ian Kerridge, Centre for Values Ethics and the Law in Medicine, University of Sydney
Dr Cath Jackson, University of York, UK
Professor Paul Kinnersley, Cardiff University, Wales
Dr Heidi Larson, London School of Hygiene and Tropical Medicine
Associate Professor Helen Marshall, University of Adelaide
Dr Peter Massey, Hunter New England Area Health Service, New South Wales
Dr Robert Ogle, Royal Prince Alfred Women and Babies, Sydney
Dr Greg Rowles, GP, National Immunisation Committee
Dr Nick Sevdalis Imperial College, London
Associate Professor John Sinn, Royal North Shore Hospital Obstetrics and Gynaecology, Sydney
Professor Rachel Skinner, Discipline of Paediatrics and Child Health, University of Sydney
Dr Tom Snelling and Dr Claire Waddington, Telethon Institute for Child Health Research, Perth
Associate Professor Lyndal Trevena, School of Public Health, University of Sydney
Health Survey Program, NSW Ministry of Health

Paediatric Active Enhanced Disease Surveillance (PAEDS)

Professor Elizabeth Elliott, Associate Professor Yvonne Zurynski and Ms Marie Deverell, Australian Paediatric Surveillance Unit, Sydney
Associate Professor Peter Richmond, Associate Professor Christopher Blyth, Ms Carol Orr, Ms Christine Robbins and Ms Caroline Talbot, Princess Margaret Hospital for Children, Perth
Dr Jim Buttery, Dr Nigel Crawford, Ms Victoria Scott, Ms Donna Lee, Ms Alissa McMinn, Ms Georgie Lewis, Ms Julie Quinn, Ms Leonie Hickie and Ms Tammy Hutchinson, Royal Children’s Hospital, Melbourne
Associate Professor Mike Gold, Associate Professor Helen Marshall, Ms Chris Heath and Ms Mary Walker, Women’s and Children’s Hospital, Adelaide
Professor Cheryl Jones, Dr Philip Britton, Dr Marino Festa and Professor Russell Dale, The Children’s Hospital at Westmead, Sydney
Associate Professor Michael Nissen, Dr Anne Kynaston, Dr Natalie Phillips and Ms Sonia Dougherty, Royal Children’s Hospital, Brisbane
Dr Tom Snelling, Telethon Institute for Child Health Research, Perth
FluCAN (The Influenza Complications Alert Network) investigators: Associate Professor Allen Cheng, Dr Niels Becker, Professor Paul Kelly, Associate Professor Tom Kotsimbos and Dr Anna Reynolds
Dr Robert Hall, Monash University, Melbourne
Dr Bruce Thorley and Ms Linda Hobday, Victorian Infectious Diseases Reference Laboratory, Melbourne
Professor Dominic Dwyer and Dr Cheryl Toi, Institute of Clinical Pathology and Medical Research, Westmead Hospital, Sydney
Professor Julie Bines, Dr Margie Danchin, Dr Katherine Lee and Professor John Carlin, Murdoch Childrens Research Institute, Royal Children’s Hospital, Melbourne
Professor Alison Kesson, The Children’s Hospital at Westmead, Sydney
Members of the Polio Expert Panel of the Communicable Diseases Network of Australia (CDNA)
Representatives of participating state health departments

Clinical studies

Professor Terry Nolan, University of Melbourne and Murdoch Childrens Research Institute
Associate Professor Peter Richmond, Princess Margaret Hospital for Children, Perth
Associate Professor Helen Marshall, University of Adelaide and Women’s and Children’s Hospital, Adelaide
Professor Dominic Dwyer, Institute for Clinical Pathology and Medical Research (ICPMR), Westmead Hospital, Sydney

For collaborators and co-investigators on grant-funded studies, please see individual projects in the ‘Clinical studies’ section of this report.
OVERVIEW

One of the major roles of NCIRS is to provide technical support to the Australian Technical Advisory Group on Immunisation (ATAGI), a Ministerial Advisory Committee of the Australian Government Department of Health, which advises on national immunisation policy in Australia.

NCIRS analyses relevant Australian data, synthesises international literature and drafts documents for review by ATAGI and the Department of Health. This work directly supports development of immunisation policy recommendations. NCIRS also drafts documents for ATAGI review that support the Pharmaceutical Benefits Advisory Committee (PBAC) in evaluating the cost-effectiveness of vaccines for potential inclusion on the National Immunisation Program (NIP).

A major responsibility of ATAGI is production of The Australian Immunisation Handbook in which NCIRS staff play a major role (see later section on The Australian Immunisation Handbook). In addition, NCIRS drafts other ATAGI statements that are published on the Department of Health website, for example, annual influenza vaccine statements and advice about new vaccines. These publications assist all healthcare professionals involved in immunisation in Australia.

These activities are funded by the Australian Government Department of Health.

KEY ACTIVITIES

SUPPORT FOR ATAGI WORKING PARTIES

The Policy Support group within NCIRS provides technical support for a number of concurrent ATAGI Working Parties. These Working Parties closely examine evidence relating to specific vaccine-preventable diseases and/or vaccines and evaluate the earliest available data from clinical studies of new vaccines.

NCIRS support for ATAGI Working Parties includes critical appraisal and synthesis of data regarding disease burden and severity, vaccine effectiveness and safety, and practical aspects of vaccine program implementation. NCIRS also provides analysis of epidemiologic data to address specific policy-relevant issues and, in some cases, disease modelling projects may also be undertaken. NCIRS staff draft numerous reports and documents for review by ATAGI Working Party members and subsequently the ATAGI.

Much of the information provided to ATAGI Working Parties by NCIRS serves to inform implementation of the National Immunisation Strategy priorities relating to improvement of immunisation coverage, including in high-risk population groups, and continued enhancement of vaccine safety monitoring systems.

During 2012–2013, NCIRS supported eight ATAGI Working Parties examining issues related to the vaccine-preventable diseases and vaccines described below.

FAST FACTS

During 2012–2013, NCIRS staff generated approximately 140 technical papers/reports to ATAGI and almost 60 papers related to production of the 10th edition of The Australian Immunisation Handbook.

During 2012–2013, NCIRS staff drafted and edited 9 ATAGI documents providing advice to the PBAC on 3 vaccine types (including 6 documents related to MMRV vaccine).
MENINGOCOCCAL DISEASE

Meningococcal disease, although relatively rare, is a life-threatening condition which can cause severe morbidity in surviving children. With the large reduction in meningococcal C disease since the introduction of the meningococcal C vaccine in 2003, most meningococcal disease in Australia is now due to the meningococcal B serogroup. The Meningococcal Working Party has focused on assessing the burden from meningococcal B disease in Australia and, in the context of a new meningococcal B vaccine being available in 2014, vaccine effectiveness and safety and practical aspects of vaccine program implementation.

NCIRS supported the Working Party by synthesising data on disease epidemiology, vaccine characteristics such as efficacy and safety, nasal carriage, and identification of strain types. This work is critical in assessing the potential impact of a new vaccine. NCIRS also provided technical support for the development of ATAGI’s statement on meningococcal disease published on the Department of Health website in early 2014.

PERTUSSIS

The Pertussis Working Party has reviewed the emerging evidence on the duration of effectiveness of acellular pertussis vaccines and the effectiveness of alternate strategies for protecting newborn infants against pertussis.

One of the most important inputs into this work was an NCIRS study of the effectiveness of pertussis vaccine in preventing disease in the first 4 years of life. This study relied on additional data provided specifically for this purpose by the Communicable Diseases Network Australia (CDNA). The data showed that one dose of acellular pertussis vaccine provided around 50% protection, and this increased to around 85% after two doses. This emphasises the importance of infants receiving their first vaccine dose early (from 6 weeks of age) and the second and third doses on time. The study also demonstrated that protection waned after 2 years of age, emphasising that it is best to give the fourth vaccine dose between 3½ and 4 years of age. Severe disease requiring hospitalisation was very uncommon in fully vaccinated children. The Working Party also examined another NCIRS-led collaborative study with the New South Wales Ministry of Health which evaluated the effectiveness of vaccinating close contacts of newborn infants (the ‘cocoon’ strategy) in preventing pertussis in young infants. (See the section ‘Program evaluation’ for more information.)

HUMAN PAPILLOMAVIRUS

With the inclusion of the human papillomavirus (HPV) vaccine for boys on the NIP, Australia became the first country to provide a fully funded public HPV vaccination program for boys. Roll-out of the program began in early 2013 with adolescent boys included in the school-based program already operating for girls.

The ATAGI HPV Working Party, with technical input from NCIRS, played a key role in providing advice to the PBAC and Department of Health prior to program commencement.

ATAGI and the National Immunisation Committee (NIC) formed a combined HPV program implementation working group, with leadership and technical support from NCIRS, to develop a vaccine safety surveillance plan for the new HPV program. Although the vaccine had an established good safety profile in girls, the safety plan will be used to gather more data specific to boys.

HEPATITIS B

The Hepatitis B Working Party is examining the epidemiology and disease burden of hepatitis B in people at high risk of hepatitis B, including those identified in the National Hepatitis B Strategy.

The Working Party examined data on the efficacy, immunogenicity and safety of hepatitis B vaccines in high-risk groups, with the initial focus on the implications for vaccine use in Aboriginal and Torres Strait Islander people.
This work aims to understand the epidemiology of hepatitis B disease and the proportion of disease in older Indigenous adults that could be prevented by vaccination. There is still a disparity in disease burden between Indigenous and non-Indigenous adults and expanded use of hepatitis B vaccine could reduce this. NCIRS has used various methods, including modelling, to support the Working Party in reviewing this issue.

**VARICELLA-ZOSTER**

The Varicella-Zoster Working Party, with technical input from NCIRS, developed a series of documents for review by ATAGI and the Department of Health in formulating advice around the incorporation of the measles-mumps-rubella-varicella (MMRV) vaccine into the NIP schedule at 18 months of age.

Because children who receive their first dose as MMRV vaccine have a slightly higher risk of fever than those who get the MMR and varicella vaccines separately, MMRV is recommended under the NIP for use as the second MMR-containing vaccine.

ATAGI endorsed a vaccine safety plan that included a range of activities to confirm that MMRV has a good safety profile when used under the NIP. Safety monitoring activities since vaccine introduction in July 2013 have included active hospital-based surveillance of febrile seizures occurring after vaccination (see the section ‘Paediatric Active Enhanced Disease Surveillance’ for more information).

The Working Party was also called on to advise the PBAC regarding potential inclusion of the herpes zoster vaccine on the NIP for older people. Although this live attenuated vaccine to prevent zoster in older people has been registered for a number of years, it has only recently become available in Australia.

**PNEUMOCOCCAL DISEASE**

Following the roll-out of the 13-valent pneumococcal conjugate vaccine (13vPCV) program in children in 2011, the Pneumococcal Working Party has reviewed data on the early impact of 13vPCV in the context of Australia’s unique schedule of three primary doses at 2, 4 and 6 months of age. The population impact on invasive pneumococcal disease of the additional six types in the childhood vaccine (compared to the previously used 7-valent vaccine) is also being evaluated. (See also the section ‘Surveillance of vaccine-preventable diseases’ for more information on this work.)

The Working Party is also examining issues around the expanded use of the 13-valent vaccine in other at-risk groups, such as those who have medical conditions and the elderly.

In anticipation of the availability in early 2014 of results from a large clinical trial of the impact of 13vPCV on community acquired pneumonia in persons aged over 65, the Working Party has done a large amount of work evaluating the evidence on the impact of the 23-valent pneumococcal polysaccharide vaccine which is currently used in this age group.

**INFLUENZA**

The Influenza Working Party has re-examined the burden of influenza in young children, especially Indigenous children. NCIRS has also supported the Working Party to examine the burden of disease in certain high-risk groups for whom influenza vaccination is recommended but not currently funded under the NIP (e.g. people who are obese or who have chronic liver disease) and has contributed to the immunisation sections of the revised Australian Health Management Plan for Pandemic Influenza.

**RABIES**

The Rabies Working Party was jointly convened by ATAGI and CDNA and was supported by NCIRS. This work generated a major update of material for the 10th edition of *The Australian Immunisation Handbook* and updating of the CDNA National Guidelines for Public Health Units on rabies virus and other lyssavirus (including Australian bat lyssavirus) exposures and infections. These publications include extensive recommendations on the use of rabies vaccine as pre- and post-exposure prophylaxis.

As new questions arise regarding the use of immunisation to prevent rabies, NCIRS and ATAGI have continued to provide assistance to the Department of Health.

**SUPPORT FOR THE AUSTRALIAN GOVERNMENT DEPARTMENT OF HEALTH**

One of the key roles of NCIRS is to provide expert and rapid assistance to the Australian Government Department of Health. Some specific examples of this are included below.

**IMPACT AND IMPLICATIONS OF SCHOOL ENTRY VACCINATION REQUIREMENTS**

In response to data showing gaps in vaccination coverage in Australia and outbreaks of measles, there was a Ministerial request for NCIRS to summarise the available evidence on the strength of the case for more stringent
requirements for documentation of immunisation status at school entry.

NCIRS prepared a report on the issue which provided an overview of where Australia currently sits with respect to vaccine coverage, school entry vaccination requirements currently in place in Australia, and a summary of the published evidence on the impact of school entry vaccination requirements. Data on measles in Australia was used as a case study to assess the applicability and potential magnitude of the impact of school entry requirements in the Australian setting.


MYTHS AND REALITIES: RESPONDING TO ARGUMENTS AGAINST IMMUNISATION

Myth and realities: responding to arguments against immunisation is a long-established tool summarising the data on common concerns about immunisation that health professionals encounter in discussions with parents or patients. It provides the facts to assist practitioners and parents in making an informed choice about the benefits and risks of vaccination.


Myths and Realities provides a key resource to support the National Immunisation Strategy priority of maintaining and ensuring community confidence in the National Immunisation Program.

ADVICE TO OTHER PEAK BODIES

NCIRS is unique in the range of roles that senior members of the organisation undertake across key federal, state and territory bodies. In this capacity, NCIRS provides a wide range of inputs that contribute to implementation of various National Immunisation Strategy priorities.

Collaborations with and contributions to other key organisations such as the Communicable Diseases Network Australia and the Australian Institute of Health and Welfare are described in the ‘Surveillance of vaccine-preventable diseases’ section of this report.

NATIONAL IMMUNISATION COMMITTEE

NCIRS has a key role in critiquing, testing and advising on technical issues coming to the National Immunisation Committee (NIC). Input provided to the NIC by NCIRS includes reports on program evaluations, disease surveillance, adverse events, vaccination coverage and other research performed by NCIRS. Peter McIntyre is the NCIRS representative on NIC.

The National Indigenous Immunisation Coordinator Brendon Kelaher is also a member of the NIC and provides input to the committee on issues relating to immunisation of Indigenous people and convenes the National Aboriginal and Torres Strait Islander Immunisation Network (see the section ‘Indigenous research’ for more information).

Rob Menzies and Brynley Hull are members of the NIC Data Subcommittee. NCIRS provides advice to the subcommittee on reporting of data from the Australian Childhood Immunisation Register (ACIR) and immunisation coverage related issues. (See also the section ‘Australian Childhood Immunisation Register’ for more information on NCIRS’s role in reporting on ACIR data.)

THERAPEUTIC GOODS ADMINISTRATION

NCIRS has worked with the TGA since 2003 to analyse and report data on adverse events following immunisation reported to the TGA. These analyses are published every 6 months (see the section ‘Adverse events following immunisation’ for more information).

In addition, NCIRS has provided broader technical support to the TGA on an ad hoc basis. For example, NCIRS staff contributed to short-term specially convened TGA/ATAGI working groups that examine and provide advice on specific vaccine safety issues. See the section ‘Adverse events following immunisation’ for more detail on the work done by NCIRS for these working groups.
The Australian Immunisation Handbook is the pre-eminent guideline on immunisation in Australia. It is considered the ‘immunisation bible’ and is a vital resource for all healthcare professionals delivering immunisation in Australia, providing recommendations on the safe and effective use of all vaccines.

The Handbook and associated resources produced by NCIRS are vital components of the National Immunisation Strategy, contributing to effective training for immunisation providers and maintaining provider and community confidence in the National Immunisation Program.

Production of the Handbook is a major responsibility of the Australian Technical Advisory Group on Immunisation (ATAGI) and NCIRS has taken the main role in coordinating production of the last three editions including the most recent 10th edition. Requirements for production of the Handbook have steadily increased for each of these editions. The 10th edition of the Handbook is over 500 pages long and involved more than 20 NCIRS staff for over 2 years. NCIRS was responsible for searching and collation of literature, evidence synthesis, technical writing (working closely with members of the ATAGI) and technical editing.

The 10th edition of the Handbook was endorsed by the National Health and Medical Research Council (NHMRC) in November 2012 and published by the Australian Government Department of Health in February 2013.

NCIRS also coordinates and prepares updates to the Handbook as required, for review by ATAGI and subsequent endorsement by the NHMRC. Modifications and updates to the 10th edition of the Handbook were published online (www.immunise.health.gov.au) in mid 2013 and January 2014.

NCIRS also conducts a continual process of scoping new information and evaluating important new evidence as it emerges, and responds to queries on Handbook content in conjunction with the ATAGI and the Department of Health.

Associated Resources

To accompany the 10th edition of the Handbook, NCIRS developed a set of resources for use by immunisation providers:

- a What’s new in the 10th edition presentation summarising changes in the new Handbook, for use as an educational teaching tool
- a video of the What’s new presentation given by Kath Cannings, Immunisation Clinical Nurse Consultant at NCIRS, for personal education and/ or group training
- a user-friendly set of individual PDFs of all tables and selected figures from the 10th edition Handbook, for use as standalone resources.

These resources are all available on the NCIRS website (www.ncirs.edu.au/immunisation/index.php).
fastfacts

37 chapters + 500 pages

3 Technical editors
12 Technical writers
3 Library and editorial support
3 Coordinators
1 Administration support
2 External technical writers
49 External reviewers
10 ATAGI sponsors

the evolution 1975 - 2013
SURVEILLANCE OF VACCINE-PREVENTABLE DISEASES

OVERVIEW

Australia is fortunate to have access to a wide range of surveillance datasets for which appropriate and timely analysis is crucial to ensure that immunisation programs are working appropriately in the relevant age and population group(s).

Effective and reliable surveillance of vaccine-preventable diseases is vital to the implementation of a number of the priorities of the National Immunisation Strategy.

NCIRS has a key role, through interaction with the Communicable Diseases Network Australia (CDNA), in developing and enhancing disease surveillance methodology aimed at improving the accuracy and relevance of the data collected.

For vaccine-preventable diseases, NCIRS holds or has access to national datasets for notifications (supplied by CDNA members) and hospitalisations and deaths (from the Australian Institute of Health and Welfare). For vaccine coverage, data come from the Australian Childhood Immunisation Register (ACIR), and the Therapeutic Goods Administration (TGA) provides data on adverse events following immunisation. (See also the sections ‘Australian Childhood Immunisation Register’ and ‘Adverse events following immunisation’.)

NCIRS also conducts a national serosurveillance program in collaboration with the Centre for Infectious Diseases and Microbiology (see the section ‘Serosurveillance’ for more details).

These datasets all contribute to surveillance reports produced by NCIRS, often in combination.

KEY ACTIVITIES

PROJECTS FUNDED BY THE AUSTRALIAN GOVERNMENT DEPARTMENT OF HEALTH

HIGHLIGHT

VACCINE PREVENTABLE DISEASES AND VACCINATION COVERAGE IN ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLE, 2006 TO 2010

Publication of regular reports on vaccine-preventable diseases (VPDs) and vaccination coverage in Aboriginal and Torres Strait Islander people has been an ongoing responsibility for NCIRS since 2004. The third report in this series was published in December 2013.*

Indigenous people are often at higher risk and more seriously affected by vaccine-preventable diseases than other Australians. The NCIRS reports on VPDs and vaccination coverage in Aboriginal and Torres Strait Islander people provide important information relevant to the National Immunisation Strategy priorities of improving immunisation coverage and access to immunisation in this high-risk population group.

*See also the sections ‘Serosurveillance’ for more details.
These reports bring together the relevant sources of routinely collected data on vaccine-preventable diseases (VPDs) in Aboriginal and Torres Strait Islander people – notifications, hospitalisations, deaths, and childhood and adult vaccination coverage. NCIRS also provides comprehensive analysis of trends in disease burden, vaccination coverage and vaccine timeliness to inform providers and planners of immunisation services of the current status and future needs for vaccination programs in Aboriginal and Torres Strait Islander people.

Some of the major findings of the latest report included:

- The hepatitis A vaccination program for Aboriginal and Torres Strait Islander children has been very successful; this disease is now less common in Aboriginal and Torres Strait Islander Australians than in non-Indigenous Australians.
- Meningococcal B disease is more than twice as common in Aboriginal and Torres Strait Islander children than in non-Indigenous children.
- There has been some improvement in vaccination timeliness of Aboriginal and Torres Strait Islander children in recent years, but it continues to be poorer than in non-Indigenous children. The addition of rotavirus vaccine with its upper age limits has increased the importance of timely vaccination.
- Rotavirus is now less common in Australia, but epidemics still occur in Central Australia.
- Many Indigenous people have chronic health conditions that exacerbate seasonal and pandemic influenza, causing a greater disease burden than in other Australians. Influenza vaccine is now free for all Indigenous Australians over 15 years of age and achieving high coverage should now be a priority.

Acknowledgement – Data used in the production of this report were provided by the National Notifiable Diseases Surveillance System and the Australian Institute of Health and Welfare.


MEASLES TRANSMISSION IN AN ERA OF ELIMINATION

Endemic transmission of measles has effectively been eliminated in Australia since 2005. The only cases of measles occurring in Australia now can be traced to cases acquired overseas. However, it is important to continually monitor the situation to avoid the return of endemic measles transmission in Australia.

This study used national notification data from Australia’s National Notifiable Diseases Surveillance System to examine trends over time and to estimate the ‘reproduction number’ (known as R) for measles (i.e. the average number of secondary cases from each infectious case). R must remain below 1 to meet criteria for disease elimination. For the years 2009 to 2011, R was estimated by three different methods to be below 1, indicating that measles elimination is being maintained in Australia.

This study* was published in the Bulletin of the World Health Organization in early 2014.


PERTUSSIS EPIDEMIOLOGY AND VACCINE EFFECTIVENESS IN YOUNG CHILDREN

In the past 20 years, pertussis immunisation policy in Australia has seen major changes, yet pertussis remains a significant problem. To evaluate recent vaccine schedule changes it is necessary to know how disease epidemiology and vaccine effectiveness has changed over time in different age groups.

NCIRS undertook a national study to determine the effectiveness of pertussis vaccine in preventing disease in children under 5 years of age.

Pertussis vaccination provides about 50% protection after one dose, and this increases to around 85% after the second dose. This protection is retained until the age of 2 years, but then declines to about 60% by 3–4 years of age.

These results emphasise the importance of having the first dose of pertussis vaccine early, having the second and third doses on time and having the fourth dose between 3½ and 4 years of age. Although protection does wane from 2 years of age, severe disease requiring hospitalisation is very uncommon in fully vaccinated children.

Results of this study were published in Pediatrics in early 2014.* Results were also provided to the ATAGI Pertussis Working Party examining evidence on the duration of effectiveness of acellular pertussis vaccines.

This study is part of a larger project to demonstrate changes in pertussis epidemiology and vaccine effectiveness for the period 1995 to 2010 and their relationship to changes in pertussis immunisation policy.

IMPACT AND EFFECTIVENESS OF PNEUMOCOCCAL POLYSACCHARIDE VACCINATION IN THE ELDERLY

Pneumococcal vaccination is recommended and funded under Australia’s National Immunisation Program for adults aged 65 and over using the 23-valent pneumococcal polysaccharide vaccine (23vPPV).

This study evaluated the impact and effectiveness of 23vPPV in elderly Australians, taking into account the herd immunity impacts of concurrent use of the 7-valent pneumococcal conjugate vaccine in infants.

Including the herd immunity effect, there was about a 35% reduction in invasive pneumococcal disease among over 65-year-olds and 23vPPV was moderately (about 60%) effective in preventing disease due to the pneumococcal serotypes that are included in the vaccine. Further benefits could be expected if an increase in 23vPPV coverage in older people can be achieved. There may also be greater reductions in disease among the elderly in the future due to indirect effects of the 13-valent pneumococcal conjugate vaccine which has been in use in children since 2011.

This work was published in the Medical Journal of Australia* in early 2014 and also informed the ATAGI Pneumococcal Working Party.


REVIEWS OF VACCINE-PREVENTABLE DISEASE EPIDEMIOLOGY

Since 2000, NCIRS has been responsible for expert analysis of national surveillance data and the ongoing publication of comprehensive reports on the epidemiology of vaccine-preventable diseases and vaccination coverage in Australia. Until 2010, each of these reports (five in total) included national notification, hospitalisation and death data in a standard format for 16 diseases covered by population immunisation programs in Australia.

In 2012, a new format for surveillance reporting was implemented in which biennial summary reports for individual vaccine-preventable diseases will be published in Communicable Diseases Intelligence. National notification, hospitalisation and death data for the most recent 2-year period, as well as some state-based data for selected diseases, will be analysed and reported in a standard format. Reports on measles, mumps and pertussis will be published in 2014.

These ongoing reports will provide valuable surveillance data to inform implementation of the National Immunisation Strategy.

EVALUATION OF VARICELLA AND ZOSTER SURVEILLANCE

As part of NCIRS’s role in contributing to optimal disease surveillance systems in Australia, NCIRS evaluated the current surveillance of varicella (chickenpox) and zoster (shingles) using the National Notifiable Diseases Surveillance System (NNDSS).

The aim was to highlight what (if any) improvements are required in monitoring varicella and zoster, specifically using notification data from states and territories.

The evaluation showed that notifications of chickenpox and shingles are captured by the current NNDSS system, although a large proportion of the notifications are for unspecified disease, and efforts are being made to improve data quality.

NATIONAL MEASLES ELIMINATION WORKING GROUP

Australia is committed to the 2012 WHO Western Pacific Region (WPR) goal of endemic measles elimination and supports the verification mechanisms that have been established. An Australian National Verification Committee for the Elimination of Measles (NVC) was convened in February 2013. The NVC was supported by the Measles Elimination Working Group.

The group’s role was to gather the epidemiologic and virologic surveillance data required to provide evidence of Australia having sustained measles elimination for the purposes of the WPR elimination goal. Dr Heather Gidding, May Chiew (MAE scholar) and Dr Aditi Dey from NCIRS contributed to this working group.
PROJECTS FUNDED BY NSW MINISTRY OF HEALTH

INVASIVE PNEUMOCOCCAL DISEASE IN NSW

The 7-valent pneumococcal conjugate vaccine (7vPCV) was included in Australia’s National Immunisation Program from 2001 for children with increased risks of invasive pneumococcal disease (IPD) and from 2005 for all infants. The 7vPCV schedule was unique to Australia, comprising three doses of vaccine in infancy without a booster dose. From July 2011, 7vPCV was replaced by the 13-valent pneumococcal conjugate vaccine.

Invasive pneumococcal disease has been notifiable in Australia nationally since 2001. However, additional enhanced surveillance data on IPD is available for the Greater Sydney metropolitan area from 1997. This data contains valuable information on IPD cases, serotype prevalence and antibiotic susceptibility. The longevity, consistency and extent of IPD surveillance in Greater Sydney offered an opportunity to evaluate the long-term population impact of 7vPCV on IPD epidemiology.

The data was also compared with published data from the USA and the UK which used different infant 7vPCV vaccination schedules.

In Greater Sydney, after 7vPCV was introduced the incidence of IPD caused by serotypes contained in the vaccine was reduced by 95% in children under 5 and by 85% in adults aged 65 and over. The overall reduction was 88%; this was comparable to that in England and Wales (which used a different three-dose schedule), but lower than in the USA (which used a four-dose schedule). However, the reduction in the incidence of IPD caused by any serotype (44% in Greater Sydney) was not significantly different to that seen in these countries with different schedules.

ENHANCED INVASIVE PNEUMOCOCCAL DISEASE (IPD) SURVEILLANCE WORKING GROUP

The aim of this subcommittee is to enhance national conformity of IPD surveillance data and produce annual IPD surveillance reports. (NCIRS member – Dr Rob Menzies)

NATIONAL SURVEILLANCE COMMITTEE

NCIRS contributions to this committee included matters related to data collection and data quality in NNDSS, data release policy, enhanced pertussis surveillance and evaluation of the varicella surveillance system. (NCIRS member – Dr Aditi Dey)

POLIO EXPERT PANEL

The Polio Expert Panel reviews cases of acute flaccid paralysis notified to the Australian Paediatric Surveillance Unit and/or identified through active hospital surveillance (see the section “Paediatric Active Enhanced Disease Surveillance”). NCIRS Director Professor Peter McIntyre is the CDNA member on the Panel.

COLLABORATION WITH THE AUSTRALIAN INSTITUTE OF HEALTH AND WELFARE

The current memorandum of understanding (MOU) between NCIRS and the Australian Institute of Health and Welfare (AIHW) was signed in early 2010. Under this MOU, the Hospitals Unit of AIHW provides NCIRS with data from the National Hospital Morbidity Database (hospitalisations) and the Population Health Unit provides data from the National Mortality Database (deaths) for use in the vaccine-preventable diseases epidemiological reviews produced by NCIRS (described previously).

COLLABORATION WITH DEPARTMENT OF HEALTH, VACCINE PREVENTABLE DISEASES SURVEILLANCE SECTION

NCIRS staff participate in regular meetings with the Vaccine Preventable Diseases Surveillance Section of the Department of Health Office of Health Protection.

NCIRS staff provide updates on the serosurveillance program and advice on surveillance issues pertaining to vaccine-preventable diseases. They also provide comments on the vaccine-preventable disease section of the annual reports of the National Notifiable Diseases Surveillance System.

COLLABORATION WITH COMMUNICABLE DISEASES NETWORK AUSTRALIA

CASE DEFINITIONS WORKING GROUP

The aim of this subcommittee is to develop national case definitions for nationally notifiable conditions, and update existing definitions as required. (NCIRS member – Dr Rob Menzies)
OVERVIEW

The Australian Childhood Immunisation Register (ACIR), the first complete purpose-built national childhood immunisation register in the world, is administered by Medicare Australia and records details of all vaccinations given to children under 7 years old.

ACIR data is used to measure vaccination coverage and timeliness of vaccination at the regional, jurisdictional and national level. Since 1998, NCIRS has received de-identified data from the ACIR on a quarterly basis and maintains a complete historical database of ACIR data.

NCIRS’s historical involvement in analysis and reporting of ACIR data will provide useful knowledge and experience to inform future investigations into expansion of the ACIR and into data linkage between the ACIR and other registers as part of the implementation of the National Immunisation Strategy.

NCIRS frequently provides ad hoc reports based on ACIR data to working parties of the Australian Technical Advisory Group on Immunisation (ATAGI) and the Therapeutic Goods Administration (TGA) and to external stakeholders and collaborators. ACIR data are also used in the program evaluations conducted by NCIRS. NCIRS pioneered reporting on the numbers of ‘conscientious objectors’ to vaccination in specific geographic areas, allowing areas and cohorts with low vaccination coverage to be identified.

Research and surveillance activities related to the ACIR are reviewed and developed in consultation with relevant stakeholders, in particular the National Immunisation Committee and the Vaccine Register Advisory Group.

KEY ACTIVITIES

PROJECTS FUNDED BY THE AUSTRALIAN GOVERNMENT DEPARTMENT OF HEALTH

IMPACT OF ROTAVIRUS VACCINE ON THE TIMELINESS OF OTHER VACCINES

Percentage of children with vaccination delay for the 3rd dose of DTPa-containing vaccine, before and after introduction of rotavirus vaccination.

Rotavirus vaccines were added to the Australian National Immunisation Program in July 2007. NCIRS used data from the ACIR to examine the impact of the introduction of rotavirus vaccine on the timeliness of other scheduled infant vaccines, with particular emphasis on Aboriginal and Torres Strait Islander infants in whom vaccine coverage is less optimal.
Following rotavirus vaccine introduction, there were improvements in timeliness of receipt of all doses of DTPa-containing and 7-valent pneumococcal conjugate vaccines, in both Indigenous and non-Indigenous infants. This apparent increase in timeliness of other concomitantly scheduled vaccines may be of interest to other similarly developed countries considering introduction of a rotavirus vaccination program and may have implications for countries where vaccination delay occurs.

Results of this project were published in the journal Vaccine in 2013.*


ANNUAL NATIONAL IMMUNISATION COVERAGE REPORTS

NCIRS has been publishing annual national immunisation coverage reports since 2009, providing analysis of data obtained from the ACIR, comment on the coverage of individual National Immunisation Program (NIP) vaccines at the different age milestones, and trends in the timeliness of vaccine delivery. Vaccine uptake is also assessed with respect to Indigenous status and geographical locations. The NCIRS coverage reports are the only source of publicly available data on several NIP vaccines (rotavirus, varicella, hepatitis A). These reports are designed to inform policy makers and others of the most important trends and significant issues surrounding immunisation coverage in Australia.

Data analysis shows that the Immunise Australia Program coverage target of 90% has been reached for children at 12 and 24 months of age but coverage is still lower at 5 years of age. A disparity still exists in vaccine coverage and vaccination timeliness between Indigenous and non-Indigenous children. Coverage is suboptimal for vaccines that are recommended for Indigenous children only (i.e. hepatitis A and pneumococcal polysaccharide vaccines) and vaccination is still more likely to be delayed in Indigenous children than in non-Indigenous children. A number of geographical areas have also been identified throughout Australia where immunisation coverage is lower than the national average.

The National Immunisation Strategy priorities of maintaining and improving immunisation coverage, particularly in high-risk groups and low coverage areas, will rely on reports of ACIR data.

The national coverage report for 2010 was published in March 2013.* The report for 2011 will be published in 2014.


REPORTS ON ANALYSES OF ACIR DATA FOR ATAGI AND PROGRAM EVALUATIONS

Reports on the ACIR data analyses performed by NCIRS are frequently required to inform the work of ATAGI working parties. They also inform estimates of adverse event rates (based on adverse event reports received by the TGA) and are a central component of program evaluations. These reports have included data on coverage at different ages, coverage for specific vaccines and coverage in specific states or local areas.

HISTORICAL DATABASE OF ACIR DATA AND REPORTS FOR EXTERNAL ORGANISATIONS

NCIRS aims to maintain a complete historical database of ACIR data. Since 1998, NCIRS has received downloads of the de-identified ACIR database each quarter which are added to the NCIRS historical collection of ACIR data. An electronic copy of all ACIR data is maintained on-site and off-site to ensure safety and security of the database.

Where feasible, and with the approval of the Australian Government Department of Health, NCIRS has made analyses of ACIR data available for external research organisations for use in immunisation-related projects. Examples have included ACIR data for the analysis of vaccine effectiveness in Queensland children by Dr Sarah Sheridan from the University of Queensland.*

VACCINE REGISTER ADVISORY GROUP

Immunisation registers are being used by several groups in Australia to evaluate immunisation programs. To facilitate the exchange of information on appropriate scientific methods, a technical reference/advisory group for vaccination registers in Australia was formed in September 2013.

The Vaccine Register Advisory Group (VRAG) will provide expert advice on NCIRS surveillance and research projects using ACIR data, advice on the scientific methods and strategic directions of NCIRS work related to the ACIR, and a forum for discussion of, and coordination with, similar work involving other vaccination registers in Australia. The group reports back to the NCIRS Scientific Advisory Committee.

Members of VRAG are: Julia Brotherton, National HPV Vaccination Program Register and Victorian Cervical Cytology Registry; Michael Crampton, WentWest Limited; Heath Kelly, Australian National University; Ros Webby, Northern Territory Department of Health; Stephen Lambert, Queensland Health. NCIRS members are Peter McIntyre, Rob Menzies, Aditi Dey and Brynley Hull.

LIAISON WITH THE NATIONAL HEALTH PERFORMANCE AUTHORITY

In 2013, the National Health Performance Authority (NHPA) published the first annual report under its remit for Medicare Locals and immunisation coverage performance. NCIRS provided substantial technical advice to NHPA in the development phase of its first report and Professor Peter McIntyre and Drs Aditi Dey and Rob Menzies were members of the Advisory Group for the report.

Following publication of the NHPA report, which is based on tabulated data, NCIRS has modified the format of its annual coverage reports (described above) to complement the data available in the NHPA report. NCIRS has also worked with the Australian Government Department of Health to overcome barriers to earlier release of the annual coverage report in Communicable Diseases Intelligence.

PROJECTS FUNDED BY NSW MINISTRY OF HEALTH

NEW SOUTH WALES IMMUNISATION COVERAGE REPORTS

NCIRS has developed a series of immunisation coverage reports (similar to the national reports described above) specific to New South Wales. These reports include coverage for all Local Health Districts, coverage for Aboriginal and Torres Strait Islander children and vaccination timeliness for all children. Data from the New South Wales Population Health Survey and the New South Wales School Immunisation Program are also used to calculate various measures of population coverage relating to adult influenza and pneumococcal vaccines and adolescent vaccination.

The report for 2011 was published in December 2012.* The report for 2012 will be published in 2014.


NSW HEALTH IMMUNISATION COVERAGE PERFORMANCE INDICATORS

NSW Health is evaluating the Aboriginal Health Workers Immunisation Project and is using immunisation coverage data as quantitative Key Performance Indicators.

NCIRS used ACIR data to calculate coverage for both Indigenous and non-Indigenous people in three different age groups over 5 years, by Local Health District and Local Government Area. Subsequent analyses every 6 months have produced updated coverage estimates for the three different age groups.
ADVERSE EVENTS FOLLOWING IMMUNISATION

OVERVIEW

Surveillance for adverse events following immunisation (AEFI) is an integral part of the Australian National Immunisation Program, and underpins the safe use of all vaccines. Continued enhancement of vaccine safety monitoring systems is also one of the priorities of the National Immunisation Strategy.

In Australia, national passive surveillance of adverse events (i.e. initiated by the reporter) occurs through voluntary reporting to the Therapeutic Goods Administration (TGA). Reports are made by state and territory health departments, health professionals, vaccine manufacturers and members of the public. All reports are assessed using internationally consistent criteria and entered into the Australian Adverse Drug Reactions System database by TGA staff.

NCIRS was responsible for developing the first national framework for consistent reporting of adverse events following immunisation and continues to analyse de-identified TGA data and produce biannual national reports.

KEY ACTIVITIES

PROJECTS FUNDED BY THE AUSTRALIAN GOVERNMENT DEPARTMENT OF HEALTH

NATIONAL REPORTS ON ADVERSE EVENTS FOLLOWING IMMUNISATION

Since 2003, NCIRS has provided analysis of national data on adverse events following immunisation in twice-yearly reports – a comprehensive annual report and a supplementary report for the first 6 months of each year focusing on children under 7 years of age. Ensuring vaccine safety is crucial in instilling public confidence in vaccines, particularly for children and infants who are the main recipients of vaccines under Australia’s National Immunisation Program.

The supplementary report for the first 6 months of 2011 for children under 7 years of age was published in Communicable Diseases Intelligence in March 2012. The total number of adverse events reported in children under 7 for the first 6 months of 2011 was much lower than for the corresponding period in 2010. Over half the reported adverse events were in children between 2 and 7 years of age; most were mild transient events, the most common being injection site reactions.

The annual report for 2011, including trends over the period 2000–2011, was published in Communicable Diseases Intelligence in December 2012. During 2011, there were fewer adverse events reported overall than in 2010 but rates of reporting were higher for some vaccines, predominantly due to reports of injection site reactions.

The supplementary report for the first 6 months of 2012 for children under 7 years of age was published in Communicable Diseases Intelligence in June 2013. There were slightly fewer adverse events reported in children under 7 in the first half of 2012 than in the same period in 2011. Reporting rates for most vaccines were similar or lower in 2012, particularly in 2 to 7 year olds.

The annual report for 2012 will be published in 2014.

In 2013, NCIRS also undertook a review of methods of analysis of AEFI data, in association with TGA staff. The review determined that AEFI are best reported using terms assigned by TGA staff from the MedDRA (Medical Dictionary for Regulatory Activities) system which is used widely...
across all countries for medicines and vaccines. This change will be implemented for the 2013 annual AEFI report and means that data reported from Australia can be easily compared with data from other countries.

Acknowledgement – Data used in the production of these reports were provided by the TGA; TGA staff are co-authors on published reports.

FEBRILE CONVULSIONS FOLLOWING INFLUENZA VACCINATION

In 2010, there was an increase in reports of fever and febrile convulsions following administration of one brand of seasonal influenza vaccine in Australia (bioCSL Fluvax). NCIRS has further investigated the link using data from the PAEDS (Paediatric Active Enhanced Disease Surveillance) network. (See the section ‘Paediatric Active Enhanced Disease Surveillance’ for more information.)

The investigation confirmed that the risk of febrile convulsions within the first 1 to 2 days after receiving the 2010 seasonal influenza vaccine was substantially higher across Australia than at other times. However, the study also found that there was an increased, albeit lower, risk of febrile convulsions after receipt of the monovalent pandemic influenza vaccine which had not been previously reported.

The findings were presented at the Public Health Association Australia National Immunisation Conference in Darwin in June 2012.

NCIRS STAFF ROLE IN IMPLEMENTING RECOMMENDATIONS FROM THE HORVATH REVIEW

In order to implement recommendations arising from the Review of the management of adverse events associated with Panvax and Fluvax which was published by Professor John Horvath in 2011, the Department of Health invited several immunisation safety experts to participate in steering and implementation committees. Associate Professor Kristine Macartney, Professor Peter McIntyre and Dr Nick Wood participated in this process.

In addition, NCIRS provided technical support in developing responses to each recommendation for consideration by the Department of Health. The response to the Review recommendations has now been published on the Immunise Australia website. One outcome of the review was establishment of the Advisory Committee on the Safety of Vaccines (ACSOV), which is to provide advice to both the TGA and the Immunisation Branch of the Department of Health. Associate Professor Macartney was

RISK OF INTUSSUSCEPTION AFTER ROTAVIRUS VACCINES

Intussusception Risk and Disease Prevention Associated With Rotavirus Vaccines in Australia’s National Immunization Program

A preliminary analysis of Australian surveillance data (in which NCIRS was involved via PAEDS) and two large international studies conducted in Mexico and Brazil indicated that rotavirus vaccine is associated with an increased risk of intussusception after vaccination.

To investigate this association further, NCIRS collaborated in a national study funded by the TGA that reviewed data on intussusception cases in infants under 12 months old, across most Australian states and territories. The study evaluated the association between intussusception and receipt of rotavirus vaccine in the previous 21 days.

The study estimated the risk of intussusception following rotavirus vaccination to be approximately 6 additional cases of intussusception among every 100,000 infants vaccinated, or 14 additional cases per year in Australia. This risk was compared with the benefits of rotavirus vaccination which prevents approximately 7,000 hospitalisations for acute gastroenteritis in children under 5 years of age annually in Australia.

The updated risk estimates were presented to the Australian Technical Advisory Group on Immunisation and incorporated into the 10th edition of The Australian Immunisation Handbook. Results have also been published in the journal Clinical Infectious Diseases* and have informed advice from international advisory bodies.

Data was also presented by Professor Peter McIntyre to the Advisory Committee on

Collaborators – John Carlin, Katherine Lee, Jim Buttery and Julie Bines, Murdoch Childrens Research Institute; and Ruth Lopert, Therapeutic Goods Administration.


ADVERSE EVENTS FOLLOWING HPV VACCINE

In 2007, the nationally funded human papillomavirus (HPV) vaccination program began for girls aged 12 to 13, with a funded catch-up program (until 2009) for women up to 26 years of age.

NCIRS examined national reporting patterns of adverse events following immunisation with HPV vaccines from 2007 to mid-2012 to determine any trends associated with the use of HPV vaccines in girls.

Findings of the study were provided to the Australian Technical Advisory Group on Immunisation HPV Implementation Working Group and were also presented at the Communicable Diseases Control Conference in Canberra in March 2013.

Analysis of the rate of adverse events associated with the HPV vaccination program in girls is also useful as a baseline to detect any changes in adverse events after the extension of the HPV vaccination program to boys from 2013.

Preliminary analysis of adverse events data for the 6 months from January to June 2013, including enhanced surveillance data provided by school-based programs, has provided the first snapshot of adverse events following HPV vaccination in boys. So far, the safety profile of HPV vaccine in boys is similar to that in girls. Analysis of adverse events reports will continue in order to confirm this.

TRENDS IN REPORTING OF ADVERSE EVENTS FOLLOWING IMMUNISATION

Previous analyses of trends in reporting of adverse events following immunisation have focused on children. As vaccine use in adults has expanded over the past decade, it is also important to examine trends in reporting of adverse events in adults. NCIRS analysed reports of adverse events following immunisation in adults between January 2000 and June 2011. The analysis included time period, age group, gender, vaccine, severity of the adverse event and number of doses received.

The findings from this analysis were presented at the Public Health Association Australia National Immunisation Conference in Darwin in June 2012.

NCIRS also studied trends in reports of adverse events following immunisation in children between January 2000 and June 2011, including profiles of new vaccines and signal investigation, using the same criteria as those for the review of adult adverse events.

MEDICARE DATA AS AN INDICATOR OF ADVERSE EVENTS FOLLOWING INFLUENZA VACCINATION

In 2010, use of seasonal influenza vaccine in children aged under 5 years was suspended in Australia following an increased number of reports of febrile convulsions after influenza vaccination.

NCIRS conducted a proof-of-concept study to investigate whether linkage of Medicare and ACIR data could be used to detect an early signal of increased adverse events. In this study, NCIRS analysed Medicare data on GP consultations occurring within 3 days of when the ACIR indicated that a child had received an influenza vaccine.
The study found that, in 2010, the rate of GP visits on the day after receipt of the influenza vaccine manufactured by bioCSL (Fluvax) was significantly higher than the rate after receipt of the bioCSL vaccine in the previous 2 years or the Sanofi Pasteur vaccine in 2009–2010. The rate of GP visits after the bioCSL seasonal influenza vaccine was also higher than for the bioCSL pandemic influenza vaccine in 2009–2010. The study concluded that a GP consultation on the day after receiving a vaccine is a reasonable indicator of early adverse events.

This kind of linkage between the ACIR and other data collected by existing GP software has the potential for use in various settings.

Results of this study were published in early 2014.*

* Dey A, Gidding HF, Menzies R, McIntyre P. General practice encounters following seasonal influenza vaccination as a proxy measure of early-onset adverse events. Vaccine 2014 [Epub ahead of print]

ENHANCED SURVEILLANCE OF ADVERSE EVENTS FOLLOWING INFLUENZA VACCINE

In 2012, the Australian Technical Advisory Group on Immunisation formed a working group to develop methods of enhanced surveillance to monitor the safety profile of seasonal influenza vaccines, particularly in children.

Following the working group recommendations, NCIRS conducted a national pilot study using prompted parent/carer reporting of data on their child’s health in the 3 days following routine influenza vaccination. Over 1,000 vaccine encounters in children under 10 were reported. This study demonstrated that the influenza vaccines recommended for use in children have a good safety profile. This surveillance, now called ‘AusVaxSafety’, will continue in 2014 using new parent-friendly technology to prompt reporting.

ADVERSE EVENTS FOLLOWING PNEUMOCOCCAL VACCINE IN OLDER AUSTRALIANS

The 23-valent pneumococcal polysaccharide vaccine (Pneumovax 23) is used under the NIP in older Australians. In mid-2011, an increase in reports of adverse events following immunisation with the pneumococcal vaccine was noted in Australia. NCIRS provided technical support to an ad hoc working group that was convened by the Department of Health, the Australian Technical Advisory Group on Immunisation and the Therapeutic Goods Administration to investigate this issue. The results of this review prompted a change in recommendations for the use of pneumococcal polysaccharide vaccine in healthy older Australians (published in late 2011).

The working group also explored the potential of novel data sources for obtaining additional information for adverse event surveillance.

Patient data collected by the General Practice Research Network (GPRN) was used to investigate adverse events following receipt of the pneumococcal vaccine. Experience gained in this project in understanding and analysing the GPRN dataset will identify the potential suitability and limitations of using this data source for future projects.

Findings from this analysis are expected in early 2014.

PROJECTS FUNDED BY NSW MINISTRY OF HEALTH

ANNUAL REPORT ON ADVERSE EVENTS FOLLOWING IMMUNISATION IN NEW SOUTH WALES

NCIRS has developed a series of reports specific to New South Wales based on similar national annual reports on adverse events (described above). To produce these reports, data from the Therapeutic Goods Administration is analysed for New South Wales only. The report summarising data for 2011 was published in the New South Wales Public Health Bulletin in September 2012.

The total number of adverse events reported in New South Wales in 2011 was slightly higher than in the same period in 2010, mainly due to reports of injection site reactions. An increased number of reports in infants was related to the introduction of the new 13-valent pneumococcal vaccine onto the NIP schedule. Increases in the number of reports in elderly adults were associated with injection site reactions following administration of the 23-valent pneumococcal vaccine. The majority of reported adverse events were mild and transient.

The report summarising data for 2012 will be published in 2014.

Acknowledgement – Data used in the production of these reports were provided by the TGA and NSW Ministry of Health.
PROJECTS JOINTLY FUNDED BY THE AUSTRALIAN AND NEW SOUTH WALES GOVERNMENTS

ADVERSE EVENTS CLINICAL SERVICE

Weekly specialist clinics are conducted by NCIRS staff at The Children’s Hospital at Westmead to advise parents and healthcare providers on re-vaccination of children who have previously experienced an adverse event following immunisation (AEFI).

The Adverse Events Clinic is part of the AEFI-CAN (AEFI – Clinical Assessment Network) involving similar clinics in Melbourne, Adelaide and Perth. The AEFI-CAN clinics collaborate to monitor and discuss the clinical management of adverse events following immunisation.

The clinic at The Children’s Hospital is coordinated by Clinical Nurse Consultant Kath Cannings from NCIRS, with support from CNC Karen Orr and a number of paediatricians from NCIRS and other hospital staff. The specialist staff provide advice to parents and vaccinate patients through the outpatient setting, day stay and overnight wards. The children attending the clinic are those requiring vaccination under close supervision or those who elect to continue receiving vaccinations in the hospital setting.

Since 2010, the Adverse Events Clinic has also provided a triage and referral service for adults, most of whom are seen through the Inject Clinic at Westmead Hospital. The majority of these patients were either new parents/grandparents requesting pertussis vaccination or healthcare workers who required vaccination for employment.

A report on the experiences and data collected during the 15 years that the clinic has been running has been prepared for publication.

Experiences of influenza vaccination in children with egg allergy at the Adverse Events Clinic have been presented by Kath Cannings at the Public Health Association Australia National Immunisation Conference in June 2012 and the New Zealand Immunisation Conference in September 2013.

Kath Cannings, Karen Orr and Dr Nick Wood also speak regularly at Immunisation Update sessions across the state that are attended by immunisation providers from the medical and nursing fields.

FAST FACTS

JAN 2012-DEC 2013
464 PATIENTS SEEN
266 NEW PATIENT REFERRALS
198 SEEN FOR FOLLOW-UP

CNC Kath Cannings in the Immunisation Adverse Events Clinic
NCIRS established the national serosurveillance program in 1997. The program is recognised as a valuable national resource for estimating vaccine coverage by measuring population immunity. Data generated by the serosurvey program are also used for immunisation program evaluations and in disease modelling. Serosurveillance is an important method for monitoring the National Immunisation Program as part of the National Immunisation Strategy.

Serosurveys are conducted at approximately 5-yearly intervals by collecting a bank of 7,000–10,000 sera from diagnostic laboratories throughout Australia and testing for antibodies to a range of vaccine-preventable diseases.

The program is conducted in collaboration with the Centre for Infectious Diseases and Microbiology (CIDM), under the direction of Professor Dominic Dwyer, which manages collection of sera, liaison with contributing laboratories and serologic testing. Laboratory work includes development and refinement of specific assays required for the serosurvey but not available in Australia.


This activity is funded by the Australian Government Department of Health.

Collaborators at the Centre for Infectious Diseases and Microbiology (CIDM) Public Health are Professor Dominic Dwyer, Dr Linda Hueston, Ms Katherine Tudo, Ms Fiona Blyth, Ms Samantha Lesic and Mr Laurence McIntyre.
TETANUS SEROPREVALENCE

The first serosurvey showed low levels of immunity to tetanus in the elderly, particularly females, which supported the recommendation for a tetanus booster at 50 years of age. The profiles of tetanus antibody levels by age from the third serosurvey were compared with those from the first serosurvey to determine current trends in tetanus immunity. The study showed that school-based dTpa (diphtheria-tetanus-acellular pertussis) vaccination programs have effectively increased the level of protection against tetanus among targeted adolescents. Compliance with the recommendation for adults to receive a single diphtheria-tetanus (dT) booster at age 50 is limited. Multicomponent strategies may help to improve uptake and individual protection.

DIPHTHERIA SEROPREVALENCE

The first serosurvey showed progressively lowering levels of diphtheria immunity with age. The profiles of diphtheria antibody levels by age from the third serosurvey were compared with those from the first serosurvey to determine current trends in diphtheria immunity. The study showed that school-based dTpa vaccination programs have effectively increased the level of protection against diphtheria among targeted adolescents. As for tetanus, compliance with the recommendation for adults to receive a single dT booster at 50 years is limited and multicomponent strategies may help to improve uptake and individual protection. Removal of the booster dose of DTPa at 18 months of age appears to have impacted on levels of immunity to diphtheria in preschool age children.

LABORATORIES PARTICIPATING IN THE FOURTH NATIONAL SEROSURVEY

AUSTRALIAN CAPITAL TERRITORY
ACT Pathology, The Canberra Hospital

NEW SOUTH WALES
Bega Hospital
Cowra Hospital
Orange Base Hospital
Pathology North, John Hunter Hospital
Pathology West, Broken Hill District Hospital
Pathology West, Nepean Hospital
The Wollongong Hospital
Douglass Hanly Moir, Macquarie Park
SEALS, Prince of Wales Hospital
South West Pathology, Griffith Base Hospital
Southern IML Pathology, Wollongong Hospital

NORTHERN TERRITORY
Alice Springs Hospital
Katherine Hospital

QUEENSLAND
Mater Pathology
Pathology Queensland, Brisbane
Pathology Queensland, Cairns
Pathology Queensland, Townsville
QML Pathology, Murarrie
Sullivan Nicolaides Pathology, Taringa

SOUTH AUSTRALIA
SA Pathology, IMVS, Adelaide

TASMANIA
Launceston Pathology
Royal Hobart Hospital

VICTORIA
Dorevitch Pathology, Heidelberg
Gippsland Pathology, Bairnsdale
Royal Children’s Hospital
Southern Cross Pathology, Southern Health, Monash Medical Centre
Victorian Infectious Diseases Reference Laboratory

WESTERN AUSTRALIA
Pathwest, King Edward Memorial Hospital for Women and Princess Margaret Hospital for Children
Pathwest, Queen Elizabeth Medical Centre
Western Diagnostic Pathology, Myaree
PROGRAM EVALUATION

OVERVIEW

Evaluation of the conduct and impact of immunisation programs provides essential information for planning and delivery of future programs. Program evaluations are an important component of the National Immunisation Strategy and NCIRS can contribute valuable expertise and experience in this area.

NCIRS has had a role in immunisation program evaluations since 1999. Since 2005, evaluation of national programs has become one of NCIRS’s core responsibilities. These evaluations follow a standard framework including evaluation of the planning and delivery process; description and assessment of the surveillance systems used to measure program effects; estimation of vaccination uptake in target groups; description and assessment of adverse events following immunisation for the particular vaccine(s); and an assessment of the effect of the vaccination program on the disease burden through analysis of routine national surveillance data.

KEY ACTIVITIES

PROJECTS FUNDED BY THE AUSTRALIAN GOVERNMENT DEPARTMENT OF HEALTH

EVALUATION OF THE HPV VACCINATION PROGRAM

Human papillomavirus (HPV) may result in lesions that cause cervical cancers, respiratory papillomatosis, genital warts and other anogenital tract abnormalities. In 2007, Australia was the first country to implement a fully funded vaccination program for adolescent girls and young women. In 2013, the program was extended to include adolescent boys.

NCIRS was part of a collaborative group who evaluated the national HPV vaccination program for girls in terms of the strengths and weaknesses of program implementation, vaccination coverage and adverse events following immunisation, and the impact of this program on the epidemiology of high-grade cervical abnormalities and genital warts.

NCIRS would like to acknowledge all state and territory immunisation program managers and immunisation providers who participated in the evaluation.

Collaborators – Tracey Bessell, Screening, Cancer and Palliative Care Branch, Department of Health; Julia Brotherton, Victorian Cytology Service; Alison Budd, Australian Institute of Health and Welfare; Michelle Bradley, Emma Hill and Joel Willis, Australian Government Department of Health; Bronwen Harvey, Richard Hill and Jane Cook, Therapeutic Goods Administration; Rosemary Lester, Communicable Diseases Network Australia; Bette Liu, University of NSW

EVALUATION OF THE HEPATITIS A VACCINATION PROGRAM

The hepatitis A vaccination program is a funded program that began in 2005 for all Aboriginal and Torres Strait Islander children aged 12 to 24 months in the Northern Territory, Queensland, South Australia and Western Australia.

Planning for evaluation of this program has included discussion at relevant national committees, scoping of required methods and resources, and ethics applications. NCIRS has developed survey instruments and questionnaires for interviewing program stakeholders for the process evaluation component of the evaluation and interviews will commence in early 2014.
EVALUATION OF THE NATIONAL VARICELLA VACCINATION PROGRAM

Varicella vaccine was added to the Australian National Immunisation Program in 2005 for children at 18 months of age with a school-based adolescent catch-up program.

NCIRS conducted an evaluation of the varicella vaccination program focusing on program implementation. The evaluation involved interviews with key people involved in program implementation and incorporated vaccine coverage and serosurvey data.

Despite some challenges, the varicella vaccination program successfully achieved high coverage in a relatively short period. Sensitive laboratory assays to measure vaccine-induced immunity at a population level are needed. Results of the evaluation were published in the journal Vaccine in 2013.

NCIRS also undertook an ecological study to examine trends in severe varicella and herpes zoster since the introduction of one-dose varicella vaccination in Australia.

Rapid attainment of high one-dose coverage in Australia reduced varicella hospitalisations not only in the targeted age group (particularly in Indigenous children) but also in other age groups, with no increase in hospitalisations for herpes zoster. This suggests high one-dose varicella vaccine coverage can have a substantial impact on severe disease and it is likely to be applicable to nationally funded programs in high and middle income countries.

Results of this study have been accepted for publication in the Bulletin of the World Health Organization.

EVALUATION OF THE ROTAVIRUS VACCINATION PROGRAM

Rotavirus vaccine was added to the Australian National Immunisation Program in 2007 for children between 2 and 6 months of age but with strict upper age limits.

NCIRS evaluated the impact of the rotavirus vaccination program on hospitalisations for both rotavirus and all-cause acute gastroenteritis and compared outcomes in Indigenous and non-Indigenous people.

There was a 71% decline in hospitalisations due to rotavirus in children under 5 years of age after the introduction of rotavirus vaccination. There was also a 38% decline in hospitalisations for acute gastroenteritis caused by organisms other than rotavirus. Reductions were also observed in older children, suggesting that transmission of rotavirus was reduced at a population level. Reductions in hospitalisations for Indigenous children were smaller than those for the general population, and fluctuated by location and year.

Results of this study were published in the Medical Journal of Australia in 2013.

REVIEW OF SCHOOL-BASED VACCINATION IN AUSTRALIA

There have been voluntary school-based vaccination programs operating in Australia for over 80 years. These programs have advantages over primary care for delivering vaccines to adolescents and over the past decade have evolved to become the primary method of delivering nationally recommended adolescent vaccines in Australia. These programs are operated by state and territory governments.

NCIRS reviewed the current operation of school-based vaccination programs in Australia. This included a literature review, semi-structured interviews with people managing and implementing the programs in each jurisdiction, and a review of program resources. Available coverage data was obtained from each state and territory.

The review found that operation of school-based programs is influenced by various factors at the school and provider level. Despite variations in program implementation, and in collection and analysis of coverage data, comparable vaccine coverage has been achieved across all states and territories. Vaccine coverage is higher than in other countries where adolescent vaccines are mandatory at school entry or available only through community vaccination providers. However, the review also identified some gaps, including a detailed understanding of how procedural factors affect uptake, the best ways to maximise consent form return, and standardisation of coverage data reporting.

Results of the review were published in Communicable Diseases Intelligence in 2013, along with a history of school-based vaccination in Australia also compiled by NCIRS.

Collaborators – Michael Batchelor, Department of Health Victoria; Vicki Bryant, Queensland Health; Sue Campbell-Lloyd, NSW Ministry of Health; Angela Newbound, SA Health; Megan Skully, WA Department of Health; Rosalind Webby, Northern Territory Department of Health
FUTURE EVALUATION: CHANGE OF VACCINE FOR THE NATIONAL CHILDHOOD PNEUMOCOCCAL PROGRAM

From July 2011, the 13-valent pneumococcal conjugate vaccine (13vPCV) replaced the 7-valent vaccine in Australia’s National Immunisation Program. A supplementary dose was offered to children between 12 and 35 months of age for 12 months.

A pilot evaluation of the 13vPCV supplementary dose program in the Northern New South Wales and Mid North Coast Local Health Districts aimed to understand provider awareness and approaches to implementation. A paper reporting the main findings of the pilot evaluation has been submitted for publication.

NCIRS has submitted a proposal to conduct a national evaluation of the change of pneumococcal vaccine on the National Immunisation Program.

PROJECTS FUNDED BY NSW MINISTRY OF HEALTH

EVALUATION OF THE ‘COCOONING’ STRATEGY FOR PREVENTING PERTUSSIS IN YOUNG INFANTS

Although recommended in the USA, Australia and several European countries for almost a decade, there is a lack of evidence on the effectiveness of vaccinating close adult contacts of newborn infants against pertussis ("cocooning").

New South Wales experienced a prolonged pertussis epidemic from 2008 and, in April 2009, a publicly funded cocoon vaccination program was implemented for adult close contacts of infants under 1 year of age.

In 2011, NCIRS, in collaboration with the NSW Ministry of Health, began a study to estimate the effectiveness of vaccinating parents to prevent pertussis in early infancy. This was a ‘case–control’ study in which ‘cases’ were infants aged less than 4 months with laboratory-confirmed pertussis (from April 2009 to March 2011) and ‘controls’ were infants sampled from the state birth register and matched to cases by date of birth and area of residence. The infants’ parents were surveyed by telephone. The survey collected information on whether the infants were vaccinated against pertussis and, if so, when they had been vaccinated, as well as if and when the infants’ close contacts had received a pertussis vaccine booster around the time of the infant’s birth.

Households in which the infant had pertussis were less likely to have an immunised mother or an immunised father, but were more likely to include additional and older children and to have a lower income. Of immunised mothers, many were vaccinated before pregnancy. When both parents were immunised, the infant’s risk of pertussis was almost halved. The effect of immunising the mother alone was about 4 times greater than immunising the father alone.

Results suggested that protection persisted to the next pregnancy following previous postpartum vaccination. More precise measurement of the magnitude and duration of any such protection in subsequent pregnancies is needed.

Preliminary results were presented at the Public Health Association Australia National Immunisation Conference in June 2012 and further results were presented at the Communicable Diseases Control Conference in March 2013. Professor Peter McIntyre was also invited to present data to the Advisory Committee on Immunization Practices in the USA in June 2013 (www.cdc.gov/vaccines/acip/meetings/live-mtg-jun-2013.html) and the study was used as part of a review conducted by the WHO Strategic Advisory Group of Experts (SAGE) on Immunization Pertussis Working Group. Results have been accepted for publication in the journal Pediatrics.
OVERVIEW

Aboriginal and Torres Strait Islander Australians experience a greater burden of many infectious diseases than non-Indigenous Australians and have lower coverage rates for some vaccines. NCIRS undertakes a wide range of research related to vaccine-preventable diseases in Aboriginal and Torres Strait Islander people with the aim of enhancing service delivery and policy development around immunisation programs for the Indigenous population. This is one of the main priorities of the National Immunisation Strategy.

Projects are generated through federal programs, state and territory initiatives and from consultation with health professionals and other stakeholders such as the National Aboriginal Community Controlled Health Organisation (NACCHO) and its affiliates. Collaboration also occurs with other centres such as the Telethon Institute for Child Health Research in Perth and the Menzies School of Health Research in Darwin.

KEY ACTIVITIES

PROJECTS FUNDED BY THE AUSTRALIAN GOVERNMENT DEPARTMENT OF HEALTH

NATIONAL ABORIGINAL AND TORRES STRAIT ISLANDER IMMUNISATION NETWORK

NCIRS originally established the National Aboriginal and Torres Strait Islander Immunisation Network (NATSiIN) in 2006 to coordinate support for those involved in providing immunisation services to Aboriginal and Torres Strait Islander people.

The Network was re-formed in October 2012 to include the government and private sectors as well as Aboriginal Community Controlled Medical Services and their state affiliates. This will provide the opportunity to maintain the NATSiIN process, while broadening the participation of organisations outside the community controlled sector.

The role of NATSiIN is to provide advice to the National Immunisation Committee (NIC) on matters related to the immunisation of Aboriginal and Torres Strait Islander people. It also promotes communication and coordination between the NIC, service providers to Indigenous people and immunisation program managers to ensure effective vaccination policy development and program delivery. These sorts of relationships will
be of great benefit in implementing the National Immunisation Strategy to ensure equity of access to immunisation services for all Australians.

Issues considered by NATSIIN have included accreditation of Aboriginal Health Workers to provide vaccinations; issues around influenza vaccination of Indigenous children; implementation of influenza vaccination of Indigenous adults; HPV vaccination; and the most efficient ways to administer the second doses of influenza and hepatitis A vaccines.

NATSIIN also now produces a quarterly newsletter, called Message stick, to enhance communication with the Aboriginal Health sector on immunisation issues. Message stick newsletters are available from the NCIRS website (www.ncirs.edu.au/indigenous/index.php).

NATSIIN is administered by the National Indigenous Immunisation Coordinator, a position hosted at NCIRS, and includes representatives from state and territory governments, the Australian Indigenous Doctors’ Association, Medicare Locals, the Royal Australian College of General Practitioners, and the Congress of Aboriginal and Torres Strait Islander Nurses. Members come from almost all jurisdictions and service levels.

VACCINE PREVENTABLE DISEASES AND VACCINATION COVERAGE IN ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLE, 2006 TO 2010

The third in this series of national reports on vaccine-preventable diseases and vaccination coverage in Aboriginal and Torres Strait Islander people was published in December 2013 (see the section ‘Surveillance of vaccine-preventable diseases’ for more information).

As a companion to the report, a summary version targeted at non-medical health workers and administrators, called Vaccination for our Mob, was published in mid 2014.

IMPACT OF PNEUMOCOCCAL VACCINATION ON PNEUMONIA HOSPITALISATIONS IN INDIGENOUS CHILDREN

Pneumococcal vaccination of infants has been associated with lower rates of pneumonia in children, including pneumonia with no specified cause, in many settings.

However, Aboriginal and Torres Strait Islander children have a greater burden of pneumococcal disease caused by serotypes that are not covered by the pneumococcal vaccine and some previous studies have shown no impact of pneumococcal vaccination on the overall rates of pneumonia.

This project examined hospitalisations for pneumonia due to any cause in Aboriginal and Torres Strait Islander children in the Northern Territory, Queensland, South Australia and Western Australia. There were significant decreases in the overall rates of pneumonia in these jurisdictions after the introduction of pneumococcal vaccination.

OTHER ACTIVITIES

EVALUATION OF THE HEPATITIS A VACCINATION PROGRAM

NCIRS is undertaking an evaluation of the hepatitis A vaccination program in which hepatitis A vaccine is recommended and funded for Aboriginal and Torres Strait Islander children in the Northern Territory, Queensland, South Australia and Western Australia as part of the National Immunisation Program. (See the section ‘Program evaluation’ for more information.)

COLLABORATION WITH HEALTHINFONET

Australian Indigenous HealthInfoNet is an innovative online resource (www.healthinfonet.ecu.edu.au) run by Edith Cowan University that aims to inform practice and policy in Indigenous health by making research and other knowledge readily accessible. A Letter of Agreement was signed in mid 2013 between NCIRS and the University to enhance collaboration and improve the Indigenous immunisation information available on the NCIRS and Indigenous HealthInfoNet websites.

PROJECTS FUNDED BY NSW MINISTRY OF HEALTH

AN INTERVENTION TO IMPROVE IMMUNISATION COVERAGE IN INDIGENOUS CHILDREN IN WESTERN SYDNEY

Delayed vaccination is more common in Aboriginal and Torres Strait Islander children than in non-Indigenous children, which puts them at increased risk of disease. This is particularly important for infants who are more likely to suffer severe disease.
NCIRS was invited by the Western Sydney Aboriginal Medical Service to contribute to the evaluation of a novel intervention aimed at improving immunisation coverage. Children attending the Service were offered a personalised calendar which included their photograph and showed the due date of their next vaccination. The calendars were very popular with children and their parents. The evaluation found that children who received a calendar had an average delay of 0.6 months for their next vaccination, compared with 3.3 months for those who did not receive a calendar. These results were published in BMC Public Health in 2013.

**PROJECTS FUNDED BY RESEARCH GRANTS**

**PENCAT ADULT AND ADOLESCENT IMMUNISATION MODULES**

PenCAT is a Clinical Audit Tool, developed by Pen Computer Systems, which integrates with clinical desktop software to allow primary care clinics to analyse their own clinic data. Seventy-five per cent of GPs are registered users and Medicare Locals are increasingly looking to it as a potential source of quality assurance data.

NCIRS, in partnership with the Queensland Aboriginal and Islander Health Council, has developed modules for adult and adolescent immunisation for incorporation into PenCAT. This will assist clinics to monitor vaccination coverage in their own patient population, including by Indigenous status, and potentially provide vaccine coverage data for adults and adolescents at the regional and national level. Piloting of the PenCAT immunisation modules will commence in early 2014.

Funding – NHMRC Centre for Research Excellence in Population Health: Immunisation in under-studied and special-risk populations (see later section in this report).

**ABORIGINAL MEDICAL SERVICES’ CONTRIBUTION TO IMMUNISATION**

Aboriginal Medical Services (AMSs) often engage in resource-intensive activities such as outreach or home visitation in an attempt to improve coverage rates and timeliness of immunisation in Aboriginal and Torres Strait Islander children. However, the amount of this activity that AMSs undertake has not previously been evaluated.

This study is being undertaken by Telphia Joseph for her Master of Philosophy to document for the first time the immunisation-related activities that are conducted by AMSs. To collect the data, Telphia embarked on a ‘road trip’ of selected AMSs in New South Wales. Visiting an AMS increased the chances of CEO consent and questionnaire completion and return. It also provided an opportunity to gain a greater insight into the day-to-day workings and ‘personality’ of each AMS.

Funding – NHMRC Centre for Research Excellence in Population Health: Immunisation in under-studied and special-risk populations (see later section in this report)
HAEMOPHILUS INFLUENZAE NON-B TYPES IN AUSTRALIAN INDIGENOUS PEOPLE

Unlike *Haemophilus influenzae* type b (Hib), there is no vaccine available for *Haemophilus influenzae* type a.

In Alaskan Native and First Nations people of Canada, rates of Hib disease were high but type a infection was rare before the availability of Hib vaccine. However, there have recently been increases in type a infections, raising the possibility that this is an effect of Hib vaccination.

This study looked at the rates of type a disease in Australian Aboriginal people from South Australia and the Northern Territory to see if type a disease has increased in Australian Indigenous populations who had high rates of Hib disease (similar to Alaskan and Canadian indigenous peoples) before the Hib vaccine was available.

The study found that rates of type a infection were stable for the period studied (2000–2011). It is therefore unlikely that the increase in type a infections seen in North America is related to Hib vaccination. Results of the study were published in the *International Journal of Circumpolar Health* in 2013.

Funding – NHMRC Centre for Research Excellence in Population Health: Immunisation in under-studied and special-risk populations (see later section in this report.)
OVERVIEW

To maintain high immunisation coverage and good process it is important to understand the community’s beliefs, attitudes and practices regarding vaccination programs in Australia and to find the most effective ways of addressing barriers.

The NCIRS Social Science Unit aims to support the optimal uptake of safe, effective vaccines by conducting and collating evidence on knowledge, attitudes and behaviours towards vaccination, especially in groups targeted by the National Immunisation Program, and generating and synthesising knowledge about how best to deliver immunisation programs. Research methods range from randomised trials to quantitative surveys of populations to in-depth qualitative investigations. The Unit also provides advice on vaccine-related communication in clinical settings and the public arena.

The expertise of the NCIRS Social Science Unit will be valuable in developing and strengthening communication resources as part of the National Immunisation Strategy to ensure that community confidence in immunisation is maintained.

Social research at NCIRS contributes to other work done by NCIRS in Indigenous health, program evaluation, policy development and communication. An integral role of NCIRS is the provision of advice based on this research to external researchers, health professionals and government. Some examples include participating and presenting at The President’s Cancer Panel on ‘Achieving widespread HPV vaccine impact’ (Washington DC, 2012); chairing the Working Group on Supporting Our Future (School of Public Health, University of Sydney, 2012–2013); being a member of the Working Group for The science of immunisation booklet (Australian Academy of Science, 2011–2012); and a consultant role in the widely acclaimed documentary Jabbed—love, fear and vaccines (SBS television, 2013).

KEY ACTIVITIES

PROJECTS FUNDED BY THE AUSTRALIAN GOVERNMENT DEPARTMENT OF HEALTH

SYSTEMS AND RESOURCES TO ADDRESS HESITANCY ABOUT VACCINATION (SARAH)

There is clear evidence that primary care providers are the most important influence on parents’ decisions about vaccinating their children. Good communication can alleviate the unwarranted concerns parents might have about vaccination. On the other hand, poor provider communication can set questioning or concerned parents on a path to rejecting vaccines altogether. Although many studies point to the need for good communication, there
there are currently no evidence-based guidelines to address this.

NCIRS developed a vaccine communication framework for primary care providers to interact with parents. The framework includes a method of stratifying parents into one of five categories – ‘unquestioning acceptance’, ‘cautious acceptance’, ‘hesitance’, ‘late or selective vaccination’ or ‘refusal’ of all vaccines – with specific communication goals for each category. It also includes training in a particular communication style, using principles of cognitive psychology and psychological counselling. A set of guidelines were developed which clinicians report are helpful and change their approach.

Vaccination decisions require support in terms of both systems and resources. An integrated approach to vaccine communication will incorporate both the ‘how’ (systems) and the ‘what’ (resources). The next phase of this project will develop the next generation of vaccine communication tools, and test these tools in a clinical setting, thereby providing the evidence base that is crucial to effective practice.

VACCINE–ATTITUDES, BEHAVIOURS AND CONCERNS (V-ABC)

Parental hesitancy about vaccination threatens the control of vaccine-preventable diseases. Despite suggestions of rising hesitancy among parents, there is no efficient and reliable way to track or provide an ‘early-warning’ indicator of changes in vaccine acceptance.

NCIRS proposed a Vaccine–Attitudes, Beliefs and Concerns (V-ABC) measure capable of being deployed as a survey across parent populations and integrated into existing ongoing surveys. The proposed V-ABC survey will measure the social and psychological factors predicting vaccine acceptance for parents and carers of young children.

A consultation process included representatives of a cross-section of national and state vaccination programs and experts in immunisation, social marketing, psychology and surveillance. This consultation found that understanding and predicting vaccine acceptance is considered necessary to maintain high and stable vaccination coverage rates.

Understanding community concerns and behaviours relating to vaccination will allow more strategic targeting of interventions and campaigns undertaken as part of the National Immunisation Strategy.

This work forms part of a PhD project and further design, development and application of the V-ABC survey instrument will take place in 2014.

PARENTAL ATTITUDES TO SEASONAL INFLUENZA VACCINATION OF CHILDREN

This study examines how parents perceive and respond to influenza in children. It involves a review of the literature exploring parental attitudes to influenza vaccination of children and interviews with parents of children attending childcare centres about their perceptions of influenza and the risks and benefits of immunisation, and their information needs.

This work forms part of a PhD project. Results from a survey about parents’ intentions and behaviour regarding seasonal influenza vaccination for their children were published in the *Journal of Pediatric Infectious Diseases* in 2012.

Results from parent interviews are being analysed further. Preliminary analysis suggests that some parents do not perceive influenza as a serious illness. There is also considerable parental concern about the safety of the influenza vaccine for children, particularly in relation to the suspension of the influenza vaccine in 2010 due to a reported increase in adverse events.

Acknowledgement – KU Children’s Services

PROJECTS FUNDED BY NSW MINISTRY OF HEALTH

NSW CHILD HEALTH SURVEY

The success of vaccination as a public health measure depends on public confidence in vaccines. It is important to understand how this changes over time, especially in parents of children under 5 years of age. This study measured changes in parental attitudes to
vaccination between 2001 and 2010 using data from the New South Wales child health survey program, an ongoing program collecting information regarding Australian children.

More than 93% of parents support immunisation and there was no sign of increasing opposition (which remained around 2%) over the period. However, the proportion of respondents who ‘strongly’ supported immunisation was significantly lower in 2010 (65%) than in 2001, 2004 and 2007 (75–81%).

It is not clear why this shift has occurred and further research is needed to provide more detail about trends in vaccine acceptance over time.

PROJECTS FUNDED BY EXTERNAL GRANTS

IMPACT OF INFLUENZA ON CARERS OF CHILDREN

The Care-ILI-QoL developed by PhD candidate Maria Chow is the first ever instrument to measure Quality of Life (QoL) in parents of children with an influenza-like illness (ILI). Development of this measure was based on a systematic review, a quantitative survey, qualitative interviews with parents, and expert input from paediatric specialists. It was established that the measure is a reliable and comprehensive way of measuring the impact of this common disease in children.

Research using the Care-ILI-QoL questionnaire found that parents experienced significantly lower quality of life while their child had influenza-like illness. Measuring quality of life can complement economic evaluation to provide a more comprehensive estimate of influenza disease burden. This will provide a more complete picture of the disease’s impact and assist formulation of government policy and the prioritisation of vaccine development.

Acknowledgements – KU Children’s Services; Sanofi

Funding – ARC Linkage Grant ‘Social, economic and health benefits of vaccinating children in day care centres against influenza’

PROTECTING BABIES FROM THE EFFECTS OF WHOOPING COUGH AND INFLUENZA

Respiratory infections such as pertussis (whooping cough) and influenza can have serious implications for pregnant women and their babies. Influenza vaccination is currently recommended for pregnant women and pertussis vaccination during pregnancy is recommended as an option.

This research explored the attitudes, behaviours and information needs of pregnant women in relation to vaccination during pregnancy.

Findings included that women were 20 times more likely to have the influenza vaccine while pregnant if it was recommended to them. Women who were concerned about their baby’s safety were less likely to have the vaccine while pregnant but about 70% of them would have the vaccine while pregnant if it was recommended to them.

Similarly, women were 7 times more likely to have a pertussis vaccine after their baby was born if it was recommended to them and 80% would have a pertussis vaccine while pregnant if it was recommended to them.

Interviews revealed that women have a range of information needs and behaviours relating to vaccination. They see pregnancy as a busy time with vaccination as only one of many competing priorities. Women prioritise actions such as vaccination according to the perceived risk to their baby before themselves.

The results of this study informed the development of a suite of decision tools for different information needs which can be used as an adjunct to other maternal vaccination initiatives.

This study was completed in 2013, with four peer-reviewed publications, three conference presentations and a PhD thesis arising from the work.

Funding – Financial Markets Foundation for Children (grant number 2010-099).
THE MUMS AND WHOOPING COUGH STUDY

Young infants are at high risk of severe disease if they contract pertussis (whooping cough) before they can be vaccinated. Vaccinating new mothers is one way to protect infants from pertussis during this period.

This study, led by Associate Professor John Sinn at Royal North Shore Hospital in collaboration with NCIRS, is examining how various factors and types of information influence new mothers to take up the pertussis vaccine.

Around 3,000 women in the maternity units of Royal North Shore Hospital and North Shore Private Hospital participated in the study.

About a third of mothers had been vaccinated against pertussis in the last 10 years. These mothers perceived pertussis as ‘severe’ and ‘common’, were less likely to report barriers to being vaccinated, and saw vaccination as a parental responsibility.

The study showed that it would be feasible to implement routine pertussis vaccination in the maternity ward with about 75% of unvaccinated mothers taking up the vaccine. By the time of discharge, vaccination coverage was over 80% in all study participants and almost 50% in their partners.

The way that messages were framed in information brochures provided to mothers (in terms of ‘gain’ or ‘loss’) did not significantly affect vaccine uptake.

A pilot study in 2013 on pertussis vaccination in pregnancy indicated that of those women eligible for pertussis vaccination, about 9% received it, primarily during their third trimester.

Funding – seeding grants from NCIRS, GlaxoSmithKline and Sanofi (recruitment phase); NHMRC Public Health Scholarship (Elizabeth Hayles – PhD candidate)
DISEASE MODELLING

OVERVIEW

Mathematical modelling is an important tool that can be used to help predict the impact of vaccination programs on disease epidemiology both in people who are vaccinated and in the wider population via herd protection. Information produced by NCIRS (including analyses of epidemiological data, vaccine coverage estimates and results of serosurveillance studies) is used to design and validate these models.

Modelling can assist in the identification of risks posed by unvaccinated cohorts in the population and inform measures to improve immunisation coverage under the National Immunisation Strategy.

This work is a collaboration between NCIRS and the modelling group at the School of Public Health and Community Medicine at the University of New South Wales (UNSW), led by Professor Raina MacIntyre, with Dr James Wood taking a primary role in conduct and coordination of modelling projects.

Modelling studies undertaken include evaluations of the effectiveness and cost-effectiveness of new vaccines and more general health economic evaluations; modelling the impact of modifications to existing vaccination schedules and the effect of control strategies for specific diseases such as pertussis and varicella; and modelling the progress towards elimination of diseases such as measles and rubella.

These activities are funded by the Australian Government Department of Health.

KEY ACTIVITIES

IMPACT OF THE VARICELLA VACCINE CATCH-UP CAMPAIGN

Varicella vaccination has been included in the Australian National Immunisation Program since November 2005, for children at 18 months of age, with an associated catch-up program for children 10–13 years of age who haven’t previously had varicella disease or vaccination.

The NCIRS/UNSW modelling group developed a model to examine the impact of the varicella catch-up program, as well as hypothetical scenarios of changing to a two-dose varicella vaccination schedule or maintaining the current one-dose schedule but with higher coverage. It was found that if one-dose coverage could be raised to 90–95%, it would have similar benefits to maintaining voluntary catch-up or adding a second dose to the schedule.

A paper including these results has been submitted for publication.
ESTIMATING THE REPRODUCTION NUMBER FOR MEASLES

Projected R values for measles in Australia. (Projections from the 2007 serosurvey in blue; projections from 2002 serosurvey in red.)

The reproduction number (R) for a disease is the average number of secondary cases resulting from each infectious case. R must remain below 1 for disease elimination to occur.

Results from the third serosurvey (conducted by NCIRS in 2007) were used to calculate the reproduction number for measles at both national and local levels. The estimated reproduction number was unexpectedly high, especially in New South Wales. This is a cause for concern but correlates with an increase in measles cases and a large measles outbreak in Sydney during that time. The model will next be adapted to integrate New South Wales outbreak data to improve estimates of outbreak risk.

This work was presented at the Communicable Diseases Control Conference in March 2013.

POTENTIAL IMPROVEMENTS TO PERTUSSIS VACCINE SCHEDULE

This study used vaccine coverage and disease data compiled by NCIRS to look at the impact of alternative infant vaccination schedules for pertussis, such as adding a booster dose at 18 months of age or delaying the third dose to 12 months rather than 6 months.

Adding an 18 month dose would reduce cases of pertussis in older children but only directly prevent a few hospitalisations (but at the cost of an extra dose for all children). Delaying the third dose would be cost neutral but, while preventing cases of pertussis in children over 1 year of age, there is a risk of extra hospitalisations in infants aged between 6 and 12 months. There are also likely to be some herd immunity effects (particularly if adding the 18 month booster) and the benefits could increase greatly depending on the size of these. The work is currently being extended to investigate how large herd effects could be.

OTHER PROJECTS

MMR VACCINE COVERAGE IN AUSTRALIA

This study aims to develop models and methods to estimate vaccine coverage and rates of waning immunity for measles, mumps and rubella based on results from serosurvey collections.

RUBELLA IN AUSTRALIA – ARE WE AT ELIMINATION?

This study has demonstrated that models developed to investigate rubella elimination in Australia are robust and able to fairly accurately predict elimination status based on changes in rubella vaccination practice and coverage in the past. Models suggest that rubella elimination status can be maintained in Australia.

WHO SAGE PERTUSSIS

The UNSW/NCIRS modelling group with Associate Professor Jodie McVernon (University of Melbourne) was one of four groups around the world invited by the World Health Organization to contribute results to inform WHO advice to middle income countries about switching from whole-cell to acellular pertussis and different schedules.
Clinical research at NCIRS focuses on trials of vaccines addressing immunogenicity and/or safety with additional attention to burden of disease studies. We study both registered vaccines and those in development and particularly address diseases of high morbidity and/or mortality.

Our strategic research on both adverse events (immediate and delayed) from vaccines (new and old) and discovering new as yet unrecognised but substantial sequelae of vaccine-preventable diseases – like meningococcal meningitis, septicaemia and viral encephalitides – is expanding to ascertain many more of the costs/sequelae of both vaccines and infections. This research is driven by enhanced active and novel surveillance, especially with Paediatric Active Enhanced Disease Surveillance (PAEDS), and detailed systematic reviews of contemporaneous relevant research.

STUDIES CONDUCTED

INFLUENZA

More than 2 million Muslims from 180 countries assemble in Mecca, Saudi Arabia, each year for the Hajj, the largest annual mass gathering. Dense crowding can lead to the rapid spread of infectious diseases.

Professor Robert Booy and Dr Harunor Rashid have led vaccination surveys among Australian and other Hajj pilgrims since 2011 and are now advancing a trial investigating the efficacy of facemasks in preventing respiratory infections, especially influenza, including the interaction of facemasks with influenza vaccine. Uptake of vaccines, including barriers and promotional factors, are under investigation.

In 2013, Dr Rashid, Professor Booy, Dr Osamah Barasheed and international colleagues commenced the formal mask trial, recruiting over 1,000 pilgrims. Just over 100 participants had respiratory symptoms, some with influenza, but none were found to have Middle East Respiratory Syndrome corona virus infection. The research will be expanded from 2014 through international collaborations.
The impact of masks and vaccines on pharyngeal acquisition of pneumococcal, meningococcal and other bacterial infections that may carry antibiotic resistance genes is also being studied by PhD student Mr Irfan Azeem, clinical pharmacist at The Children’s Hospital at Westmead.

Funding – Qatar National Research Foundation research grant; Saudi government PhD research fellowship (Dr Osamah Barasheed)

Collaborators – Dr Elizabeth Haworth, Oxford University, UK; Professor Ziad Memish, former Saudi Arabia Deputy Health Minister, Director of WHO Collaborating Centre for Mass Gatherings Medicine, Riyadh, Saudi Arabia; Dr Halitham El Bashir, Senior Consultant Developmental Paediatrics and Rehabilitation, Qatar; Professor Jonathan Nguyen Van-Tam, University of Nottingham, UK; Professor Atif Asghar, Institute of Hajj and Umrah Research, Umm al-Qura University, Mecca, Saudi Arabia; Dr Abdullatif Al-Khal, Hamad Medical Corporation, Doha, Qatar

NATIONAL GRANT

FLUMUM: INFLUENZA VACCINATION IN PREGNANCY AND THE BENEFIT TO INFANTS

Influenza vaccination is recommended for pregnant women who will be in their second or third trimester during the influenza season. NCIRS is collaborating on a multicentre study to determine the effectiveness of maternal influenza vaccination in protecting infants from influenza during the first 6 months of life.

The study aims to establish the first national system of validated annual influenza vaccine uptake in pregnancy and to estimate the effectiveness of maternal influenza vaccination in preventing influenza during pregnancy.

The study which commenced in 2012 is planned to involve about 10,000 women and their infants recruited through six centres over a 4-year period.

Funding – National Health and Medical Research Council project grant (1020035)

Lead investigator – Associate Professor Ross Andrews, Menzies School of Health Research, Darwin

Co-investigators – Dr Kerry-Ann O’Grady and Associate Professor Stephen Lambert, Queensland Children’s Medical Research Institute, Brisbane; Professor Terry Nolan, Vaccine and Immunisation Research Group (VIRGo), University of Melbourne; Associate Professor Peter Richmond, University of Western Australia; Dr Nick Wood, NCIRS; Associate Professor Helen Marshall, Vaccinology and Immunology Research Trials Unit (VIRTU), University of Adelaide; Mr Mark Chatfield, Menzies School of Health Research, Darwin

INDUSTRY SPONSORED

EFFICACY AND SAFETY OF NITAZOXANIDE IN THE TREATMENT OF INFLUENZA

New drug treatments for influenza are needed. This study will assess the effect of Romark’s drug nitazoxanide alone and in combination with oseltamivir in the treatment of acute uncomplicated influenza. Adults aged 13–65 years who have symptoms/signs of influenza will be randomly assigned to four treatment groups. The first patients were recruited in 2013 and recruitment will continue in 2014.

Sponsor – Romark

RM08-3002: A phase III randomised double-blind placebo controlled trial to evaluate the efficacy and safety of nitazoxanide and nitazoxanide plus oseltamivir in the treatment of acute uncomplicated influenza

COMPARISON OF INFLUENZA VACCINES PRODUCED IN CELL CULTURE OR CHICKEN EGGS

This trial involving children and adolescents compared the safety of two flu vaccines: a new vaccine prepared by growing the influenza viruses in cell culture and an existing vaccine prepared by the older method of growing the viruses in hen’s eggs.

Sponsor – Novartis

V58-31: A phase III observer blind randomised controlled multicentre study to evaluate the safety of a trivalent subunit influenza vaccine produced either in mammalian cell culture or in embryonated chicken eggs (Fluvirin®) in healthy children and adolescents 4–17 years of age

SAFETY AND IMMUNOGENICITY OF A QUADRIVALENT INFLUENZA VACCINE

Since the early 2000s two lineages of influenza B have been circulating through the world’s human population. In response to this, several vaccine manufacturers are developing quadrivalent influenza vaccines (containing strains from both influenza B lineages as opposed to the current standard trivalent vaccines which contain a strain from only one B lineage).

This study was a randomised controlled trial designed to determine the batch-to-batch consistency of Sanofi Pasteur’s candidate quadrivalent unadjuvanted split-virion vaccine. Study activities were completed in 2012.
Sponsor – Sanofi Pasteur

GQM04: Safety and immunogenicity of a quadrivalent influenza vaccine administered via the intramuscular route in child/adolescent and adult subjects

Pertussis

National Grant

Optimising Pertussis Vaccination in Infants: A New Approach

Australia has recently experienced a pertussis (whooping cough) epidemic. Pertussis incidence is highest in the youngest infants, who have the greatest risk of hospitalisation and death and are not protected by current vaccination schedules. Re-evaluation of pertussis immunisation schedules to assess whether protection through infant vaccination can be improved is an urgent priority.

This study will investigate whether giving two early doses of pertussis vaccine (at 6 weeks and 12 weeks of age) and a later third dose (at 12 months of age) will produce an earlier immune response, and therefore better protection from pertussis, than the current standard schedule in which pertussis vaccine is given at 2, 4 and 6 months of age. This study has commenced and plans to recruit 80 infants.

Funding – Financial Markets Foundation for Children (Grant No: 2012-083)

Lead investigator: Dr Nick Wood, NCIRS

Whooping Cough Epidemics: Effect of Strains on Severity of Infection and Immunisation

NCIRS is involved in a very important study examining the relationship between the genotype of Bordetella pertussis causing disease and the clinical severity of pertussis in vaccinated and unvaccinated children. The rationale is that vaccine pressure may have driven the selection of pertussis strains that are more likely to cause severe disease and/or are more transmissible.

This study will clarify the genetic differences between the most prevalent (epidemic) strains currently circulating in the Australian population and their closest less prevalent relatives (non-epidemic strains), characterise the clinical factors of each strain, and inform how epidemic strains may evade vaccine-induced immunity.

Funding – National Health and Medical Research Council project grant (1011942)

Lead investigator – Associate Professor Ruiting Lan, University of New South Wales

Co-investigators – Associate Professor Vitali Sintchenko and Professor Lyn Gilbert, Institute for Clinical Pathology and Medical Research (ICPMR), Westmead Hospital, Sydney; Associate Professor Helen Marshall, University of Adelaide and Women’s and Children’s Hospital, Adelaide; Professor Peter McIntyre and Dr Nick Wood, NCIRS

Industry Support

Long-Term Immunity Following Pertussis Vaccine at Birth: Response to a Booster Dose

The main rationale for this study is that immunity to pertussis is gradually lost after infants complete the primary infant vaccination schedule at 6 months of age and there is an increase in the number of cases of pertussis among children who are 2 to 4 years old.

A previous NHMRC funded trial in which NCIRS was involved looked at the immune response and adverse effects of giving infants the acellular pertussis vaccine at birth. In this follow-up study, responses of 160 children to a booster dose of acellular pertussis vaccine in the second year of life were examined, comparing the vaccine normally given to infants (DTPa) with a reduced antigen content formulation of the vaccine (dTpa). Recruitment has been completed and serological assays are currently being performed at the GlaxoSmithKline Biological laboratory in Belgium.

Funding – GlaxoSmithKline, investigator initiated

Collaborators – Professor Terry Nolan, University of Melbourne; Associate Professor Helen Marshall, University of Adelaide; Associate Professor Peter Richmond, University of Western Australia
OTHER DISEASES

MENINGITIS AND ENCEPHALITIS

Even without widespread vaccination, meningococcal A disease has disappeared in recent decades from developed countries. Meningococcal B disease may too be waning but remains. A new effective, but relatively expensive, vaccine is available privately but its universal introduction is contentious and its evaluation a crucible – will any new vaccine ever again be cost-effective for universal introduction, given huge development costs (necessitating a high price for vaccine) in the context of rare, even waning, diseases?

Socioeconomic health gains, reductions in smoking and other secular trends have mediated some dramatic declines in both colonising infection and invasive disease rates of meningococcus B, fuelling concern over vaccine cost-effectiveness and focusing yet more attention on vaccine tolerability. Now that vaccines have drastically slashed the burden of bacterial meningitis, especially in children, increasing attention is directed to identifying both acute and long-standing sequelae of other important infection-associated brain insults: viral encephalitides and encephalopathies.

In 2013, surveillance of viral encephalitides and encephalopathies began in New South Wales (co-led by Professor Robert Booy and Professor Cheryl Jones from the University of Sydney). Already two outbreaks have been detected: one caused by Enterovirus 71, the second by Pareco virus type 3. Long-term sequelae will be investigated to deepen the understanding of disease burden and to inform cost-effectiveness evaluation of any newly developed vaccines.

INTERNATIONAL GRANT

OPTIMISING IMMUNITY TO VACCINATION IN AUSTRALIAN HAJJ PILGRIMS

Travellers, including Hajj pilgrims, are often required to receive multiple vaccines before their journeys. There are speculations that carrier proteins in conjugate polysaccharide vaccines may interact with diphtheria or tetanus toxoid in diphtheria-tetanus-acellular pertussis (dTpa) vaccines.

The clinical research team are conducting a randomised controlled trial among Australian pilgrims who will be attending the Hajj pilgrimage in 2014, 2015 and 2016. The trial will gauge the immune response to pneumococcal and meningococcal conjugate vaccines administered before, with or after dTpa vaccine to determine whether prior exposure to dTpa vaccine potentiates (or suppresses) the immune response to conjugate polysaccharide vaccines.

In this study, pilgrims will be randomly assigned to one of the three study arms: some will receive dTpa followed by conjugate pneumococcal and meningococcal vaccines; some will receive conjugate vaccines followed by dTpa; and the other group will receive the dTpa and conjugate vaccines at the same time. So far, 116 Hajj pilgrims have been recruited from Greater Sydney.

Funding – Robert Austrian award 2014 (Dr Mohamed Tashani); Libyan government fellowship and Islamic Development Bank (IDB) scholarship (Dr Mohamed Tashani)

Collaborators – Dr Melanie Wong, Immunologist, The Children's Hospital at Westmead, Sydney; Professor Ziad Memish, former Saudi Arabia Deputy Health Minister, Director of WHO Collaborating Centre for Mass Gatherings Medicine, Riyadh, Saudi Arabia

NATIONAL GRANT

FEBRILE SEIZURES FOLLOWING VACCINATION IN CHILDREN

Febrile seizures are relatively common in young children. This research will examine the risks and outcomes of febrile seizures occurring after vaccination.

The study will measure whether there has been any increase in the risk of febrile seizure following the introduction of the combined quadrivalent measles-mumps-rubella-varicella (MMRV) vaccine into the Australian National Immunisation Program. It will build an active surveillance system in four Australian states to measure the risk of post-vaccination febrile seizures, the associated risk factors (including genetic markers) and the risk of recurrence. It will also look for long-term clinical, behavioural and neurological outcomes in children who have experienced a febrile seizure after vaccination.
The study involves PAEDS sites in Sydney, Melbourne, Adelaide and Perth. Active recruitment of children experiencing febrile seizure at these four sites commenced from 1 May 2013. For each case, detailed clinical, laboratory and vaccine history will be obtained. (See also the ‘Paediatric Active Enhanced Disease Surveillance’ section of this report.)

Funding – National Health and Medical Research Council project grant (1049557)

Lead investigator – Dr Nick Wood, NCIRS

Co-investigators – Dr Jim Buttery and Dr Nigel Crawford, Royal Children’s Hospital, Melbourne; Associate Professor Michael Gold, Women’s and Children’s Hospital, Adelaide; Associate Professor Peter Richmond, Princess Margaret Hospital for Children, Perth; Dr Belinda Barton, The Children’s Hospital at Westmead, Sydney; Associate Professor Kristine Macartney, NCIRS; Professor Ingrid Scheffer and Professor Samuel Berkovic, Epilepsy Research Centre, Melbourne

Q FEVER: HOW COMMON IS IT AND HOW CAN WE BEST PREVENT IT?

There are some major gaps in knowledge about Q fever disease and its prevention. Addressing these gaps is critical to the formulation of appropriate policies for the control of Q fever. Australia is uniquely placed to do this as it is the only country using a Q fever vaccine.

This study will collect useful data on disease burden in different risk groups, duration of vaccine immunity, correlation of immunity with exposure, illness and vaccine history, knowledge and attitudes about the need for vaccination, and the risk of vaccine-related adverse events.

The study will be conducted among veterinarians, vet students and vet nurses. In 2013, active surveillance of adverse events following vaccination was conducted in University of Sydney veterinary students, the majority of whom were female. Higher rates of systemic reactions were found in this study than are reported in the literature. Recruitment to capture a larger sample of vaccine recipients is ongoing.

This important study involves the development of strong collaborations between veterinary and clinical researchers.

Funding – National Health and Medical Research Council project grant (1049558)

Lead investigator – Dr Nick Wood, NCIRS

Co-investigators – Dr Kevin Gift, University of New South Wales; Dr Samuel Berkovic, NCIRS; Associate Professor Michael Nissen, University of Queensland; Professor David Durrheim, Hunter New England Public Health Unit, Newcastle; Associate Professor Ingrid Scheffer and Professor Samuel Berkovic, Epilepsy Research Centre, Melbourne

EFFECT OF PNEUMOCOCCAL VACCINATION ON CHRONIC SUPPURATIVE LUNG DISEASE

Children with chronic suppurative lung disease (CSLD) can suffer repeated exacerbations after infections. Often this is caused by non-typeable Haemophilus influenzae infection and results in reduced lung function and increased long-term sequelae.

The 10-valent pneumococcal conjugate vaccine (Synflorix, GlaxoSmithKline) contains non-typeable Haemophilus influenzae protein D as the carrier protein conjugated to 8 of the 10 pneumococcus serotype polysaccharides contained in the vaccine.

This study is a double blind randomised controlled trial to evaluate how effective this vaccine is in reducing the rate of respiratory exacerbations in children with CSLD. Recruitment in this multicentre clinical vaccine trial has commenced.

Funding – National Health and Medical Research Council project grant (1019904)

Lead investigator – Dr Kerry-Ann O’Grady, Queensland Children’s Medical Research Institute, Brisbane

Co-investigators – Professor Anne Chang, Associate Professor Peter Morris, Professor Edward Mulholland, Dr Heidi Smith-Vaughan and Ms Amber Reville, Menzies School of Health Research, Darwin; Professor Keith Grimwood, Queensland Children’s Medical Research Institute, Brisbane; Professor Paul Torzillo, University of Sydney; Professor Allan Cripps, Griffith University, Brisbane; Dr Nick Wood, NCIRS

INVESTIGATOR FUNDED

VACCINATION OF IMMUNOSUPPRESSED CHILDREN WITH QUADRIVALENT HPV VACCINE

Human papillomavirus (HPV) infection may result in lesions that include cervical and other anogenital tract abnormalities and cancers, head and neck cancers, genital warts, cutaneous warts and respiratory papillomatosis. The quadrivalent HPV vaccine provides protection
against the high-risk oncogenic HPV types 16 and 18, as well as low-risk types 6 and 11 which are predominantly associated with non-malignant lesions. There is little research on the use of this vaccine in people who are immunosuppressed.

This investigator-driven study of immunogenicity and duration of immunity of HPV vaccine in immunosuppressed children began in 2011. Laboratory testing has been done by Merck USA and the data are currently being analysed. Long-term follow-up is continuing into 2014.

Lead investigator – Professor Raina MacIntyre, School of Public Health and Community Medicine, University of New South Wales

Co-investigators – Associate Professor Helen Marshall and Dr Christina Boros, University of Adelaide; Professor Peter Shaw, University of Sydney; Ms Laura Rost, NCIRS; Dr Ted O’Laughlin and Dr Michael Stormon, The Children’s Hospital at Westmead; Dr Fiona Mackie, Sydney Children’s Hospital, Randwick; Dr Holly Seale, Dr Michelle Barnes and Ms Aye Moa, University of New South Wales

**INDUSTRY SPONSORED**

**COMBINED HAEMOPHILUS INFLUENZAE TYPE B–MENINGOCOCCAL SEROGROUP C VACCINE**

The combination of conjugated meningococcal serogroup C polysaccharide (MenC) with conjugated Haemophilus influenzae type b (Hib) polysaccharide in a single vaccine reduces the number of vaccine injections required, and facilitates the incorporation of meningococcal C vaccine into childhood immunisation schedules at 12 months of age.

This multicentre study evaluated the immunogenicity of a combined Hib–MenC vaccine given once at 12 months of age, compared to giving the two components in separate vaccinations. The study began in 2006. The long-term follow-up phase which involved annual blood sampling continued until late 2012.

Subjects from this study are now being enrolled in a study to investigate the antibody responses to a single dose of a tetanus-toxoid conjugated meningococcus serogroup A, C, W135, Y vaccine with additional follow-up blood sampling planned for 2 and 4 years later.

Sponsor – GlaxoSmithKline

* A phase III, open, randomised, controlled, multicentre study to demonstrate the non-inferiority of the meningococcal serogroup C and the Haemophilus influenzae type b immune response of GlaxoSmithKline (GSK) Biologicals’ conjugate Hib-MenC vaccine co-administered with GSK Biologicals’ measles-mumps-rubella vaccine, Priorix™, versus MenC-CRM197 conjugate vaccine co-administered with GSK Biologicals’ Hib vaccine, Hiberix™, and Priorix™ in 12- to 18-month old toddlers primed in infancy with a Hib vaccine but not with a meningococcal serogroup C vaccine; and to evaluate the long-term antibody persistence up to 5 years after the administration of the Hib-MenC vaccine

* GSK MENACWY-TT-106 (EXT:HIB-MENC-TT-016 Y6,8,10): A phase IIIb, open, multicentre study to evaluate the immunogenicity, reactogenicity and safety of a booster dose of GSK Biologicals’ MenACWY-TT vaccine administered at 6 years post-primary vaccination with either GSK Biologicals’ Hib-MenC-TT vaccine (Mentorix™) or Hiberix™ and Meningitec™, in healthy subjects aged 12-18 months at primary vaccination and to evaluate the long-term antibody persistence at 2 and 4 years after MenACWY-TT booster vaccination

**SAFETY, TOLERABILITY AND IMMUNOGENICITY OF A MENINGOCOCCAL SEROGROUP B VACCINE**

Neisseria meningitidis serogroup B is the major cause of meningococcal disease in Australia. Vaccines based on surface proteins of Neisseria meningitidis serogroup B are now becoming available.

This study, in adolescents and young adults, evaluates the safety profile of a candidate meningococcal B vaccine by investigating adverse events occurring after each of the three vaccine doses and during a 6-month follow-up period. It will also evaluate the immune response induced by the vaccine.

Sponsor – Pfizer

B1971014: A phase 3, randomised, placebo and active-control, observer-blind trial to assess the safety, tolerability and immunogenicity of a meningococcal serogroup B recombinant lipoprotein (rLP2086) vaccine given in healthy subjects aged ≥11 to <26 years
In addition to the studies already described, NCIRS staff are involved in collaborative research being undertaken by the NHMRC Centre for Research Excellence (CRE) in Critical Infectious Diseases (led by Professor John Iredell at the Westmead Millennium Institute, Sydney) and the Marie Bashir Institute for Infectious Diseases and Biosecurity at the University of Sydney.

The NCIRS Clinical Research division also has collaborations with other research groups around Australia including:
- Professor Cheryl Jones, Discipline of Paediatrics and Child Health, University of Sydney
- Professor Dominic Dwyer, Institute for Clinical Pathology and Medical Research (ICPMR), Westmead Hospital, New South Wales
- Dr Peter Hay, Castle Hill Medical Practice, New South Wales
- Associate Professor Thomas Gottlieb, Concord Hospital, New South Wales
- Associate Professor Vitali Sintchenko, ICPMR, Westmead Hospital, New South Wales
- Professor James Branley, Nepean Hospital, New South Wales
- Professor Adam Jaffe, Faculty of Medicine, University of New South Wales, and Associate Director of Research, Sydney Children’s Hospitals Network
- Professor Sally Redman, Chief Executive Officer, SAX Institute, New South Wales
- Associate Professor Amanda Leach, Menzies School of Health Research, Northern Territory
- Professor Emily Banks, Australian National University, Australian Capital Territory
- Professor Mark Kendall, Australian Institute for Bioengineering and Nanotechnology, University of Queensland

In addition to the studies already described, other international collaborators include:
- Professor Martin Hibberd, Genome Institute of Singapore
- Dr Shamez Ladhani, Health Protection Agency, UK
- Professor Mike Levin and Professor Simon Kroll, Imperial College, University of London, and Centre for Child Health, Queen Mary School of Medicine and Child Health, University of London, UK
- Dr Hugh Reyburn, Joint Malaria Project, Tanzania and London School of Hygiene and Tropical Medicine, UK
- Dr George Mtowve, Muheza Hospital, Tanzania
- Professor Paul Heath, St Georges Hospital Medical School, University of London, UK
- Professor Russell Viner and Dr Deborah Christie, University College, University of London, UK
- Professor Mohammad A Muhit, University of South Asia, Dhaka, Bangladesh
- Dr Mohammad Sudomo and Professor Abdurrahman Muktasam, Universities in Bali and Lombok, Indonesia

Members of the NCIRS Hajj research team with Grand Mufti of Australia Dr Ibrahim Abu Muhammed (second from right)
PAEDIATRIC ACTIVE ENHANCED DISEASE SURVEILLANCE (PAEDS)

OVERVIEW

The Paediatric Active Enhanced Disease Surveillance (PAEDS) network is now in its 8th year since beginning as a pilot project under the joint leadership of NCIRS and the Australian Paediatric Surveillance Unit (APSU) in 2007.

PAEDS conducts active, hospital-based surveillance of serious vaccine-related childhood conditions and collects data which is not readily available using other surveillance mechanisms. Data collected by PAEDS will help to inform vaccination policy and practice in the implementation of the National Immunisation Strategy.

PAEDS involves a network of clinicians and public health researchers in five Australian tertiary paediatric hospitals: The Children’s Hospital at Westmead, Sydney; Royal Children’s Hospital, Melbourne; Women’s and Children’s Hospital, Adelaide; Princess Margaret Hospital, Perth; and, since 2013, the Royal Children’s Hospital, Brisbane. (For further details, see the list of ‘Collaborations and partnerships’ at the front of this report.)

Surveillance is ongoing for the three conditions that have been monitored by PAEDS since 2007 – acute flaccid paralysis, intussusception and varicella/herpes zoster. In 2012–2013, PAEDS added three new conditions for surveillance – pertussis, febrile seizures and acute childhood encephalitis (a pilot project in NSW only).

In previous years, PAEDS has also studied important conditions such as Guillain-Barré syndrome and pandemic influenza. In 2013, the work on pandemic influenza undertaken by PAEDS investigators and collaborators, under the NHMRC’s Urgent Call for Research on H1N1 Influenza 09 grant program, was recognised as one of Australia’s 10 best research projects. The project used PAEDS to monitor the impact of H1N1 infection in children under 15 years of age admitted to the five PAEDS hospitals.

PAEDS is funded by the Australian Government Department of Health with contributions from the state health departments of New South Wales, Queensland, South Australia, Victoria and Western Australia.

PAEDS is overseen by the PAEDS Reference Group, formed in 2013, which includes representatives from all participating state health departments and independent expert groups. The Reference Group provides guidance on priority conditions for surveillance and potential synergies and collaborations with other surveillance schemes. It also provides feedback on PAEDS network outputs, including translation of surveillance and research findings into policy and practice.

KEY ACTIVITIES

CONDITIONS UNDER ONGOING SURVEILLANCE

ACUTE FLACCID PARALYSIS

Surveillance for acute flaccid paralysis (AFP) has been conducted by PAEDS since 2007. To retain polio free status in Australia, it is important that AFP surveillance meets World Health Organization requirements related to case identification, stool collection and case investigation. PAEDS centres continue to notify most of the AFP cases that are reported in Australia (to the Polio Expert Panel of the Department of Health) and provide stool samples to the Victorian Infectious Diseases Reference Laboratory for testing for enteric pathogens.

INTUSSUSCEPTION

PAEDS has monitored cases of intussusception since 2007 when rotavirus vaccines were introduced in Australia. PAEDS investigators were the first in the world to publish data on the risk of intussusception associated with these new
In 2012, a study commissioned by the Therapeutic Goods Administration extended this analysis, while still incorporating PAEDS data. This study, published in *Clinical Infectious Diseases*, estimated that there would be approximately 6 additional cases of intussusception among every 100,000 infants vaccinated, or 14 additional cases per year in Australia. (See also the section ‘Adverse events following immunisation’.)


**VARICELLA AND HERPES ZOSTER**

PAEDS provides the only systematic prospectively collected data on hospitalised varicella in Australia, including information on risk factors and vaccination status. In 2013, PAEDS published the first major Australian study of the impact of universal varicella vaccination in children, as funded under the Australian National Immunisation Program since 2005. This study was led by Associate Professor Helen Marshall from the Women’s and Children’s Hospital, Adelaide.

It demonstrated a 68% reduction in varicella hospitalisations and a 40% reduction in herpes zoster in children since vaccine introduction. The results emphasised the importance of varicella vaccination, as 80% of hospitalised children were unvaccinated, including all cases requiring intensive care.

Further analysis is planned, including formal assessment of vaccine effectiveness and correlations of disease severity with varicella genotype.


**PERTUSSIS**

Active surveillance of hospitalised pertussis commenced in January 2012 with special emphasis on disease severity, the need for intensive care, and death and disability. This study will also examine the contribution of co-infections and other co-morbidities, and disease transmission in households (by checking the immunisation history of patients, family members and ‘coughing contacts’). These factors will also be correlated with the genetic subtypes of *Bordetella pertussis* identified by culture.

**FEBRILE SEIZURES**

Febrile seizures usually occur in children from 6 months to 6 years of age, and they can be triggered by a sudden fever from any cause – most often from a viral illness. However, fever following vaccination can also be associated with febrile seizures.

About 1 in 30 children of this age will have a febrile seizure. Recurrent seizures occur in approximately one-third of children. The long-term clinical outcomes and risks of recurrence of febrile seizures that occur following vaccination are not well described.

New vaccines recently added to the National Immunisation Program (the 13-valent pneumococcal conjugate vaccine and the combined measles-mumps-rubella-varicella vaccine) have been associated with somewhat high rates of fever, and therefore a potential risk of febrile seizure, under certain circumstances.

This important PAEDS study will gather enhanced clinical and epidemiological information on febrile seizures and will determine if there is an increased risk of febrile seizures with the new vaccines. It will also describe the clinical and revaccination outcomes of children who have experienced a febrile seizure.

In addition, in four PAEDS sites, children who experience febrile seizure identified during the PAEDS study will be offered enrolment into an NHMRC funded study led by Dr Nick Wood.
from NCIRS. This study will compare the genetic susceptibility to seizures among children who have a febrile seizure following vaccination and those who have a febrile seizure not related to vaccines. (See the section ‘Clinical studies’ for more information.)

**ACUTE CHILDHOOD ENCEPHALITIS**

Encephalitis is a complex neurological syndrome caused by inflammation of the brain. Children are among those most severely affected. However, there is limited information about the causes of encephalitis in children worldwide and in up to 70% of cases a cause cannot be found.

The Australian Childhood Encephalitis (ACE) study led by Professor Cheryl Jones (from The Children’s Hospital at Westmead) will collect data on encephalitis cases via PAEDS. A 6-month pilot study of surveillance conducted at the New South Wales site in 2013 showed this to be very feasible and efficient. Roll-out to other states is occurring in 2014.

The ACE study has the potential to describe the incidence, aetiology, clinical characteristics, potential risk factors and short-term outcomes among Australian children hospitalised for encephalitis. This will be valuable in informing the development of standardised diagnostic guidelines, and also potentially improving the prevention and management of this complex condition.
NCIRS is a major contributor to this NHMRC Centre of Research Excellence (CRE) which commenced in 2012. The CRE is led by Professor Raina MacIntyre, Head of the School of Public Health and Community Medicine at the University of New South Wales (UNSW) and Senior Principal Research Fellow at NCIRS.

The four streams of research conducted by the CRE are:

- Aboriginal and Torres Strait Islander vaccination needs
- Vaccine-preventable diseases in the frail elderly
- Migrant, traveller and refugee health
- Neonatal and parental vaccination strategies.

These risk groups suffer disproportionate morbidity and mortality from vaccine-preventable diseases, because of less robust immunity, co-morbidities or environmental factors. However, there are critical gaps in research relating to these vulnerable groups.

The CRE is addressing these gaps in knowledge using a variety of methods spanning both quantitative and qualitative research. High quality research evidence in areas including vaccine efficacy and safety, changing environmental factors, social norms and population demographics is necessary to inform vaccine policy.

Subsequent translation of research findings into policy and practice will improve the population health impact of vaccination programs and contribute greatly to implementation of National Immunisation Strategy priorities.

The CRE involves an international team of experts in clinical research, epidemiology, modelling, health economics and social sciences and is also developing Australian research capacity among postdoctoral researchers and students.

Chief Investigators: Professor Raina MacIntyre (UNSW); Professor Peter McIntyre, Professor Robert Booy, Associate Professor Julie Leask, Dr Nick Wood and Dr Rob Menzies (NCIRS); Professor Cheryl Jones (University of Sydney and The Children’s Hospital at Westmead); Professor John Kaldor (The Kirby Institute); Associate Professor Philippe Beutels (University of Antwerp, Belgium); and Professor Dominic Dwyer (Centre for Infectious Diseases and Microbiology Laboratory Services, Westmead Hospital).

Associate Investigators: Associate Professor Christopher Poulos; Mr James Ward; Associate Professor Rachel Skinner; Dr Barend Marais; Associate Professor Kristine Macartney (NCIRS).

Professional Research Persons: Dr Heather Gidding; Dr Anita Heywood; Ms Telphia Joseph (NCIRS); Dr Bette Liu; Dr Anthony Newall; Dr Harunor Rashid (NCIRS); Dr Holly Seale; Dr Mohamud Sheikh; Dr Tom Snelling; Ms Megan Williams; Dr James Wood.

Further information about the CRE is available at www.creimmunisation.com.au.
CRE WORKSHOPS

NCIRS contributions to workshops conducted by the CRE are described below.

In addition to these workshops, the CRE also conducted a stakeholder workshop on immunisation issues for migrants and refugees. Proceedings of the workshop are available on the CRE website (http://creimmunisation.com.au/news/national-stakeholder-workshop-immunisation-policy-migrants-refugees-and-travellers).

UPDATE ON MEASLES, MUMPS AND RUBELLA – CURRENT RESEARCH AND FUTURE PRIORITIES

In August 2012, NCIRS hosted this workshop as a member of the CRE.

The workshop involved a series of talks around the current epidemiology of measles, mumps and rubella followed by a discussion session for CRE researchers to identify research gaps and priorities.

Dr Aditi Dey from NCIRS gave an overview of national surveillance data in Australia and Professor Margaret Burgess reported back on a recent meeting about the epidemiology of measles, mumps and rubella in Europe. Dr James Wood (UNSW) presented some recent modelling work and Ms May Chiew (NCIRS), Dr Anita Heywood (UNSW) and Dr Heather Gidding (UNSW) spoke about projects planned to estimate the measles reproduction number, and how data linkage can inform estimates of disease burden and vaccine uptake and effectiveness.

SURVEY DESIGN WORKSHOP

In November 2013, Associate Professor Julie Leask and Dr Hal Willaby from NCIRS, with Dr Holly Seale and Professor Raina MacIntyre from UNSW, conducted an interactive workshop on survey design. The workshop was hosted by the School of Public Health and Community Medicine at UNSW.

Attendees included students and investigators within the CRE as well as others undertaking immunisation surveys. The workshop aimed to equip students and investigators with tools and insights to develop surveys of immunisation knowledge, beliefs, attitudes and behaviours.
NATIONAL INDIGENOUS IMMUNISATION RESEARCH WORKSHOP: LESSONS LEARNT AND FUTURE DIRECTIONS

The Telethon Institute for Child Health Research hosted this very successful national workshop in November 2013. The workshop was held in Fremantle in conjunction with the CRE and NCIRS.

The workshop brought together vaccine researchers with policymakers, service providers and interested stakeholders to present recent and current work in this field, to discuss research priorities and to foster collaboration and research translation.

Ms Telphia Joseph and Professor Peter McIntyre represented the CRE on the organising committee and several members of the CRE attended the workshop and presented their research work. The CRE also contributed by sponsoring Associate Professor Kelvin Kong to give a keynote presentation at the conference.

Further information on the National Indigenous Immunisation Research Workshop is provided in the ‘Education and training’ section of this report.

![Participants at the National Indigenous Immunisation Research Workshop](image)

WORKSHOP ON ALLERGY AND NEONATAL IMMUNISATION

This workshop was hosted and organised by both the CRE and Centre for Food and Allergy Research in October 2013 in Melbourne. The workshop was very well attended with over 20 participants and included leading Australian experts in allergy from the Centre for Food Allergy Research, leading vaccine experts from the CRE and other invited guests.

Discussion topics included the epidemiology of allergic diseases, biological plausibility of any relationship to vaccines and identification of potential studies to further examine any association between food allergy and vaccines. Potential grant applications for the future were also discussed. Professor Peter McIntyre and Dr Nick Wood from NCIRS represented the CRE on the organising team.
INTERNATIONAL COLLABORATIONS AND COMMITTEE MEMBERSHIPS

CHINESE CENTER FOR DISEASE CONTROL AND PREVENTION

Between May 2011 and October 2012, NCIRS, with the University of New South Wales School of Public Health and Community Medicine and the University of Queensland School of Population Health, worked with the Chinese Center for Disease Control and Prevention on a collaborative project titled ‘Development and implementation of a post-marketing evaluation system of vaccines and developing national immunisation strategy for new vaccines’.

This international collaboration involved assisting with project implementation by providing advice about vaccine safety and adverse events following immunisation; facilitating comparisons of adverse events between Australian and Chinese programs and WHO standards; facilitating short-term training in Australia of Chinese National Immunization Program (NIP) staff in AEFI surveillance and providing advice on post-marketing surveillance; and assisting in the dissemination of findings through reports and journal publications.

A delegation from the Chinese CDC visited NCIRS in April 2012. The delegation included Dr Huaqing Wang, Deputy Director of NIP; Dr Jingshan Zheng, Director of Immunization Service Division of NIP; Dr Keli Li, Deputy Director of AEFI Surveillance Division of NIP; and Ms Disha Xu, staff of AEFI surveillance division of NIP.

NCIRS arranged for the delegation to visit the NSW Ministry of Health in Sydney, the Therapeutic Goods Administration in Canberra, a school-based immunisation service at Granville High School, and a state Vaccine Centre. The delegation also met with staff from NCIRS and the School of Public Health and Community Medicine at UNSW to discuss potential collaborative research projects in the future.

In October 2012, Dr Aditi Dey from NCIRS and Dr Andrew Page and Biao Guo from the University of Queensland attended a meeting at the CDC in Beijing to mark the completion of the project. The project was rolled out in seven provinces in China selected by the CDC as research districts for AEFI surveillance system evaluations and capacity building.

This project provided the opportunity for sharing experiences and expertise between Chinese CDC and Australian collaborators and it is anticipated that there will be follow-up projects that will further strengthen research collaborations between participating institutions.

TIMOR LESTE HEALTH LEADERS FELLOWSHIP PROGRAM

From August to October 2013, NCIRS staff played an important mentoring role for Australia Awards Fellows in the ‘Timor Leste Health Leaders Program – developing Timorese health leaders’. This Fellowship program is funded by AusAID and coordinated by the Office for Global Health at the University of Sydney to develop the skills and capacity of future health leaders in Timor Leste including clinicians, nurses, public health practitioners, managers, policy makers, researchers and educators.
The program involved individualised mentoring, placement and training plans for each Fellow and a ‘Project for Change’ to be implemented in their organisations when they returned home. Ms Telphia Joseph and Dr Nick Wood were mentors for Mr Carlos Sarmento and Dr Aditi Dey and Mr Brendon Kelaher were mentors for Mr Juvinal Xavier.

NCIRS mentors facilitated visits to a range of immunisation activities, such as school vaccination programs, adverse events clinics, Aboriginal Medical Services and the Masters of Public Health elective course run by NCIRS.

Carlos developed a project aimed at identifying under-immunised Timor Leste children and developing a mobile phone based intervention to increase vaccination coverage. Juvinal developed a training program for vaccine providers for improving recording and reporting of vaccinations in the Ainaro District of Timor Leste.

ADVISORY COMMITTEE ON IMMUNIZATION PRACTICES PERTUSSIS WORKING GROUP

The Advisory Committee on Immunization Practices (ACIP) is the peak advisory group on vaccines and immunisation in the United States convened by the Centers for Disease Control and Prevention (CDC). The ACIP holds public meetings where its recommendations are discussed three times a year, in February, June and October.

Professor Peter McIntyre, NCIRS Director, is a member of the ACIP Pertussis Working Group. ACIP Working Groups serve a key role in scientific support of vaccine policy development by the ACIP. They are convened solely to gather scientific information related to vaccines and vaccine-preventable diseases, to analyse relevant issues and data, and to draft policies or options for review, deliberation and vote by the ACIP.

At the June 2013 meeting of the ACIP at CDC, Atlanta, Professor McIntyre was asked to present on Australian work evaluating the association between rotavirus vaccines and intussusception (see ‘Adverse events following immunisation’) and the NSW cocoon evaluation (see ‘Program evaluation’).

IMMUNIZATION AND VACCINES RELATED IMPLEMENTATION RESEARCH – ADVISORY COMMITTEE (IVIR-AC)

Professor Peter McIntyre was appointed to the newly formed IVIR-AC in 2012. This committee meets once a year in Geneva to review research reports and research proposals relating to program implementation and modelling of vaccine-preventable diseases. Details of the committee’s terms of reference, membership and activities are available at www.who.int/immunization/research/committees/ivir_ac/en/.

WHO SAGE PERTUSSIS WORKING GROUP

Professor Peter McIntyre is a member of the WHO Strategic Advisory Group of Experts (SAGE) on Immunization Pertussis Working Group.

This group of international experts was reconvened in 2012 to update global guidelines for use of pertussis vaccines. Dr Helen Quinn and Ms Han Wang from NCIRS have provided technical support in data analysis to the WHO secretariat.

A report on the outcomes from the Working Group is available on the WHO website (www.who.int/immunization/sage/meetings/2014/april/presentations_background_docs/en/).

WHO SAGE Pertussis Working Group 2013
L to R: Dr Wirsing von Koenig (Germany), Prof Claire-Anne Seigrist (Switzerland), Peter McIntyre, Dr Daniel Levy-Bruhl (France), Prof Kathryn Edwards (USA), Dr Tom Clark (USA), Dr Philippe Duclos (WHO), Prof Scott Halperin (Canada), Dr Gabriela Moreno (Argentina)
OVERVIEW

NCIRS provides and supports a range of educational activities for immunisation researchers, providers and other professionals. This includes hosting workshops, presentations by NCIRS staff at national and international conferences, membership on conference organising committees and immunisation update sessions for immunisation providers. A full list of conference presentations provided by NCIRS staff is provided at the end of this report.

NCIRS also plays a significant role in the development of the next generation of researchers in immunisation and vaccine-preventable diseases by providing comprehensive training for postgraduate students. Effective training to ensure that immunisation providers are adequately skilled is a core priority of the National Immunisation Strategy.

HIGHLIGHT

PUBLIC HEALTH ASSOCIATION AUSTRALIA NATIONAL IMMUNISATION CONFERENCE

The Public Health Association’s 13th National Immunisation Conference was held in Darwin in June 2012. This biennial conference is the pre-eminent national focus for immunisation professionals in Australia and over 500 delegates attended.

Professor Peter McIntyre was the convenor of the conference organising committee which also included Associate Professor Kristine Macartney.

Over 30 NCIRS staff members attended the conference and participated in oral or poster presentations. NCIRS staff members Professor Peter McIntyre, Associate Professor Kristine Macartney, Dr Tom Snelling, Dr Julie Leask and Dr Rob Menzies were invited speakers at the conference. All presentations by NCIRS staff are included in the presentations list at the end of this report.

A post-conference seminar day was organised by the Australian Medicare Local Alliance and Dr Jane Jelfs, Policy Support Manager at NCIRS, assisted greatly with the organisation of the day. A number of NCIRS staff members were invited speakers. The topics they presented were: engaging with pregnant women – experiences from the MumVacc study (Kerrie Wiley); vaccine safety (Dr Nick Wood); the ACIR (Brynley Hull); the Australian Immunisation Professionals email discussion group – AIP (Dr Jane Jelfs); and adults and adverse events following immunisation (Kath Cannings).
VACCINES IN PUBLIC HEALTH WORKSHOPS

Each year, NCIRS conducts the ‘Vaccines in public health’ workshop as an elective offered in the Master of Public Health and Master of International Public Health programs at the University of Sydney. Participants include students enrolled in these programs as well as other health professionals who are interested in vaccines and public health.

The course includes interactive lectures and small group case studies on epidemiology, program implementation, Indigenous health, adverse events and public controversies, presented by researchers from NCIRS.

Approximately 50 students attended these workshops in both 2012 and 2013.

ETHICAL ISSUES IN IMMUNISATION SEMINAR

In March 2012 a one-day seminar on ‘Ethical issues in immunisation’ was hosted by NCIRS in association with the Centre for Values, Ethics and the Law in Medicine at the University of Sydney. The seminar was opened by Her Excellency Professor Marie Bashir with a welcome to country from Ms Donna Ingram.

The seminar addressed the major ethical issues facing immunisation programs in Australia today including acceptable levels of vaccine risk, compensation schemes, the ethics of persuasion, vaccine funding, and incorporation of public values in vaccination programs.

Chairs, speakers and panellists: Dr Marie Bismark, Dr Stacy Carter, Dr Andrea Forde, Dr Robert Hall, Dr Claire Hooker, Professor David Isaacs, Associate Professor Heath Kelly, Associate Professor Ian Kerridge, Associate Professor Julie Leask (NCIRS), Associate Professor Kristine Macartney (NCIRS), Professor Roger Magnusson, Associate Professor Helen Marshall, Dr Peter Massey, Ms Stephanie Newall, Professor Terry Nolan, Professor Glenn Salkeld and Professor Cameron Stewart.

NATIONAL IMMUNISATION PROGRAM IMPLEMENTATION SEMINAR

In March 2013, NCIRS hosted a one-and-a-half day seminar on the implementation of immunisation programs which brought together a range of key people involved in the development, management, delivery and evaluation of immunisation programs in Australia. The seminar was held back-to-back with a meeting of the National Immunisation Committee (NIC) which enabled members of NIC to actively participate and provide their insights on program implementation in Australia.

Presentations and panel discussions focused on evidence-based approaches to program implementation in primary care and adverse events following immunisation; key challenges in program implementation and potential solutions for implementation at a national, state and local level; and identifying priorities to enhance program implementation in Australia in the future.

The program featured Dr Nikki Turner from the New Zealand Immunisation Advisory Centre and included representatives from each state and territory immunisation program, Medicare Locals, Aboriginal Community Controlled and remote health sectors, and immunisation providers including general practitioners and nurses.

Speakers: Ms Carolyn Banks, Mr Michael Batchelor, Ms Sue Campbell-Lloyd, Ms Simone Duncombe, Professor Paul Effler, Ms Kerry Finlay, Ms Melinda Hassall, Dr Richard Hill, Associate Professor Julie Leask (NCIRS), Associate Professor Kristine Macartney (NCIRS), Professor Terry Nolan, Ms Heather O’Donnell, Ms Julianne Quaine, Dr Greg Rowles, Dr Jenny Royle, Ms Kate Russo, Dr Vicky Sheppeard, Ms Maureen Watson, Dr Helena White and Dr Nick Wood (NCIRS).

A welcome to country was offered by Mr Michael West.

The Hon. Tanya Plibersek opened the National Immunisation Program Implementation Seminar.
The National Indigenous Immunisation Research Workshop, held in Fremantle in November 2013, was hosted by the Telethon Institute for Child Health Research, co-sponsored by NCIRS. This was the third of a series of like-minded events. The first was initiated by Menzies School of Health Research in Darwin in 2007 and the second in 2009 was hosted by NCIRS in Sydney.

This workshop brought together a mix of health researchers, Aboriginal Health Workers, service providers, state and territory health department staff, and health professionals with an interest in immunisation for Aboriginal and Torres Strait Islander people.

The aims of the workshop were to identify priorities in Indigenous immunisation research, facilitate collaboration among researchers, policy makers, immunisation providers, the community and other relevant stakeholders, and facilitate implementation and translation of research into policy and practice.

Presentations covered topics such as current data on each of the common vaccine-preventable diseases in Indigenous Australians; innovations to achieve or monitor immunisation coverage; maternal and neonatal immunisation; and a session on engagement, consultation and education.

Presenters from NCIRS were Dr Rob Menzies, Ms Telphia Joseph, Mr Brendon Kelaher, Dr Nick Wood and Dr Heather Gidding. Associate Professor Julie Leask and Dr Frank Beard also attended.

POSTGRADUATE TRAINING

One of the visions of NCIRS is to play a significant role in the development of the next generation of researchers and practitioners in our areas of expertise. To that extent, NCIRS has sought to support and train high level professionals in immunisation research and surveillance, through higher degree and professional training programs and supporting professional development of staff. NCIRS provides a number of opportunities for students and professional trainees to take on research projects in the fields of immunisation and vaccine-preventable diseases, under the guidance of senior NCIRS staff.

The NCIRS academic group provides a focal point for coordination and communication across our academic areas including postgraduate support, teaching and investigator-driven research.

HIGHER DEGREE RESEARCH

NCIRS offers a variety of research projects suitable for honours, masters and PhD candidates, as well as short-term projects for undergraduates, in a range of areas including epidemiology, social sciences, evaluation, systematic reviews and clinical trials, in the context of prevention and control of vaccine-preventable diseases.

NCIRS also supports a number of students who carry out research projects under joint supervision with one of our collaborators, including the Discipline of Paediatrics and Child Health, The Children’s Hospital at Westmead; Clinical School and School of Public Health, University of Sydney; and School of Public Health and Community Medicine, University of New South Wales.

During 2012–2013, NCIRS supported 20 post-graduate students (listed in the front of this report).

PROFESSIONAL TRAINEES

**Fellowship of the Australasian Faculty of Public Health Medicine** – NCIRS is an accredited site for advanced training in the Faculty. The Public Health Medicine Registrar position at NCIRS offers in-depth training experience in research and evaluation, epidemiology, information management, policy, communication and Indigenous health, in the context of national surveillance and control of vaccine-preventable diseases.

**New South Wales Public Health Officer Training Program** – NCIRS is a host site for trainee placement in this program. Trainees are offered projects and supervised learning in the areas of national surveillance and control of vaccine-preventable diseases. This allows trainees to acquire a wide range of public health competencies and to complete the academic requirements of the training program.

**Master of Philosophy in Applied Epidemiology (MAE)** – NCIRS provides supervision for students in the MAE program run by the National Centre for Epidemiology and Population Health at the Australian National University (ANU). MAE scholars are based at NCIRS for 2 years while completing academic course components through ANU. During 2012–2013, NCIRS hosted two MAE scholars. NCIRS academic staff act as field supervisors for MAE scholars.
scholars and work closely with academic supervisors at the National Centre for Epidemiology and Population Health at ANU (Dr Stephanie Davis and Dr Martin Kirk). MAE scholars are involved in a number of surveillance and evaluation projects, outbreak investigations and epidemiological studies while at NCIRS.

OTHER TRAINING

NCIRS staff are regularly invited to provide presentations at training and educational sessions hosted by Divisions of General Practice (via State Based Organisations), the Australian General Practice Network, Public Health Units and hospitals. Senior NCIRS staff and NCIRS’s clinical nurse consultants presented at over 40 of these sessions during 2012–2013.

Topics covered included recent changes and updates in immunisation practice, identification and management of adverse events following immunisation, and an overview and statistics from the Adverse Events Clinic run by NCIRS.

Professor Robert Booy, Head of Clinical Research at NCIRS, was one of six Australian experts who delivered a series of 50 workshops to immunisation providers in 2013 as part of an Australian Medicare Local Alliance project. The workshops were designed to increase or update the knowledge of immunisation providers on current immunisation issues, the National Immunisation Program and vaccine-preventable diseases, with a focus on the diagnosis, treatment and management of pertussis, particularly in young babies.

JOURNAL CLUB

NCIRS actively identifies relevant and topical literature from Australia and overseas on all aspects of immunisation and vaccine-preventable diseases. Recent peer-reviewed articles are critiqued by NCIRS staff in weekly Journal Club forums and external experts are also regularly invited to speak.

During 2012–2013, NCIRS hosted a range of guest speakers including Professor Margaret Burgess, founding director of NCIRS; Dr Barbara Romanowski, Department of Medicine, University of Alberta, Canada; Professor Peter McMinn, Infectious Diseases and Immunology, Sydney Medical School; Associate Professor Philippe Beutels, Center for Health Economics Research and Modelling Infectious Diseases, University of Antwerp, Belgium; Dr Helena Maltezou, Hellenic Centre for Disease Control and Prevention, Athens, Greece; Professor Gregory Zimet, Indiana University School of Medicine; Mr Jeroen Luyten, international PhD student from Belgium; Dr Jann Foster, School of Nursing and Midwifery, University of Western Sydney; Dr Seye Abimbola, National Primary Health Care Development Agency, Nigeria; and Dr Margie Danchin, Murdoch Childrens Research Institute, Melbourne.

L to R: Associate Professor Julie Leask, Professor Margaret Burgess, guest speaker Associate Professor Philippe Beutels (Center for Health Economics Research and Modelling Infectious Diseases, University of Antwerp, Belgium) and Professor Peter McIntyre at the NCIRS immunisation journal club.
SUPPORT FOR HEALTH PROFESSIONALS

OVERVIEW

NCIRS provides evidence-based resources and advice for Australian health professionals working in the area of immunisation through avenues such as the NCIRS website, fact sheets, the Australian Immunisation Professionals email discussion group, newsletters and workshops. Senior NCIRS staff also provide expert advice and responses to queries from health professionals via telephone and email and are actively sought after to provide extensive media interaction.

Support for immunisation providers is a priority of the National Immunisation Strategy and resources and advice provided by NCIRS contribute to the effective training of the immunisation workforce.

KEY ACTIVITIES

NCIRS WEBSITE

The NCIRS website provides useful resources that are accessed not only by health professionals but also by students, the media, parents and the general public. The NCIRS communications team is constantly improving the NCIRS website to provide more resources and ensure that these resources continue to meet the needs of users.

Resources provided on the NCIRS website include fact sheets on vaccine-preventable diseases and vaccine safety, tables summarising the history of vaccination in Australia, the latest Australian immunisation schedules for children and adults, an MMR decision aid for parents, educational presentations, and resources to accompany The Australian Immunisation Handbook.

“Thank you - the Adult Immunisation Schedule is excellent and the immunisation history doc is very interesting.”

“I have found this decision aid which goes through pros and cons of vaccination for MMR the best I have seen.”

Since 2011, the NCIRS website has been included by the World Health Organization in their Vaccine Safety Net (VSN) Project which identifies websites that provide information on vaccine safety that complies with good information practices. WHO evaluators will continue to regularly assess the NCIRS website against a set of credibility and content criteria established by the WHO Global Advisory Committee on Vaccine Safety. The continued inclusion of the NCIRS website in the VSN project was last re-confirmed by WHO evaluators in early 2013.

The NCIRS website has seen an exceptionally high growth in the number of visits over the past two years.
NCIRS FACT SHEETS

NCIRS provides fact sheets in two categories – vaccine-preventable diseases and vaccine safety. NCIRS strives to provide resources based on the latest evidence, and fact sheets are updated as new information and vaccines become available. NCIRS fact sheets are developed primarily for immunisation providers but they are also available to interested members of the community.

New fact sheets on hepatitis B, rotavirus and pertussis were developed in 2013 and the HPV and influenza fact sheets were updated.

The full set of NCIRS fact sheets is available from the NCIRS website (www.ncirs.edu.au/immunisation/fact-sheets/index.php).

NCIRS-AIP (AUSTRALIAN IMMUNISATION PROFESSIONALS) EMAIL DISCUSSION GROUP

The Australian Immunisation Professionals email discussion group (NCIRS-AIP) was established by NCIRS in December 2003 to provide a forum for interested health professionals to discuss issues related to immunisation. By December 2013, NCIRS-AIP had over 700 members.

Members of NCIRS-AIP include immunisation providers (such as practice nurses, GPs, school-based immunisers, council nurses), program managers and immunisation coordinators, public health staff, immunisation educators, researchers, policy makers and post-graduate students.

Although NCIRS-AIP is intended for discussions among members, NCIRS staff provide responses to queries raised by NCIRS-AIP members as required. A range of other information is also circulated by NCIRS, including newsletters from relevant international organisations, media items and notices of workshops and conferences. NCIRS also coordinates and provides administrative support for the group.

“...I love this NCIRS mailing group...what a wealth of information and such a prompt reply!”
“Wonderful network and support.”
“It is great to have this support, resource and quick response to questions.”
“Thanks for all the great information you send out. It’s proved really helpful over the years.”
“I have recently gone onto the NCIRS AIP which I find invaluable for keeping up with media, updates etc. Congratulations to NCIRS for doing this.”
“I find it a good resource with links and articles and always enjoy the topical discussions. It is really great to have this network available. Thanks for providing it.”

SCIENTIFIC SUPPORT FOR GOVERNMENT

One of the key roles of NCIRS is to provide expert and rapid assistance to the Australian Government Department of Health on a range of issues related to vaccines and vaccine-preventable diseases, for example, guidance on complex immunisation queries received by the Department of Health Immunisation Hotline. NCIRS has also provided a number of workshops for Department of Health staff based on the ‘Vaccines in public health’ workshops run by NCIRS (described previously).

NCIRS staff also provide technical advice in response to a range of immunisation queries received from state and territory health departments, including advice on providing catch-up, vaccination following previous adverse events and specialised vaccine recommendations for circumstances not captured in national guidelines.
SUPPORT FOR PRODUCTION OF THE SCIENCE OF IMMUNISATION BY THE AUSTRALIAN ACADEMY OF SCIENCE

The science of immunisation: questions and answers was produced by the Australian Academy of Science to explain the current state of immunisation science, including where there is scientific consensus and where uncertainties still exist, to address confusion created by contradictory information in the public domain.

Professor Peter McIntyre and Associate Professor Julie Leask were invited to be members of the Working Group of eight experts responsible for development of the Science of Immunisation document. Other NCIRS staff, in particular Dr Melina Georgousakis, provided major input into document design, development of text and figures, and contribution to final review and editing.

The document was launched in November 2012 and is available online (www.science.org.au/immunisation.html).

SOCIAL MEDIA

In August 2013, NCIRS launched a Twitter account as a new avenue for communication with immunisation professionals and other researchers, as well the wider public. NCIRS quickly gathered 200 followers and engaged with various organisations and individuals, most of which have professional interests in immunisation.

NCIRS uses Twitter to disseminate useful resources and links, news items, new publications, staff achievements and re-tweets from other researchers.
Information on grants that were active during 2012–2013 is provided with details of the associated work in relevant sections of this report. Grants involving NCIRS staff members that were awarded during 2012–2013 are listed below.

**NCIRS STAFF LEAD INVESTIGATORS**

**Dr Nicholas Wood, Dr Jim Buttery, A/Prof Michael Gold, A/Prof Peter Richmond, Dr Nigel Crawford, Dr Belinda Barton, A/Prof Kristine Macartney**

Febrile seizures following vaccination in children: How common are they and what is the long-term clinical outcome?  
(NHMRC Project Grant 1049557, announced October 2012)

**Dr Nicholas Wood, Dr Heather Gidding, Prof Peter McIntyre, A/Prof Michael Nissen, Prof David Durrheim, A/Prof Jacqueline Norris, Dr Katrina Bosward, Dr Jane Heller**

Q fever: How common is it and how can we best prevent it? Research to inform Q fever vaccine policy in Australia and internationally.  
(NHMRC Project Grant 1049558, announced October 2012)

**Dr Harunor Rashid, Dr Haitham El Bashir, Dr Osamah Barasheed, Dr Iman Ridda, Dr Leon Heron, Dr Elizabeth Haworth, Prof Edward Holmes, Prof Dominic Dwyer, Prof Robert Booy**

Cluster-randomised controlled trial to test the effectiveness of facemasks in preventing respiratory virus infection among Hajj pilgrims.  
(Qatar National Research Fund (QNRF), member of Qatar Foundation, Doha, Qatar, announced May 2013)

**NCIRS STAFF COLLABORATING INVESTIGATORS**

**University of Adelaide**

A/Prof Michael Gold, Prof Annette Braunack-Mayer, Dr Jim Buttery, Prof Nigel Stocks, Prof Paul Effler, A/Prof Kristine Macartney, Dr Hossein Hajj Ali Afzali

The STARSS e-Health system for post-marketing safety surveillance of drugs and vaccines.  
(NHMRC Partnership Project 1067703, awarded October 2013)

**Menzies School of Health Research**

Dr Steven Tong, Prof Stephen Locarnini, Dr Joshua Davis, A/Prof Gail Garvey, A/Prof John Condon, Dr Margaret Littlejohn, Dr Nicholas Wood, Dr Nadia Warner, Dr Renae Walsh

A novel hepatitis B virus genotype in Indigenous Australians: impact on vaccine efficacy and clinical outcomes.  
(NHMRC Project Grant 1060811, awarded October 2013)

A/Prof Amanda Leach, Prof Edward Mulholland, Prof Mathuram Santosham, Prof Paul Torzillo, Prof Ngiare Brown, Prof Peter McIntyre, Dr Heidi Smith-Vaughan, Ms A Balloch, Mr Mark Chatfield

Better use of vaccines for improved ear and hearing health of Indigenous children.  
(NHMRC Project Grant 1046999, awarded October 2012)
Sax Institute
Dr Bette Liu, Dr Anthony Newall, Prof Raina MacIntyre, Prof Peter McIntyre
Providing the evidence to guide adult immunisation strategies: a novel approach using a large prospective cohort study and record linkage.
(NHMRC Project Grant 1048180, awarded October 2012)

University of New South Wales
Dr Anthony Newall, Dr James Wood, Prof Peter McIntyre, A/Prof Philippe Beutels, Dr Rob Menzies
Post-implementation economic evaluation of childhood vaccination programs.
(ARC Linkage Project 120200043, awarded June 2012)

Prof Adam Jaffe, Dr Thomas Snelling, Prof Gwendolyn Gilbert, A/Prof Stephen Lambert, Dr Melanie Wong
(Prof Peter McIntyre Associate Investigator)
Impact of pneumococcal vaccine on childhood pneumonia.
(NHMRC Project Grant 1064841, awarded October 2013)
STAFF AWARDS + ACHIEVEMENTS

Dr Shopna Bag
Awarded the 2013 RACP President’s Award for Trainee of the Year, May 2013, for outstanding contribution to College activities
Passed Australasian Faculty of Public Health Medicine oral exam, November 2013

Dr Osamah Barasheed
Prize of excellence for his presentation at the University of Sydney’s Discipline of Paediatrics and Child Health’s annual Postgraduate Research Student Conference, 2012

Ms May Chiew (MAE scholar)
Field Epidemiology Training Program fellowship with Western Pacific Regional Office of the World Health Organization, August 2013

Ms Maria Chow
WHO intern with the Strategic Advisory Group of Experts (SAGE) on Immunization in Geneva, 2012
Awarded PhD from the University of Sydney (The psychological and social impact of influenza-like-illness in children on their families), 2013

Dr Aditi Dey
Conjoint academic appointment as Senior Lecturer within the Discipline of Paediatrics and Child Health, Sydney Medical School, conferred August 2012

Dr Melina Georgousakis
Conjoint lecturer appointment with the School of Public Health, University of Sydney, conferred September 2013
Master of Public Health awarded March 2013

Dr Heather Gidding (part-time with NCIRS; Senior Lecturer University of NSW)
NHMRC Early Career Fellowship 2013–2016 (Population-based studies to determine the effectiveness of Australia’s immunisation program)

Ms Sophie Hale (Summer scholar)
Finalist (second prize) for the Sydney Medical School Dean’s prize, 2012
Ms Elizabeth Hayles
Awarded NHMRC Public Health (PhD) scholarship, January 2012 – October 2014
New investigator award at the Perinatal Society of Australia and New Zealand meeting, Sydney, March 2012
Perinatal Research and Maternal Medicine (PRaMM) travelling fellowship, awarded May 2013 at World Congress of Perinatal Medicine (Moscow) and European Society for Paediatric Infectious Diseases (Milan)

Dr Jane Ho
Awarded Fellow of the Royal Australian College of Physicians, 2012

Dr Gulam Khandaker
Highly commended in the University of Sydney Discipline of Paediatrics and Child Health higher degree research student publication prize, 2012 (Neurologic complications of influenza A(H1N1)pdm09: surveillance in 6 pediatric hospitals)
Avant Doctor in Training Research Scholarship (Long-term outcomes of neonatal herpes simplex infections in Australian children), awarded August 2012
NHMRC Early Career Fellowship 2013–2016 (Causes and consequences of acute encephalitis in children)
Awarded PhD from the University of Sydney (The epidemiology, control and management of influenza), 2013

Associate Professor Julie Leask
NHMRC Career Development Fellowship 2013–2017 (Improving communication about immunisation through social sciences research)
Conjoint title of Associate Professor with the University of Sydney School of Public Health, conferred November 2012
Appointed as Sub Dean for early career researchers, April 2013
NHMRC project grant review panel deputy chair, 2013

Associate Professor Kristine Macartney
NHMRC project grant review panel member, 2013
Appointed as member of the Advisory Committee on the Safety of Vaccines (ACSOV), 2013

Dr Deepika Mahajan
Master of Public Health awarded March 2013

Ms Diana Wang (Summer scholar)
Finalist for the Sydney Medical School Dean’s prize, 2013

Dr Andre Wattiaux
Completed Fellowship requirements for Australasian Faculty of Public Health Medicine, 2013

Ms Kerrie Wiley
NHMRC Postgraduate Scholarship to complete PhD on maternal vaccination, awarded March 2012
Awarded best student presentation for her presentation at the University of Sydney’s Discipline of Paediatrics and Child Health’s annual Postgraduate Research Student Conference, 2012

Dr Hal Willaby
Awarded winner, University of Sydney School of Public Health 2013 Research Day Conference Debate on ‘the Nanny State’, July 2013

Dr Nick Wood
NHMRC Career Development Fellowship 2014–2018 (Immunisation safety and adverse events)

Dr J. Kevin Yin
Chinese Government Award for Outstanding Self-financed Students Abroad, issued by China Scholarship Council, 2012
Awarded Certificate from Advanced Course of Vaccinology (ADVAC), organised by Fondation Mérieux and Université de Genève, Annecy, France, 2013
Awarded PhD from the University of Sydney (Epidemiology and economic impacts of healthcare interventions to control influenza: implications for policy), 2013

The Consul General of China in Sydney, Mr Jielong Duan, presented the Chinese Government Award for Outstanding Self-financed Students Abroad to Dr Kevin Yin in 2012
2013


McIntyre PB, Sintchenko V. The “how” of polymerase chain reaction testing for Bordetella pertussis depends on the “why” [editorial]. Clinical Infectious Diseases 2013;56:332-4.


Wiley KE, Massey PD, Cooper Robbins SC, Wood N, Quinn HE, Leask J. Pregnant women’s intention to take up a post-partum pertussis vaccine, and their willingness to take up the vaccine while pregnant: a cross sectional survey. Vaccine 2013;31:3972-8.


2012


Yin JK, Chow M, Khandaker G, King C, Richmond P, Heron L, Booy R. Impacts on influenza A(H1N1)pdm09 infection from cross-protection of seasonal trivalent influenza vaccines and A(H1N1)pdm09 vaccines: systematic review and meta-analyses. *Vaccine* 2012;30:3209-22.


Bold indicates author was a staff member or student at NCIRS when research included in the publication was conducted.
PRESENTATIONS BY NCIRS STAFF 2012–2013

NATIONAL CONFERENCES/MEETINGS 2013

Booy R. Antiviral use in nursing homes. Influenza Specialist Group Annual Scientific Meeting; 2013 February; Melbourne.


Booy R. Vaccines for the future. Australasian Society for Infectious Diseases (ASID) Annual Scientific Meeting; 2013 March; Canberra.


Macartney K. Vaccination for neonates at risk – HBV and others. Viruses in May; 2013 May; Katoomba.

Booy R. Controversies in vaccination – autistic spectrum and beyond. Viruses in May; 2013 May; Katoomba.


Barasheed O. Pilot randomised controlled trial to test facemask effectiveness in preventing influenza-like illness transmission among Hajj pilgrims. University of Sydney Discipline of Paediatrics and Child Health and The Children’s Hospital at Westmead Clinical School, 2013 Postgraduate Research Student Conference; 2013 August; Sydney.


Hayles E. Maternal attitudes and factors influencing pertussis booster vaccination to new mothers on the postnatal ward. University of Sydney Discipline of Paediatrics and Child Health and The Children’s Hospital at Westmead Clinical School, 2013 Postgraduate Research Student Conference; 2013 August; Sydney.


Leask J. Childhood vaccination: achievements and challenges. Annual State Conference for Environmental Health Australia (Tasmania) Incorporated; 2013 September; Port Arthur, Tasmania.

Booy R. Vaccine safety – who is monitoring and what are they finding? The Science of Immunisation Conference; 2013 October; Newcastle, NSW.


Macartney K. Catch up immunisations – what a challenge. The Science of Immunisation Conference; 2013 October; Newcastle, NSW.
Wiley KE, Leask J. Influenza vaccine uptake in pregnant women: a mixed methods study. 9th Australian Influenza Symposium; 2013 October; Sydney.

Macartney K. Influenza: what can active paediatric hospital-based surveillance (PAEDS) do? 9th Australian Influenza Symposium; 2013 October; Sydney.

Booy R. TIV safety in children. 9th Australian Influenza Symposium; 2013 October; Sydney.

2012

Leask J. Interacting with the media. Influenza Specialist Group Annual Scientific Meeting; 2012 February; Melbourne.

Wiley KE, Leask J, Wood N, Cooper SC. Influenza vaccination during pregnancy: uptake, attitudes and awareness. Influenza Specialist Group Annual Scientific Meeting; 2012 February; Melbourne.

Booy R. An overview of immunogenicity and effectiveness of pandemic vaccines and cross-protection of seasonal vaccines. Influenza Specialist Group Annual Scientific Meeting; 2012 February; Melbourne.


Booy R. H1N1 influenza and the brain: what have we learnt? Are we prepared? Joint 12th International Child Neurology Congress (ICNC) and 11th Asian and Oceanian Congress of Child Neurology (AOCCN); 2012 May; Brisbane.


Wood N, Marshall H, McIntyre P. Waning of pertussis antibodies to 4 years among infants who did and did not receive monovalent acellular pertussis vaccine at birth. 13th National Immunisation Conference; 2012 June; Darwin.


Leask J. What makes pregnant women have a vaccine? [plenary]. 13th National Immunisation Conference; 2012 June; Darwin.


McIntyre P. Challenges in monitoring and analysing vaccine safety. World Congress on Risk 2012: Risk and development in a changing world; 2012 July; Sydney.

Leask J. Learning to listen to and engage with public concerns about vaccines. World Congress on Risk 2012: Risk and development in a changing world; 2012 July; Sydney.

Booy R. Key innovative leaps in vaccine development. 1st International Conference on BioNano Innovation (ICBNI); 2012 July; Brisbane.


Macartney K. Rotavirus. NSW Department of Health, Population Health, Bug Breakfast; 2012 November; Sydney.

Macartney K, Yin JK. Health policy making in China: what we can learn and apply from Australia. 2012 China Studies Centre Annual Conference; 2012 December; Sydney.

INTERNATIONAL CONFERENCES

2013


Menzies R. The importance of pertussis vaccine timeliness for Indigenous Australian infants. 5th International Meeting on Indigenous Child Health; 2013 April; Portland, Oregon, USA.

Menzies R, Quinn H, McIntyre P. Reduced effectiveness of pertussis vaccine without an 18 month booster. 16th Annual Conference on Vaccine Research; 2013 April; Baltimore, USA.

Leask J. Effective communication strategies during an infectious disease event. Sheela Basrur Symposium; 2013 April; Toronto, Canada.

Barasheed O (on behalf of the Hajj Research Team). Pilot randomised controlled trial to test facemask effectiveness in preventing influenza-like illness transmission among Hajj pilgrims. 13th Conference of the International Society of Travel Medicine; 2013 May; Maastricht, Netherlands.


Li-Kim-Moy J, Yin JK, Rashid H, Khandaker G, Booy R. A systematic review of fever and febrile convolution after inactivated trivalent influenza vaccine (TIV) in children. 31st Annual Meeting of the European Society for Paediatric Infectious Diseases (ESPID); 2013 May; Milan, Italy.


Yin JK, Heywood A, Georgousakis M, King C, Chiu C, Isaacs D, Macartney K. Systematic review of herd protection by vaccinating children against seasonal influenza [poster]. 31st Annual Meeting of the European Society for Paediatric Infectious Diseases (ESPID); 2013 May; Milan, Italy.

Hayles E, Cooper SC, Skinner SR, Wood N, Sinn JH. Maternal attitudes and factors influencing pertussis booster vaccination to new mothers on the postnatal ward [poster]. 31st Annual Meeting of the European Society for Paediatric Infectious Diseases (ESPID); 2013 May; Milan, Italy.
Leask J. Public engagement and risk communication in childhood vaccination. Joint Symposium by the London School of Hygiene and Tropical Medicine and University of Sydney School of Public Health; 2013 June; London, UK.


McIntyre P. Decision and cost effectiveness analysis: a second dose of Tdap. Meeting of the Advisory Committee on Immunization Practices (ACIP); 2013 June; Atlanta, Georgia, USA.

McIntyre P. on behalf of Carlin J, Macartney K, Lee K, Quinn H, Buttery J, Bines J, Lopert R. Intussusception and rotavirus vaccines in Australia. Meeting of the Advisory Committee on Immunization Practices (ACIP); 2013 June; Atlanta, Georgia, USA.

McIntyre P. Epidemiology of pertussis in Australia: impact of vaccine strategies. 10th International Symposium on Bordetella; 2013 September; Dublin, Ireland.

Cannings K. Influenza vaccination in children with egg allergy at the Children’s Hospital at Westmead. 8th New Zealand Immunisation Conference; 2013 September; Auckland, New Zealand.

Heywood AE, Wang H, Macartney KK, McIntyre PB. Population impact of Australia’s national varicella immunisation program on varicella and herpes zoster [poster]. 7th Vaccine and ISV Annual Global Congress; 2013 October; Barcelona, Spain.

Pillsbury A, Quinn H, Macartney K, Kirk M, McIntyre P. What is the best model for serious adverse events following immunisation (AEFI) surveillance in Australia? Evaluation of surveillance for intussusception (IS) following rotavirus vaccines as a case study. 7th TEPHINET (Training Programs in Epidemiology and Public Health Interventions Network) Southeast Asia and Western Pacific Bi Regional Scientific Conference; 2013 November; Da Nang, Vietnam.

McIntyre P. Update on pertussis vaccination recommendations: what should Asia do? Fondation Merieux Asia Pacific and Australia Countries (APAC) Vaccinology Meeting; 2013 November; Bangkok, Thailand.

Booy R. Immunogenicity and safety of the Hib-MenC-TT conjugate vaccine in Hib-primed toddlers: 5 year follow up. World Society of Paediatric Infectious Diseases (WSPID); 2013 November; Cape Town, South Africa.

Carlin J on behalf of Macartney K, Lee K, Quinn H, Buttery J, Bines J, Lopert R, McIntyre P. Intussusception and rotavirus vaccines in Australia. Meeting of the Global Advisory Committee on Vaccine Safety (GACVS); 2013 December; Geneva, Switzerland.

2012

McIntyre P. How to protect newborns against pertussis: cocoon strategy; maternal immunisation. 5th International Vaccinology Workshop. Vaccines as solution for healthcare issues: challenges and expectations; 2012 February; Tokyo, Japan.

McIntyre P. Krause V, Menzies R, Chiu C. Cook H. Seven lessons from a country without a conjugate booster dose. 8th International Symposium on Pneumococci and Pneumococcal Diseases; 2012 March; Iguaçu Falls, Brazil.


McIntyre PB, Chiu C, Lowbridge C, Gilmour R, Gilbert L, Oftadeh S. Long-term impact of 7vPCV on invasive pneumococcal disease in Greater Sydney, Australia [poster]. 8th International Symposium on Pneumococci and Pneumococcal Diseases; 2012 March; Iguaçu Falls, Brazil.


Menzies R, Koehler A, Krause V, Markey P, Hanna J, Boyd R. No evidence of increasing Haemophilus influenzae non-b infection in Australian Aboriginal children. 15th International Congress on Circumpolar Health; 2012 August; Fairbanks, Alaska, USA.
Leask J. Dealing with misinformation about HPV vaccine. The President’s Cancer Panel on Achieving Widespread HPV Vaccine Impact; 2012 September; Washington DC, USA.

Leask J. Working in regions with higher rates of vaccine refusal. Seminar at Seattle Children’s Hospital; 2012 September; Washington DC, USA.

Jayasinghe S, Dey A, Macartney K. The impact of rotavirus vaccination program on hospitalizations due to rotavirus disease in Australia. 6th Asian Congress of Pediatric Infectious Disease; 2012 November; Colombo, Sri Lanka.


Bold indicates author was a staff member or student at NCIRS when research included in the presentation was conducted.