



# **Australian Paediatric Surveillance Unit**



## **Surveillance Report 2009 and 2010**

**Australian Paediatric Surveillance Unit  
Biennial Research Report 2009 and 2010**

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**Front Cover:** Many thanks go to the Cross family for the photo of Molly. Molly has Angelman Syndrome.  
Photography by Lisa Footner Photography



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## **The Hon Tanya Plibersek MP Minister for Health**



John Dewey said that what the best and wisest parent wants for their child, society should want for all its children. Good health is first among these desires, and good information is vital to protect and build the health of our children.

The Australian Paediatric Surveillance Unit continues to demonstrate its expertise in collecting data to better understand the extent and impact of uncommon childhood diseases, rare serious complications of common diseases and rare adverse effects of treatment through the engagement of 1,300 paediatricians and other health physicians around Australia.

The APSU has demonstrated the value of a flexible system which can be adapted for potential emerging infectious diseases threatening Australian children. It also provides a platform for rapid response in times of need such as in 2007 when influenza surveillance was added to the APSU data collection following a number of childhood deaths. This in turn allowed the APSU, in 2008, 2009 and 2010, to provide the Australian Government with important paediatric hospitalisation data before, during and after the influenza (H1N1) 2009 pandemic.

The APSU data provides useful clinical and public health insights relating to infectious diseases in Australian children and APSU studies of the impacts of rare diseases on families, clinicians and health services provide important information to policy makers, planners, educators and service providers.

I commend the APSU for and its role in public health and in the health of our children through the long-time success of this important national paediatric surveillance system.

A handwritten signature in black ink that reads 'Tanya Plibersek'.

The Hon Tanya Plibersek MP  
Minister for Health

## Foreword

### **Dr Gervase Chaney** **President, Paediatrics & Child Health Division, RACP**



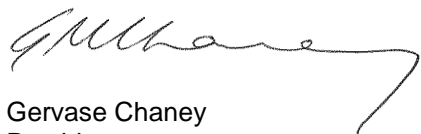
On behalf of the Paediatrics and Child Health Division of the Royal Australasian College of Physicians (RACP), I would like to commend and congratulate the Australian Paediatric Surveillance Unit on this Biennial Research Report 2009 and 2010. The APSU continues to be a leader in paediatric research and evidence in Australia and its growing activity, collaborations and surveillance programs are a testament to its success and status.

The Division and the College are delighted to continue what has been a very successful partnership with the APSU. This has been enhanced by the successful securing of the Australian Research Council (ARC) Linkage Grant by the APSU with the input of the support of the RACP and other partners. In addition the APSU and the RACP have been formalising their relationship with the development of a memorandum of understanding.

It is reassuring to see the ongoing high level of engagement by clinicians with the APSU, with the well over 90% response rate being maintained. This is a reflection of the reputation of the APSU and its contribution to child and youth health among paediatricians and other clinicians.

I was fortunate to be in Warwick at the Royal College of Paediatrics and Child Health Annual Scientific Meeting in April 2011 and enjoy the recognition of the British Paediatric Surveillance Unit at its 25<sup>th</sup> Anniversary Symposium and celebrations. It was fitting that Elizabeth Elliott was one of the guest speakers – there to present the APSU (Australian) experience. It is clear that the two organisations share much and continue to learn from each other's experiences and it was very satisfying to see that the APSU is at least the equal of its British predecessor in its scope, outputs and influence.

APSU continues to be very well led by the Director Professor Elizabeth Elliott and Deputy Director Yvonne Zurynski. I would like to again commend them, the other APSU staff, the board and all the researchers and contributors for the ongoing success of APSU and its contribution to the health of children, young people and their families in this country.

A handwritten signature in black ink, appearing to read 'G Chaney', with a long, sweeping horizontal line extending to the right.

Gervase Chaney  
President  
Paediatrics and Child Health Division  
Royal Australasian College of Physicians

**Professor Elizabeth Elliott, AM**  
**Director, Australian Paediatric Surveillance Unit**



Paediatricians are responsible for the ongoing success of the Australian Paediatric Surveillance Unit (APSU) and the quality of surveillance data it collects. Monthly report cards have become a 'way of life' for those of us in clinical paediatric practice and a vehicle through which even the most isolated paediatrician can contribute new knowledge about disease epidemiology, influence clinical care, and inform health policy. Paediatricians say they find the educational materials provided by the APSU useful and that monthly reporting is no burden. The latter is reflected in the persistently high reporting rate, for which we are envied internationally.

Over the last few years, the APSU has extended its activities to include leadership in raising awareness of the need for a national plan for rare diseases. A National Rare Disease Working Group convened by APSU in 2008 outlined the principles of a national plan and gained endorsement for a plan from individuals and agencies nationally. With colleagues in Western Australia, APSU planned a national conference on rare disease (Awakening Australia to Rare Diseases) to progress the notion of a plan and a scoping paper on a national plan is soon to be submitted to the Australian Health Ministers Advisory Council. With the National Centre for Immunisation Research, APSU jointly oversees the Paediatric Active Enhanced Disease Surveillance (PAEDS) System, through which data are collected from inpatients in tertiary/quaternary hospitals in four Australian States, with funding from the Department of Health and Ageing. APSU is also represented on the advisory board of the Australian Maternity Outcomes Surveillance System.

APSU has strengthened its relationships with, and contribution to, parent support groups – including the Steve Waugh Foundation (SWF), SMILE Foundation and the Association of Genetic Support for Australasia (AGSA). We are delighted that the Australian Research Council has recently funded a study on the impacts of rare diseases on families, health services and health providers - a collaboration between APSU, SWF, SMILE, AGSA, the Royal Australasian College of Physicians and The Sydney Children's Hospitals Network. I congratulate Associate Professor Yvonne Zurynski, APSU's Assistant Director, on her ARC grant, her election to Co-Chair of the International Network of Paediatric Surveillance Units, promotion to Associate Professor. I congratulate the BPSU, the first of the paediatric surveillance units, on their 25th anniversary and was delighted to be asked present the keynote address at their celebration in Warwick.

We are grateful for financial support received from the Department of Health and Ageing and the National Health and Medical Research Council (NHMRC) of Australia for APSU activities. The NHMRC Enabling scheme has now been discontinued and we are currently seeking infrastructure funding to take APSU into its 20<sup>th</sup> year. I thank the APSU staff for their dedication and members of the Board and Scientific Review Panel for their support, and commend paediatricians for their remarkable ongoing contribution to child health research.

Director, Australian Paediatric Surveillance Unit  
 Professor, Discipline of Paediatrics and Child Health  
 The University of Sydney

## Foreword

### **Professor Carol Bower** **Board Chair, Australian Paediatric Surveillance Unit**



Once again, the APSU Biennial Report clearly demonstrates the clinical and public health value of this unique resource. In infectious disease, the APSU has made a major contribution to being able to declare Australia polio-free, has recorded the effectiveness of rubella and varicella vaccination and has documented the serious consequences of influenza infection in childhood and the need for children with chronic conditions to be vaccinated against influenza. Importantly, data have also been collected to monitor the incidence of intussusception following rotavirus vaccination. Surveillance activities are not limited to infectious diseases. Valuable research on neuromuscular disorders, Rett syndrome, systemic lupus erythematosus, vitamin K deficiency bleeding and seatbelt injuries has been conducted, contributing to our understanding of these conditions and how they can be diagnosed, managed and prevented.

The move to electronic notification, involvement in the development of a rare diseases policy and the extensive community and consumer involvement are additional aspects of the APSU that increase the ease of use and relevance of the surveillance system.

The APSU is a national treasure. Paediatricians can be justly proud of their contribution to it and of the work done by APSU staff and investigators.

A handwritten signature in black ink, which appears to read 'Carol Bower'.

Professor Carol Bower  
Head of Epidemiology, Division of Population Sciences,  
Telethon Institute for Child Health Research,  
The University of Western Australia.



## APSU Board and Scientific Review Panel and Staff

### Patron

#### **Fiona Stanley AC**

Professor, School of Paediatrics and Child Health, The University of Western Australia. Director, Telethon Institute for Child Health Research, Perth

### Board

#### **Carol Bower\* (Chair)**

Clinical Professor, Centre for Child Health Research; Head of Epidemiology, Division of Population Sciences, Telethon Institute for Child Health Research, The University of Western Australia. Head and Medical Specialist, Western Australian Birth Defects Registry, Women and Newborn Health Services.

#### **Elizabeth Elliott\* AM (APSU Director)**

Professor, Discipline of Paediatrics and Child Health, The University of Sydney. Consultant Paediatrician, The Children's Hospital at Westmead.

#### **Nigel Dickson\***

Senior Lecturer, Department of Preventive and Social Medicine, The University of Otago, New Zealand. Co-Director, New Zealand Paediatric Surveillance Unit.

#### **David Isaacs**

Clinical Professor, Discipline of Paediatrics and Child Health, The University of Sydney. Senior Staff Specialist, Department of Immunology & Infectious Diseases, The Children's Hospital at Westmead.

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Professor, School of Public Health and Community Medicine, The University of New South Wales. Director, Centre for Research, Evidence Management and Surveillance (REMS), South West Sydney Local Health District.

#### **Peter McIntyre**

Professor, Discipline of Paediatrics and Child Health, The University of Sydney. Director, National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases (NCIRS), The Children's Hospital at Westmead.

#### **Elizabeth Peadon**

Australian Paediatric Surveillance Unit- PhD Student.

\* Board and Scientific Review Panel members

#### **Elisabeth Murphy**

Clinical Consultant, Health Services Policy Branch, Policy Division, NSW Department of Health.

#### **Michael Nissen\***

Associate Professor in Medical Virology, Faculty of Science, The University of Queensland. Director, Department of Infectious Diseases, Royal Children's Hospital, Brisbane.

#### **Barry Taylor**

Professor and Head of Paediatric Section, Department of Women's and Children's Health, The University of Otago, New Zealand. Co-Director, New Zealand Paediatric Surveillance Unit.

#### **Melissa Wake\***

Professor and Director, Research and Public Health Unit, Centre for Community Child Health, Royal Children's Hospital, Melbourne, Victoria.

#### **Gervase Chaney\***

President, Paediatrics and Child Health Division, Royal Australasian College of Physicians.

#### **John Ziegler**

Professor, School of Women's and Children's Health, University of New South Wales. Clinical Immunologist and Head, Department of Immunology and Infectious Diseases, Sydney Children's Hospital.

#### **Yvonne Zurynski\* (APSU Deputy Director)**

Associate Professor (Research Only), Discipline of Paediatrics and Child Health, The University of Sydney.

#### **Kate Pennington (Observer)**

Epidemiologist, Vaccine Preventable Diseases Surveillance, Office of Health Protection, Department of Health and Ageing.

## APSU Staff 2009-2010

Professor Elizabeth Elliott, Director (Jan 1993 – )

Associate Professor Yvonne Zurynski, Deputy Director (Feb 2005 – )

Ms Nicole McKay, Data Manager (Apr 2006 – Aug 2011)

Ms Karen Pattinson, Office Manager (Aug 2006 – Jan 2011)

Ms Ingrid Charters, Administration Officer (Oct 2004 – )

Ms Trudy Butlin, Administration Officer (2010 – May 2011)

Ms Sarah Srikanthan, Publications Project Officer (Aug 2007– Apr 2011 )

Dr Greta Ridley, Senior Research Officer (Sep 2010 – )

Ms Leanne Vidler, Coordinator, Paediatric Active Enhanced Diseases Surveillance System (June 2009 – Dec 2011)

Ms Kirilee Drew, Office Manager (Feb 2011 – )

Mr Tim Groenendyk, Publications Project Officer (May 2011 – )

Blanche Baker, Administration Officer (June 2011 – Aug 2011)

### Students

Elizabeth Peadon, PhD, Sydney Medical School

James Fitzpatrick, PhD, Sydney Medical School

Kate Larkins, Honours, Sydney Medical Program

Emily Fitzpatrick, Masters, Sydney Medical Program

Matilda Anderson, Honours Sydney Medical Program

Michael Smith, Honours Sydney Medical Program

Nicola Benwell, Honours, Sydney Medical Program

# Institutions Collaborating with the APSU 1993-2010

## National Organisations

- Australian Maternity Outcomes Surveillance System (AMOSS)
- Association for Genetic Support Australasia (AGSA)
- Association for the Welfare of Children in Hospitals (AWCH)
- Australia and New Zealand Paediatric Nephrology Association
- Australian CHARGE Association
- Australian Enteric Pathogens Surveillance Scheme
- Australian Polio Expert Committee
- Australasian Paediatric Endocrine Group
- Australian Institute of Health and Welfare
- Australian National University Medical School
- Australian Research Alliance for Children and Youth (ARACY)
- Australian Society of Clinical Immunology and Allergy
- Intergovernmental Committee on Drugs: Working party on FASD
- Commonwealth Department of Health and Ageing
- National Births Anomalies Steering Committee
- National Centre in HIV Epidemiology and Clinical Research
- National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases
- National Heart Foundation of Australia
- National Notifiable Diseases Surveillance System
- National Perinatal Statistics Unit
- National Polio Reference Laboratory
- OzFoodNet: Australian Enhanced Foodborne Disease Surveillance
- WHO Regional Commission for the certification of poliomyelitis eradication
- Rett Syndrome Association of Australia & AussieRett
- Royal Australasian College of General Practitioners (RACGP)
- Royal Australasian College of Physicians, Paediatrics and Child Health Division (RACP)
- SMILE Foundation
- Steve Waugh Foundation

## New South Wales

- Anti-Discrimination Commission of New South Wales
- Child and Adolescent Mental Health Statewide Network (CAMHSNET)
- Centre for Kidney Research
- Centre for Mental Health, New South Wales Health
- Gastroenterology and Liver Unit, Prince of Wales Hospital
- Hunter Genetics
- Institute for Neuromuscular Research
- Liverpool Health Service
- Macleay Hastings Health Service
- Macquarie Group Foundation
- Millennium Institute of Health Research
- NSW Birth Defects Register
- NSW Centre for Perinatal Health Services Research
- NSW Commission for Children
- NSW Department of Health
- NSW Hospitals: Bankstown, John Hunter, Nepean, Royal Prince Alfred, Royal North Shore, Sydney Children's, Westmead, The Children's Hospital at Westmead
- Paediatric HIV Services Unit, Sydney Children's Hospital
- Prince of Wales Medical Research Institute
- The University of Sydney
- The University of New South Wales
- South Eastern Sydney and Illawarra Area Health Service
- South Eastern Area Laboratory Services
- Sydney South West Area Health Service

## Northern Territory

- NT Hospitals: Alice Springs, Royal Darwin
- The Menzies School of Health Research, Darwin

## Victoria

- Australian Mycobacterium Reference Laboratory Network
- Centre for Adolescent Health, Royal Children's Hospital
- Victorian Infectious Diseases Reference Laboratory
- Monash Medical Centre
- Murdoch Children's Research Institute
- Public Health Group, Department of Human Services
- The University of Melbourne
- Victorian Hospitals: Royal Women's, Royal Children's, Mercy Hospital

## Queensland

- Queensland Hospitals: Mater Children's, Princess Alexandra, Royal Children's
- Queensland University of Technology
- Tropical Public Health Unit
- The University of Queensland

## South Australia

- Flinders Medical Centre
- Institute of Medical Veterinary Science
- Mycobacterium Reference Laboratory, Adelaide
- South Australian Health Commission
- Women's and Children's Hospital, Adelaide
- University of Adelaide
- Children Youth and Women's Health Services

## Western Australia

- Curtin University
- Disability Services Commission
- Pathcentre, Queen Elizabeth II Medical Centre
- Telethon Institute for Child Health Research
- WA Hospitals: King Edward Memorial, Princess Margaret Hospital for Children, Royal Perth

## Tasmania

- Royal Hobart Hospital

## Australia Capital Territory

- Canberra Hospital

## International Organisations

- Canadian Immunisation Monitoring Program Active
- European Organisation for Rare Diseases, Paris, France
- Great Ormond St Hospital, London, UK
- Hospital for Sick Children, Toronto, Canada
- New Zealand Organisation for Rare Diseases
- Oakland Children's Hospital, USA
- Orphanet, Paris, France
- Rare Diseases, London, UK
- UK Obstetric Surveillance System
- Westkids, Auckland, NZ

## International Network of Paediatric Surveillance Units (INoPSU)

- British Paediatric Surveillance Unit
- Belgian Paediatric Surveillance Unit
- Canadian Paediatric Surveillance Programme
- German Paediatric Surveillance Unit
- Greek Paediatric Surveillance Unit
- Latvian Paediatric Association
- Netherlands Paediatric Surveillance Unit
- New Zealand Paediatric Surveillance Unit
- Portuguese Paediatric Surveillance Unit
- Swiss Paediatric Surveillance Unit
- Republic of Ireland Paediatric Surveillance Unit
- Welsh Paediatric Surveillance Unit

## Funding and Sponsorships 2009 and 2010

The National Health and Medical Research Council of Australia supports the APSU:

Enabling Grant entitled "Australian Paediatric Surveillance Unit: A collaborative network for child health research" (Grant No. 402784; Principal Investigators: Elliott EJ, Bower C, Kaldor J, Booy R, Sullivan E) and a

Practitioner Fellowship: Elliott EJ (Grants Nos. 457084 and 1021480).

Characterisation of H1N1 Influenza 09 in hospitalised children using Paediatric Active Enhanced Diseases Surveillance (grant no. 633028)

The Australian Government Department of Health and Ageing, provides infrastructure support for APSU activities that relate to communicable and vaccine-preventable surveillance and for the Paediatric Active Enhanced Diseases Surveillance system.



The Sydney Medical School, University of Sydney provides in-kind support and is the main fundholder. The APSU Director and Deputy Director are members of the Discipline of Paediatrics and Child Health, Faculty of Medicine.



The Royal Australasian  
College of Physicians

*Paediatrics & Child Health Division*

The Division of Paediatrics and Child Health of the RACP provides support for special projects including production of the bi-ennial report.



The Children's Hospital at Westmead provides office space, IT services and research infrastructure support for the APSU.

### Additional financial supporters for individual surveillance studies include:

- Acute intussusception: CSL Biotherapies, GlaxoSmithKline (GSK).
- Acute rheumatic fever: National Heart Foundation of Australia
- Congenital cytomegalovirus infection: Virology Division, Dept of Microbiology, South Eastern Area Laboratory Service, Sydney Children's Hospital.
- HIV/AIDS and perinatal exposure to HIV: National Centre in HIV Epidemiology and Clinical Research.
- Neonatal herpes simplex virus infection: Department of Immunology and Infectious Diseases, The Children's Hospital at Westmead, Herpes Simplex Virus Research Unit.
- Neuromuscular disorders of childhood: Department of Neurology and Neurosurgery, Royal Children's Hospital, Melbourne.
- Rett syndrome: The Telethon Institute for Child Health Research, USA National Institutes of Health, Rett Syndrome Association of Australia.

Mount Majura Wines continues to generously sponsor the APSU wine prize draw.

## The APSU

The Australian Paediatric Surveillance Unit (APSU) is a national research resource, established in 1993 to facilitate active surveillance of uncommon childhood diseases, rare serious complications of common diseases or rare adverse effects of treatment. Conditions are chosen for their public health importance and impact on health resources. A range of infectious, vaccine-preventable, mental health, congenital and genetic conditions, and injuries have been studied (Table 1 and Table 8). For many childhood conditions, the APSU provides the only mechanism for national data collection.

To the end of 2010, the APSU has been used by over 300 individual researchers to run 48 surveillance studies. Epidemiological and clinical data collected through the APSU are of direct relevance to clinical and public health policy and resource allocation, and thus impact on the health and welfare of Australian children.<sup>1</sup>

The APSU is affiliated with the Division of Paediatrics and Child Health, Royal Australasian College of Physicians (RACP) and the Discipline of Paediatrics and Child Health, Sydney Medical School, the University of Sydney. It is based at The Children's Hospital at Westmead. The APSU Board oversees the management and policy directions of the unit, while the APSU Scientific Review Panel (SRP) determines which studies are suitable to run through the APSU mechanism and provides advice on surveillance methods. The activities of the APSU are funded in part by the Australian Government Department of Health and Ageing (Communicable Disease and Health Risk Policy Section), the Sydney Medical School, The University of Sydney, The National Health and Medical Research Council of Australia (NHMRC Enabling Grant 402784), and other competitive research funding.

### Contributors to the APSU

Contributors to the APSU are clinicians working in paediatrics and child health in Australia. Most (about 80%) are general paediatricians with or without a special interest. In addition, 6% are neonatologists, 3.5% are surgeons, 2.6% are geneticists and 2% are emergency physicians. Clinicians are identified through the Division of Paediatrics and Child Health of the RACP, the Australasian Association of Paediatric Surgeons and other paediatric special interest groups. In 2010 an estimated 91% of all paediatricians listed on the RACP list of Fellows and in active clinical practice in Australia participated in APSU surveillance.

### Aims of the APSU

1. To provide a national active surveillance mechanism that can be used to:
  - estimate the incidence, epidemiology, clinical features, current management and short-term outcomes of rare childhood conditions in Australia
  - respond to epidemiological emergencies such as outbreaks, emerging or imported diseases.
2. To initiate and facilitate collaborative, national, child health research consistent with national health priorities, including 'a healthy start in life' and to fill knowledge gaps.
3. To produce and disseminate evidence that will support development of:
  - the most effective educational resources and clinical guidelines for clinicians
  - the most appropriate prevention strategies and community awareness campaigns.

### Operation of the APSU

Individuals or organisations may apply to study a rare condition through the APSU. Applications undergo a process of peer review by the SRP and must have ethical approval from a properly constituted ethics committee before being listed on the monthly report card. All studies must have the potential to contribute significant new knowledge about rare childhood conditions and to influence policy, clinical practice or resource allocation.

Conditions are usually studied for two to three years, although provision for ongoing surveillance may be granted for diseases of particular public health significance or with very low incidence (e.g. HIV/AIDS, congenital rubella).

Each month all clinicians participating in APSU surveillance are sent a report card listing up to 17 different conditions under surveillance and asked to return the report card indicating whether they have seen a case or not. All positive reports of cases generate a brief questionnaire requesting de-identified information about the child's demographics, details of diagnosis, management and short-term outcome from the clinician. For more detail on APSU methodology please see the APSU website: [www.apsu.org.au](http://www.apsu.org.au).

<sup>1</sup> Zurynski Y, Peadon E, Bower C, Elliott E. Impacts of national surveillance for uncommon conditions in childhood. *Journal of Paediatrics and Child Health* 2007; 43(11):724-731.

## INTERNATIONAL COLLABORATIONS

In October 2010, Yvonne Zurynski represented the APSU at the 6<sup>th</sup> **International Network of Paediatric Surveillance Units (INoPSU)** meeting held in Dublin, where eight other countries were represented. Yvonne Zurynski and Danielle Grenier, of the Canadian Paediatric Surveillance Unit (CPSP) were elected co-chairs of INoPSU for the next three years. The co-Chairs are working towards strengthening INoPSU governance and management, increasing the network membership, as well as encouraging publication of international results on conditions that have been recently studied by several national surveillance units, e.g. Early Onset Eating Disorders (Australia, Canada, Britain); Acute Flaccid Paralysis (Australia, Britain, Netherlands, Canada, Germany).

As part of her **Creswick Foundation Fellowship**, Yvonne Zurynski was able to travel overseas to visit patient organisations which provide support and resources for families who have a child affected by a rare disease: Contact-a-Family; INVOLVE; Rare Diseases UK; Eurodis; and the rare diseases information service for clinicians, Orphanet. A comparison of rare diseases resources, policy, research infrastructure and awareness in Australia and Europe was presented at the 2009 RACP Congress.<sup>1</sup> Given that information about rare diseases for Australian parents and the community is often lacking, the APSU provides patient accessible summaries for conditions studied, including clinical features, links to other information resources, and to support groups if these exist, and educational opportunities for patients. These summaries are available on the APSU website [www.apsu.org.au](http://www.apsu.org.au).

## SUPPORTING THE DEVELOPMENT OF NEW SURVEILLANCE SYSTEMS

The **Paediatric Active Enhanced Disease Surveillance system (PAEDS)** is an inpatient surveillance system involving specialist paediatric centres in NSW (the Children's Hospital at Westmead), VIC (Royal Children's Hospital, Melbourne), SA (Women's and Children's Hospital, Adelaide), and WA (Princess Margaret Hospital, Perth) jointly managed by the APSU and the National Centre for Immunization Research and Surveillance (NCIRS). PAEDS was successfully piloted in 2007 and 2008, and has now received funding to mid 2014 from the Department of Health and Ageing. This allows PAEDS to gather unique linked clinical and laboratory data in hospitalised children which is not available through other surveillance systems. The surveillance focus for PAEDS has been conditions relevant to vaccine preventable diseases or potential adverse events following immunization. (to read more please go to page xx)

APSU supported the development of the **Australian Maternity Outcomes Surveillance System (AMOSS)** which was launched in June 2009. AMOSS is modelled on APSU methodology and informed by the UK Obstetric Surveillance System (UKOSS). AMOSS is managed by the National Perinatal Statistics Unit and funded by a project grant from the NHMRC. AMOSS aims to provide detailed, systematically collected data on serious but rare outcomes related to birth and pregnancy. Surveillance commenced in the second half of 2009. For more information on AMOSS go to: [www.amoss.org.au](http://www.amoss.org.au) (check this link)

## MAKING APSU REPORTING EASIER FOR CLINICIANS

The number of clinicians reporting via e-mail has increased from 68% in 2008 to 83% in 2010.

In late 2010 APSU received support from the Information and Communication technology department of the University of Sydney under their e-Research platform to develop a web-based reporting system. This has made reporting more efficient for clinicians and for APSU staff who previously had to manually enter 1340 responses into the APSU database each month. The web-based reporting system is currently being trialled in NSW and we plan to roll it out to other states over the next year.

## Major Achievements 2009–2010

### WORKING WITH FAMILY SUPPORT GROUPS AND CHARITIES

The APSU helped raise awareness of rare childhood diseases by participating in Rare Diseases Day activities in 2009. The APSU joined the global effort by the National Organization of Rare Diseases (NORD) and the European Organisation for Rare Diseases, Eurodis, who coordinated the day.

In 2010, to mark International Rare Diseases Day, the APSU hosted a Workshop on the 27th of February at the Children's Hospital at Westmead, Sydney with the aim of raising awareness of rare disease impacts and to outline key points to for a national plan for rare diseases in Australia. Workshop attendees supported a coordinated response to rare diseases in Australia and the development of a National Plan. Delegates also supported the need to establish an umbrella organisation for rare diseases in Australia that brings together support groups, researchers and health professionals.



*Steve Waugh, the Walker family and Prof Elizabeth Elliott at the "Zebras on the Commons" APSU Rare Diseases Workshop in February 2010*

The APSU and the Steve Waugh Foundation collaborated in 2009, to establish the Medical Health Advisory Committee and to develop criteria that the Foundation can apply when making decisions about funding applications by families who have a child with a rare disease. Prof Elliott and A/Prof Zurynski serve on this committee. The Steve Waugh Foundation focuses on supporting families who have nowhere else to turn [www.stevewaughfoundation.org.au](http://www.stevewaughfoundation.org.au)

The APSU also has strong links with the **SMILE Foundation** which provides emergency grants to families in crisis and supports medical research into rare diseases [www.SMILE.org.au](http://www.SMILE.org.au) . Prof Elliott is serves on the Board of SMILE.

### DEVELOPING A RARE DISEASES PLAN

Following the publication of a literature review<sup>1</sup>, the APSU **convened a National Rare Diseases Working Group** in February 2009. This group comprised researchers, child health advocates, clinicians and consumer support groups including: The Steve Waugh Foundation; SMILE Foundation; Association for the Welfare of Children in Hospitals; Association for Genetic Support Australasia; European Organisation for Rare Diseases (Eurodis); New Zealand Organisation for Rare Diseases; Royal Australasian College of Physicians, Paediatrics and Child Health Division; Royal College of General Practitioners; The Children's Hospital at Westmead; NSW Health; NSW Commission for Children; Australian Research Alliance for Children and Youth (ARACY); and the Anti-discrimination Commission of NSW. With support from a small grant from ARACY, this Working Group and the APSU achieved the following **four outcomes**:

1. Draft of 8 key points to be addressed by a National Plan for Rare Diseases:
  - Raise awareness of the burden of rare diseases on patients, families, health professionals and the community
  - Provide educational resources and networking opportunities for health professionals to allow them to better identify and manage rare diseases
  - Improve health care for people with rare diseases through access to diagnostic tests, new drugs and other treatments, improved primary care and specialised services
  - Promote research on rare diseases through advocacy for targeted research funds and development of national and international multidisciplinary research partnerships
  - Increase knowledge of the epidemiology and impacts of rare diseases in Australia through research
  - Develop and disseminate information to educate patients, parents, carers and the general public, about rare diseases that is relevant in the Australian context



## Major Achievements 2009–2010

- Develop an umbrella organisation to support people affected by any rare disease by linking existing organisations to facilitate the co-ordinated development of integrated peer support networks, contact among families and contact among rare diseases interest groups.
  - Advocate to government in partnership with families, for people affected by rare diseases
2. A strategy to attract funding to develop a National Plan for Rare Diseases;
  3. A strategy for raising community awareness of International Rare Diseases Day 28<sup>th</sup> of February 2009;
  4. A publication and presentations about the impacts of rare diseases and the need for a national plan.<sup>2</sup>

Prof Elizabeth Elliott and A/Prof Yvonne Zurynski participated in the National Organising Committee for Rare Diseases Symposium held in Fremantle WA in April 2011. This symposium brought together national and international experts on rare diseases to meet with parents, researchers, clinicians, policy makers, people living with rare disease and support groups. A strategy for the adoption of a National Plan for Rare Diseases in Australia was set and subsequently operationalized. The National Rare Diseases Coordinating Committee was established and is working towards the further development of a National Plan for Rare Diseases for Australia.

APSU recently secured a highly competitive three year **Australian Research Council (ARC) Linkage Grant**. The ARC funding will enable Australia to lead the international research effort on rare diseases by using a coordinated approach to study the impacts of rare diseases on children, families, clinicians and health services. Data obtained will improve psychosocial, health and economic outcomes for children and families and will inform the development of new health service models. This grant brings together many partners including the **Royal Australasian College of Physicians, The University of Sydney, University of Western Australia, SMILE Foundation, Steve Waugh Foundation and the Association of Genetic Support of Australasia**.

### INFORMING PUBLIC HEALTH POLICY

#### Child restraint and seatbelt safety

An APSU study of seatbelt related injuries informed national policy on child restraints by highlighting severe injuries occurring among young children travelling while restrained by adult seatbelts. Reported injuries included abdominal crush injuries, lumbar spine Chance fractures, cervical spine and brain injuries, many of which could have been prevented if the child had travelled in an Australian standards approved car seat or booster seat. Children aged less than 7 are too small to be effectively restrained by an adult seatbelt, where the lap-belt sits on the abdomen rather than the hips and the sash belt sits on the neck rather than shoulder. Furthermore, many of the injured children were misusing their restraint or seatbelt. The new child restraint laws were first introduced in Victoria in xxxxxx and in NSW in April 2009. All states and territories of Australia now have child restraint laws covering children aged up to 7 years.

#### Influenza vaccination policy

APSU was able to rapidly respond to the H1N1-2009 Influenza pandemic, having conducted seasonal influenza surveillance since 2007. The APSU protocols were also adapted for use by the PAEDS system during the 2009 pandemic after receiving emergency funding from the NHMRC. Although serious complications occur in children who have underlying chronic conditions very few had been vaccinated for influenza despite this being recommended by the National Immunisation Programme. We also found that even previously healthy children develop serious life threatening complications such as encephalitis, rhabdomyelitis and severe pneumonia due to influenza infection. (These findings informed influenza vaccination policy.

#### Varicella vaccination policy

The surveillance study of neonatal and congenital varicella showed that the rates of these most serious of outcomes of varicella infection have fallen significantly since the introduction of universal vaccination for varicella in Australia. This finding supports the continuation of the varicella vaccination programme and has raised awareness of the potential benefits of vaccinating for varicella in countries that do not have a varicella vaccination policy.

#### Alcohol in Pregnancy Policy

Although the APSU surveillance study of Fetal Alcohol Syndrome concluded in 2004, this study raised many questions and acted as impetus for health professional education, informed policy and catalysed new research. A national Alcohol in pregnancy research group was formed and further research included studies on: health professionals attitudes and knowledge regarding alcohol use in pregnancy, women's knowledge about Fetal Alcohol Spectrum Disorders (FASD), and communication of public health messages about alcohol and pregnancy. Research conducted by the APSU informed the revision of the NHMRC Guidelines on Alcohol use in pregnancy in 2009 and tools for screening and diagnosis have been developed. With the support of the Federal Government. The Lililwan Project aims to determine the prevalence of FASD in the Fitzroy Valley, Kimberley, WA and is providing new insights into the reasons for alcohol use in pregnancy among Aboriginal women and potential strategies for the prevention of FASD in these high risk populations.

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## Conditions Studied 2009–2010: Key Findings

**Table 1. Key findings of National Surveillance conducted through the APSU 2009–2010**

Conditions Under Surveillance	Dates of Study	Key findings, implications and publications
<b>Infectious/vaccine preventable conditions</b>		
Acute flaccid paralysis (AFP)	Mar 1995–	Surveillance for AFP has a central role in monitoring Australia's polio-free status. <sup>1</sup> The data generated are reported to the Department of Health and Ageing and the World Health Organization. Australia reported an AFP rate of 1.15 per 100,000 children <15 years of age in 2009 and a rate of 1.00 in 2010 per 100,000 children <15 years of age per annum. Australia has met the WHO AFP surveillance performance indicator of one AFP case per 100,000 children <15 years of age on seven occasions since surveillance commenced in 1995 and for three years in a row from 2008–10, for the first time.
Acute rheumatic fever (ARF)	Oct 2007–Dec 2010	ARF occurs not only across northern Australia but also in southern states including NSW, Victoria, SA and southern WA, and it occurs in urban settings as well as rural and remote regions. <sup>2,3</sup> Results from this study support the need for a national approach to ARH/RHD control. The establishment of RHD Australia is a significant step forward to achieving this national approach. This study has supported a proposal by Australian Maternal and Obstetric Surveillance System (AMOSS) which will investigate the existence and impact of RHD in pregnancy. There is a need for improved education for health professionals to support them in recognising and treating ARF as early as possible to prevent the development of valve damage and rheumatic heart disease.
Congenital cytomegalovirus (cCMV) infection	Jan 1999–	This study continues to inform the ongoing debate about the need for routine screening of mothers and infants for CMV as women tend to be asymptomatic and unaware of their infection, and the majority of infants are asymptomatic at birth and are unlikely to be captured without routine screening. Approximately 13.5% of infected infants will develop permanent sequelae. <sup>4</sup> Despite APSU capturing only a portion of cCMV cases, national surveillance of cCMV remains important in the absence of screening programs and prior to the introduction of therapeutic agents which are currently being developed. The roll-out of newborn hearing screening programs, use of PCR and retrospective analysis of newborn screen cards is likely to lead to the identification of additional cases.
Neonatal herpes simplex virus infection (HSV)	Jan 1997–	Although the incidence and mode of presentation of neonatal HSV infection has remained relatively similar since 1997, there is a trend to improved survival of infants. One possible explanation for this is that international guidelines have recommended larger doses of antiviral agents (parenteral acyclovir) for longer durations. <sup>5</sup> We have observed that HSV-1 is now the major serotype that causes neonatal HSV disease in Australia, and importantly, adolescent mothers (i.e. less than or equal to 20 years of age) are more likely to transmit genital HSV-1 infection to their newborns than adult mothers.
HIV/AIDS, perinatal exposure to HIV	May 1993–	HIV infection among children remains a rare occurrence in Australia. The increasing number of reports of perinatal exposure to HIV may be partly attributed to the availability of interventions for minimising the risk of mother-to-child transmission. Complete documentation of the use of interventions is required to provide evidence of their effectiveness in the Australian population. <sup>6</sup>
Severe complications of influenza	Sep 2007; Jul 2008–Sep 2008; Jun 2009–Sep 2009; Jun 2010–Sep 2010.	Pandemic influenza H1N1 2009 led to many more admissions when compared with the previous and subsequent year. <sup>7,8</sup> Severe complications, in particular pneumonia and encephalitis were more common in 2009, leading to lengthy hospital stays, PICU admissions and ongoing problems on discharge. There were six deaths in 2009, but only two deaths were reported in 2010. Few children with underlying chronic conditions and eligible for vaccination according to the NIP were vaccinated for seasonal influenza, suggesting the need for education and raising awareness among clinicians and parents. Despite the number of confirmed cases decreasing in 2010, children experienced serious complications including pneumonia and encephalitis.



## Conditions Studied 2009–2010: Key Findings

Conditions Under Surveillance	Dates of Study	Key findings, implications and publications
Acute intussusception (IS)	May 2007–May 2010	The increased risk of IS in relation to rotavirus vaccination is evident in infants <3 months of age that have been shown to develop IS within 1-7 days following one dose of rotavirus vaccination. This risk disappears as age increases in affected children that have received up to three doses of the vaccine. The level of intervention required to resolve IS was similar to that observed in the VAERS data and no deaths occurred as a result of IS. <sup>9</sup>
Congenital rubella	May 1993–	The one notification received in 2010 highlights the need for immigrant women from countries with poorly developed vaccination programs to be serologically tested for rubella after arrival in Australia and vaccinated where appropriate. Continued vigilance for this rare congenital infection is essential given the seriousness of congenital rubella syndrome which is characterised by deafness, cataracts, growth retardation, mental handicap and cardiac abnormalities. <sup>10</sup>
Congenital varicella	May 2006–	There have been no cases of congenital varicella in recent years, 2008-2010, supporting the effectiveness of the vaccination program in preventing severe outcome due to varicella infection in pregnancy. <sup>11</sup>
Neonatal varicella	May 2006–	Our study shows that there has been a significant reduction in the incidence of neonatal varicella in Australia following the introduction of the varicella vaccine to the National Immunisation Program in 2005. Countries considering the routine use of varicella vaccine need to consider both direct and indirect effects (including clinical and economic benefits beyond the neonatal period) of universal varicella vaccination. <sup>11</sup>
Severe complications of varicella	May 2006–	Despite the inclusion of varicella vaccination on the National Immunisation Program cases of severe complications of varicella continue to be reported, predominately among non-immunised children, 20% of which also had underlying medical conditions. <sup>12</sup>
<b>Congenital/genetic disorders</b>		
Neuromuscular disorders of childhood (NMD)	Jan 2007–	The most common forms of neuromuscular disease in childhood are muscular dystrophy, followed by SMA, congenital myopathies and inherited neuropathies. Surprisingly, myotubular myopathy appears to be the most common congenital myopathy in the Australasian population. Increasing focus on epidemiological studies of common and severe diseases such as Duchenne muscular dystrophy (DMD) has led to establishment of a working group which has successfully worked toward establishment of Australasian registries for DMD and SMA, and is now working to establishment of a registry for myotonic dystrophy. <sup>13</sup>
Rett syndrome	May 1993–Apr 1995; Jan 2000–	This study enables continuing enrolment of new cases of Rett syndrome into the Australian Rett Syndrome Database. The Guidelines for Management of Scoliosis in Rett Syndrome will assist clinicians and families working with children with Rett Syndrome. <sup>14</sup> Analytical investigations using data relating to different aspects of the study continue to be undertaken and during 2009/10, 18 articles relating to the study were either published or accepted for publication. Collaborative research between Australia and Israel has identified the brain-derived neurotrophic factor (BDNF) polymorphism as another genetic modifier of Rett syndrome severity.
<b>Other injury/illness</b>		
Vitamin K deficiency bleeding (VKDB)	May 1993–	The majority of infants with VKDB had late onset disease and approximately half of them had liver disease. Compared with early/classical disease, ongoing morbidity was more frequent with late onset disease and deaths only occurred in this group. In the period 2005-2010, parents refused consent for Vitamin K administration at birth in 50% the reported cases. There is a need to educate parents about the serious potential consequences of refusing vitamin K at birth.
Systemic lupus erythematosus	Oct 2009–	This study provides the first estimate of incidence of SLE in Australian children. Despite the rarity of SLE, the incidence of SLE in indigenous children (30% of all reported cases) is much greater than that of the overall population. <sup>15</sup>

## Conditions Studied 2009–2010: Key Findings

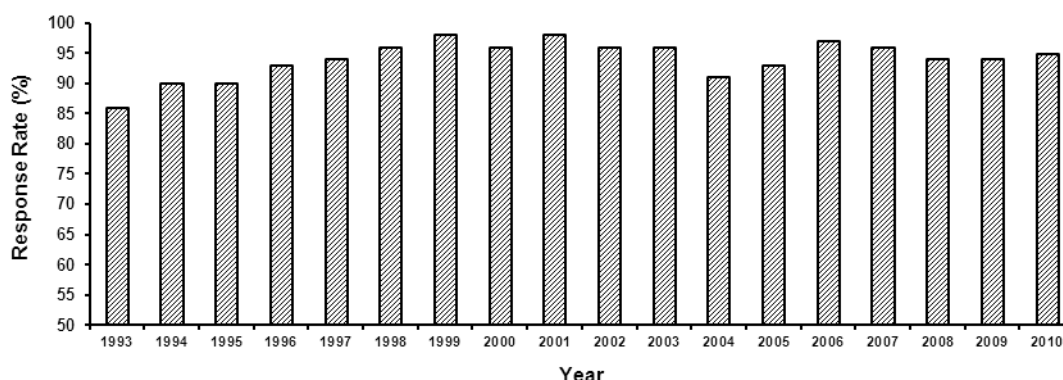
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## Response Rates

In 2009, 1329 clinicians participated in the monthly surveillance of 15 conditions, with an overall response rate of 94% (Figure 1). In 2010, 1344 clinicians participated in the monthly surveillance of 17 conditions and the overall response rate was 95% (Figure 1). This maintains the excellent participation level by contributing clinicians since APSU's inception in 1993. In 2009 and 2010 approximately 83% of clinicians reported by e-mail.

**Figure 1. APSU annual response rate (%) 1993-2010**



New South Wales (NSW) has the greatest proportion of the national population of children aged less than 15yrs (32.0%), Victoria has 24.1% and Queensland 21.3%. Correspondingly, NSW has the greatest number of participating clinicians. Response rates to the monthly report card have remained high in all states, with ACT and Tasmania recording the highest rates in 2009 and SA and Tasmania recording the highest rates in 2010 (Table 2).

**Table 2. Response rates to monthly report card, number of clinicians reporting to the APSU and proportion of all children < 15yrs of age for each state for 2009 and 2010.**

STATE	RESPONSE RATE (%)		CLINICIANS REPORTING N (%)		NUMBERS AND PROPORTION OF AUSTRALIAN CHILDREN <15yrs N (%)	
	2009	2010	2009	2010	2009	2010
ACT	96	94	21 ( 1.6)	21 ( 1.6)	64,993 ( 1.6)	46,553 ( 1.1)
NSW	94	95	501 (37.7)	505 (37.6)	1,345,199 (32.1)	1,355,146 (32.0)
NT	84	91	18 ( 1.4)	17 ( 1.3)	52,993 ( 1.3)	53,101 ( 1.3)
QLD	93	93	233 (17.5)	236 (17.6)	886,975 (21.2)	901,542 (21.3)
SA	94	99	101 ( 7.6)	104 ( 7.7)	291,178 ( 7.0)	293,153 ( 6.9)
TAS	100	100	22 ( 1.7)	23 ( 1.7)	97,698 ( 2.3)	97,648 ( 2.3)
VIC	94	94	307 (23.1)	309 (23.0)	1,007,452 (24.1)	1,017,271 (24.1)
WA	94	96	126 ( 9.5)	129 ( 9.6)	438,600 (10.5)	445,818 (10.5)
Australia	94	95	1329 (100)	1344 (100)	4,185,598 (100)	4,230,205 (100)

## Respondent Workload

Workload continued to be low for most clinicians who participate in APSU surveillance. During 2009 the majority of clinicians (79.5%) had no cases to report and therefore no case questionnaires to complete; 12.9% reported one case, 3.6% reported two cases and 4% reported three or more cases. During 2010, 84.4% of clinicians had no cases to report; 11.5% reported one case, 2.7% reported two and 1.4% reported three or more cases.

## Summary of surveillance study results 2009-2010

A summary of the classification of all case reports received for the period 2009-2010 is presented in Table 3. Duplicate reports are identified using the child's date of birth, first two letters of the first name and first two letters of the surname. After duplicates are identified, all data are completely deidentified and stored securely. Errors include cases that do not meet case definition criteria or administrative errors including 'report made by mistake'.

Case classifications are provided after review by the expert investigators responsible for each surveillance study and are accurate at December 2010. However, it is possible that some notifications may be reclassified at a later date as additional clinical data for existing notifications, or additional notifications, are received.

## Summary of Surveillance Data

**Table 3. Summary of results for studies conducted during 2009-2010**

Conditions Under Surveillance	Year	Total notifications	Questionnaires returned, n (%)	Duplicate cases	Errors	Probable/unknown cases	Total confirmed cases
Acute flaccid paralysis *	2009	61	61 (100)	4	7	2	48
	2010	57	57 (100)	4	10§	2	41
Acute rheumatic fever *	2009	69	63 (91)	3	9§	6	45
	2010	56	54 (96)	4	3	8	39
Congenital cytomegalovirus infection *	2009	52	43 (83)	5	3	2	33
	2010	42	39 (93)	3	3	2	31
Neonatal herpes simplex virus infection	2009	19	16 (84)	5	1	0	10
	2010	9	9 (100)	2	3	0	4
Perinatal exposure to HIV *	2009	58	57 (98)	3	2	0	52
Perinatal HIV infection	2009						8
Perinatal exposure to HIV *	2010	65	63 (97)	9	0	0	52
Perinatal HIV infection	2010						5
Severe complications of influenza	2009	146	142 (97)	18	24§	0	100
Severe complications of influenza	2010	42	38 (90)	4	9§	0	25
Acute intussusception	2009	74	62 (84)	7	15	0	40
	2010	16	14 (88)	0	5	0	9
Neuromuscular disorders	2009	111	77 (69)	9	10	0	58
Rett syndrome *	2009	25	25 (100)	2	3	3	17
	2010	7	6 (86)	0	1	0	5
Congenital rubella (with defects)	2009	0	0	0	0	0	0
	2010	1	1	0	0	0	1
Congenital varicella	2009	3	3 (100)	0	3	0	0
	2010	0	0	0	0	0	0
Neonatal varicella	2009	5	4 (80)	1	0	0	3
	2010	2	1 (50)	0	0	0	1
Severe complications of varicella infection	2009	12	11 (92)	1	2	0	9
	2010	13	12 (92)	3	0	0	11
Systemic lupus erythematosus	2009	7	5 (71)	0	1	0	4
	2010	20	18 (90)	2	1	2	16
Vitamin K deficiency bleeding	2009	2	2(100)	0	1	1	0
	2010	6	6 (100)	2	2	0	2

\* Includes notifications from APSU and other sources (e.g. laboratory). § Includes errors and unclassified cases

An estimate of incidence is calculated using the reported number of newly diagnosed cases of disease in a defined population seen by paediatricians in a defined period of time. As 100% case ascertainment is unlikely to be achieved by any one surveillance scheme, '*reported rate*' is used in this report to represent estimates of minimum incidence. The reported rate of each condition is expressed either as the number of new cases per 100,000 live births per annum (for conditions diagnosed before 12 months of age) or per 100,000 children in the age range specified in the study protocol (Tables 4a and 4b). Population figures for the denominator are obtained from the Australian Bureau of Statistics.<sup>2</sup>

Tables 4a and 4b show the reported rate of conditions studied through the APSU during 2009-2010. For conditions where cases were also ascertained through complementary sources e.g. mandatory reporting systems and laboratory surveillance (including perinatal exposure to HIV, acute flaccid paralysis and Rett syndrome), cases from more than one source have been included to estimate the rate of disease.

<sup>2</sup> AusStats: Population by age and sex, Australian states and territories. *Australian Bureau of Statistics* Dec 2010; Cat.No. 3101.0

**Table 4a. Reported rate for each condition studied to December 2009**

Conditions Under Surveillance	Study period	Duration of study (years)	Total notifications	Questionnaires returned, n (%)	Total confirmed cases for duration of study*	Reported Rate for duration of study (per 10 <sup>5</sup> per annum)
<b>Infectious/vaccine preventable conditions</b>						
Acute flaccid paralysis	Mar 1995 ongoing	15	876	809 (92)	557	0.94 <sup>b</sup>
Acute rheumatic fever	Oct 2007 ongoing	2.5	185	169 (91)	111	1.19 <sup>b</sup>
Congenital cytomegalovirus infection	Jan 1999 ongoing	11	399	296 (74)	160	5.37 <sup>a</sup>
Neonatal herpes simplex virus infection	Jan 1997 ongoing	13	233	223 (96)	117	3.35 <sup>a</sup>
Perinatal exposure to HIV infection	May 1993 ongoing	16.5	595	527 (89)	367	8.26 <sup>a</sup>
Perinatal HIV infection					66	1.49 <sup>a</sup>
Serious complications of seasonal influenza	May 2009–Sep 2009	0.4	146	142 (97)	100	†
Congenital rubella (with defects)	May 1993 ongoing	16.5	110	106 (96)	51	0.08 <sup>b</sup>
Congenital varicella	May 2006 ongoing	3.5	12	12 (100)	2	0.19 <sup>a</sup>
Neonatal varicella	May 2006 ongoing	3.5	26	23 (88)	17	1.58 <sup>a</sup>
Severe complications of varicella infection	May 2006 ongoing	3.5	58	47 (81)	36	0.24 <sup>b</sup>
<b>Congenital/genetic disorders</b>						
Neuromuscular disorders	Jan 2007–Dec 2009	3	386	306 (79)	198	1.49 <sup>d</sup>
Systemic lupus erythematosus	Oct 2009 ongoing	0.25	7	5 (71)	4	†
Rett syndrome	Jan 2000 ongoing	10	295	288 (98)	161	0.35 <sup>e</sup>
<b>Other injury/illness</b>						
Vitamin K deficiency bleeding	May 1993 ongoing	16.5	142	139 (98)	32	0.72 <sup>a</sup>

\* Total confirmed cases according to case definition in the study protocol

a. Reported incidence per 100,000 live births

b. Reported incidence per 100,000 children < 15 years

c. Reported incidence per 100,000 children ≤ 24 months

d. Reported incidence per 100,000 children < 16 years

e. Reported incidence per 100,000 females < 16 years

† Due to limited surveillance period a reported rate cannot be calculated

**Table 4b. Reported rate for each condition studied to December 2010**

Conditions Under Surveillance	Study period	Duration of study (years)	Total notifications	Questionnaires returned, n (%)	Total confirmed cases for duration of study*	Reported Rate for duration of study (per 10 <sup>5</sup> per annum)
<b>Infectious/vaccine preventable conditions</b>						
Acute flaccid paralysis	Mar 1995 ongoing	16	933	866 (93)	598	0.94 <sup>b</sup>
Acute rheumatic fever	Oct 2007–Dec 2010	3.2	241	223 (93)	151	1.11 <sup>b</sup>
Congenital cytomegalovirus infection	Jan 1999 ongoing	12	441	339 (77)	191	5.83 <sup>a</sup>
Neonatal herpes simplex virus infection	Jan 1997 ongoing	14	242	232 (96)	121	3.2 <sup>a</sup>
Perinatal exposure to HIV infection	May 1993 ongoing	17.5	681	612 (90)	437	9.22 <sup>a</sup>
Perinatal HIV infection					77	1.62 <sup>a</sup>
Serious complications of seasonal influenza	Jul 2008–Sep 2008	0.25	42	38 (90)	25	†
Intussusception	May 2007–May 2010	3	303	245 (81)	163	5.17 <sup>c</sup>
Congenital rubella (with defects)	May 1993 ongoing	17.5	110	106 (96)	52	0.07 <sup>d</sup>
Congenital varicella	May 2006 ongoing	4.5	12	12 (100)	2	0.15 <sup>a</sup>
Neonatal varicella	May 2006 ongoing	4.5	28	24 (86)	18	1.31 <sup>a</sup>
Severe complications of varicella infection	May 2006 ongoing	4.5	71	59 (83)	45	0.23 <sup>b</sup>
<b>Congenital/genetic disorders</b>						
Systemic Lupus Erythematosus	Oct 2009 ongoing	1	27	23 (85)	20	0.36 <sup>d</sup>
Rett syndrome	Jan 2000 ongoing	9	302	294 (97)	166	0.35 <sup>e</sup>
<b>Other injury/illness</b>						
Vitamin K deficiency bleeding	May 1993 ongoing	17.5	148	145 (98)	34	0.72 <sup>a</sup>

\* Total confirmed cases according to case definition in the study protocol

a. Reported incidence per 100,000 live births

b. Reported incidence per 100,000 children < 15 years

c. Reported incidence per 100,000 children ≤ 24 months

d. Reported incidence per 100,000 children < 16 years

e. Reported incidence per 100,000 females < 16 years

† Due to limited surveillance period a reported rate cannot be calculated

## Acute Flaccid Paralysis (AFP)

BR Thorley, M Ryan, E Elliott

**Case Definition:** Any child less than 15 years of age newly diagnosed with acute flaccid paralysis in one or more limbs or acute onset of bulbar paralysis. All cases are reviewed by the National Polio Expert Panel (PEP) and classified as: confirmed poliomyelitis, non-polio AFP, polio-compatible AFP or non-AFP. [AFP cases with lack of clinical information are reported as "polio compatible, zero evidence"].

**Background:** For the complete study protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** The AFP surveillance system in Australia follows the World Health Organization (WHO) international standard for a polio-free country by focussing on AFP cases in children <15 years of age, the age group at highest risk of poliovirus infection. The APSU and PAEDS systems were used to ascertain cases of AFP in 2009 and 2010 and the notifications from both systems were combined. The surveillance system relies on two information sources for enteroviruses to determine whether poliovirus is the causative agent of AFP: (i) completion of a clinical questionnaire by the clinician who notified the AFP case and (ii) collection of two stool specimens within 14 days of the onset of symptoms for testing at the WHO Victorian Infectious Diseases Laboratory Reference Laboratory (VIDRL). The WHO AFP surveillance performance indicators are (i) one case of AFP per 100,000 children <15 years of age per annum, and (ii) testing of two stool specimens from 80% of the AFP cases. The clinical and laboratory data are reviewed by the Polio Expert Panel, convened by the Department of Health and Ageing, and the final case classifications are reported to the WHO.

In 2009, 48 children were classified as non-polio AFP. This gave an AFP rate of 1.15 per 100,000 children < 15 years of age per annum, thus meeting the WHO surveillance performance indicator as a sensitive system to detect an imported case of polio in children. In 2010, 41 children were classified as non-polio AFP and an additional two children as "polio compatible, zero evidence" giving an AFP rate of 1.00 per 100,000 children <15 years of age per annum. It continues to be difficult to meet the WHO surveillance performance indicator for adequate stool specimens. Specimens were referred from 16 children (32%) in 2009 and 12 (29%) in 2010. The most common diagnoses for AFP in 2009 and 2010 were Guillain Barré syndrome in 30 children (33%) and acute disseminated encephalomyopathy in 12 (13%).

For case classification details and reported rates please see Tables 3 and 4, pages 16–18.

### Study Highlights and Impacts:

- The AFP surveillance system has a central role in monitoring Australia's polio-free status.
- The data generated by the surveillance system are referred to the Polio Expert Panel and reported to the Department of Health and Ageing and the World Health Organization
- Australia has reported an AFP rate of >1.00 per 100,000 children <15 years of age in 2008, 2009 and 2010.

\*For more information on the PAEDS system please refer to page 48.

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### Original Articles:

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2. Thorley B, Kelly H, Nishimaru Y, Yoon YK, Brussen KA, Roberts J, Shimizu H. Oral poliovirus vaccine type 3 from a patient with transverse myelitis is neurovirulent in a transgenic mouse model. *Journal of Clinical Virology* 2009; 44(4): 268-271.
3. Stewardson AJ, Roberts JA, Beckett CL, Prime HT, Loh PS, Thorley BR, Daffy JR. An imported case of poliomyelitis in Melbourne, Australia. *Emerging Infectious Diseases* 2009; 15(1): 63-65.
4. Roberts JA, Grant KA, Yoon YK, Polychronopoulos S, Ibrahim A, Thorley BR. Annual report of the Australian National Poliovirus Reference Laboratory 2008. *Communicable Diseases Intelligence* 2009; 33(3): 291-297.
5. Roberts JA, Hobday L, Polychronopoulos S, Ibrahim A, Thorley BR. Annual report of the Australian National Poliovirus Reference Laboratory 2009. *Communicable Diseases Intelligence* 2010; 34(3): 277-284.

### Presentations:

1. Thorley B. Is polio eradication feasible? Monash University, May 2010.
2. Thorley B. The global polio eradication initiative. 63rd United Nations DPI Non-Government Organisations Conference: advance global health, achieve the millennium development goals. Melbourne, September 2010.
3. Thorley B. Australia's response to a wild poliovirus importation and Australia's country report. 16<sup>th</sup> meeting of the Regional Commission for the Certification of poliomyelitis eradication in the Western Pacific region. Manila, October 2010.
4. Thorley B. Polio surveillance. Face-to-face meeting of the Communicable Disease Network of Australia. Sydney, November 2010.
5. Thorley B. Surveillance for poliovirus: wild, vaccine-like and vaccine derived. Alfred Hospital, Melbourne, August 2009.
6. Thorley B. Polio eradication: a goal too far? Victorian Infectious Diseases Reference Laboratory, Melbourne, November 2009.
7. Elliott EJ. Acute flaccid paralysis surveillance in Australia. PAEDS and the APSU. Polio Expert Committee Annual Meeting. Canberra, May 2010.

## Acute Rheumatic Fever (ARF) – Final Report

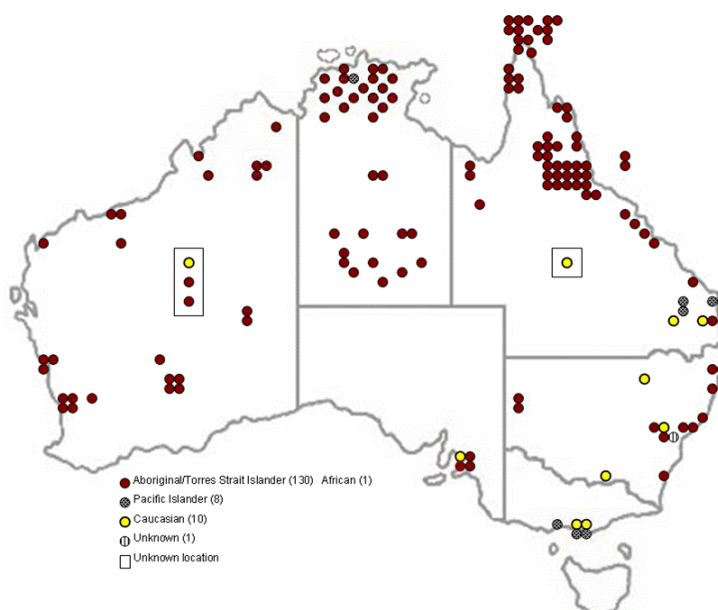
J Carapetis, S Noonan, E Elliott, Y Zuryski, B Currie, McDonald, G Wheaton, D Isaacs, J Ramsay, P Richmond, N Curtis, M Nissen

**Case Definition:** Any new episode of Acute Rheumatic Fever (even if there is a history of previous episodes) in any child <15 years of age and diagnosed according to the criteria provided by the National Heart Foundation Guidelines for Diagnosis and Management of ARF and RHD<sup>1</sup>. ().

**Background:** For the complete study protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** During the study period October 2007 to December 2010, 151 cases were confirmed, the majority (64%) from the NT and QLD, where ARF and RHD (Rheumatic heart disease) burden is known to be high, particularly among Indigenous children (see figure). Aboriginal and Torres Strait Islander children represented the majority of cases (87%) however, 5% were Pacific Islanders and 7% were non-Indigenous and non-Pacific Islander. Six of the 10 Caucasian children lived in rural eastern Australia (NSW and south east QLD), the remainder were from suburban Melbourne and Adelaide. The Pacific Islander children tended to be from urban regions. No cases were reported in the ACT or Tasmania. Delays in diagnosis were common and tended to be slightly longer for children living in rural and remote regions. Only 8.7% of children were reported as having recurrent ARF, however, this may be due to the unavailability of a complete medical history or lack of recognition of previous episodes. The median age at diagnosis was 10.2 years.

All children were prescribed secondary penicillin prophylaxis following the ARF illness; 92% were prescribed injections of Benzathine penicillin G, 1% were prescribed twice daily Erythromycin (presumably due to penicillin allergy), and 7% were prescribed twice daily oral penicillin – a therapy known to be less effective mainly due to difficulties with adherence with this regimen.



In addition to the APSU surveillance, audits of admissions for ARF and RHD were conducted at the Children's Hospital at Westmead (2008-2010) and all cases identified had been reported to the APSU. However, a comparison between APSU cases and notifications to the Queensland Notifiable Diseases database showed that only 62% of locally reported cases had been reported to the APSU. This suggests that there may be systematic under-reporting and that clinicians may be less likely to report cases to the APSU in areas where a mandatory reporting system already exists.

The most common presenting symptoms included carditis, polyarthritis and fever. Skin manifestations such as erythema marginatum and subcutaneous nodules were uncommon.

*For case classification details and reported rates please see Tables 3 and 4, pages 16–18.*



## ARF Study Highlights and impacts:

- This is the first national study of the epidemiology and impacts of ARF in Australian children.
- ARF occurs not only across northern Australia but in southern states including NSW, Victoria, SA and southern WA, and in urban as well as rural and remote regions. Both Indigenous and non-indigenous cases were reported.
- Results from this study support the need for a national approach to ARH/RHD control. The establishment of RHD Australia is a significant step towards achieving this national approach. This study has supported a proposal by the Australian Maternity and Obstetric Surveillance System (AMOSS) to investigate the existence and impact of RHD in pregnancy.
- There is a need for improved education for health professionals to support early recognition and treatment of ARF to prevent the development of valve damage and rheumatic heart disease.

1. Carapetis JR, Brown A, Wilson NJ, Edwards KN, on behalf of the Rheumatic Fever Guidelines Writing Group An Australian guideline for rheumatic fever and rheumatic heart disease: an abridged outline. *MJA* 2007;186:581-586

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## Original Articles:

Smith MT, Lester-Smith D, Zurynski Y, Noonan S, Carapetis JR, Elliott EJ. Persistence of acute rheumatic fever in a tertiary children's hospital. *Journal of Paediatrics and Child Health* 2011; 47(3): 1440-1754.

## Abstracts:

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## Presentations:

Noonan S. ARF surveillance in Australian Children, ARF/RHD Research Planning Day, Charles Darwin University Darwin, August 2010.

## Congenital Cytomegalovirus Infection (cCMV)

W Rawlinson, G Scott, P Palasanthiran, M Ferson, D Smith, G Higgins, M Catton, A McGregor, D Dwyer, A Kesson, C Jones

**Case Definition:** *Definite cCMV:* Any child from whom CMV is isolated in the first three weeks of life from urine, blood, saliva or any tissue taken at biopsy. *Suspected cCMV:* Any child up to 12 months of age, in whom CMV is isolated from urine, blood, saliva or any tissue taken at biopsy *and/or* a positive serum IgM is found *and* in whom clinical features exist that may be due to intrauterine CMV infection. *Clinical features associated with cCMV infection include:* prematurity, low birth weight, sensorineural deafness, other neurological abnormalities (encephalitis, microcephaly, developmental delay, seizures), microphthalmia, chorioretinitis, cataracts, hepatitis, hepatosplenomegaly, thrombocytopaenia, pneumonitis or myocarditis.

**Background:** For the complete study protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results** Of 94 notifications received in 2009 and 2010, 82 (87%) questionnaires were returned – an improvement on return rates when compared with 2008 (79%). Over the two years, 64 reports met case definition criteria, either definite (60 cases) or suspected (4 cases). Cases were reported from all states and territories except the ACT in 2009 and ACT and Tasmania in 2010. Representing approximately one-third of Australia's births annually, NSW continues to report the most cases of cCMV (34). In contrast, only six cases were reported from Victoria, which represents one-quarter of Australia's births annually. Retrospective analysis of blood spots on Newborn Screen cards identified almost half (30) of the infants affected by cCMV, 25 of whom were investigated for sensorineural hearing loss. Twenty-two of these were from NSW. In total, 32 of the 64 infants confirmed with cCMV had hearing loss; 20 of these were identified at more than 30 days old and five were more than 12 months old. These five infants were identified through retrospective analysis of Newborn Screen cards. Eleven infants, all from NSW, received treatment with Ganciclovir in the Newborn period.

For case classification details and reported rates please see Tables 3 and 4, pages 16–18.

### Study Highlights and Impacts:

- This study continues to inform the ongoing debate about the need for routine screening of mothers and infants for CMV as women tend to be asymptomatic and unaware of their infection, and the majority of infants are asymptomatic at birth and are unlikely to be captured without routine screening.
- Approximately 13.5% of infected infants will develop permanent sequelae<sup>1</sup> ~ 50% with hearing impairment.
- There is a need for education and awareness raising among women and health professionals about simple hygiene measures that can be used to prevent vertical transmission of CMV from mother to fetus<sup>2,3</sup>.
- Given the disproportionate reporting of cCMV cases to birth rates between states, it seems likely that APSU surveillance captures only a portion of cCMV cases nationally.
- Despite likely under-ascertainment through the APSU, national surveillance of cCMV remains important in the absence of screening programs and prior to the introduction of therapeutic agents currently being developed.
- In response to an article published in the *Medical Journal of Australia*, an ABC news report, 'Doctors urge screenings to prevent cytomegalovirus spread,' highlighted the need for routine screenings in newborns, and education for doctors.
- The roll-out of newborn hearing screening programs, use of PCR and retrospective analysis of newborn screen cards is likely to lead to the identification of additional cases.

### References:

1. Kenneson A, Cannon MJ. Review and meta-analysis of the epidemiology of congenital cytomegalovirus (CMV) infection. *Reviews in Medical Virology* 2007; 17(4): 253-276.
2. Adler SP, Finney JW, Manganello AM, Best AM. Prevention of child-to-mother transmission of cytomegalovirus by changing behaviours: a randomized controlled trial. *The Pediatric Infectious Disease Journal* 1996; 15(3): 240-246.
3. Adler SP, Finney JW, Manganello AM, Best AM. Prevention of child-to-mother transmission of cytomegalovirus among pregnant women [see comment]. *Journal of Paediatrics* 2004; 145(4): 485-491.

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### Original Articles:

1. McMullan BJ, Palasanthiran P, Jones CA, Hall B, Robertson PW, Howard J, Rawlinson WD. Congenital cytomegalovirus — time to diagnosis, management and clinical sequelae in Australia: opportunities for earlier identification. *Medical Journal of Australia* 2011, 194:625-629.

## Neonatal Herpes Simplex Virus (HSV)

C Jones, D Isaacs, P McIntyre, T Cunningham, S Garland

**Case definition:** Any child aged  $\leq 28$  days (regardless of gestation) with clinical evidence of HSV infection\* and either:

- HSV isolated from the baby *or*
- HSV detected in CSF by PCR in association with CSF pleocytosis or other evidence of HSV encephalitis *or*
- Specific HSV-IgM detected in baby's serum *or*
- Mother seroconverted or IgM positive and baby has typical clinical manifestations *or*
- HSV isolated from mother around delivery and baby has typical clinical manifestations.

\*Clinical manifestations may be localised (herpetic lesions of the skin, eye or mouth) or disseminated including encephalitis, pneumonitis, or hepatitis (manifest by coagulopathy, jaundice, hepatosplenomegaly).

**Background:** For the complete study protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** This study has identified important trends and significant knowledge gaps in the epidemiology, management and outcome of HSV infection in the newborn period. This new knowledge will better inform clinical practice guidelines, and provide indirect evidence of efficacy of treatment, management and diagnostic changes. However, confirmation of these trends requires follow up, and the surveillance study was not adequately designed to characterise morbidity in survivors or to document the frequency or management of early viral recurrences. There is also a paucity of data about both the initial presentation of and recurrences of HSV in early infancy but beyond the neonatal period. This has led to poorly informed management guidelines with inadequate data to inform risks of dissemination and sequelae. In view of this, we propose to commence a new APSU study of HSV infection in neonates and infants to better define the incidence of HSV infection from birth to 12 months of age in Australia and to document management of initial and recurrent infections and outcomes.

*For case classification details and reported rates please see Tables 3 and 4, pages 16–18.*

**Study Highlights and Impacts:** 2010 marks 14 years of active surveillance of HSV through the APSU. Although the incidence and mode of presentation of neonatal HSV infection has remained relatively similar over this period, there is a trend for improved survival of infants. One possible explanation for this is that international guidelines recommend larger doses of antiviral agents (parenteral acyclovir) for longer durations. Evaluation of the efficacy of this intervention in a randomised clinical trial remains problematic due to the rarity of the condition. Our national study has documented the uptake of this changed management since 2003 and an associated improvement in short term survival, although a causal relationship between the two findings cannot be proven. The method of diagnosis of neonatal HSV has also changed over the 14 year period, with a move to use of highly sensitive molecular techniques over virus isolation potentially resulting in earlier diagnosis and treatment.

Ongoing surveillance is needed to determine whether new diagnostic methods translate into earlier detection and thus earlier institution of antiviral therapy after infection, which may be an explanation for enhanced survival in recent years. The APSU study also highlights important epidemiological changes in the condition. In the past, HSV-2 was the main cause of genital herpes. However, in recent years there has been an increase in genital herpes in Australia caused by HSV-1. We have observed that HSV-1 is now the major serotype that causes neonatal HSV disease in Australia. Importantly, adolescent mothers (i.e. less than or equal to 20 years of age) are more likely to transmit genital HSV-1 infection to their newborns than older mothers. Differences in the mortality and morbidity between the two HSV serotypes have been reported. We therefore need ongoing surveillance to determine the causes and consequences of this epidemiological change.

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### Original Articles:

1. Jones CA, Walker K, Badawi N. Antiviral agents for treatment of herpes simplex virus infection in neonates. *Cochrane Database of Systematic Reviews*. 2009 Jul 8;(3): CD004206

### Abstracts:

1. Jones CA. Diagnosis and treatment of neurological disease from herpes viruses in neonates and children. Abstracts of Viruses in May, Katoomba, May 2009. Abstract 16, page A16.
2. Jones CA. Herpes simplex virus infections in pregnancy. Australasian Society for Infectious Diseases Annual Scientific Meeting, Cypress Lakes, 2009, page 56.
3. Jones CA. Diagnosis and treatment of neurological disease from herpes viruses in neonates and children. Australian Society of Microbiology, ASM. Sydney 2010. Abstract no. SY01.2, page 25.

# HIV Infection, AIDS and Perinatal Exposure to HIV

A McDonald, L Mackey, J Kaldor, J Ziegler, E Elliott, D Wilson

**Case definition:** Any child under 16 years of age who is found to be HIV antibody positive or have positive virus culture, polymerase chain reaction (PCR) or antigen. It is important that these reports include children born with maternal antibodies even if they are subsequently found not to have HIV infection.

Please report any neonate or child who meets the case definition who you have seen in the last month and have not previously reported to the APSU. This includes both old and new patients, even if they have been reported to the national HIV registry or the national AIDS register.

**Background:** For complete study protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** During 2009 and 2010, there were 123 notifications of perinatal exposure to HIV and 120 (98%) questionnaires were returned. In both years 52 infants reported through the APSU met the criteria for perinatal exposure to HIV. A completed questionnaire was received for almost all cases in both 2009 (98%) and 2010 (97%). HIV infection was diagnosed in eight of 52 (15%) perinatal exposed children in 2009 and in five of 52 (10%) perinatally exposed children reported in 2010. For two cases of paediatric HIV infection reported in 2010, HIV exposure was attributed to medical care in countries other than high HIV prevalence countries.

The mother's HIV infection was diagnosed prior to or on the date of the child's birth in 41 of 52 (79%) perinatally exposed children reported in 2009 and in 46 of 52 (88%) perinatally exposed children reported in 2010. Antiretroviral treatment during pregnancy was reported by 35 mothers in 2009 and by 45 mothers in 2010; information on antiretroviral use was not reported for six mothers in 2009 and one mother in 2010. Avoidance of breastfeeding was reported by 31 mothers in 2009 and 43 in 2010, and mode of infant feeding was not reported for 15 mothers in 2009 and two mothers in 2010.

Among children born to mothers whose HIV infection was diagnosed antenatally, no cases of mother-to-child transmission occurred among 41 exposed children in 2009, and one (2%) case was reported among 46 exposed children in 2010. Four cases of mother-to-child transmission among eight children born to mothers whose HIV infection was diagnosed postnatally were reported in 2009. In 2010, no cases of perinatal exposure among children born to mothers whose HIV infection was diagnosed postnatally were reported. Four (67%) and two (33%) cases of mother-to-child transmission among six children seen in 2009 and 2010, respectively, were born to mothers whose date of HIV diagnosis was not reported.

*For case classification details and reported rates please see Tables 3 and 4, pages 16–18.*

**Study Highlights and Impacts:** HIV infection among children remains a rare occurrence in Australia. The increasing number of reports of perinatal exposure to HIV may be partly attributed to the availability of interventions for minimising the risk of mother-to-child transmission. Complete documentation of the use of interventions is required to provide evidence of their effectiveness in the Australian population.

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### Surveillance Reports:

1. National Centre in HIV Epidemiology and Clinical Research. *HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2009*. National Centre in HIV Epidemiology and Clinical Research, UNSW, Sydney NSW 2009.
2. National Centre in HIV Epidemiology and Clinical Research. *HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2010*. National Centre in HIV Epidemiology and Clinical Research, UNSW, Sydney NSW 2010.

## Severe Complications of Influenza

Y Zurynski, David Lester-Smith, R Booy, M Festa, A Kesson, E Elliott

**Case definition:** Any child aged <15 years with laboratory confirmed influenza *AND* admitted to hospital *AND* with any of the following complications:

- Pneumonia (X-ray confirmed)
- Requirement for Ventilation
- Encephalitis / encephalopathy with or without seizures
- Myocarditis; Pericarditis; Cardiomyopathy
- Rhabdomyolysis
- Purpura fulminans
- Disseminated coagulopathy
- Transverse myelitis
- Polyneuritis
- Guillain-Barré
- Shock (requiring >40 ml/kg fluid resuscitation)
- Acute renal failure
- Reye's Syndrome
- Laboratory proven secondary bacterial infection; Bacteraemia; Septicaemia; Bacterial pneumonia
- Death
- *Exclusion:* Simple febrile seizures

**Background:** For complete protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** Surveillance was conducted from June to September in 2009 in response to the H1N1 2009 influenza pandemic. There were 100 confirmed cases: 39 (NSW), 34 (QLD), 9 (VIC), 8 (WA), 5 (SA), 4 (NT) and 1 (TAS). Admissions peaked in the second week of July and earlier than the expected peak for seasonal influenza in most years. The median length of stay was 4 days (range 1-53 days). All children had influenza A: 77 H1N1 2009; six type A but not H1N1; two H3N2 and 15 had an unknown subtype. The median age was 2.8 years (range 0-14.5) and 53% were male. Forty-five per cent of children had an underlying chronic condition. Of these, 39 children were > six months old and therefore recommended for seasonal influenza vaccination under the National Immunisation Program (NIP). Only two of the 39 had been vaccinated. Sixty-five children received Oseltamivir (Tamiflu). Pneumonia (69%) was the most common complication reported. Thirteen children had encephalopathy, nine with associated seizures and two with ongoing neurological problems at discharge. Eleven had a laboratory proven co-infection, five had rhabdomyolysis and five had hypovolaemic shock. Thirty-eight children (median age 5 years; range 0-13) were admitted to PICU with a median length of stay of 6.5 days (range 2-51) and 28 required ventilatory support. Eighteen of the 38 (47%) children had an underlying chronic illness.

Six (6%) children died (age 6.3-12.9 years), and all had influenza A H1N1 2009. Of these, two had an underlying chronic illness, four were admitted to PICU and two required ventilation. None of the deceased had been vaccinated for seasonal influenza. One previously healthy child was discharged home, developed serious pneumonia and died at home two days after discharge.

In 2010, from June to September there were only 25 confirmed cases: 12 (QLD), five (NSW), four (VIC), three (WA) and one (NT). Admissions peaked in the fourth week of August and the median length of stay was seven days (range 1-37 days). Twenty-three children had influenza A: 17 H1N1 2009, one type A but not H1N1, and five were not further subtyped. Two children had influenza B. The median age was 1.7 years (range 0-14.5) and 48% were male. Six (24%) children had an underlying chronic condition. Of those children eligible for vaccination according to the NIP, none had been vaccinated. Only 10 (40%) children received Oseltamivir. Pneumonia (56%) was the most commonly reported complication and six children had laboratory proven co-infection. Five children had encephalopathy, two with associated seizures, three had hypovolaemic shock and three had pericarditis/myocarditis. Eleven (44%) children (median age 5 years; range 0-13) were admitted to PICU with a median length of stay of 15 days (range 3-37) and eight required ventilatory support. Three of the 11 children had an underlying chronic illness. Two (8%) children died. One of these children was an infant with severe congenital heart and lung disease and influenza was unlikely to have been the main cause of death.

*For case classification details and reported rates please see Tables 3 and 4, pages 16–18.*

### Study highlights and Impacts:

- Pandemic influenza H1N1 2009 led to many more admissions when compared with the previous and subsequent year.
- Severe complications, in particular pneumonia and encephalitis were more common in 2009, leading to lengthy hospital stays, more PICU admissions and ongoing problems on discharge.
- There were six deaths in 2009 during the pandemic, but only two deaths were reported in 2010, however, the proportions were similar in both years.
- Few children with underlying chronic conditions and eligible for vaccination according to the NIP were vaccinated for seasonal influenza, suggesting the need for education and awareness raising among clinicians and parents.
- Despite the number of confirmed cases decreasing in 2010, children experienced serious complications including pneumonia and encephalitis.

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## Surveillance Study Reports

### Original Articles:

1. Lester-Smith D, Zurynski Y, Booy R, Festa MS, Kesson A, Elliott EJ. The burden of childhood influenza in a tertiary paediatric setting. *Communicable Diseases Intelligence* 2009; 33(2): 208-214.
2. Zurynski Y, Davey E, Elliott EJ. Australian Paediatric Surveillance Unit Annual Report, 2008 and 2009. *Communicable Diseases Intelligence* 2010; 34: 285-289.

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1. Lester-Smith D, Zurynski Y, Festa M, Kesson A, Booy R, Elliott E. Significant burden of childhood influenza in a tertiary paediatric setting. *Journal of Paediatrics and Child Health* 2008; 44(9): A12.
2. Lester-Smith D, Zurynski Y, Festa M, Kesson A, Booy R, Elliott E. Seasonal surveillance for serious complications of influenza in children using the Australian Paediatric Surveillance Unit. *Journal of Paediatrics and Child Health* 2009; 45(11): A4.
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3. Elliott EJ. Novel paediatric surveillance of first wave pandemic influenza A (2009) informs planning for second wave. International Paediatric Association 26th Congress. Johannesburg, August 2010.
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## Acute Intussusception (IS) – Final Report

M Danchin, J Buttery, C Lloyd-Johnsen, D Strong, E Elliott, R Booy, P Richmond, V Krause, S Beggs, M Nissen, M Gold, J Bines, H Cook

**Case Definition:** Any case of newly diagnosed acute intussusception in any child aged  $\leq 24$  months where intussusception is confirmed on air/liquid contrast enema, ultrasound or surgery. If diagnosis is by ultrasound, this should include the demonstration of an intra-abdominal mass by abdominal ultrasound with specific characteristic features (target sign or doughnut sign on transverse section and a pseudo-kidney or sandwich sign on longitudinal section) that are proven to be reduced by hydrostatic enema on post-reduction ultrasound.

**Background:** For complete protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** From May 2007 to May 2010, there were 303 notifications of intussusception and the questionnaire return rate was 81%. There were 163 children confirmed with IS, of which the majority were male (65%). Five (4%) children were identified as indigenous. The mean age at episode was 8.9 months (range: 2.2-24.0). The diagnosis of IS was mostly confirmed by ultrasound (68.5%), the rest by either enema or X-ray or a combination of these examinations. Four cases were diagnosed after surgery. In 40 cases (25%), lead points were identified and overall, no deaths occurred. Fifty-four stool samples were collected; however, results were only available for 42 of these samples. Only one sample was positive for rotavirus and 8 (19%) were positive for adenovirus. Of those that reported on immunisation (129), 84% reported that the child's immunisation schedule was up to date. Out of 80 cases with complete immunisation data, 47 (44%) children had received a rotavirus vaccine; 14 received the vaccine within 14 days prior to the diagnosis of IS and for seven of these children, it was after the first dose of vaccine (usually three doses given). These children were significantly younger (median age 3.8 months) than those who did not receive a rotavirus vaccine before developing IS (median age 8.9 months).

In 59 (36%) children the IS was resolved using surgical intervention. This is slightly higher than previously reported in an Australian study<sup>1</sup> however lower than other overseas experiences<sup>2</sup>. Among the 14 cases that had received a rotavirus vaccination, six (43%) required surgery and three (21%) required resection. This is comparable to the US Vaccine Adverse Event Reporting System (VAERS) data obtained following RotaTeq vaccination, of which 47% required surgery and 23% required intestinal resection<sup>3</sup>. Although the numbers are small, these vaccine-related cases are occurring in younger infants and the risks associated with surgery are greater.

The number of cases reported to the APSU is likely to be an underestimate. This was recognised at the outset of this study and a separate hospital based surveillance system, the Paediatric Active Enhanced Disease Surveillance (PAEDS) system developed by the APSU and the National Centre for Immunisation Research and Surveillance (NCIRS) was used to identify additional cases (for details on PAEDS please see page 48 in this report). The data from APSU when combined with data from PAEDS showed some evidence of an elevated risk in IS following the first dose of rotavirus vaccines, Rotateq® and Rotarix®. In infants one to < three months of age, there was a 4-5 fold increased risk of intussusception 1-7 days following vaccination, and a 2-3 fold increased risk of intussusception 1-21 days following vaccination. Combining exposure windows associated with all doses of rotavirus vaccine in children aged one to nine months, there was no evidence of an overall increased risk of intussusception following vaccination for either vaccine<sup>4</sup>. Further limitations include the inability to check vaccination status through the Australian Childhood Immunisation Register (ACIR) as the APSU reports were de-identified and it is possible that paediatricians were more likely to report cases if the child had received a rotavirus vaccine.

For case classification details and reported rates please see Tables 3 and 4, pages 16–18.

### Study Highlights and Impacts:

- The increased risk of IS in relation to rotavirus vaccination is evident in infants <3 months of age that have been shown to develop IS within 1-7 days following one dose of rotavirus vaccination. This risk disappears as age increases in affected children that have received up to three doses of the vaccine.
- The level of intervention required to resolve IS was similar to that observed in the VAERS data and no deaths occurred as a result of IS.

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# Surveillance Study Reports

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1. BATTERY J\*, DANCHIN M\*, LEE K, CARLIN J, MCINTYRE P, ELLIOTT E, BOOY R, BINES J. For the APSU and PAEDS study group. Intussusception following rotavirus vaccine administration: Post-marketing surveillance in the National Immunization Program in Australia. *Vaccine* 2011; 29(16): 3061-6. \*co-first authors.

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1. LLOYD-JOHNSEN C, BINES J, ZURYNSKI Y, ELLIOTT E, BOOY R, RICHMOND P, KRAUSE V, BEGGS S, NISSEN M, GOLD M, DANCHIN M. Preliminary national data on acute Intussusception in Children aged  $\leq 24$  months from the Australian Paediatric Surveillance Unit (APSU). *Journal of Paediatrics and Child Health* 2008; 44(9): A7.

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1. DANCHIN M, LLOYD-JOHNSEN C, BUTTERY J, ZURYNSKI Y, ELLIOTT E, BOOY R, RICHMOND P, KRAUSE V, BEGGS S, NISSEN M, GOLD M, BINES J. Preliminary national data on acute Intussusception in Children  $\leq 24$  months from the Australian Paediatric Surveillance Unit (APSU). Presentation at the 11<sup>th</sup> National Immunisation/3<sup>rd</sup> PHAA Asia/Pacific Vaccine Preventable Diseases Conference; 2008: Gold Coast, Queensland.
2. LLOYD-JOHNSEN C, ZURYNSKI Y, ELLIOTT E, RICHMOND P, KRAUSE V, COOK H, BEGGS S, NISSEN M, GOLD M, BUTTERY J, BINES J, DANCHIN M (2008) Preliminary national data on acute Intussusception in Children aged  $\leq 24$  months from the Australian Paediatric Surveillance Unit (APSU) oral presentation given at the RACP Congress in Adelaide, 13th May 2008.
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4. BUTTERY J, DANCHIN M, LEE K, CARLIN Jc, MCINTYRE P, ELLIOTT E, RICHMOND P, WOOD N, ROYLE J, BOOY R, ZURYNSKI Y, GOLD M, MCKAY N, LLOYD-JOHNSEN C, STRONG D, BINES J, for the PAEDS and APSU Study Group. Intussusception following rotavirus vaccine administration: Post-marketing surveillance of Rotateq and Rotarix in the national immunization program in Australia. European Society of Pediatric Infectious Diseases Annual Scientific Conference, Nice 2010.
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## Neuromuscular disorders of childhood (NMD) – Final Report

M Ryan, A Kornberg, P Lamont, K North, P Rowe, K Sinclair

**Case definition:** Any child aged 15 years or less, seen in the previous month with a newly diagnosed, inherited or chronic auto-immune neuromuscular disorder (see table on APSU website: [www.apsu.org.au](http://www.apsu.org.au)).

Inherited neuromuscular disorder refers to any genetic disorder of the lower motor neuron i.e. disorders of anterior horn cell, motor and/or sensory peripheral nerve, neuromuscular junction or muscle.

Chronic auto-immune neuromuscular disorders are acquired immune-mediated disorders of peripheral nerve, neuromuscular junction or muscle, causing permanent or persistent (>3 months duration) symptoms. These disorders include chronic inflammatory demyelinating polyneuropathy (CIDP), myasthenia gravis and dermatomyositis.

**Background:** For complete protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** During the period 2007-2009, a total of 386 notifications were received with a total of 198 confirmed cases of paediatric neuromuscular disorders. These included 80 infants diagnosed at less than two years of age, 66 children diagnosed at 2-5 years, and 48 children at ages 6-15 years (4 were age-unspecified). Fifty-nine (30%) cases had a positive family history. Eighty-three (42%) presented with a classic 'floppy infant' presentation, while 110 (56%) were referred for delayed motor development. Antenatal diagnosis was made in only two cases. Targeted genetic testing was diagnostic in 132 (67%) children. Neurophysiological study was undertaken on 52 children (26%), and 53 (27%) required muscle biopsies for establishment of a specific diagnosis.

Neuromuscular disorders are a relatively common cause of chronic severe illness in childhood. In the Australasian population, spinal muscular atrophy (SMA) (40, 20%) and the muscular dystrophies (71, 36%) are the most common NMDs. Inherited neuropathies are more common than is often recognised - particularly Charcot Marie-Tooth (CMT) type 1A (25, 13%).

Epidemiological studies such as this are the first step towards natural history and other research studies, and facilitate inclusion of Australasian subjects in multicentre international clinical trials.

*For case classification details and reported rates please see Tables 3 and 4, pages 16–18.*

### Study Highlights and Impacts:

- The most common forms of neuromuscular disease in childhood are muscular dystrophy, followed by SMA, congenital myopathies and inherited neuropathies.
- Surprisingly, myotubular myopathy appears to be the most common congenital myopathy in the Australasian population.
- Increasing focus on epidemiological studies of common and severe diseases such as Duchenne muscular dystrophy (DMD) has led to establishment of a working group which has successfully worked toward establishment of Australasian registries for DMD and SMA, and is now working to establishment of a registry for myotonic dystrophy.

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### Presentations:

1. Ryan MM. An update on management of paediatric neuromuscular disorders. Murdoch Children's Research Institute, Melbourne Australia 2011.
2. Ryan MM. An update on management of paediatric neuromuscular disorders. St Vincent's Hospital Neurology Grand Rounds, Melbourne Australia 2011.
3. Ryan MM. Clinical trials for paediatric neuromuscular disorders in the Australian context. Awakening Australia to Rare Diseases, Perth Australia 2011.
4. Ryan MM. Clinical trials- an update. Australian Neuromuscular Network, Perth Australia 2011.
5. Ryan MM. An update on management of paediatric neuromuscular disorders. Royal Children's Hospital Grand Rounds, Melbourne Australia 2011.
6. Ryan MM. All about spinal muscular atrophy: genetics, diagnosis, clinical profiles Therapies for spinal muscular atrophy and inherited neuropathies. What to expect: clinical consequences of Charcot-Marie-Tooth disease. Parent Project Australia 'Towards a Brighter Future', Sydney 2009.

## Rett Syndrome

H Leonard, J Downs, J Christodoulou, C Ellaway, H Woodhead, G Baikie, M Davis

**Case definition:** A child <16 years age with newly diagnosed or possible Rett syndrome according to the clinical criteria tabled below or by genetic testing.

- Apparently normal prenatal and perinatal history
- Psychomotor development largely normal through the first 6 months or may be delayed from birth
- Normal head circumference at birth
- Postnatal deceleration of head growth in the majority
- Loss of achieved purposeful hand skill between ages 1/2 – 2 1/2 years
- Stereotypic hand movements such as hand wringing/squeezing, clapping/tapping, mouthing and washing/rubbing automatisms
- Emerging social withdrawal, communication dysfunction, loss of learned words, and cognitive impairment
- Impaired (dyspraxic) or falling locomotion

**Background:** For complete protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** The contribution of new cases of Rett syndrome via the APSU to the population-based and longitudinal Australian Rett Syndrome Database has been critical to our recent research on diagnosis, survival, function, co-morbidities and genetics. Since the discovery of the association between MECP2 mutation and Rett syndrome in 1999, the median age of diagnosis in Australia has decreased from 4.5 years to 3.5 years. However, a proportion of cases, particularly those with a p.R133C or p.R294X mutation, are still being diagnosed later, suggesting that less typical presentations are more difficult to diagnose. We also compared survival of the original cohort of patients diagnosed by Dr Andreas Rett with those in the Australian Rett syndrome database. Dr Rett's Austrian patients lived to an average of 13.5 years - only three of the original cohort of 22 are still alive. Nearly 80% of children in our Australian study were still alive at 20 years of age, likely attributable to improved medical care over time.

Data from repeated video recordings in children diagnosed with Rett syndrome suggests that gross motor skills were more likely to be stable over time in females who maintained the ability to walk, and hand function was more likely maintained in the presence of the ability to walk.

Using a cohort study design, we found that children who had surgery for their scoliosis maintained functional skills post-operatively. On average, bone density was lower in females with Rett syndrome than in the general population, especially in those who were less mobile, with epilepsy, or in the presence of the p.R168X or p.T158M mutation. Use of sodium valproate for epilepsy was found to be associated with greater risk of fracture compared with other anti-epileptic medications. We advocate the need for active preventive strategies to optimise bone health, especially if sodium valproate is prescribed. Clinical management guidelines for scoliosis have been developed and highlight the need for comprehensive management over the course of childhood<sup>1</sup>. Finally, by combining data in the Australian cohort with Israeli subjects, we have been able to show that the common brain-derived neurotrophic factor (BDNF) polymorphism appears to be another genetic modifier of Rett syndrome severity.

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*For case classification details and reported rates please see Tables 3 and 4, pages 16-18.*

### Study Highlights and Impacts:

This study enables:

- Continuing enrolment of new cases of Rett syndrome into the Australian Rett Syndrome Database.
- The Guidelines for Management of Scoliosis in Rett Syndrome will assist clinicians and families working with children with Rett Syndrome.
- Analytical investigations using data relating to different aspects of the study continue to be undertaken and during 2009/10, 18 articles relating to the study were either published or accepted for publication.
- An article in The West Australian Newspaper on 28 April 2009, 'Mother puts hope in gene therapy for Mikayla', was in response to one article published after collaborative research was done between Australia and Israel, investigating the effect of a modifier of severity of Rett syndrome other than MECP2 mutation.

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### International

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## Surveillance Study Reports

2. Corona J, Miller DJ, Downs J, Akbarnia B, Blakemore LC, Betz RR, Campbell RM, Flynn JM, Johnston CE, McCarthy RE, Roye DP Jr, Skaggs DL, Smith JT, Snyder BD, Sponseller PD, Sturm PF, Thompson GH, Yazici M, Vitale MG. Finding the tipping point: When should surgery be performed in children with early onset idiopathic scoliosis? 4th International Congress on Early Onset Scoliosis and the Growing Spine, November 19-20, 2009. Toronto.
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4. Downs J, Bebbington A, Kaufmann WE, Leonard H. Longitudinal hand function in Rett syndrome, 2nd European Conference on Rett Syndrome, October 7-10, 2010, Edinburgh.
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27. Jenny Downs Clinical guidelines for scoliosis and related projects; 3rd RettSearch Consortium Meeting; 2009 Chicago; United States
28. Jenny Downs Measurement of functional abilities in Rett syndrome – using video to document skills; 3rd RettSearch Consortium Meeting; 2009 Chicago; United States.

### National

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2. Bourke J, Leonard H, Bower C. IDEA database: Trends in prevalence of intellectual disability in WA, 45th Annual Board Conference Australasian Society for Intellectual Disability, 29 September- 1 October 2010, Brisbane.
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### Congenital Rubella

C Jones, P McIntyre

**Case Definition:** Any child or adolescent <16 years of age who in the opinion of the notifying paediatrician has definite or suspected congenital rubella, with or without defects, based on history, clinical and laboratory findings.

**Background:** For the complete protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** Childhood vaccination for rubella and maternal antenatal screening has made congenital rubella a rare occurrence in Australia. In 2010, the APSU was notified of an infant with laboratory confirmed congenital rubella born in late 2007 and also identified by the Victorian Department of Health. Similar to the other confirmed cases since 2004, the infant's mother was born overseas, and had not been vaccinated against rubella. The infant presented at seven weeks of age with bilateral cataracts, and was subsequently found to have a cardiac defect and bilateral sensorineural hearing loss.

*For case classification details and reported rates please see Tables 3 and 4, pages 16-18.*

**Study Highlights and Impacts:**

- The one notification received in 2010 highlights the need for immigrant women from countries with poorly developed vaccination programs to be serologically tested for rubella after arrival in Australia and vaccinated if appropriate.
- Continued vigilance for this rare congenital infection is essential given the seriousness of congenital rubella syndrome which is characterised by deafness, cataracts, growth retardation, mental handicap and cardiac abnormalities.

**Correspondence to:** A/Prof Cheryl Jones, Head, Centre for Perinatal Infection Research Unit, The Children's Hospital at Westmead, Locked Bag 4001, Westmead NSW 2145 Email: [cheryl.jones@health.nsw.gov.au](mailto:cheryl.jones@health.nsw.gov.au) Ph: 02 9845 3382 Fax: 02 9845 3389.

### Congenital Varicella

G Khandaker, H Marshall, E Peadon, Y Zurynski, D Burgner, J Buttery, M Gold, M Nissen, E Elliott, M Gold, R Booy

**Case definition:** Any stillbirth, newborn infant, or child <2 years who, in the opinion of the notifying paediatrician has definite or suspected congenital varicella syndrome, with or without defects and meets at least one of the following criteria:

- Cicatricial skin lesions in a dermatomal distribution and/or pox-like skin scars and/or limb hypoplasia
- Development of herpes zoster in the first year of life
- Spontaneous abortion, termination, stillbirth or early death following varicella infection during pregnancy

**Background:** For the complete protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** During 2009-2010 there were three notifications of congenital varicella; one was an error and two had been notified previously (one child in 2006 and the other in 2007). These two cases followed antenatal maternal infection at 12 and 20 weeks respectively. The incidence of congenital varicella 2006-2010 was 0.15/100,000 live births per annum compared to 0.8/100,000 live births per annum (six cases) in 1995-1997, which is a non-significant reduction.

*For case classification details and reported rates please see Tables 3 and 4, pages 16-18.*

**Study Highlights and Impacts:** There have been no cases of congenital varicella reported in 2008-2010, supporting the effectiveness of the vaccination program in preventing severe outcomes due to varicella infection in pregnancy.

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**Original Articles:**

1. Khandaker G, Marshall H, Peadon E, Zurynski Y, Burgner D, Buttery J, Gold M, Nissen M, Elliott EJ, Burgess M, Booy R. Congenital and neonatal varicella: impact of the national varicella vaccination programme in Australia. *Archives of Disease in Childhood* 2011; 96(5): 453-6.

**Presentations:**

1. Khandaker G, Marshall H, Peadon E, Zurynski Y, Burgner D, Buttery J, Gold M, Nissen M, Elliott EJ, Burgess M, Booy R. Congenital and neonatal varicella: impact of the national varicella vaccination programme in Australia. Public Health Association Australia (PHAA) 12th National Immunisation Conference - 17th - 18th August 2010, Adelaide, South Australia.
2. Khandaker G, Marshall H, Peadon E, Zurynski Y, Burgner D, Buttery J, Gold M, Nissen M, Elliott EJ, Burgess M, Booy R. Congenital and neonatal varicella: impact of the national varicella vaccination programme in Australia. Public Health Association of Australia (PHAA), the Communicable Diseases Network Australia (CDNA) Communicable Disease Control Conference, 4th-6th April 2011, Canberra, Australia.
3. Khandaker G, Marshall H, Peadon E, Zurynski Y, Burgner D, Buttery J, Gold M, Nissen M, Elliott EJ, Burgess M, Booy R. Congenital and neonatal varicella: impact of the national varicella vaccination programme in Australia. The 29th Annual Meeting of the European Society for Paediatrics Infectious Diseases (ESPID), 7-11 June 2011, Hague, Netherlands.

## Neonatal Varicella

G Khandaker, H Marshall, E Peadon, Y Zurynski, D Burgner, J Buttery, M Gold, M Nissen, E Elliott, M Gold, R Booy

**Case definition:** Any infant who, in the opinion of the notifying paediatrician, has neonatal varicella based on history, clinical and/or laboratory findings in the first month of life without features of congenital varicella syndrome.

Features of neonatal varicella infection include pox-like rash which may be papulovesicular, vesiculopustular or haemorrhagic, and fever. Other systemic symptoms may be present. Complications of neonatal varicella include bacterial superinfection, neurological and haematological problems and general visceral involvement.

The diagnosis of neonatal varicella can be made when an infant in the first month of life presents with clinical features of varicella infection. There may be a history of maternal varicella infection in the last 1–4 weeks of pregnancy or contact with a varicella infected person after birth.

The diagnosis can be confirmed by laboratory tests to detect:

- viral antigen/viral isolate from scrapings of the skin lesions or viral DNA from lesion fluid
- varicella specific IgM in a serum sample from the infant (or from the contact)

**Background:** For the complete protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** From May 2006 to December 2010, there have been 18 confirmed cases of neonatal varicella with an estimated incidence of 1.31/100,000 live births per annum. The incidence was significantly lower ( $p=0.000001$ ) during this study period (2006-2010) compared to an incidence of 5.8/100,000 live births per annum reported in 1995-1997 (previous APSU surveillance on neonatal varicella). Furthermore, looking at the incidence for the most recent years (2008 - 2010) the incidence rate was only 0.5/100,000 live births per annum, a reduction of more than 90% compared to both pre-vaccination surveillance (1995-1997) and the first year of the vaccination program (2006).

*For case classification details and reported rates please see Tables 3 and 4, pages 16-18.*

**Study Highlights and Impacts:** Our study shows that there has been a significant reduction in the incidence of neonatal varicella in Australia following the introduction of the varicella vaccine to the National Immunisation Program in 2005. Countries considering the routine use of varicella vaccine need to consider both direct and indirect effects (including clinical and economic benefits beyond the neonatal period) of universal varicella vaccination.

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### Original Articles:

1. Khandaker G, Marshall H, Peadon E, Zurynski Y, Burgner D, Buttery J, Gold M, Nissen M, Elliott EJ, Burgess M, Booy R. Congenital and neonatal varicella: impact of the national varicella vaccination programme in Australia. *Archives of Disease in Childhood*. 2011; 96(5): 453-6.

### Presentations:

1. Khandaker G, Marshall H, Peadon E, Zurynski Y, Burgner D, Buttery J, Gold M, Nissen M, Elliott EJ, Burgess M, Booy R. Congenital and neonatal varicella: impact of the national varicella vaccination programme in Australia. Public Health Association Australia (PHAA) 12th National Immunisation Conference - 17th - 18th August 2010, Adelaide, South Australia
2. Khandaker G, Marshall H, Peadon E, Zurynski Y, Burgner D, Buttery J, Gold M, Nissen M, Elliott EJ, Burgess M, Booy R. Congenital and neonatal varicella: impact of the national varicella vaccination programme in Australia. Public Health Association of Australia (PHAA), the Communicable Diseases Network Australia (CDNA) Communicable Disease Control Conference, 4th-6th April 2011, Canberra, Australia.
3. Khandaker G, Marshall H, Peadon E, Zurynski Y, Burgner D, Buttery J, Gold M, Nissen M, Elliott EJ, Burgess M, Booy R. Congenital and neonatal varicella: impact of the national varicella vaccination programme in Australia. The 29th Annual Meeting of the European Society for Paediatrics Infectious Diseases (ESPID), 7-11 June 2011, Hague, Netherlands.



### Severe Complications of Varicella Infection

G Khandaker, H Marshall, E Peadon, Y Zurynski, D Burgner, J Buttery, M Gold, M Nissen, E Elliott, M Gold, R Booy

**Case definition:** Any child aged 1 month or more, and less than 15 years, hospitalised with varicella *AND* one or more of the following complications:

- Bacteraemia / septic shock
- Toxic shock syndrome/ toxin mediated disease
- Septic arthritis or other focal purulent collection
- Necrotising fasciitis
- Encephalitis
- Purpura fulminans/disseminated coagulopathy
- X-Ray evidence of pneumonia
- Fulminant varicella (multi-organ involvement)
- Reye's syndrome
- Ataxia

**Virological testing:** In order to confirm varicella we recommend collection of a sample of vesicle fluid. Please Collect the sample and send to your local laboratory for culture or PCR or IF as per usual practice. The investigators will liaise with your virology laboratory regarding transporting the samples for genotyping.

**Background:** For the complete protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** During the study period (2009-2010) there were 28 reports of severe complications of varicella, and we have received 26 (92.8%) completed questionnaires. Among these were 20 confirmed cases, 4 duplicates and 2 errors. The following severe complications of varicella infection were reported during the study period: focal purulent collection (8; 40%), ataxia (5; 25%), toxic shock/toxin mediated disease (5; 25%), bacteraemia/septic shock (4; 20%), X-Ray evidence of pneumonia (2; 10%), hepatitis (2; 10%), disseminated coagulopathy (2; 10%), encephalitis (1; 10%) and other (6; 30%).

Of the confirmed cases, 85% were born in Australia. NSW and QLD had the most cases (30% each), followed by Victoria (20%) and Western Australia (10%); whilst Tasmania and South Australia had 5% each. The median age at diagnosis was 6 years (range 1 to 12 years) and 55% were female. Four infants (20%) had underlying medical conditions and none had had a previous varicella infection. Seventeen (85%) were not vaccinated against varicella. The median length of stay (LOS) in hospital was 5 days (range 2 to 40 days). Six children (30%) were admitted to ICU (median LOS 4 days). Two children died. One was a one year old boy who had bacteraemia and sepsis secondary to varicella infection (Genotype A, Africa/Asian strain) was admitted to ICU and treated with Acyclovir, but died after 5 days. The second child was a 12 year old boy who developed encephalitis and died of an intra-cerebral haemorrhage. A limited autopsy showed varicella in the CSF.

*For case classification details and reported rates please see Tables 3 and 4, pages 16-18.*

#### Study Highlights and Impacts:

- Despite the inclusion of varicella vaccination on the National Immunisation Program cases of severe complications of varicella continue to be reported, predominately among non-immunised children. This highlights the importance of universal vaccination.

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**Correspondence to:** Professor Robert Booy, Director, NCIRS, The Children's Hospital at Westmead, Locked Bag 4001, Westmead NSW 2145. Email: [robert.booy@health.nsw.gov.au](mailto:robert.booy@health.nsw.gov.au) Ph: 02 9845 1415.

#### Abstracts:

1. Khandaker G, Marshall H, Peadon E, Zurynski Y, Burgner D, Buttery J, Gold M, Nissen M, Elliott EJ, Booy R. Severe complications of varicella in Australia following the introduction of National Varicella Vaccination Program. Public Health Association Australia (PHAA) 12th National Immunisation Conference Proceedings - 17th - 18th August 2010, Adelaide, South Australia.



## Vitamin K Deficiency Bleeding (VKDB)

B Jalaludin, K Chant, P Loughnan, L Taylor, E Elliott

**Case definition:** Any infant <6 months of age with spontaneous bruising/bleeding or intracranial haemorrhage associated with prolonged clotting time, not due to an inherited coagulopathy or disseminated intravascular coagulation.

**Background:** For complete protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** Since 1993, 148 notifications of Vitamin K Deficiency Bleeding (VKDB) have been received and the questionnaire return rate was 98%. There were 34 infants confirmed with definite VKDB and eight with probable VKDB. In 2009, there was one probable case in VIC and in 2010 there were two definite cases, one in VIC and one in WA. The infant confirmed in 2009 had early onset/classical VKDB and had received the recommended 1mg vitamin K IM at birth. This child had mild gastrointestinal bleeding which was resolved after a second dose of Vitamin K on day three of life, and there was no ongoing morbidity. The two infants confirmed in 2010 had late onset VKDB and both had received vitamin K at birth. Both were given a standard dose of Vitamin K at birth (1mg IM). One infant had biliary atresia and suffered an intracerebral haemorrhage and seizures on day three of life and received a dose of Vitamin K when bleeding noted. The second child reported in 2010 died after suffering an intracranial haemorrhage on day 100 after birth. This child received a dose of Vitamin K at birth (1mg IM) and at the time of the cerebral haemorrhage (2.5mg IV).

Of the 42 definite and probable cases, the majority were male (60%). Most (93%) infants were born at term gestation and the majority (93%) were breast fed. Eleven infants (26%) had early onset/classical VKDB and 31 (74%) had late-onset VKDB. The main sites of bleeding in early/classical cases were the gastrointestinal tract (14%), skin (7%), umbilicus (5%) and the Guthrie heel prick site (5%). In late onset cases, the most common bleeding sites were skin (38%), intracranial (24%) and gastrointestinal (21%) and umbilicus (12%). Of the 31 late-onset cases of VKDB, 15 (49%) infants had evidence of underlying liver disease and five infants died. These five infants had intracranial haemorrhage and two had underlying liver disease. Eighteen of the 31 (58%) infants with late onset VKDB received vitamin K at or near birth, however only 11 (36%) received the recommended dose or course of vitamin K prophylaxis. Only two of the five infants with late onset VKDB that died received vitamin K at birth. Eight of the 11 (73%) infants with early/classical VKDB received vitamin K at or near birth, although only two (18%) infants received the recommended dose or course of vitamin K. None of these infants had liver disease or died.

Parents of 15 (38%) infants refused consent to administer Vitamin K at birth over the whole time period; seven out of 14 cases identified since 2005. There was a higher incidence of VKDB (2.63/100,000 live births per annum) during the period when oral administration of vitamin K was recommended (Jan 1993-Mar 1994) compared to VKDB incidence of 0.66/100,000 live births per annum when intramuscular administration was recommended (April 1994 onwards).

*For case classification details and reported rates please see Tables 3 and 4, pages 16-18.*

### Study Highlights and Impacts:

- The majority of infants with VKDB had late onset disease and approximately half of them had liver disease. Compared with early/classical disease, ongoing morbidity was more frequent with late onset disease and deaths only occurred in this group
- There is still the need to educate parents during the antenatal period about the serious potential consequences of refusing vitamin K administration at birth, with 38% of parents withholding consent during the period 1993-2010 and during 2005-2010, parents refused consent in 50% the reported cases
- There is also a need for increased awareness among health professionals of clinical recommendations on vitamin K prophylaxis
- Oral prophylaxis of vitamin K increased the rate of VKDB, particularly late onset disease, however this rate was not significantly different to that observed for IM prophylaxis.

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### Systemic Lupus Erythematosus

F Mackie, G Kainer, J Munro, K Murray, AR Rosenberg, B Wainstein, J Ziegler, D Singh-Grewal, C Boros, N Adib, R Fahy

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#### Case definition:

Any child  $\leq 15$  years of age who meets any of the 3 definitions below:

1. Any child  $\leq 15$  years of age fulfilling the clinical diagnostic criteria for SLE i.e. presenting with **4 or more of the 11** following symptoms:

1. Malar rash	2. Discoid rash	3. Photosensitivity	4. Oral ulcers
5. Arthritis	6. Serositis	7. Renal disorder	8. Neurological disorder
9. Haematological disorder	10. Immunological disorder	11. Antinuclear antibody	
- OR**
2. Any child  $\leq 15$  years of age who presents with 1 or more of the above clinical features **AND** a positive antinuclear antibody  $>1:320$ .
- OR**
3. Any child  $\leq 15$  years of age who presents with a tissue diagnosis of SLE renal biopsy diagnostic of SLE or skin biopsy consistent with SLE.

**Background:** For complete protocol including rationale and objectives please see [www.apsu.org.au](http://www.apsu.org.au)

**Results:** Cases notified to the APSU from October 2009 to December 2010 were collated and questionnaires regarding presenting symptoms, laboratory investigations, initial treatment, adverse events, ethnicity and geographic location were sent to reporting physicians. In the 12 months, 27 cases were reported (with one error) and completed questionnaires were received in 23 of the 27 cases giving a response rate of 85%. Seventeen fitted the case definition for SLE  $> 4/11$  criteria. Two children fulfilled diagnostic criteria with  $>1$  clinical criteria with antinuclear antibody (ANA) titre  $>1:320$ . One child did not meet criteria but had a renal biopsy diagnostic of SLE. Median age at diagnosis was 10.3 years (2.7-14 years); and the female:male ratio was 5.5:1. NSW recorded the most cases (46%), followed by QLD (23%) and then WA, NT, SA and Victoria with one case each. The most common ethnic background was Caucasian (38%) followed by indigenous (30%) and Asian (23%). However, the incidence of SLE for indigenous children was 4.0 per 100 000  $<15$  years per annum compared to the overall incidence of 0.3 per 100 000 children  $< 15$  yrs per annum. Arthritis was the commonest presenting symptom (9/13) followed by malar or photosensitive rash. Six cases proceeded to renal biopsy with class IV nephritis the most common finding. At presentation, 77% received daily oral prednisone, 38% methylprednisolone, 25% cyclophosphamide, and 50% of patients received hydroxychloroquine. No patients received rituximab initially. The majority of newly diagnosed SLE cases were inpatients (9/13) with an average length of stay of 14 days. There were no deaths but one patient required dialysis and ICU admission. Two experienced significant drug related events: cardiomyopathy from hydroxychloroquine and a rash from ACE inhibitors.

*For case classification details and reported rates please see Tables 3 and 4, pages 16-18.*

**Study Highlights and Impacts:** Prior to this initial report there were no data on incidence of SLE in Australia. This study provides the first estimate of incidence of SLE in Australian children. Despite the rarity of SLE in Australian children the incidence of SLE in indigenous children is much greater than that of the overall population.

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#### Abstracts:

1. Mackie F, Kainer G, Rosenberg AR, Munro J, Murray K, Wainstein B, Ziegler J, Singh D, Boros C, Adib N, Fahy R, Elliott EJ. High Rates of SLE (systemic lupus erythematosus) in Indigenous Children in Australia - an interim report of the Australian Paediatric Surveillance Unit Study (APSU) 2009-2010. *Journal of Paediatrics and Child Health* 2011; 47(supp.2): 9.

# Severe Neonatal Hyperbilirubinaemia or Exchange Transfusion

N Evans, A McGillivray, P Beeby, N Badawai, R Haslam, A Kent, A Watkins, N French, P Gray, P Dargaville

## BACKGROUND

There is concern internationally that the number of babies affected by severe neonatal hyperbilirubinaemia may be increasing. Cases of cerebral palsy caused by severe jaundice have been reported with increasing frequency in Europe and North America<sup>1-4</sup>. Currently, there is a paucity of accurate severe hyperbilirubinaemia incidence data in Australia and it is of concern that unless this information is gathered urgently an increasing number of Australian children and their families could be affected by athetoid cerebral palsy.

Extremely high circulating levels of unbound bilirubin in the newborn period can have detrimental effects on the developing brain. Kernicterus, or bilirubin encephalopathy may result from severe neonatal hyperbilirubinaemia and cause athetoid cerebral palsy, deafness and paralysis of ocular muscles in surviving infants<sup>1,5,6</sup>. Timely recognition and appropriate treatment of newborn babies with hyperbilirubinaemia prevents these sequelae and thus, cases of cerebral palsy due to hyperbilirubinaemia may be preventable<sup>7,8</sup>.

Reasons postulated for the re-emergence of kernicterus in an age of advanced neonatal care are multifactorial and include: early hospital discharge, inadequate community newborn surveillance and deficiencies in education programs concerning jaundice and its potential consequences among parents and care-providers<sup>8,9</sup>. On review of the root cause of 125 cases of kernicterus in the United States, Johnson et al. found that health-system failings included: failure to recognise the significance of early jaundice, failure to institute appropriate monitoring and treatment in addition to inadequate post-discharge follow-up and lactation support<sup>10</sup>. We aim to establish in Australia the current incidence of severe neonatal hyperbilirubinaemia and its sequelae including cerebral palsy and to document the underlying causes and associated clinical risk factors. It is anticipated that these data will inform the development of important future prevention strategies such as screening initiatives and education programs for parents, care-providers and health professionals. This study will also inform future improvements to the continuity and co-ordination of newborn care, particularly after hospital discharge. Ultimately, our study strives to inform risk reduction strategies for severe neonatal hyperbilirubinaemia and associated disabilities.

**Commenced April 2010.**

For complete protocol and questionnaire please see [www.apsu.org.au](http://www.apsu.org.au)

## STUDY OBJECTIVES

The study aims to describe:

- The current incidence of severe neonatal hyperbilirubinaemia in Australia
- The associated diagnosis in affected infants and clinical risk factors
- The type and timing of treatment received
- The short-term\* outcomes for each infant

\*Long term sequelae including developmental outcome will be determined via a separate study.

## REPORTING INSTRUCTIONS

Please report any neonate with severe hyperbilirubinaemia according to the case definition below.

## CASE DEFINITION

A newborn infant born **after 34 weeks** gestation and **up to 1 month post-delivery** with severe hyperbilirubinaemia defined by:

A **total** serum bilirubin  $\geq 450\mu\text{mol/L}$

**OR**

needing an **exchange transfusion** for prevention or treatment of bilirubin encephalopathy

**OR**

clinical and/or MRI imaging evidence consistent with bilirubin encephalopathy

## INVESTIGATOR CONTACT DETAILS (\*Principle investigator and contact person)

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**\*Dr Angela McGillivray** (Clinical Neonatology Fellow and study coordinator/contact person) Tel 0403 786 298 or email: [angela.mcgillivray@sswahs.nsw.gov.au](mailto:angela.mcgillivray@sswahs.nsw.gov.au)

Newborn Care, Royal Prince Alfred Hospital, Missenden Rd, Camperdown, NSW 2050

## CO-INVESTIGATORS

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**Prof Nadia Badawi**, Children's Hospital at Westmead, Sydney, NSW.

**A/Prof Ross Haslam**, Women's and Children's Hospital, Adelaide, SA

**A/Prof Alison Kent**, Canberra Hospital, ACT

**Dr Andrew Watkins**, Mercy Hospital, Melbourne

**Dr Noel French**, King Edward Maternity Hospital, Perth, WA

**Dr Peter Gray**, Mater Hospital, Brisbane, QLD

**Dr Peter Dargaville**, Royal Hobart Hospital, Tasmania

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## Subdural Haematoma and Effusion in Children < 2 years

Y Zurynski, S Marks, A Stachurska, R Chaseling, D Tizoumi, A Stephens, C Molly, A Piper, J Bragg, G Cole, M Vonau, P Winterton, G Vimpani

### BACKGROUND

Subdural haematoma and effusion (SDH/E) is a rare but significant cause of morbidity and mortality in infancy. SDH/E has been described in neonates after traumatic delivery and in a very small group of infants it has been described prior to birth as a result of trauma *in utero*. Other causes may include accidental trauma due to falls or motor-vehicle accidents, congenital malformations, inborn errors of metabolism, or coagulopathy.

Studies from overseas<sup>1-3</sup> and an Australian study based on an audit of admissions to the Children's Hospital at Westmead<sup>4</sup>, have shown that SDH/E is predominantly due to inflicted non-accidental injury. Hallmark signs include: retinal haemorrhages and the presence of intracranial haemorrhages of different ages. Other intracranial injuries including subgaleal bleeding, intracerebral bleeding, cerebral oedema and axonal shearing injury may also be present. Multiple skeletal injuries are also common and may include fractures or contusions of the ribs, metaphyses of long bones, skull, vertebrae, and almost any other site. History of family disruption, substance abuse and deprivation is commonly reported.

Outcome following SDH/E is poorly reported, but one study suggests that neuro-developmental impairment is likely in at least 20% of survivors, this leading to life-long consequences<sup>5,6</sup>. In our study, outcome will be determined at the time of discharge and at six months. Such data is likely to support the development of future research including longitudinal cohort studies to determine the longer-term health and social consequences of SDH/E among Australian children.

Paediatric Surveillance Units in Britain and in New Zealand have estimated the incidence of SDH/E in children aged < 2 years at 12.5/100,000 in the United Kingdom<sup>1</sup> and 14.7/100,000 in New Zealand<sup>2</sup>. In a Scottish study<sup>3</sup> of infants aged < 1 year, it was 24.6/100,000. There are no national data on SDH/E in Australian children, and this study will provide the first national estimate of the incidence of SDH/E and its causes. Based on the incidence reported in Britain and in New Zealand, and an estimated Australian population of 563, 800 children aged < 2 years, we expect ~60 cases per year. The case definitions and questionnaires used in our study are based on methods and materials used successfully in Britain and in New Zealand.

International literature recognises the difficulties that face clinicians when considering a diagnosis of inflicted brain injury, and the involvement of child protection teams and child protection statutory agencies<sup>1-6</sup>. Infants often initially present with no history of injury or a history of only trivial trauma and the true history may only come to light at a later date. Our study will provide information on the presentation and diagnosis of SDH/E to inform clinical practice when investigating young children presenting with signs and symptoms of SDH/E, and may also inform educational materials for clinicians as well as community awareness campaigns to prevent SDH/E.

**Commenced July 2010.**

For complete protocol and questionnaire please see [www.apsu.org.au](http://www.apsu.org.au)

### STUDY OBJECTIVES

We aim to determine the incidence of SDH/E in Australian children aged < 2 years and to describe the following:

- Causes of SDH/E.
- Demographics of children presenting with SDH/E.
- Presenting symptoms, associated medical conditions and injuries, investigations, treatments and referral patterns.
- Outcome at discharge from hospital and at six months.

### CASE DEFINITION & REPORTING INSTRUCTIONS

Please report any child aged <2 years and newly diagnosed with a subdural haematoma or effusion (SDH/E) as confirmed by CT, MRI, head ultrasound, subdural tap or on post-mortem examination.

### FOLLOW-UP OF REPORTED CASES

A 2-page questionnaire requesting further details will be forwarded to clinicians who report a case of subdural haematoma/effusion. An additional one page questionnaire will be sent six months after the initial diagnosis to obtain any additional information about the diagnosis and outcome for the child.

### INVESTIGATOR CONTACT DETAILS (Principal Investigators and contact person)

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## Upcoming studies for 2011-2012

Please go to [www.apsu.org.au](http://www.apsu.org.au) to download all study materials including detailed case definitions and questionnaires

Condition approved for study	Commencement date	Study summary	Investigators (*Principal investigator)
Cryopyrin Associated Periodic Syndrome – CAPS (Once-off report card only)	June 2011	<p>Cryopyrin-Associated Periodic Syndromes (CAPS) are extremely rare, potentially life threatening auto-inflammatory disorders. Three separate CAPS are recognised: Familial Cold-Auto-Inflammatory Syndrome (FCAS), Muckle Wells Syndrome (MWS) and Neonatal Onset Multi-Inflammatory Disorder (NOMID). The conditions represent a continuum of disease, with FCAS being the mildest and NOMID being the most severe. The disorders are associated with mutations of the NLRP3 gene (also known as CIAS1). However a mutation may be only found in up to 60% of patients, suggesting genetic heterogeneity.</p> <p>Early recognition and treatment with anti-IL-1 receptor antagonists is paramount to preventing joint, hearing and brain injury.</p> <p>This once-off APSU study will estimate the number of cases currently in Australia, and provide detailed information about presentation, treatment, complications and outcomes and will enable correlates between genetic mutations and presenting features</p>	*Dr Sam Mehr, Dr Navid Abid, Dr Roger Allen, Dr Christina Boros, Dr Davinder Singh Grewal, Dr Alyson Kakakios, Dr Maurine Rogers, Dr Paul Turner, Dr Yvonne Zurynski
Juvenile Onset Recurrent Respiratory Papillomatosis – JoRRP	October 2011	<p>Juvenile onset Recurrent Respiratory Papillomatosis (JoRRP) is a condition in which benign papillomata develop and recur in the larynx. RRP usually develops in infancy or early childhood (median age - 4 years). It is the most common benign neoplasm of the larynx in children and the second most frequent cause of childhood hoarseness. Common presenting symptoms include: stridor, chronic cough, recurrent pneumonia, failure to thrive, dyspnoea, dysphagia and acute respiratory distress in children with upper respiratory tract infection. Asthma, croup and bronchitis need to be excluded before RRP is diagnosed. In about one third of children with RRP the disease spreads into the trachea and bronchi, with the risk of respiratory obstruction.</p> <p>It is currently not known which HPV genotypes are mainly responsible for JoRRP, and whether the current HPV vaccination program will reduce the incidence of JoRRP. The APSU study will enable the collection of detailed data including child and maternal history, symptoms, clinical presentation and treatment of JoRRP in Australia. HPV genotypes will be identified where possible and may inform future vaccine development.</p>	*Dr Daniel Novakovic, Dr Alan Cheng, Dr Julia Brotherton, A/Prof Yvonne Zurynski, Prof Robert Booy, Prof Elizabeth Elliott, A/Prof Paul Walker, A/Prof Robert Berkowitz, Dr Henley Harrison, A/prof Robert Black, A/Prof Chris Perry, A Prof Shyan Vijayasekaran, Dr Davud Wabnitz



## Upcoming studies for 2011-2012

Condition approved for study	Commencement date	Study summary	Investigators (*Principal investigator)
Food protein induced enterocolitis syndrome – FPIES	January 2012	<p>FPIES is a paediatric non-immunoglobulin E mediated allergic disorder triggered by ingestion of certain food protein(s). The majority of children present with their first FPIES episode when less than 12 months of age. The diagnosis of FPIES remains a clinical one, with children presenting typically 2-4 hours after ingestion of a food protein recently introduced into the diet, with profuse vomiting and some subsequently develop diarrhoea. Some children present in a moribund state, with pallor, floppiness, reduced body temperature, hypovolemic shock and/or metabolic acidosis.</p> <p>Early and accurate diagnosis is important to enable appropriate dietary advice and prevention of recurrences. The APSU study will facilitate better understanding of the demographics of affected children, clinical features, causative foods, and clinical practices of clinicians caring for children with FPIES, thereby informing the development of educational materials for clinicians and families.</p>	*Dr Sam Mehr, A/Prof Katie Allen, Prof Dianne Campbell, Dr Katie Frith, A/Prof Michael Gold, Dr Preeti Joshi, A/Prof Alyson Kakakios, A/Prof Richard Loh, A/Prof Peter Smith, A/Prof Mimi Tang, Dr Melanie Wong, A/Prof Yvonne Zurynski, Dr Brynn Wainstein.
Sudden unexpected early neonatal death or collapse in previously healthy term infants in the first 7 days of life	January 2012	<p>The incidence of sudden unexpected and unexplained death or neonatal collapse is reported as between 0.035/1000 to 0.4/1000 live births. Although rare, greater than half of these infants die and the majority of survivors have significant long term neurodevelopmental morbidities. There is currently no National system available in Australia for investigating and reporting these cases.</p> <p>We aim to establish the current incidence of sudden unexplained death or collapse in the early neonatal period (first 7 days of life) in Australia. The APSU study will also enable a detailed description of known risk factors to inform prevention strategies.</p>	*Professor Heather Jeffery Professor Elizabeth Elliott Dr Tracey Lutz, Dr Rod Hunt, Prof Nadia Badawi, Dr David Cartwright, Dr Zsuzsoka Kecskes



# Surveillance Studies Performed from 1993 - 2010

## Conditions Studied

Between 1993 and 2010, the APSU has facilitated 47 studies which are listed in Table 8.

**Table 8. Conditions studied from 1993-2010.**

Condition under surveillance	Dates of study
<b>Infectious/vaccine preventable conditions</b>	
Acute flaccid paralysis	Mar 1995–
Acute rheumatic fever	Oct 2007–
Congenital cytomegalovirus infection	Jan 1999–
Neonatal and infant Group B streptococcus sepsis	Jan 2005–Jun 2008
Haemolytic uraemic syndrome	Jul 1994–Dec 2001
Hepatitis C virus infection	Jan 2003–Dec 2007
Neonatal herpes simplex virus infection	Jan 1997–
HIV/AIDS, Perinatal exposure to HIV	May 1993–
Hospitalised pertussis in infancy	Jan 2001–Dec 2001
Severe complications of influenza	Sep 2007; Jul 2008–Sep 2008; Jun 2009–Sep 2009; Jun 2010–Sep 2010
Intussusception	May 2007–
Invasive <i>haemophilus influenzae</i> infection	Jan 1998–Dec 2000
Kawasaki disease	May 1993–June 1995
Non tuberculous mycobacterial infection	July 2004–Sep 2007
Congenital rubella	May 1993–
Subacute sclerosing panencephalitis	Jan 1995–Dec 1998
Congenital and neonatal varicella	Mar 1995–Dec 1997
Congenital varicella	May 2006–
Neonatal varicella	May 2006–
Severe complications of varicella	May 2006–
<b>Congenital/genetic disorders</b>	
Arthrogryposis multiplex congenital	Jan 1996–Dec 1998
CHARGE association	Jan 2000–Dec 2002
Congenital adrenal hyperplasia	Aug 1995–Dec 1997
Congenital & idiopathic nephrotic syndrome	Jul 1998–Jun 2001
Extrahepatic biliary atresia	May 1993–Dec 1996
Fetal alcohol syndrome	Jan 2001–Dec 2004
Haemoglobinopathies	July 2004–Mar 2006
Hirschsprung disease	Jan 1997–Dec 2000
Hyperinsulinaemic hypoglycaemia of infancy	Jan 2005–Mar 2007
Neuromuscular disorders of childhood	Jan 2007–Dec 2009
Prader-Willi syndrome	Jan 1998–Dec 2000
Primary immunodeficiency disorders	Jan 1997–Dec 1999
Rett syndrome	May 1993–Apr 1995; Jan 2000–
Severe combined immunodeficiency	May 1995–Dec 2001
<b>Mental health issues</b>	
Childhood conversion disorder	Jan 2002–Dec 2003
Childhood dementia	May 1993–Jun 1995
Early onset eating disorder	Jul 2002–Jul 2005
Munchausen by proxy syndrome	Jan 2000–Dec 2003
<b>Other injury/illness</b>	
Adverse reactions to complementary and alternative medicines	Jan 2001–Dec 2003
Anaphylaxis following food ingestion	Jul 2002–Dec 2003
Near drowning	May 1993–Dec 1996
Serious seatbelt injuries	Jan 2006–Dec 2007
Simple vitamin D deficiency rickets	Jan 2006–Aug 2007
Subdural haematoma and effusion in children	July 2010–
Systemic lupus erythematosus	Oct 2009–
Vitamin K deficiency bleeding	May 1993–
Severe Neonatal Hyperbilirubinemia or Exchange Transfusion	April 2010–

## International Network of Paediatric Surveillance Units (INoPSU)

The International Network of Paediatric Surveillance Units (INoPSU) supports *“the advancement of knowledge about rare and uncommon childhood infections and disorders through the participation of paediatricians in the surveillance on a national and international basis”* and facilitates collaboration and information sharing among 12 active Paediatric Surveillance Units (PSUs) around the world. INoPSU member PSUs communicate regularly via e-mail and a bi-annual face-to-face meeting provides opportunity for networking, and exchange of ideas and experiences of rare disease surveillance.

The 6<sup>th</sup> Biennial Meeting of INoPSU was held in Dublin, Ireland on the 8<sup>th</sup> of October 2010, and provided an opportunity for PSUs to present results of surveillance at a special session of the Faculty of Paediatrics Ireland Annual Scientific Conference:

- *Surveillance and beyond: the Canadian experience.* Danielle Grenier
- *Paediatric TB across Europe.* Delane Shingadia
- *Sexually transmitted infections in children.* Richard Reading
- *Toxic shock syndrome in children.* Shazia Adalat
- *Paediatric surveillance of HIV.* Karina Butler
- *Lead poisoning in children.* Dominique Crowley
- *Eating disorders in children: are the numbers really increasing?* Richard Lynn
- *Pandemic influenza H1N1 in children.* Yvonne Zuryski
- *Fast track surveillance for public health emergencies – is it possible?* Anne-Marie Winstone

At the business meeting it was reported that a database which lists all 200 individual conditions that INoPSU units have surveyed, along with the researchers, their contact details and publications has now been established. This will be an invaluable resource to enable collaboration across units. A number of publications are planned, bringing together international data to highlight international comparisons and impacts on clinical and public health policy. Articles will include an international comparison of haemolytic uraemic syndrome and surveillance for acute flaccid paralysis according to WHO guidelines.

A new work programme was also agreed on with the main aim being to increase the profile of INoPSU. Initiatives to do this include collaborating with international organisations for rare diseases such as Orphanet ([www.orpha.net](http://www.orpha.net)) and Eurodis ([www.eurordis.org](http://www.eurordis.org)). INoPSU's profile will also increase through participation in Rare Disease Day activities in February each year as demonstrated by the APSU and CPSP.



**INoPSU delegates and speakers at the 6<sup>th</sup> INoPSU meeting in Dublin.**

A/Prof Yvonne Zuryski from the APSU and Dr Danielle Grenier from the Canadian Paediatric Surveillance Program and were elected as the new INoPSU co-chairs from 2010 to 2013. We look forward to further developments of INoPSU under their leadership. INoPSU acknowledged and thanked Dr Daniel Virella, from the Portuguese Paediatric Surveillance Unit for the leadership he provided, as Convenor of INoPSU for 2008-2010, and Helen Friend and Richard Lynn who provide the administration hub for INoPSU.

All delegates expressed their thanks to Robert Cunney and Sandra Morgan from the Irish Paediatric Surveillance Unit for organising the 2010 Biennial INoPSU meeting and for their generous hospitality.

The Swiss Unit will host the next INoPSU meeting from the 1st to the 3rd of September, 2011 coinciding with the Swiss Paediatric Society Meeting in Montreux, Switzerland.

The 10th meeting of INoPSU is to be held in Australia in 2013 to coincide with the 30th meeting of the International Paediatric Association and APSU's 20th anniversary. Importantly, 2013 will see INoPSU celebrate 15 years of international paediatric surveillance.

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## Paediatric Active Enhanced Disease Surveillance (PAEDS)

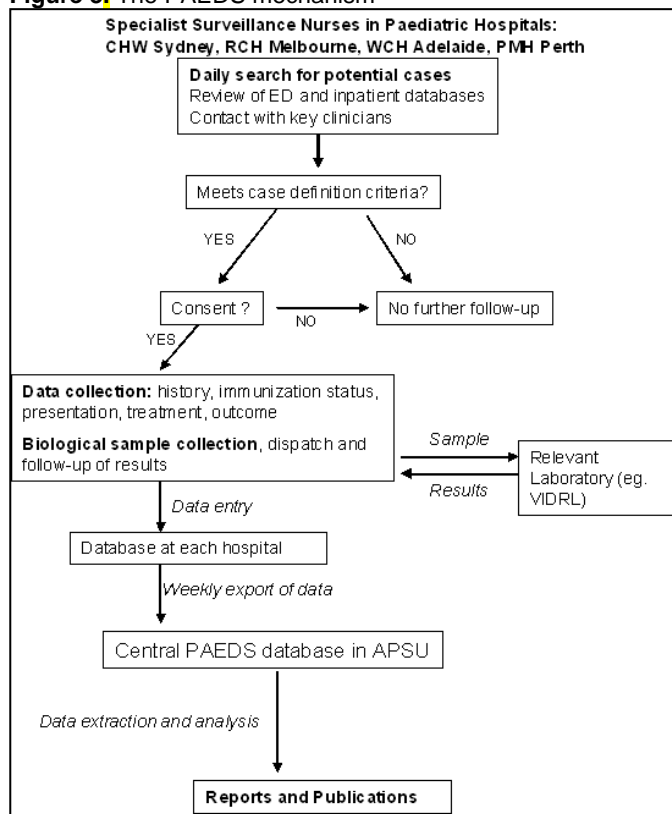
Although excellent national laboratory and public health surveillance systems are currently operating in Australia, very few provide timely, detailed clinical data or the opportunity for simultaneous collection of biological specimens.<sup>1</sup> To address this gap, the Australian Paediatric Surveillance Unit (APSU) and the National Centre for Immunisation Research and Surveillance (NCIRS) developed a hospital-based active surveillance system: Paediatric Active Enhanced Disease Surveillance (PAEDS) which is modelled on the Canadian Immunisation Monitoring Program Active (IMPAct) system which includes all 12 tertiary care paediatric centres in Canada.

The Australian Department of Health and Aging (DoHA), provided support to enable the implementation and evaluation of the pilot PAEDS network. There are plans to extend the network nationally however, currently there are four paediatric centres in four states participating in PAEDS:

- The Children's Hospital at Westmead, Sydney, NSW
- The Royal Children's Hospital Melbourne, Victoria
- The Women's and Children's Hospital, Adelaide, SA
- Princess Margaret Children's Hospital, Perth, WA

Dedicated research teams and surveillance nurses ensure timely and complete case ascertainment, collection of biological samples where relevant, and collection of detailed clinical data which is managed in a central database in the APSU (Figure 3)

**Figure 3.** The PAEDS mechanism



One of the major drivers for the PAEDS initiative was a long-standing problem in attaining acceptable rates of reporting of acute flaccid paralysis (AFP), a clinical manifestation of polio virus infection.<sup>2</sup> In order to maintain polio-free certification, Australia must reach the World Health Organisation (WHO) surveillance target of at least one AFP case per 100,000 children aged <15 years per annum, and a stool specimen collection rate of 80% of identified cases. The addition of varicella vaccination to the National Immunization Program in late 2005 prompted surveillance for varicella hospitalizations. Intussusception (IS) has been reported as a potential AEFI following rotavirus vaccination<sup>3,4</sup> and was therefore included in PAEDS after the introduction of new rotavirus vaccines in Australia. Protocols for AFP, IS and varicella had already been developed and used by APSU in collaboration with teams of expert clinicians and researchers.<sup>5</sup> A protocol for another potential rare AEFI, infantile seizures, was developed by the PAEDS Study Group. Furthermore, with support from an NHMRC special grant PAEDS was able to respond rapidly to the H1N1-2009 pandemic.<sup>6</sup>

Data obtained through PAEDS may inform planning and policy development for diseases soon to become vaccine preventable. Surveillance for hospital admissions allows better assessment of disease severity in determining the need for future vaccines and provides background rates of severe disease enabling assessment of the subsequent impact on severe disease rates after introduction of vaccines into the National Immunisation Program.

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40. He S, Zurynski Y, Elliott E. Evaluation of a national resource to identify and study rare diseases: the Australian Paediatric Surveillance Unit. *Journal of Paediatrics and Child Health* 2009; 45(9): 498-504.

## Books and reports that include APSU data

### 2010

1. Elliott E, Zurynski Y, McIntyre P, Booy R, Wood N, Richmond R, Royle J, Buttery J, Gold M, Marshall H. Paediatric Active Enhanced Disease Surveillance: Evaluation and case for renewed funding, Report to the Department of Health and Ageing, April, 2010.
2. Elliott E, Zurynski Y, Ridley G. Australian Paediatric Surveillance Unit Biennial Research Report 2007-2008. 2010; ISSN: 1443-3524.
3. National Centre in HIV Epidemiology and Clinical Research. HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2010. National Centre in HIV Epidemiology and Clinical Research, The University of New South Wales, Sydney, NSW

### 2009

4. Elliott E, Zurynski Y, McIntyre P, Booy R, Wood N, Richmond R, Royle J, Buttery J, Gold M, Marshall H. Paediatric Active Enhanced Disease Surveillance: Review and Options Paper, Report to the Department of Health and Ageing, 2009.
5. Zurynski Y, Elliott E. Report on rare childhood infectious diseases studied by the APSU; 2007-2008; Submitted to the Department of Health and Ageing, 2009.
6. National Centre in HIV Epidemiology and Clinical Research. HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2009. National Centre in HIV Epidemiology and Clinical Research, The University of New South Wales, Sydney, NSW

## Abstracts

### 2010-2011

1. Mackie F, Kainer G, Rosenberg A, Munro J, Murray K, Wainstein B, Ziegler J, Singh D, Boros C, Adib N, Fahy R, Elliott E. High Rates of SLE (systemic lupus erythematosus) in Indigenous children in Australia – An interim report of the Australian Paediatric Surveillance Unit (APSU) 2009-2010. *Journal of Paediatrics and Child Health* 2011; 47(sup.2): 9.
2. Noonan S, Carapetis J, Elliott E, Zurynski Y, Currie B, Curtis N, Wheaton G, Isaacs D, Ramsay J, Richmond P. National Surveillance for Acute Rheumatic Fever in Australian Children through the Australian Paediatric National Surveillance Unit. *Journal of Paediatrics and Child Health* 2011; 47 (sup. 2): 10.
3. Peadon E, Payne J, Henley N, D'Antoine H, Bartu A, Bower C, Elliott E. How do women want to be informed about alcohol use in pregnancy? *Journal of Paediatrics and Child Health* 2010; 46 (supl. 2): P12.
4. Zurynski Y, Moons CF, Simm PH, Garnet, on behalf of the APSU Vitamin D Rickets Study Group. Vitamin D deficiency rickets in Australia: need for screening and early treatment in high risk groups. *Swiss Medical Weekly* 2011; 141(sup. 187): 15.
5. Zurynski Y. Supporting families and clinicians to manage rare childhood diseases: A view from Europe. *Journal of Paediatrics and Child Health* 2010; 46(2): P22.
6. Zurynski Y, Lester-Smith D, Booy R, Festa M, Kesson A. Influenza H1N1 2009 pandemic: severe complications and deaths in children < 15 years. *Journal of Paediatrics and Child Health* 2010; 46(2): O56
7. Kesson A, Benwell N, Elliott E. Nor virus infection in hospitalized Australian children. *Clinical Microbiology and Infection* 2010; 16(sup. 2); S49.
8. Zurynski Y, Booy R, Elliott E. Influenza complications and deaths reported to the APSU among Aboriginal and Torres Strait Islander and non-Aboriginal and Torres Strait Islander children in 2008, 2009 and 2010. *Journal of Paediatrics and Child Health* 2011; 47(Sup.2): 17.
9. Zurynski Y, Elliott E. The Importance of engaging with patient support groups: education, research, and influencing national policy on rare diseases. *Swiss Medical Weekly* 2011; 141(sup. 187): 13.



## Publications, Presentations and Media Impacts

### 2009

10. Lester-Smith D, Zurynski Y, Festa M, Kesson A, Booy R, Elliott E. Seasonal surveillance for serious complications of influenza in children using the Australian Paediatric Surveillance Unit. *Journal of Paediatrics and Child Health* 2009; 45(9): A4.
11. Royle J, Zurynski Y, Booy R, Elliott E, Buttery J, Marshall H, Gold M, Richmond P, McIntyre P, Wood N, Rhind L, Pym M, McKay N, Heath C. A new surveillance mechanism for childhood conditions: Paediatric Active Enhanced Disease Surveillance (PAEDS). *Journal of Paediatrics and Child Health* 2009; 45(9): A22.
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13. Wood N, Royle J, Zurynski Y, Adams J, Booy R, Buttery J, Elia S, Gold M, Heath C, McKay N, Marshall H, McIntyre P, Phillips A, Pym M, Rhind L, Richmond P, Wall K, Elliott E. Seizures in Infants: results from Paediatric Active Enhanced Disease Surveillance (PAEDS). *Journal of Paediatrics and Child Health* 2009; 45(11): A22.
14. Zurynski Y, He S, Elliott E. What do paediatricians think of The Australian Paediatric Surveillance Unit? *Journal of Paediatrics and Child Health* 2009; 45(11): A10.

### Presentations

#### 2010-2011

1. Bines J, Buttery J, Danchin M, Lee K, Carlin J, McIntyre P, Elliott E, Richmond P, Wood N, Royle N, Booy R, Zurynski Y, Marshall H, Gold M, McKay N, Lloyd-Johnsen C, Strong D, Justice F for the PAEDS/APSU Study Group. Post marketing surveillance following introduction of Rotavirus Vaccines in Australia Rotavirus Symposium. 26<sup>th</sup> International Paediatrics Association Congress. Johannesburg, August 2010.
2. Bowden J, Steinoff K, Lilischkis, Zurynski Y, Murphy J. An evaluation of community attitudes to participation in paediatric clinical research. Australasian Research Management Society Conference. Sydney, September 2011 (accepted).
3. Buttery J, Danchin M, Lee K, Carlin J, McIntyre P, Elliott EJ, Bines J for the PAEDS/APSU Study Group. Intussusception following rotavirus vaccine administration: post-marketing surveillance of rotateq and rotarix in the national immunisation program in Australia. 28<sup>th</sup> Meeting of the European Society for Paediatric Infectious Diseases. Nice, May 2010.
4. Buttery J, Danchin M, Lee K, Carlin J, McIntyre P, Elliott EJ, Bines J for the PAEDS/APSU Study Group. Intussusception post-marketing surveillance following rotavirus vaccine introduction in Australia. Public Health Association of Australia Conference. Adelaide, August 2010.
5. Elliott EJ. Developing a rare diseases national plan for Australia. Rare Diseases symposium. Awakening Australia to rare diseases: Global perspectives on establishing a coordinated approach to a national plan. Fremantle, 2011.
6. Elliott EJ. Fetal alcohol syndrome: where did APSU surveillance lead? APSU Session, Royal Australasian College of Physicians Congress, Darwin May 2011.
7. Elliott EJ. Integrated approach to health care. Rare Diseases symposium. Awakening Australia to rare diseases: Global perspectives on establishing a coordinated approach to a national plan. Fremantle, 2011
8. Elliott EJ. on behalf of APSU and PAEDS Influenza Study Investigators, Sydney Medical School and the Sydney Children's Hospitals Network. Influenza Complications in Children. Viruses in May Conference. Katoomba, May 2011.
9. Elliott EJ. Acute flaccid paralysis surveillance in Australia. PAEDS and the APSU. Polio Expert Committee Annual Meeting. Canberra, May 2010.
10. Elliott EJ. The Australian Paediatric Surveillance Unit – 18 years on. Royal North Shore Perinatal Research Group, September 2010.
11. Elliott EJ. Complications of influenza in children. Viruses in May conference. Katoomba, May 2010 (Keynote).
12. Elliott EJ. FASD in Australia – Diagnosis, research and future directions. Alice Springs Hospital. Alice Springs, February 2010.
13. Elliott EJ. FASD in Australia – what is FASD, what is the impact in Australia, and where are we going? Drug and alcohol workers. In: fetal alcohol spectrum disorder (FASD). Alice Springs, February 2010.



## Publications, Presentations and Media Impacts

14. Elliott EJ. FASD in Central Australia. Public lecture in fetal alcohol spectrum disorder (FASD). Alice Springs, February 2010.
15. Elliott EJ. Fetal alcohol spectrum disorders, impact in the classroom. St Theresa's School, Wilcannia, September 2010.
16. Elliott EJ. Fetal alcohol spectrum disorders. Graduate Diploma of Indigenous Health (Substance Abuse), University of Sydney, October 2010.
17. Elliott EJ. Fetal Alcohol Spectrum Disorders (FASD): The legacy of alcohol use in pregnancy and the challenges for health professionals and society. Australasian Professional Society of Alcohol and Other Drugs. Annual Conference, Canberra, 2010 (Keynote).
18. Elliott EJ. H1N1 2009 Pandemic: how did our children fare? The Children's Hospital at Westmead, Sydney, May 2010.
19. Elliott EJ. International overview of the issues and challenges of children with FASD. Current approaches to education and care of children and young people with foetal alcohol spectrum disorder. Royal Society of Medicine, London, March 2010 (Keynote).
20. Elliott EJ. Maternal and Child Health Project. Dien Bien Phu, Vietnam. Sydney Institute of Emerging Infections and Biosecurity, May 2010 (Keynote).
21. Elliott EJ. Novel paediatric surveillance of first wave pandemic influenza A (2009) informs planning for second wave. International Paediatric Association 26<sup>th</sup> Congress. Johannesburg, August 2010.
22. Elliott EJ, Fitzpatrick J. Australian Aboriginal Child Health Education module. Children's Hospital at Westmead, Sydney, September 2010.
23. Elliott EJ, Fitzpatrick J. Fetal alcohol spectrum disorders. Children's Hospital at Westmead, Sydney, September 2010.
24. Khandaker G, Zurynski Y, Elliott E, Rashid H, Booy R. Possible harms of oseltamivir – interpreting safety in context of the H1N1 09 pandemic. 28<sup>th</sup> Annual Meeting of the European Society for Paediatric Infectious Diseases (ESPID). Nice, May 2010.
25. Khandaker G, Zurynski Y, Elliott E, Rashid H, Booy R. Possible harms of oseltamivir – interpreting safety in context of the H1N1 09 pandemic. XII International Symposium on Respiratory Viral Infections. Taipei, March 2010.
26. Khandaker G, Zurynski Y, Elliott EJ, Booy R. Oseltamivir treatments in infants under one year of age with influenza infection. 2010 Australian Society of Infectious Diseases (ASID) Annual Scientific Meeting. Darwin, May 2010.
27. Khandaker G, Zurynski Y, Elliott EJ, Booy R. Oseltamivir treatments in infants under one year of age with influenza infection. Options for the Control of Influenza VII Conference. Hong Kong SAR, China, September 2010.
28. Khandaker G, Marshall H, Peadon E, Zurynski Y, Burgner D, Buttery J, Gold M, Nissen M, Elliott EJ, Burgess M, Booy R. Congenital and neonatal varicella: impact of the national varicella vaccination program in Australia. 12<sup>th</sup> National Immunisation Conference. Adelaide, August 2010.
29. Khandaker G, Marshall H, Peadon E, Zurynski Y, Burgner D, Buttery J, Gold M, Nissen M, Elliott EJ, Burgess M, Booy R. Severe complications of varicella in Australia following the introduction of the national varicella vaccination program. 12<sup>th</sup> National Immunisation Conference. Adelaide, August 2010.
30. Marshall H, Richmond P, Buttery J, Royle J, Gold M, Wood N, Elliot EJ, Zurynski Y, Toi C Booy R. Paediatric Active Enhanced Disease Surveillance (PAEDS) of severe hospitalised varicella and complications over a three year period in Australia. World Society for Pediatric Infectious Disease Congress. Melbourne, November 2011.
31. Noonan, S. ARF Surveillance in Australian Children, ARF/RHD Research Planning Day, Charles Darwin University Darwin, August 2010
32. Zurynski Y. Research gaps and needs in the Australian context. Rare Diseases symposium. Awakening Australia to rare diseases: Global perspectives on establishing a coordinated approach to a national plan. Fremantle, April, 2011.

## 2009

1. Carapetis J, Noonan S, Elliott E.J, Zurynski Y, Currie B, McDonald M, Wheaton G, Nissen M, Ramsay J, Isaacs D, Richmond P, Curtis N, Heazlewood R. National surveillance for acute rheumatic fever in Australian children. National Heart Foundation Conference. Brisbane, May 2009.
2. Ellaway C. Multidisciplinary integrated clinics for rare diseases: The Rett Syndrome clinic at the Children's Hospital and Westmead. APSU session, RACP Physicians Week. Sydney, May 2009.
3. Elliott EJ. Alcohol and pregnancy NHMRC Guidelines. The Population Sciences Division Scientific Forum in Alcohol and Pregnancy. Telethon Institute for Child Health Research. Perth, February 2009.
4. Elliott EJ. Alcohol in pregnancy. 16<sup>th</sup> Annual Women's Health Conference. Gold Coast, February 2009. (Keynote)
5. Elliott EJ. Alcohol in pregnancy. Pre-pregnancy care. Women's Hospitals Australasia Scientific Meeting. Melbourne, May 2009 (Keynote).
6. Elliott EJ. The Australian Paediatric Surveillance Unit. Australian Maternity Obstetric Surveillance System Launch. Parliament House, Canberra, June 2009.
7. Elliott EJ. Congenital Infections, 16<sup>th</sup> Annual Women's Health Conference. Gold Coast, February 2009.
8. Elliott EJ. FASD: Epidemiology, diagnosis and management. In: Fetal Alcohol Syndrome - It takes a community effort to prevent. Royal Flying Doctor Service, Mt Isa, June 2009. (Keynote).
9. Elliott EJ. Fetal Alcohol Spectrum Disorders (FASD) in Australia: A Monograph. Presentation to the Inter-Governmental Committee on Drugs (IGCD) on behalf of the IGCD FASD Working Party. Perth, February 2009.
10. Elliott EJ. Fetal alcohol syndrome. George Abbott Symposium. Christchurch School of Medicine, Christchurch, August, 2009.
11. Elliott EJ. Guideline 4, Alcohol during pregnancy and breastfeeding. Launch of the NHMRC Australian Alcohol Guidelines. Melbourne, May 2009.
12. Elliott EJ. A national plan for rare diseases. RACP Physicians Week. Sydney, May 2009.
13. Elliott EJ. Paediatric Active Enhanced Disease Surveillance and the Australian Paediatric Surveillance Unit: AFP surveillance in Australia. Polio Expert Committee Face-to-face meeting, Commonwealth Department of Health and Ageing and WHO Western Pacific. Canberra, May 2009.
14. Elliott EJ, O'Leary C, Bower C. Australian alcohol guidelines and pregnancy: 2008 and beyond. The 3<sup>rd</sup> International Conference on fetal alcohol spectrum disorder. Victoria, British Columbia, March 2009.
15. Elliott EJ, Peadon E, Payne J, Henley N, O'Leary C, D'Antoine H, Bartu A, Bower C and the Alcohol and Pregnancy Research Group. Alcohol and Pregnancy: What influences Australian women's knowledge, attitudes and practice? The 3<sup>rd</sup> International Conference on Fetal Alcohol Spectrum Disorder. Victoria, British Columbia, March 2009.
16. Elliott EJ, Zurynski Y. Australian Paediatric Surveillance Unit (APSU) and Paediatric Active Enhanced Disease Surveillance (PAEDS): Latest developments in paediatric surveillance. National Centre for Immunisation Research Surveillance (NCIRS) Journal Club. Sydney, March 2009.
17. Jaffe A. Australian rare lung diseases registry: how disease registries can inform your practice. APSU session. RACP Physicians Week. Sydney, May 2009.
18. Mackie F. Systemic lupus erythematosus. Proposed new conditions for APSU surveillance. APSU session. RACP Physicians Week. Sydney, May 2009.
19. Marshall H, Booy R, Gold M, Buttery J, Elliot E, Heath C, McIntyre P, McKay N, Pym M, Richmond P, Rhind L, Royle J, Elia S, Wood N, Zurynski Y. Complicated childhood varicella: results from active surveillance of tertiary paediatric hospitals and varicella genotyping. The Communicable Diseases Network Australia Conference. Canberra, May 2009.
20. Marshall H, Booy R, Gold M, Buttery J, Elliot E, Heath C, McIntyre P, McKay N, Pym M, Richmond R, Rhind L, Royle J, Elia S, Wood N, Zurynski Y, Tsoi J. Severe childhood varicella: Paediatric Active Enhanced Disease Surveillance (PAEDS) of children hospitalised with varicella in Australia and associated varicella genotypes. European Society for Paediatric Infectious Diseases. Belgium, June 2009.
21. McDonald A, Zurynski Y, Giles M, Elliott E, Ziegler J and Kaldor M. The Pattern of Perinatal Exposure to HIV in Australia, 1999 – 2008. RACP Physicians Week. Sydney, May 2009.
22. Payne J, France K, Henley N, D'Antoine H, Bartu A, O'Leary C, Elliott E, Bower C & the Alcohol and Pregnancy Steering Committee. Bridging the evidence-practice gap. PHAA 39th Annual Conference. Canberra, September 2009.

23. Wood N. Infantile Seizures: Lessons from the Paediatric Active Enhanced Disease Surveillance (PAEDS) pilot. APSU Session. RACP Physicians Week. Sydney, May 2009.
24. Zurynski Y. Subdural haematomas in children <2 years. Proposed new conditions for APSU surveillance. APSU session. RACP Physicians Week. Sydney, May 2009.
25. Zurynski Y, Adams J, Booy R, Buttery J, Elia S, Gold M, Heath C, McKay N, Marshall H, McIntyre P, Phillips A, Pym M, Rhind L, Richmond P, Royle J, Wall K, Wood N, Elliott E. Paediatric Active Enhanced Disease Surveillance (PAEDS): a new surveillance mechanism for Australia. Communicable Disease Control Conference. Canberra, May 2009.

## Community and Media Impacts

### 2010-2011

1. AAP. Clinic to target baby alcohol disorders (Elizabeth Elliott). *The Australian*. June 20, 2011.
2. ABC. Doctors urge screenings to prevent cytomegalovirus spread (Bill Rawlinson). ABC News. June 19, 2011.
3. Elliott E. Kimberley community worried for children's futures. ABC News. February 17, 2011.
4. Elliott E. Kimberley community worried for children's futures. Australia: 7pm TV News. February 17, 2011.
5. Elliott E. Radio interview on an Australian study on Fitzroy Crossing and fetal alcohol disorders. *The Sun Herald*. July 18, 2010.
6. Elliott E. Radio interview on research into rare childhood diseases and support for families with ill children. ABC Hobart and ABC Tasmania. December 13, 2010.
7. Fitzgerald D. The need for surveillance (Varicella research by Gulam Khandaker). *Medical Observer*. April 19 2011.
8. Gleeson R. Babies risk brain damage: call for a national ban on mothballs containing naphthalene (APSU research on Kernicterus). The University of Sydney News February 7 2011.
9. Kaye B. Costing Lives - The Price of Orphan Drugs (Elizabeth Elliott). *Medical Observer*. June 10 2011.
10. Kenny, K. Duo wins top professional award. (The Royal Australasian College of Physicians awards the John Sands Medal to Elizabeth Elliott.) The University of Sydney News June 8, 2011.
11. Kirby J. Alternative remedies can harm kids: study. *MedConnect*. December 26, 2010.
12. Koff E. ARC Linkage Grant (APSU). Chief Executive Update, Children's Hospital at Westmead. June 28, 2011.
13. Lyons J. Rare diseases - bringing it all together. *Medical Observer*. May 17, 2011.
14. McSweeney L. Infant risk from maternal HSV-1 (Professor Cheryl Jones). *Medical Observer*. June 2, 2011.
15. MacIntosh P. Byron Bay Journalist Jane Hansen reports the APSU investigated eating disorders in children. Mornings with Pam Macintosh. ABC North Coast, Lismore May 24, 2011.
16. Madden S. Rise of eating disorders in young people. Children's Hospital at Westmead Media Release and 2UE, 2CC, 2GB, May 2010.
17. Munns C. Too much slip, slop, slap a bad thing for pregnant mums. *The Daily Telegraph*. February 10, 2010.
18. Nowland D. Australia lagging in foetal alcohol research. ABC News. June 20, 2011.
19. O'Brien M. Foundation aims to hit rare diseases for six. *Medical Observer*. June 7, 2011.
20. Rouse R. Babies benefitting from increased herd immunity. *Medical Observer*. March 8, 2011.
21. Rouse R, AAP. Clinic set to tackle fetal alcohol spectrum disorder. *Medical Observer*. June 28, 2011.
22. Taor A. Use of complementary and alternative medicines, in favour of conventional medicines, can have fatal consequences in children, Australian researchers warn. *The Australian*. Pulse. January 22, 2011.
23. Tarnow-Mordi W, Evans N, Lui K, Darlow B, on behalf of the Advisory Committee of the Australian and New Zealand Neonatal Network. Risk of brain damage in babies from naphthalene in mothballs: call to consider a national ban (APSU research on Kernicterus). *Medical Journal of Australia* 2011; letters, 194(3):150.

## Publications, Presentations and Media Impacts

24. Tasker B. Clinic to target baby alcohol disorders (Elizabeth Elliott). *Sydney Morning Herald*. June 20 2011.
25. Thompson A. A snap decision puts little Sarah on Centre Stage. *Illawarra Mercury*. May 7, 2011.
26. Valentine J. Common problems of rare diseases. Interview with Y. Zurynski in ABC Radio 702. February 26, 2010.
27. Woods K. Cytomegalovirus: the unknown danger (Cheryl Jones). *Medical Observer*. July 22, 2011.

### 2009

28. D'Antoine H. Woman delayed birth to drink grog. *The Australian*. March 31, 2009.
29. Elliott EJ, Zurynski Y. Australian Health Professionals Call for National Response to Rare Diseases. The Children's Hospital at Westmead media release, February 28, 2009.
30. Elliott EJ. ABC Lateline. Special report: Suzanne Smith investigates fetal alcohol spectrum disorder (FASD). March 24, 2009.
31. Elliott EJ. Alcohol in pregnancy and fetal alcohol spectrum disorder. ABC Radio, Mt Isa, (Darren Nelson) June 11, 2009.
32. Elliott EJ. Call for centres to deal with 'alcohol' babies. Lateline ABC News. Tuesday, March 17, 2009.
33. Elliott EJ. Common front to fight rare ailments. *Sydney Morning Herald*. February 28, 2009.
34. Elliott EJ. Fast tracked Swine Flu Medical Research. The Children's Hospital at Westmead Media Release. July 10, 2009.
35. Elliott EJ. H1N1 medical research projects fast-tracked. NHMRC Media Release. July 8, 2009.
36. Elliott EJ. Jab's the job says minister. *Parramatta Sun*. December 16, 2009.
37. Elliott EJ. Radio interview on alcohol consumption during pregnancy. ABC 702 Sydney. March 6, 2009.
38. Elliott EJ. Research into combating swine flu gets \$7m boost. *Sydney Morning Herald*. July 9, 2009.
39. Elliott EJ. Research grant for flu research. *Parramatta Advertiser*. July 15, 2009.
40. Elliott EJ. Swine flu vaccine now available for kids. *Sydney Morning Herald, the Age*. December 8, 2009.
41. Kaldor J. Many more babies born to HIV mums. *Sydney Morning Herald, Nine MSN News, the West, Yahoo News, Australian Medical Association Western Australia*. April 19, 2009.
42. Lester-Smith D. Fund flu vaccine in all kids. *Medical Observer*. May 29, 2009.
43. Madden S. Anorexia's lifelong legacy. *Sydney Morning Herald* and in <http://melindahutchings.blogspot.com/2009/06anorexias-lifelong-legacy.html>. June 18, 2009.
44. Madden S. Children with eating disorders on the rise: study. ABC News. April 19, 2009.
45. Madden S. Delayed diagnosis of child eating disorders harmful. <http://www.streetcorner.com.au/news/showPost.cfm?bid=10911&mycomm=WC>. June 19, 2009.
46. Madden S. Eating disorders striking younger boys and girls. *Courier Mail*. April 19, 2009.
47. Madden S. GPs missing anorexia in children. *Sydney Morning Herald*. April 20, 2009.
48. Madden S. Unhealthy PE teachers giving wrong lesson to children. *Sydney Morning Herald*. June 11, 2009.
49. Munns C. Muslim veil-wearers might not get enough Vitamin D: doctors. *Courier Mail*. April 19, 2009.
50. Saunders D. Upcoming changes to child restraints in cars. Interview with Y Zurynski in ABC Western Plains. *Sydney*, November 18, 2009.
51. Zurynski Y, Frith K, Leonard H, Elliott E. Australian Study of rare childhood disorders confirms that national approach presents best route to addressing needs. (Rare childhood diseases: how should we respond?) *OrphaNews Europe: The newsletter of the Rare Disease Task Force*. February 2009.

### Workshops and Policy Development

1. Zebras on the Commons – Rare Disease Workshop, Children’s Hospital at Westmead, Sydney, February 2010 (convened and coordinated by APSU).
2. National Plan for Rare Diseases (Draft) [www.apsu.org.au](http://www.apsu.org.au)

### Awards

1. Elliott E. Awarded the John Sands Medal, Annual Scientific Meeting of the Royal Australasian College of Physicians, May 2011.
2. Smith M. Dean’s Summer Scholarship Award, University of Sydney Summer Scholarship Scheme. March 25, 2009.
3. Zurynski Y. Awarded Creswick Foundation Fellowship for travel to Europe, 2009

# Clinicians Reporting Cases in 2009

## ACT

Paul I Jenkins  
Alison Kent  
George Malecky  
Abdel-Latif Mohamed  
Suzanna Powell  
Graham J Reynolds

## NSW

Susan Adams  
Wendy Allen  
Rosemary Ambler  
Elizabeth Argent  
John D Arnold  
Nadia Badawi  
Robert Booy  
Jennifer R Bowen  
J J Brereton  
Adam Buckmaster  
Kathryn Carmo  
Jeffrey Chaitow  
Raymond Chin  
John Christodoulou  
Yew-Wee Chua  
Des Cohen  
Carolyn Cooper  
Elizabeth A M Cotterell  
Patricia Crock  
Genevieve E Cummins  
Jacqueline Dalby-Payne  
Russell Dale  
Patricia Davidson  
John A De Courcy  
Mark De Souza  
Ana Maria Dosen  
Scott Dunlop  
Shoma Dutt  
Matthew J Edwards  
Peter D Eisman  
Carolyn Jane Ellaway  
Elizabeth J Elliott  
Elizabeth R Fagan  
Dominic A Fitzgerald  
Anna Clare Gill  
Neil D Ginsberg  
Tanya Gulliver  
Hasantha Gunasekera  
Doaa Habashy  
Robert J Hardwick  
Andrew Holland  
Christopher B Ingall  
David Isaacs  
Sean Kennedy  
Allan M G Kerrigan  
Eli Kleiner  
Jan Klimek  
Martin R Kluckow  
Phillip Kolos  
Erik La Hei  
Ian D Lennon  
Joyce Leong  
David Lester-Smith  
B H Lo  
Melissa Christine Luig  
Kristine Macartney  
John Macdessi  
Mary McCaskill  
Tim McCrossin  
David T McDonald  
Ann McDonald  
David R Mowat  
David N Murphy  
Patricia E Mutton

Kathryn North  
Pamela Palasanthiran  
Mary Paradisis  
Ken Peacock  
Elizabeth Peadon  
James P Pendergast  
Nick Pigott  
Michael Plaister  
Melvyn Polon  
Andrew Rechtman  
David N Schell  
Robert Smith  
Soundappan Soundappan  
David R Starte  
Gopinath M. Subramanian  
Rodney L Tobiansky  
Dimitra Tzioumi  
Peter Van Asperen  
Graham V Vimpani  
Mary-Clare Waugh  
Richard Webster  
Mark A Westphalen  
Bruce Whitehead  
Catherine R Wiles-Harrell  
Ian Wilkinson  
Meredith Wilson  
Nicholas Wood  
Lisa Catherine Worgan  
Kylie Meredith Yates  
John B Ziegler

## NT

Paul A M Bauert  
Jonathan R Carapetis  
Anita Lucia D'Aprano  
Rosemary E Fahy  
Deborah Fearon  
Louise Martin  
Kathryn Roberts  
Annie Whybourne

## QLD

Gary S Alcock  
Donald B Appleton  
Ruth Barker  
Christopher Bourke  
Richard P B Brown  
Anita Cairns  
Leisha A Callaghan  
Gregory I Carman  
Richard E Cherry  
John Coghlan  
Lucy Helen Cooke  
Mark G Coulthard  
Maree G Crawford  
Penelope Cruickshanks  
Catherine Dawson  
Peter J DeBuse  
Timothy John Donovan  
Nigel David Dore  
Aaron Mark Easterbrook  
Lesley B Everard  
Bruce Goodwin  
Leonie M Gray  
Keith Grimwood  
Alison Harris  
Wayne A Harris  
Katrina Harris  
Glenn J Harte  
Phillip J Harvey  
Richard Heazlewood  
Thomas M Hurley

Elizabeth M Hurron  
Garry Inglis  
Susan Ireland  
Ronald W James  
Helen Liley  
Elena J Mantz  
Andrea McGlade  
Robert A L McGregor  
Kim Alison McLennan  
David McMaster  
Hilary P Mercer  
Susan Moloney  
Brian D Morris  
Richard Mulcahy  
Clare Nourse  
Julie Panetta  
Brian R Patten  
David R Pincus  
Jose A Prado  
Jeffrey J Prebble  
Ian F Robertson  
Patrick J Ryan  
Phil Sargent  
Mark Stretton  
Clare Thomas  
Fiona Thomson  
Alison Tigg  
Timothy H Warnock  
Michael L Williams  
Suzanne Wilson  
Paul G Woodgate

## SA

David A Baulderstone  
Christina A Boros  
Brian Coppin  
Philip R Egan  
Paul N Goldwater  
T T S Han  
Abu Haque  
Michael G Harbord  
Malcolm A Higgins  
Andrew Kelly  
David B Ketteridge  
Andrew J McPhee  
Scott Morris  
Phil S Munt  
Abdul Musa  
Richard G Power  
Peter C Prager  
Patrick J Quinn  
Terence Patrick Robertson  
Jacqueline Kaye Schutz  
Sanjay Sinhal  
Nigel L Stewart  
Felix K Y Tan  
Heather Tapp  
Mark A Thesinger  
Deirdre A White

## TAS

Neil Atherton  
Christopher J Bailey  
Sean Beggs  
Anita Cornelius  
Peter A Dargaville  
John Daubenton  
Tony De Paoli  
Anthony J Dunstan  
Peter J Flett  
Evelyn Funk-Bowles  
David Strong

## VIC

Roger C Allen  
Kym P Anderson  
Ylva Andersson  
Jim Buttery  
Elizabeth A Carse  
Tracy Coleman  
Noel E Cranswick  
Joseph Dezordi  
Richard R Doherty  
Peter James Eastaugh  
Daryl Efron  
Jeremy Leighton Freeman  
Peter W Goss  
Julia Gunn  
Geoffrey G Hogg  
James Holberton  
Rod W Hunt  
Bernard M Jenner  
Bryn Jones  
Joshua Y Kausman  
Julian Kelly  
Hugh Kelso  
Shahriyar Khosrowpanah  
Christopher Kimber  
Kypros Kyprianou  
Richard Leventer  
Edwin J Lowther  
Catherine Lynch  
Michael K Marks  
R John H Massie  
John A McLennan  
Kathy McMahon  
Carl J Orkin  
Robert Roseby  
Monique Ryan  
Lara S Shekerdemian  
Nick H Thies  
David Tickell  
Andrew M C Watkins  
Guin Wilson  
Flora Wong

## WA

Anita Banks  
Andrew M Bullock  
Richard J Christie  
Annette M Finn  
Ian J Gollow  
Paula Holmes  
Louise Houlston  
Farhat Hussain  
Christine A Jeffries-Stokes  
Geoffrey J Knight  
Helen Leonard  
Corrado Minutillo  
Kevin J Murray  
Lakshmi Nagarajan  
Murali Narayanan  
Flemming H Nielsen  
Marianne Phillips  
Shripada Rao  
Peter C Richmond  
Peter W Rowe  
Jacqueline M Scurlock  
Mary J Sharp

# Clinicians Returning 100% Monthly Report Cards in 2009

## ACT

Judith L Bragg  
Ann Crawshaw  
Ian F Crawshaw  
G David Croaker  
Amelia M Herath  
Hilary A Holmes  
Paul I Jenkins  
Penelope J Johnson  
Zsuzsoka (Susanne) Kecskes  
Alison Kent  
George Malecky  
Timothy McDonald  
Abdel-Latif Mohamed  
Suzanne M Packer  
Graham J Reynolds  
Erroll Simpson

## NSW

C Abkiewicz  
Susan Adams  
Alexander Shirley  
Hugh D W Allen Wendy Allen  
Frank Alvaro  
Geoff Ambler  
Rosemary Ambler  
Alan F Amos  
Jacqueline Kay Andrews  
Michael Ancombe  
Jayne H Antony  
Elizabeth Argent  
Jennifer E Ault  
Nadia Badawi  
Lynn Banna  
Peter A Barr  
Louise A Baur  
Vivian V Bayl  
Philip J Beeby  
Yvonne Belessis  
Graham J Bench  
G P Bent  
Jennifer Berg  
Andrew Berry  
Vivek Bhadri  
Rani Bhatia  
Habibur Rehman Bhurawala  
Roger Blackmore  
(Alice) Bijou Blick  
Paul Bloomfield  
Gilda B Bonacruz-Kazzi  
Robert Booy  
Jennifer R Bowen  
Nick Boyd  
J J Brereton  
Kerry Brown  
Michael P Brydon  
Adam Buckmaster  
P Buckner  
Vicki Burneikis  
Donald L Butler  
Anne M E Bye  
Patrina Ha Yuen Caldwell  
Ian Callander  
Peter J Campbell  
Thomas Arthur Campbell  
Jeffrey Chaitow  
Janis D Chamberlain  
Bronwyn J Chan  
Paul C Chay  
Howard W Chilton  
Raymond Chin  
David Christie  
John Christodoulou  
Robert Sin Liang Chu  
Yew-Wee Chua  
Simon D Clarke  
John C Coakley  
Ralph C Cohen  
Des Cohen

Alison F Colley  
Felicity A Collins  
James S Colquhoun-Kerr  
J R Coomarasamy  
Peter John Cooper  
Stephen Geoffrey Cooper  
Carolyn Cooper  
Elizabeth A M Cotterell  
Christopher T Cowell  
Jonathon Craig  
Maria Craig  
Paul Craven  
Stuart Crisp  
Genevieve E Cummins  
John Curotta  
Shane Curran  
Bruce Currie  
Jacqueline Dalby-Payne  
Russell Dale  
Luce Dalla-Pozza  
Davidson Patricia  
Robert Davies  
Robert Day  
John A De Courcy  
Mark De Souza  
Koert de Waal  
Michael J Deloughery  
Anthony Dille  
Kim Donaghue  
Peter John Donald  
Stuart F A Dorney  
David Dossetor  
Barry John Duffy  
Scott Dunlop  
Richard John Dunstan  
Linda Durojaiye  
Peter William Ebeling  
Matthew J Edwards  
Peter D Eisman  
Fergus Elder  
Carolyn Jane Ellaway  
Elizabeth J Elliott  
Adrienne G Epps  
Anthony D Epstein  
John B Erikson  
Nick Evans  
Michael J Fairley  
Robert H Farnsworth  
Bruce J Fasher  
Penelope Field  
Michael J Field  
Dominic A Fitzgerald  
Fiona Fleming  
Bob K J Fonseca  
Gadd Stuart M  
Gaskin Kevin J  
Madlen Gazarian  
Sondhya Ghedia  
Henry J Gilbert  
Anna Clare Gill  
Joanne Ging  
Neil D Ginsberg  
Anne F Glanville  
Chin Lum Goh  
Safak Goktogan  
Maria Linette Gomes  
P M Goodhew  
Linda Louise Goodwin  
Sandra P Grass  
Thomas M Grattan-Smith  
Robert Guaran  
Hasantha Gunasekera  
Julie M Haas  
Doaa Habashy  
Anna Hackett  
Nils F Hanson  
Ralph M Hanson  
Robert J Hardwick

Richard K Hart  
John G Harvey  
Richard E Hawker  
Philip L Hazell  
Guy Henry  
Steven Hing  
Ken Ho  
Elisabeth M Hodson  
Peter Hogan  
Andrew Holland  
James C S Hong  
Peter Yee-Tai Hong  
Maxwell Hopp  
Jason Hort  
Keith M Howard  
Neville J Howard  
Robert Howman-Giles  
Christine Hughes  
Paul Hutchins  
Christopher B Ingall  
David Isaacs  
Michelle M Jack  
Adam Jaffe  
Allan James  
Robyn Jamieson  
Heather E Jeffery  
Sandra L J Johnson  
Patricia M Johnson  
Heather Johnston  
Owen Jones  
Cheryl Anne Jones  
Kristi J Jones  
G M Kainer  
Alyson M Kakakios  
Hala Katf  
Brian E Kearney  
Stewart J Kellie  
Debra Kennedy  
Sean Kennedy  
Allan M G Kerrigan  
Alison M Kesson  
Bruce King  
Eli Kleiner  
Jan Klimek  
Martin R Kluckow  
Karen Knoll  
Michael Kohn  
Phillip Kolos  
Kasia Kozlowska  
Rajendra Kumar  
Maria Kyriagis  
Erik La Hei  
Albert H Lam  
Basiliki (Bessy) Lampropoulos  
K C Lau  
John A Lawson  
Joanne Leal  
Joyce Leong  
Garth I Leslie  
Jane Mary Lesslie  
David Lester-Smith  
Florence Levy  
Deborah J Lewis  
David Lillystone  
A S C Lim  
Daniel C S Lin  
Anthony Jun Wing Liu  
B H Lo  
Michael Lonergan  
Alison Loughran-Fowlds  
O Lozynsky  
Melissa Christine Luig  
Kristine Macartney  
John Macdessi  
Kerrie T MacDonald  
Fiona E Mackie  
Sloane Madden  
Annabel K Magoffin

Susan M Marks  
Frank J Martin  
Bradley Martin  
Tania May  
Emma McCahon  
Robert McCarthy  
Mary McCaskill  
Tim McCrossin  
David T McDonald  
David W McDonald  
Jennifer L McDonald  
Ann McDonald  
Anne McGeechan  
Gayle McInerney  
Peter B McIntyre  
Margot McIver  
Patricia McVeagh  
Sam Mehr  
Michael Melamdowitz  
Tracey Merriman  
Susan M Messner  
Bronwyn Milne  
Joseph P Moloney  
Kieran T Moran  
Anne Morris  
Angela M Morrow  
David R Mowat  
Craig Munns  
David N Murphy  
Marea W Murray  
Patricia E Mutton  
Anandhan P Naidoo  
Ranjit Nanra  
Kathryn North  
Karen O'Brien  
Ju Oei  
Stephen J O'Flaherty  
Fenton O'Leary  
Matthew W O'Meara  
David A Osborn  
Pamela Palasanthiran  
Dimitrios Papadopoulos  
Mary Paradis  
Julianne Parle  
Elizabeth Peadon  
Deborah G Perkins  
Megan Phelps  
Susan Phin  
Elizabeth Pickford  
Jason Pinner  
Susan Piper  
Michael Plaister  
Jaqueline C Pollack  
Melvyn Polon  
Christopher C Poon  
Alison Poulton  
Keith M Power  
Peter G Procopis  
Karin L Proudman  
Stephen D Pryde  
Kerry Quinn  
Patrick M Rahilly  
William Rawlinson  
Andrew Rechtman  
Gordon J Rennick  
Rebecca Richardson  
Peter Roberts  
Suzanne I Robertson  
Paul Robinson  
Laurence G Roddick  
A Ronan  
Andrew R Rosenberg  
Greg Rowell  
Susan J Russell  
Sharon Ryan  
Peter J Rye  
Mark Selikowitz  
Christopher Seton

## Clinicians Returning 100% Monthly Report Cards in 2009

Arun S Shanker  
 Peter Shaw  
 Vijay Shingde  
 Gary F Sholler  
 Albert Shun  
 Martin Silink  
 David O Sillence  
 Natalie Silove  
 Dragica Singer-Remeljan  
 Davinder Singh-Grewal  
 John K H Sinn  
 Grahame Smith  
 Robert Smith  
 Soundappan Soundappan  
 Bernard J N St. George  
 Anna Stachurska  
 Jacqueline A Stack  
 Jean Starling  
 David R Starte  
 Kate Steinbeck  
 Glenn Stephens  
 Michael M Stevens  
 H Victor Storm  
 John E Stuart  
 Lee Sutton  
 Jonny Taitz  
 Arthur Teng  
 Andrew Terrey  
 Kathryn E Thacker  
 Ganesha Thambipillay  
 James B W Thomas  
 Ronda L Ticehurst  
 Rodney L Tobiansky  
 Susan J Towns  
 Toby Trahair  
 Javeed Travadi  
 Anne M Turner  
 Dimitra Tzioumi  
 A B Underwood  
 Duc Ngoc Van  
 Peter Van Asperen  
 P K J Van Vliet  
 Mary Varughese  
 Charles Verge  
 Graham V Vimpani  
 Anne F Vimpani  
 Brynn Wainstein  
 Chris Wake  
 J L Walker  
 Anna Ward  
 Meredith Ward  
 Philip Watt  
 Mary-Clare Waugh  
 Christopher F Webber  
 Murray T Webber  
 Dylan Wesley  
 Carolyn M West  
 Mark A Westphalen  
 Bruce Whitehead  
 Catherine R Wiles-Harrell  
 Ian Wilkinson  
 Helen F Wilkinson  
 George L Williams  
 Gary Williams  
 Meredith Wilson  
 Catherine Wiltshire  
 Carola Wittekind  
 Nicholas Wood  
 Helen Woodhead  
 Susan Woolfenden  
 Lisa Catherine Worgan  
 Ian Wright  
 Michael Wu  
 Barry E Wyeth  
 Berlinda Yeoh  
 Terence Yoong  
 John B Ziegler

David Ziegler  
 Michael Zilibowitz  
 Karen Zwi  
**NT**  
 Paul A M Bauert  
 Rosemary E Fahy  
 Deborah Fearon  
 Carolyn MacLennan  
 Sarah Martin  
 Peter S Morris  
 Victor Nossar  
 Kathryn Roberts  
 Susan Skull  
 Monique Stone  
 Annie Whybourne  
**QLD**  
 Jason Acworth  
 Leslie Ah Yui  
 Erica Baer  
 Deborah Bailey  
 Sasaka Bandaranayake  
 Ruth Barker  
 Donna Bostock  
 David R Brewster  
 Richard P B Brown  
 Helen M Buntain  
 Scott Burgess  
 John R Burke  
 Leisha A Callaghan  
 Gregory I Carman  
 Theresa A Carroll  
 David W Cartwright  
 Richard E Cherry  
 Ronald C Clark  
 Geoffrey J Cleghorn  
 John Coghlan  
 Paul B Colditz  
 Jan Connors  
 Lucy Helen Cooke  
 Lisa Copeland  
 Andrew Cotterill  
 John W Cox  
 Maree G Crawford  
 Penelope Cruickshanks  
 Jan A Cullen  
 Mark W Davies  
 Neville G Davis  
 Peter J DeBuse  
 Maureen Dingwall  
 R D Diplock  
 Tanya Dodman  
 Timothy John Donovan  
 Nigel David Dore  
 Aaron Mark Easterbrook  
 Priya Edwards  
 Loui Ee  
 Ian I Findlay  
 Catriona Fleming  
 William Frischman  
 Michael Gabbett  
 Donna Gandini  
 Michael R Gattas  
 John B Gavranich  
 Glen A Gole  
 Bruce Goodwin  
 Peter H Gray  
 Leonie M Gray  
 Simon Grew  
 Keith Grimwood  
 Andrew R Hallahan  
 Alison Harris  
 Margaret-Anne Harris  
 Katrina Harris  
 Glenn J Harte  
 Phillip J Harvey  
 Tim E G Hassall  
 Richard Heazlewood

Shivanand Hebbandi  
 Anthony Herbert  
 Helen S Heussler  
 Margaret Holloway  
 Johanna M Holt  
 Elizabeth M Hurron  
 Garry Inglis  
 Helen Irving  
 Lisa Kane  
 Sumant Kevat  
 Paul Koch  
 J Anne Kynaston  
 Peter J Lewindon  
 Bruce R Lewis  
 Helen Liley  
 Margaret A Little  
 Gillian Mahy  
 Louise Suzanne Marsh  
 John R McCreanor  
 David B McCrossin  
 Michael McDowell  
 James J McGill  
 Michael McGill  
 Andrea McGlade  
 Lynne McKinlay  
 Kim Alison McLennan  
 Sarah McMahon  
 Steven McTaggart  
 Julian D Mellick  
 Hilary P Mercer  
 Ross D Messer  
 Malcolm N Miller  
 Ryan Mills  
 Susan Moloney  
 David J Moore  
 Brian D Morris  
 Richard Mulcahy  
 Michael D Nissen  
 Gary Niven  
 Clare Nourse  
 Trevor E Olsen  
 Peter S O'Regan  
 Julie Panetta  
 Julian H Paxton  
 James T Pelekanos  
 David R Pincus  
 Ross Pinkerton  
 Jose A Prado  
 Jeffrey J Prebble  
 Nicola Previtera  
 Darrell A Price  
 Marlon Radcliffe  
 Toni Redman  
 Fergus A C Ring  
 Peter Roddenby  
 David A Rogers  
 Peter C Roper  
 Richard F Roylance  
 Patrick J Ryan  
 Christopher J Ryan  
 James A Scorer  
 Geoffrey Seet  
 Wei Seto  
 Doug CShelton  
 Alan ASive  
 Catherine Y Skellern  
 Anthony J Slater  
 Peter Kenneth Smith  
 Velencia Soutter  
 Harry Stalewski  
 S L Stathis  
 Lila Stephens  
 Mark Stretton  
 David Symmons  
 Donna Taylor  
 Fiona Thomson  
 Susan Thornton

Alison Tigg  
 Liam Tjia  
 Otilie Adrienne Tork  
 Deanna Kathryn True  
 David I Tudehope  
 Jasper Van der Westhuyzen  
 Claire E Wainwright  
 Rosslyn M Walker  
 Cameron J B Ward  
 Timothy H Warnock  
 Kerri-lyn Webb  
 Andrew White  
 John S Whitehall  
 Neil R Wigg  
 Michael L Williams  
 Judy A Williams  
 Sue Wilson  
 Suzanne Wilson  
 David C Winkle  
 David Wood  
 Paul G Woodgate  
 Nicholas F Woolfield  
**SA**  
 K Abbott  
 Phillip Adams  
 David A Baulderstone  
 George P Blake  
 Christina A Boros  
 Hilary Boucaut  
 Yumin Chan  
 Anthony Chitti  
 Brian Coppin  
 Richard T L Couper  
 Terence George Donald  
 Philip R Egan  
 Vanessa J Ellison  
 Janice M Fletcher  
 Kevin D Forsyth  
 John K Freeman  
 Liberty Gallus  
 Michael S Gold  
 Paul N Goldwater  
 Andrew W Grieve  
 Eric A Haan  
 T T S Han  
 Abu Haque  
 Michael G Harbord  
 Ross R Haslam  
 Bevan Headley  
 Paul H Henning  
 Malcolm A Higgins  
 Anthony R Israel  
 Judith A Jaensch  
 Deepa Jeyaseelan  
 Kenneth F Jureidini  
 Jon Jureidini  
 Andrew Kelly  
 Janine Kelly  
 J D Kennedy  
 David B Ketteridge  
 Maria Kirby  
 Margaret Anne Kummerow  
 Margaret R Kyrkou  
 Paul Lang  
 Jan Liebelt  
 Paul D Machet  
 Clare Macvicar  
 Peter B Marshall  
 David J Moore  
 Scott Morris  
 Christopher L Munt  
 Josie Nozza  
 Maree O'Keefe  
 Christopher C Pearson  
 Peter A Petek  
 Robert P Pollnitz  
 Nicola K Poplawski



# Clinicians Returning 100% Monthly Report Cards in 2009

Richard G Power  
Peter C Prager  
Patrick J Quinn  
Jeremy Raftos  
Tamas Revesz  
Michael S Rice  
James Rice  
Malcolm Richardson  
Terence Patrick Robertson  
Jacqueline Kaye Schutz  
Michael J Smiley  
Gregory J Smith  
Neil Smith  
Anthony Sparnon  
Nigel L Stewart  
Felix K Y Tan  
Billy S Tao  
Heather Tapp  
Mark A Thesinger  
David G Thomas  
Elizabeth M Thompson  
Deirdre A White  
Rosa Zarrinkalam

## TAS

Neil Atherton  
Christopher J Bailey  
Sean Beggs  
Allan Carmichael  
Peter A Dargaville  
John Daubenton  
Tony De Paoli  
Anthony J Dunstan  
Edmond J M Fenton  
Bronwyn Fitzgerald  
Peter J Flett  
Evelyn Funk-Bowles  
Valerie M Hewitt  
Brenda McCann  
Tom McDonagh  
Mark M Pascoe  
Bert Shugg  
David Strong  
Charlotte Margaret Whitelaw  
Michelle Williams

## VIC

Roger C Allen  
Nabil E Ameen  
David Amor  
Stuart G Anderson  
Ylva Andersson  
Giuliana C Antolovich  
Kenneth L Armstrong  
David S Armstrong  
Alexander W Auldish  
Gordon Baikie  
David G Bannister  
Peter L J Barnett  
Philip B Bergman  
Julie E Bines  
John M Bishop  
Simon P Blair  
Ellen D Bowman  
Paul Brooks  
Justin Brown  
Fiona D Brown  
David P Burgner  
Donald J S Cameron  
Fergus J Cameron  
Martin Campbell  
William D Capell  
David J Carolane  
Elizabeth A Carse  
Daniel Casalaz  
Bronwyn A Cathels  
A G Catto-Smith  
C Chandran  
Anthony Chin  
Tracy Coleman  
Jacinta M Coleman

Kevin J Collins  
Simon Costello  
John M Court  
Noel E Cranswick  
Nigel Crawford  
Mick Creati  
Nigel Curtis  
David A Cutting  
Andrew J Daley  
Margot J Davey  
Peter Davis  
Noni M Davis  
Amol Daware  
Martin B Delatycki  
Peter S Dewez  
Natashia Dilla  
Peter Andrew Downie  
David Campbell Downing  
John Hedley Drew  
Karen Leslie Dunn  
Kevin Bernard Dunne  
Peter James Eastaugh  
Maurice Kelvin Easton  
Daryl Efron  
Adrian M Elderhurst  
Michael Fahey  
Wei Qi Fan  
Wolf-Christian Fiedler  
Geoffrey W Ford  
Peter J Forrest  
Mike Forrester  
Bronwyn M Francis  
Peter D Francis  
Simon Fraser  
Jolene M Fraser  
Jeremy Leighton Freeman  
Nicholas J Freezer  
David Fuller  
Danny E Garrick  
Susan Gibb  
Tiow-Hoe Goh  
Sheena Gune  
Julia Gunn  
Dennis Hain  
Elizabeth Hallam  
Michael D Harari  
Winita Hardikar  
Simon Harvey  
Richard Haslam  
Simon Hauser  
Sari Hayllar  
Michael Hayman  
John A Heath  
Katie L Heathershaw  
Robert D Henning  
David J Hill  
Harriet Hiscock  
Nigel W J Hocking  
Geoffrey G Hogg  
James Holberton  
Sarah Hope  
Robyn L Hore  
Sian M C Hughes  
Ian E Humphrey  
Rod W Hunt  
John G Hunter  
John M Hutson  
Susan E Jacobs  
Frederick C Jarman  
Bernard M Jenner  
David L Johnson  
Diana Lynne Johnston  
Lilian Johnstone  
Colin Lindsay Jones  
Bryn Jones  
Joshua Y Kausman  
Justin H Kelly  
Julian Kelly  
Hugh Kelso

Caroline Killick  
A Richard Kitching  
Andrew J Kornberg  
Barry D Kras  
Renata Kukuruzovic  
Pei-Yoong Lam  
Lee Chyi Lam  
Geoffrey K Lane  
Teresa Lazzaro  
Thomas J Lee  
Stuart K Lewena  
Anthony Lewis  
Robert F Lim  
Alissa Lim  
Peter M Loughnan  
Andrew William Lovett  
Edwin J Lowther  
Lionel Lubitz  
Catherine Lynch  
Emma Magrath  
Leslie J Markman  
Michael K Marks  
Catherine Marraffa  
R John H Massie  
Catherine McAdam  
Zoe McCallum  
Joanna McCubbin  
Peter N McDougall  
Karen McLean  
John A McLennan  
Kathy McMahon  
Neil D McMullin  
R B McNeill  
David Meldrum  
Samuel Menahem  
John F Mills  
P T Monagle  
Martina Moorkamp  
Margot Nash  
Terence M Nolan  
M J Nowotny  
Frank Oberklaid  
Shane O'Dea  
Anne O'Neill  
Carl J Orkin  
Greg M Pallas  
Chris Pappas  
Campbell Paul  
Georgie Paxton  
Roderic J Phillips  
Harley R Powell  
Jenny Proimos  
Ian D Rawlinson  
Dinah S Reddihough  
Gehan Roberts  
Colin F Robertson  
Philip James Robinson  
Christine Rodda  
Sheryle Rogerson  
Robert Roseby  
Phillip Rosengarten  
Elisa Rough  
Margaret Rowell  
Christine Sanderson  
Kerryn R Saunders  
R Savarirayan  
Susan Sawyer  
Ingrid E Scheffer  
Adam M Scheinberg  
Jill R Sewell  
David Sholl  
Peter Simm  
Ian J Skelton  
Elizabeth Smibert  
Lindsay J Smith  
Jennifer A S Smith  
Andrea Smith  
Mike South  
Mike Starr

John Stevens  
Michael J Stewart  
Amanda Stock  
Terry G Stubberfield  
Robert Stunden  
Joseph Tam  
Mimi Tang  
Nick H Thies  
Katherine Thomson  
David Tickell  
Karin Tiedemann  
Brian J M Timms  
David Gerald Tingay  
Anne-Marie Turner  
Martin Tuszyński  
Peter Jason Vuillermin  
Rowan G Walker  
Amanda M Walker  
Garry L Warne  
Keith D Waters  
Peter W Wearne  
Annette N Webb  
Robert G Weintraub  
Anthony P Weldon  
George Werther  
Susan White  
Sumitra F Wickramasinghe  
Martin C Wright  
Joy Yapito-Lee  
Michele Yeo  
Margaret Zacharin  
Harry Zehnwrith

## WA

Sabine Afchani  
Angela J Alessandri  
Gareth Baynam  
Lynda M Chadwick  
Gervase M Chaney  
Hock Leng Chua  
Barry S Clements  
Harvey L C Coates  
Peter N Le Souef  
Catherine H Cole  
Joanne Colvin  
Charles Crompton  
Luigi D'Orsogna  
Harry Dumbell  
Simon J Erickson  
Ian James Everitt  
Philomena Fitzgerald  
Noel P French  
Katharine Gardiner  
Gary C Geelhoed  
Andrew Gill  
Ian J Gollow  
Elizabeth Green  
Sasson S Gubbay  
Anna Gubbay  
Linda A Harris  
Petra Hartmann  
T Rex Henderson  
Ian K Hewitt  
Louise Houlston  
Michelle Howell  
Christine A Jeffries-Stokes  
Mohammad Jehangir  
Timothy W Jones  
Bradley Jongeling  
Andrew Douglas Kennedy  
C Kikiros  
Cathy Kiraly-Borri  
Geoffrey J Knight  
Rolland Kohan  
Alpana Kulkarni  
Hemant Anant Kulkarni  
Katherine M Langdon  
Cherry Martin  
Andrew Martin  
Robert McClure

## Clinicians Returning 100% Monthly Report Cards in 2009

Michaela McGregor  
Fiona McKenzie  
Judy E McMichael  
Helen J Mead  
Divyesh Mehta  
Corrado Minutillo  
Kevin J Murray  
Lakshmi Nagarajan  
Rama Naidoo  
Murali Narayanan  
Flemming H Nielsen

Mark Parker  
Aida Partridge  
Shveta T Patel  
Sanjay Patole  
Donald Payne  
Bronwyn Peirce  
Marianne Phillips  
Susan L Prescott  
P James S Price  
James Ramsay  
Christiane Remke

Steven Resnick  
Peter C Richmond  
David E Roberts  
Peter W Rowe  
Andrew Neil Savery  
Mary J Sharp  
Aris Siafarikas  
Peter J Silberstein  
Desiree Silva  
M Slattery  
Jennie Slee

Alide Smit  
Colin Somerville  
Johana Stefan  
Russell G Troedson  
Jack B Vercoe  
Ian R Walpole  
Michael Watson  
Amanda Wilkins-Shurmer

## Clinicians Reporting Cases in 2010

### ACT

Alison Kent  
Abdel-Latif Mohamed

### NSW

Wendy Allen  
Jacqueline Kay Andrews  
Nadia Badawi  
Philip J Beeby  
Gilda B Bonacruz-Kazzi  
Adam Buckmaster  
Kathryn Carmo  
Jeffrey Chaitow  
Raymond Chaseling  
Robin K C Choong  
Paul Craven  
Russell Dale  
John A De Courcy  
Mark De Souza  
Barry John Duffy  
Anne Maria Durkan  
Jonathan Egan  
Peter D Eisman  
Carolyn Jane Ellaway  
Phillip John Emder  
Adrienne G Epps  
Anthony D Epstein  
Nick Evans  
Marino Festa  
Dominic A Fitzgerald  
Joanne Ging  
Helen Margaret Goodwin  
Adrienne Gordon  
Doaa Habashy  
David Hartshorn  
Jason Hort  
David Isaacs  
Mary Iskander  
Stephen Jacobe  
Cheryl Anne Jones  
Allan Kelly  
Sean Kennedy  
Alison M Kesson  
Jan Klimek  
Stephen Knipe  
Ian D Lennon  
Michael Lonergan  
Kei Lui  
Melissa Christine Luig  
Larissa Mackey  
Albert Mansour  
Susan M Marks  
Kieran T Moran  
Desmond L Mulcahy  
Patricia E Mutton  
Anandhan P Naidoo  
David A Osborn

Pamela Palasanthiran  
Ken Peacock  
Elizabeth Peadon  
James P Pendergast  
Nick Pigott  
Jason Pinner  
Susan Piper  
Keith M Power  
Marilyn Rochefort  
David N Schell  
Davinder Singh-Grewal  
Soundappan Soundappan  
Anna Stachurska  
Jacqueline A Stack  
David R Starte  
Lee Sutton  
Juliana Tze  
Khang Teo  
Rodney L Tobiansky  
Dimitra Tzioumi  
Maureen van Rossum du Chattel  
Meredith Ward  
Murray T Webber  
Richard Webster  
Mark A Westphalen  
Barry Wilkins  
Caroline Williams  
John B Ziegler

### NT

Jonathan R Carapetis  
Carolyn MacLennan  
Louise Martin  
Peter S Morris  
Monique Stone  
Annie Whybourne

### QLD

Donald B Adsett  
Robyn M Brady  
Richard P B Brown  
David W Cartwright  
Maree G Crawford  
Alison Cupitt  
Mark W Davies  
Peter J DeBuse  
Timothy John Donovan  
Aaron Mark Easterbrook  
Lesley B Everard  
Peter H Gray  
Leonie M Gray  
Alison Harris  
Katrina Harris  
Richard Heazlewood  
Helen S Heussler  
Elizabeth M Hurron  
Susan Ireland

Peter Dominic Jones  
Pieter Koorts  
Helen Liley  
Julie McEniery  
Andrea McGlade  
David McMaster  
Steven McTaggart  
Ryan Mills  
Susan Moloney  
David J Moore  
Anthony Morosini  
Clare Nourse  
Mark Painter  
Brian R Patten  
Jeffrey J Prebble  
Ian F Robertson  
Patrick J Ryan  
Wei Seto  
Rachel Susman  
Clare Thomas  
Claire E Wainwright  
Timothy H Warnock  
Andrew White  
Jason Wildschut  
Michael L Williams

### SA

Christina A Boros  
Terence George Donald  
Philip R Egan  
Vanessa J Ellison  
Paul N Goldwater  
Ross R Haslam  
Malcolm A Higgins  
David B Ketteridge  
Maria Kirby  
Jan Liebelt  
Scott Morris  
Peter C Prager  
Suzanna Thompson  
M W Yung

### TAS

Christopher J Bailey  
Peter A Dargaville  
David Strong

### VIC

Jim Buttery  
Elizabeth A Carse  
A G Catto-Smith  
Jeanie L Y Cheong  
Tracy Coleman  
Tom Connell  
Noel E Cranswick  
Richard R Doherty  
Maurice Kelvin Easton  
Austen Lawrence Erasmus

Mike Forrester  
Michelle Giles  
Julia Gunn  
Dennis Hain  
Simon Harvey  
Sari Hayllar  
Ralf Heine  
Susan E Jacobs  
Diana Lynne Johnston  
Lilian Johnstone  
Andrew William Lovett  
Thao Lu  
Lionel Lubitz  
Gideon Lurie  
Michael K Marks  
Catherine McAdam  
Kathy McMahon  
Margot Nash  
Carl J Orkin  
Nicole Claire Robins-Browne  
Elisa Rough  
Monique Ryan  
Lara S Shekerdemian  
Peter Jason Vuillermin

### WA

Daniel Alexander  
Christopher Blyth  
Andrew M Bullock  
Catherine H Cole  
Simon J Erickson  
Katharine Gardiner  
Andrew Gill  
Geraldine Goh  
Rafiq Hemani  
Louise Houlston  
Farhat Hussain  
Christine A Jeffries-Stokes  
Mohammad Jehangir  
Alice Johnson  
Geoffrey J Knight  
Helen Leonard  
Flemming H Nielsen  
Aida Partridge  
Donald Payne  
P James S Price  
James Ramsay  
Shripada Rao  
Steven Resnick  
Jacqueline M Scurlock  
Jack B Vercoe  
Ian R Walpole  
Andrew Michael Wawryk

# Clinicians Returning 100% Monthly Report Cards in 2010

## ACT

Judith L Bragg  
Ann Crawshaw  
Ian F Crawshaw  
G David Croaker  
Amelia M Herath  
Hilary A Holmes  
Paul I Jenkins  
Penelope J Johnson  
Zsuzsoka (Susanne) Kecskes  
Alison Kent  
Antony Lafferty  
Timothy McDonald  
Abdel-Latif Mohamed  
Suzanne M Packer  
Suzanna Powell  
Graham J Reynolds  
Michael J Rosier  
Erroll Simpson

## NSW

C Abkiewicz  
Julie C Adamson  
Shirley Alexander  
Hugh D W Allen  
Wendy Allen  
Geoff Ambler  
Rosemary Ambler  
Alan F Amos  
Jacqueline Kay Andrews  
Michael Anscombe  
Jayne H Antony  
Elizabeth Argent  
John D Arnold  
Bindu Baburaj  
Nadia Badawi  
Lynn Banna  
Peter A Barr  
Louise A Baur  
Vivian V Bayl  
Philip J Beeby  
Yvonne Belessis  
Graham J Bench  
G P Bent  
Jennifer Berg  
Andrew Berry  
Vivek Bhadri  
Rani Bhatia  
Habibur Rehman Bhurawala  
Stewart Birt  
Roger Blackmore  
(Alice) Bijou Blick  
Paul Bloomfield  
Gilda B Bonacruz-Kazzi  
Robert Booy  
Jennifer R Bowen  
Nick Boyd  
Kerry Brown  
Gary Browne  
Michael P Brydon  
Adam Buckmaster  
P Buckner  
Vicki Burneikis  
Donald L Butler  
Anne M E Bye  
Patrina Ha Yuen Caldwell  
Ian Callander  
Peter J Campbell  
Dianne Campbell  
Thomas Arthur Campbell  
Jeffrey Chaitow  
Janis D Chamberlain  
Bronwyn J Chan  
Paul C Chay  
Kity Chee  
Alan Cheng  
Howard W Chilton  
Raymond Chin  
Alan Y H Chong

David Christie  
John Christodoulou  
Robert Sin Liang Chu  
Yew-Wee Chua  
Simon D Clarke  
John C Coakley  
Ralph C Cohen  
Des Cohen  
Simon Cohen  
Richard J Cohn  
Alison F Colley  
Felicity A Collins  
Anne F Collins  
James S Colquhoun-Kerr  
J R Coomarasamy  
Peter John Cooper  
Stephen Geoffrey Cooper  
Carolyn Cooper  
Elizabeth A M Cotterell  
Carolyn Cottier  
Eric S Coudounaris  
Heather Coughtrey  
Jonathon Craig  
Maria Craig  
Paul Craven  
Stuart Crisp  
Genevieve E Cummins  
John Curotta  
Shane Curran  
Bruce Currie  
Julie A Curtin  
Jacqueline Dalby-Payne  
Russell Dale  
Patricia Davidson  
Robert Davies  
Robert Day  
John A De Courcy  
Mark De Souza  
Koert de Waal  
Michael J Deloughery  
Anthony Dilley  
Kim Donaghue  
Peter John Donald  
Ana Maria Dosen  
David Dossetor  
John Robert Douglas  
Barry John Duffy  
Scott Dunlop  
Linda Durojaiye  
Shoma Dutt  
Peter William Ebeling  
Matthew J Edwards  
Fergus Elder  
Carolyn Jane Ellaway  
Phillip John Emden  
Adrienne G Epps  
Anthony D Epstein  
John B Erikson  
Nick Evans  
Robert H Farnsworth  
Bruce J Fasher  
Michael Fasher  
John M Feller  
Penelope Field  
Michael J Field  
Dominic A Fitzgerald  
Fiona Fleming  
Jeff Fletcher  
Bob K J Fonseca  
Michael R Frelander  
Stuart M Gadd  
Andrew J Gardiner  
Madlen Gazarian  
Maurice D Gett  
Sondhya Ghedia  
Henry J Gilbert  
Deepak Gill  
Anna Clare Gill

Joanne Ging  
Neil D Ginsberg  
Chin Lum Goh  
Safak Goktogan  
Maria Linette Gomes  
P M Goodhew  
Linda Louise Goodwin  
Helen Margaret Goodwin  
Thomas M Grattan-Smith  
Padraic Grattan-Smith  
Toby D R Greenacre  
Robert Guaran  
Maree Guizzo  
Hasantha Gunasekera  
Julie M Haas  
Doaa Habashy  
Anna Hackett  
Robert J Halliday  
Nils F Hanson  
Ralph M Hanson  
Robert J Hardwick  
Richard K Hart  
David Hartshorn  
John G Harvey  
Richard E Hawker  
Philip L Hazell  
Guy Henry  
Steven Hing  
Ken Ho  
Yoon Mei Ho  
Peter Hogan  
Andrew Holland  
James C S Hong  
Maxwell Hopp  
Jason Hort  
Keith M Howard  
Neville J Howard  
Robert Howman-Giles  
Christine Hughes  
Paul Hutchins  
Christopher B Ingall  
Michelle M Jack  
Reuben Jackson  
Adam Jaffe  
Allan James  
Con A James  
Robyn Jamieson  
Heather E Jeffery  
Sandra L J Johnson  
Patricia M Johnson  
Owen Jones  
Cheryl Anne Jones  
Kristi J Jones  
Preeti Joshi  
Colin Kable  
G M Kainer  
Alyson M Kakakios  
Hala Katf  
Stewart J Kellie  
Debra Kennedy  
Sean Kennedy  
Allan M G Kerrigan  
Alison M Kesson  
Bruce King  
Eli Kleiner  
Martin R Kluckow  
Paul W Knight  
Karen Knoll  
Michael Kohn  
Phillip Kolos  
Kasia Kozlowska  
Peter Kristidis  
Rajendra Kumar  
M Kumaradeva  
Maria Kyriagis  
Ahti T Lammi  
Basiliki (Bessy) Lampropoulos  
K C Lau

John A Lawson  
Joanne Leal  
J Lemoh  
Ian D Lennon  
Garth I Leslie  
Jane Mary Lesslie  
David Lester-Smith  
Florence Levy  
Deborah J Lewis  
David Lillystone  
A S C Lim  
Daniel C S Lin  
Anthony Jun Wing Liu  
B H Lo  
Michael Loneragan  
Alison Loughran-Fowlds  
O Lozynsky  
Melissa Christine Luig  
Kristine Macartney  
John Macdessi  
Kerrie T MacDonald  
Sloane Madden  
Annabel K Magoffin  
Albert Mansour  
Glenn M Marshall  
Frank J Martin  
Hugh C O Martin  
Bradley Martin  
Tania May  
Emma McCahon  
Robert McCarthy  
Mary McCaskill  
C R (Rod) McClymont  
Tim McCrossin  
David T McDonald  
Jennifer L McDonald  
Ann McDonald  
Anne McGeechan  
Gayle McInerney  
Peter B McIntyre  
Margot McIver  
Patricia McVeagh  
Sam Mehr  
Michael Melamdowitz  
Tracey Merriman  
Susan M Messner  
Bronwyn Milne  
Joseph P Moloney  
Anne Morris  
John R Morton  
David R Mowat  
Desmond L Mulcahy  
Craig Munns  
David N Murphy  
Marea W Murray  
Patricia E Mutton  
Anandhan P Naidoo  
Ralph Nanan  
Ranjit Nanra  
Kathryn North  
Ju Oei  
Stephen J O'Flaherty  
Fenton O'Leary  
Matthew W O'Meara  
David A Osborn  
Pamela Palasanthiran  
Con Papadopoulos  
Dimitrios Papadopoulos  
Mary Paradisis  
Julianne Parle  
Patrick Patradoon-Ho  
Ken Peacock  
Elizabeth Peadon  
James P Pendergast  
Deborah G Perkins  
Megan Phelps  
Susan Phin  
Elizabeth Pickford

## Clinicians Returning 100% Monthly Report Cards in 2010

Jason Pinner  
Susan Piper  
Michael Plaister  
Jaqueline C Pollack  
Melvyn Polon  
Christopher C Poon  
Alison Poulton  
Keith M Power  
Peter G Procopis  
Karin L Proudman  
Stephen D Pryde  
Kerry Quinn  
Patrick M Rahilly  
Shanti Raman  
Andrew Rechtman  
Rebecca Richardson  
Ingrid D Rieger  
Suzanne I Robertson  
Peter Robinson  
Paul Robinson  
Marilyn Rochefort  
Laurence G Roddick  
A Ronan  
Andrew R Rosenberg  
Greg Rowell  
Gerard Roy  
Sharon Ryan  
Peter J Rye  
Terry M Sands  
Vanessa Sarkozy  
Charles M Scarf  
Mark Selikowitz  
Christopher Seton  
Arun S Shanker  
Peter Shaw  
Gary F Sholler  
Albert Shun  
Martin Silink  
David O Silience  
Natalie Silove  
John K H Sinn  
Ingrid Sinnerbrink  
Jacqueline E Small  
Grahame Smith  
Robert Smith  
Soundappan Soundappan  
Shubha Srinivasan  
Bernard J N St. George  
Anna Stachurska  
Jacqueline A Stack  
Jean Starling  
David R Starte  
Kate Steinbeck  
Glenn Stephens  
Michael M Stevens  
H Victor Storm  
Gopinath Musuwadi  
Subramanian  
Lee Sutton  
Paul R Tait  
Arthur Teng  
Juliana Tze  
Khiang Teo  
Andrew Terrey  
Kathryn E Thacker  
Ganesha Thambipillay  
Ronda L Ticehurst  
Rodney L Tobiansky  
Susan J Towns  
Mark B Tracy  
Toby Trahair  
Javeed Travadi  
Anne M Turner  
Dimitra Tzioumi  
A B Underwood  
Duc Ngoc Van  
Peter Van Asperen  
Maureen Van Rossum du Chattel

Charles Verge  
Graham V Vimpani  
Anne F Vimpani  
Brynn Wainstein  
Chris Wake  
J L Walker  
Anna Ward  
Meredith Ward  
Philip Watt  
Mary-Clare Waugh  
Christopher F Webber  
Murray T Webber  
Richard Webster  
Dylan Wesley  
Carolyn M West  
Mark A Westphalen  
Bruce Whitehead  
Catherine R Wiles-Harrell  
Barry Wilkins  
George L Williams  
Gary Williams  
Meredith Wilson  
Carola Wittekind  
Nicholas Wood  
Lisa Catherine Worgan  
Ian Wright  
Barry E Wyeth  
Kylie Meredith Yates  
Berlinda Yeoh  
Suky Yim  
Terence Yoong  
Simon Young  
Andrea Zalan  
John B Ziegler  
David Ziegler  
Karen Zwi  
**NT**  
Jonathan R Carapetis  
Anita Lucia D'Aprano  
Rosemary E Fahy  
Raj (Angraj) Khillan  
Carolyn Maclellan  
Louise Martin  
Peter S Morris  
Victor Nossar  
Susan Skull  
Monique Stone  
Annie Whybourne  
**QLD**  
Jason Acworth  
Donald B Adsett  
Leslie Ah Yui  
Gary S Alcock  
Donald B Appleton  
Erica Baer  
Deborah Bailey  
Sasaka Bandaranayake  
Ruth Barker  
Jennifer A Batch  
Donna Bostock  
Christopher Bourke  
Michelle Boyd  
Robyn M Brady  
Richard P B Brown  
Helen M Buntain  
Scott Burgess  
John R Burke  
Anita Cairns  
Leisha A Callaghan  
Laxmi Camadoo  
Gregory I Carman  
Theresa A Carroll  
David W Cartwright  
Richard E Cherry  
Ronald C Clark  
Geoffrey J Cleghorn  
John Coghlan  
Paul B Colditz  
Timothy Colen

Frances L Connor  
Louise Conwell  
Lucy Helen Cooke  
Lisa Copeland  
Andrew Cotterill  
John W Cox  
Maree G Crawford  
Penelope Cruickshanks  
Jan A Cullen  
Armando Da Silva  
Mark W Davies  
Neville G Davis  
Mark Davoren  
Catherine Dawson  
Peter J DeBuse  
Apaks Dede  
Maureen Dingwall  
R D Diplock  
Tanya Dodman  
Timothy John Donovan  
Nigel David Dore  
Aaron Mark Easterbrook  
Priya Edwards  
Loui Ee  
Ian I Findlay  
Catriona Fleming  
William Frischman  
Michael Gabbett  
Donna Gandini  
Michael R Gattas  
Yuri Gilhotra  
Glen A Gole  
Bruce Goodwin  
Peter H Gray  
Simon Grew  
Keith Grimwood  
Andrew R Hallahan  
Alison Harris  
Margaret-Anne Harris  
Glenn J Harte  
Phillip J Harvey  
Tim E G Hassall  
Richard Heazlewood  
Shivanand Hebbandi  
Anthony Herbert  
Margaret Holloway  
Johanna M Holt  
Thomas M Hurley  
Elizabeth M Hurrian  
Garry Inglis  
Susan Ireland  
Helen Irving  
Ronald W James  
Luke Jardine  
Christopher M Johansson  
Robert N Justo  
Lisa Kane  
Sumant Kevat  
Paul Koch  
Guan Koh  
Pieter Koorts  
J Anne Kynaston  
Peter J Lewindon  
Bruce R Lewis  
Bruce G Lister  
Liane R Lockwood  
Gillian Mahy  
Elena J Mantz  
Vesna Markovic  
Louise Suzanne Marsh  
John R McCreanor  
David B McCrossin  
Michael McDowell  
James J McGill  
Michael McGill  
Andrea McGlade  
Lynne McKinlay  
Kim Alison McLennan  
Sarah McMahon

David McMaster  
Steven McTaggart  
Julian D Mellick  
Hilary P Mercer  
Ross D Messer  
Malcolm N Miller  
Ryan Mills  
Haseena Mohamed  
Susan Moloney  
David J Moore  
Anthony Morosini  
Richard Mulcahy  
Gary Niven  
Clare Nourse  
Michael J O'Callaghan  
Trevor E Olsen  
Mansu Pabari  
Brian R Patten  
Jane E Peake  
James T Pelekanos  
David R Pincus  
Ross Pinkerton  
Jeffrey J Prebble  
Nicola Previtera  
Darrell A Price  
Marlon Radcliffe  
Fergus A C Ring  
Ian F Robertson  
Jeremy Robertson  
Peter Roddenby  
David A Rogers  
Peter C Roper  
Richard F Roynance  
Patrick J Ryan  
Phil Sargent  
James A Scorer  
Geoffrey Seet  
Wei Seto  
Doug C Shelton  
E Shi  
Katharine G (Kate) Sinclair  
Alan A Sive  
Catherine Y Skellern  
Anthony J Slater  
B David Slaughter  
Peter Kenneth Smith  
Jennifer B Smith  
Velencia Soutter  
Harry Stalewski  
S L Stathis  
Lila Stephens  
Mark Stretton  
David Symmons  
Donna Taylor  
Clare Thomas  
Susan Thornton  
Alison Tigg  
Liam Tjia  
Otilie Adrienne Tork  
Uyen Tran  
David I Tudehope  
Claire E Wainwright  
Rosslyn M Walker  
Geoffrey B Wallace  
Cameron J B Ward  
Christopher Ward  
Timothy H Warnock  
John H N Waugh  
Kerri-lyn Webb  
John S Whitehall  
Neil R Wigg  
Michael L Williams  
Judy A Williams  
Sue Wilson  
David C Winkle  
Geoffrey Withers  
Stephen Withers  
David Wood  
Paul G Woodgate

# Clinicians Returning 100% Monthly Report Cards in 2010

P K J Van Vliet  
 Mary Varughese  
 Nicholas F Woolfield  
**SA**  
 K Abbott  
 Phillip Adams  
 David A Baulderstone  
 John Bethell  
 Vineesh Bhatia  
 George P Blake  
 Christina A Boros  
 Hilary Boucaut  
 Theresa Casey  
 Yumin Chan  
 Anthony Chitti  
 Richard Cockington  
 Brian Coppin  
 Richard T L Couper  
 Terence George Donald  
 Philip R Egan  
 Vanessa J Ellison  
 David S Everett  
 Janice M Fairchild  
 Janice M Fletcher  
 John K Freeman  
 Liberty Gallus  
 Michael S Gold  
 Paul N Goldwater  
 Andrew W Grieve  
 Eric A Haan  
 Paul Hammond  
 T T S Han  
 Abu Haque  
 Michael G Harbord  
 Ross R Haslam  
 Bevan Headley  
 Paul H Henning  
 Malcolm A Higgins  
 Anthony R Israel  
 Judith A Jaensch  
 Simon L James  
 Deepa Jeyaseelan  
 Kenneth F Jureidini  
 Jon Jureidini  
 Andrew Kelly  
 J D Kennedy  
 David B Ketteridge  
 Maria Kirby  
 Margaret R Kyrkou  
 Christopher M Lamb  
 Paul Lang  
 Diana M Lawrence  
 Patrina Lee  
 Paul D Machet  
 Peter B Marshall  
 Andrew J McPhee  
 David J Moore  
 Scott Morris  
 Phil S Munt  
 Christopher L Munt  
 Abdul Musa  
 Josie Nozza  
 Maree O'Keefe  
 Christopher C Pearson  
 Peter A Petek  
 Robert P Pollnitz  
 Nicola K Poplawski  
 Terence S Pouras  
 Richard G Power  
 Peter C Prager  
 Patrick J Quinn  
 Jeremy Raftos  
 Tamas Revesz  
 Nicholas Ricci  
 Michael S Rice  
 James Rice  
 Malcolm Richardson  
 Terence Patrick Robertson  
 Remo (Ray) N Russo

Jacqueline Kaye Schutz  
 Sanjay Sinhal  
 Michael J Smiley  
 Gregory J Smith  
 Neil Smith  
 Anthony Sparnon  
 Nicola J Spurrier  
 Nigel L Stewart  
 Ram Suppiah  
 Andrew Tai  
 Felix K Y Tan  
 Billy S Tao  
 Heather Tapp  
 Mark A Thesinger  
 David G Thomas  
 Elizabeth M Thompson  
 Gavin Wheaton  
 Deirdre A White  
 M W Yung  
 Rosa Zarrinkalam  
**TAS**  
 Neil Atherton  
 Christopher J Bailey  
 Sean Beggs  
 Allan Carmichael  
 Peter A Dargaville  
 John Daubenton  
 Tony De Paoli  
 Geoffrey Donegan  
 Anthony J Dunstan  
 Edmond J M Fenton  
 Bronwyn Fitzgerald  
 Peter J Flett  
 Evelyn Funk-Bowles  
 Brendan McCann  
 Tom McDonagh  
 Mark M Pascoe  
 Bert Shugg  
 Ian G Stewart  
 Charlotte Margaret Whitelaw  
 Michelle Williams  
**VIC**  
 Roger C Allen  
 Katie J Allen  
 Nabil E Ameen  
 David Amor  
 Stuart G Anderson  
 Ylva Andersson  
 Giuliana C Antolovich  
 Kenneth L Armstrong  
 Gordon Baikie  
 Enver Bajraszewski  
 David G Bannister  
 Danielle Bao  
 Charles Barfield  
 Philip B Bergman  
 John M Bishop  
 Simon P Blair  
 Penelope H Bolt  
 Ellen D Bowman  
 Justin Brown  
 Fiona D Brown  
 A Douglas Bryan  
 David P Burgner  
 Jim Buttery  
 Donald J S Cameron  
 Fergus J Cameron  
 William D Capell  
 David J Carolane  
 Elizabeth A Carse  
 Daniel Casalaz  
 Bronwyn A Cathels  
 A G Catto-Smith  
 C Chandran  
 Jeanie L Y Cheong  
 Anthony Chin  
 Tracy Coleman  
 Jacinta M Coleman  
 Kevin J Collins

Chris Cooper  
 Simon Costello  
 John M Court  
 Noel E Cranswick  
 Nigel Crawford  
 Mick Creati  
 Nigel Curtis  
 David A Cutting  
 Andrew J Daley  
 Margot J Davey  
 Peter Davis  
 Noni M Davis  
 Amol Daware  
 Martin B Delatycki  
 Peter S Dewez  
 Natasha Dilla  
 Peter Andrew Downie  
 David Campbell Downing  
 John Hedley Drew  
 Louise du Plessis  
 Trevor D Duke  
 Karen Leslie Dunn  
 Kevin Bernard Dunne  
 Peter James Eastaugh  
 Maurice Kelvin Easton  
 James Elder  
 Adrian M Elderhurst  
 Austen Lawrence Erasmus  
 Lakshmi Etta  
 Michael Fahey  
 Wei Qi Fan  
 Wolf-Christian Fiedler  
 Lance V Fong  
 Geoffrey W Ford  
 Peter J Forrest  
 Mike Forrester  
 Lisa Fox  
 Bronwyn M Francis  
 Peter D Francis  
 Simon Fraser  
 Jeremy Leighton Freeman  
 Nicholas J Freezer  
 Alexis Frydenberg  
 David Fuller  
 Vanessa Gabriel  
 Danny E Garrick  
 Susan Gibb  
 Michelle Giles  
 Tiow-Hoe Goh  
 Hugo Gold  
 Peter W Goss  
 Philip J Graves  
 Sheena Gune  
 Julia Gunn  
 Desmond H Guppy  
 Dennis Hain  
 Elizabeth Hallam  
 Rubina Hameed  
 Michael D Harari  
 Anton G M Harding  
 Simon Harvey  
 Richard Haslam  
 Simon Hauser  
 Sari Hayllar  
 Michael Hayman  
 John A Heath  
 Katie L Heathershaw  
 Robert D Henning  
 David J Hill  
 Harriet Hiscock  
 Nigel W J Hocking  
 Geoffrey G Hogg  
 James Holberton  
 Sarah Hope  
 Robyn L Hore  
 Ian E Humphrey  
 Rod W Hunt  
 John M Hutson  
 Shobha Iyer

Susan E Jacobs  
 Frederick C Jarman  
 Bernard M Jenner  
 David L Johnson  
 Diana Lynne Johnstone  
 Lilian Johnstone  
 Bryn Jones  
 Joshua Y Kausman  
 Justin H Kelly  
 Julian Kelly  
 Hugh Kelso  
 Shahriyar Khosrowpanah  
 Caroline Killick  
 A Richard Kitching  
 Annette Knoches  
 Andrew J Kornberg  
 Barry D Kras  
 David Krieser  
 Renata Kukuruzovic  
 Kypros Kyprianou  
 Lee Chyi Lam  
 Geoffrey K Lane  
 Teresa Lazzaro  
 Thomas J Lee  
 Anthony Lewis  
 Robert F Lim  
 Alissa Lim  
 Shaamini Lokuge-Hayes  
 Peter M Loughnan  
 Edwin J Lowther  
 Lionel Lubitz  
 Gideon Lurie  
 Catherine Lynch  
 Mark T Mackay  
 Emma Magrath  
 Leslie J Markman  
 Michael K Marks  
 Catherine Marraffa  
 R John H Massie  
 Catherine McAdam  
 Zoe McCallum  
 Joanna McCubbin  
 Karen McLean  
 James A McLellan  
 John A McLennan  
 Kathy McMahan  
 Neil D McMullin  
 R B McNeill  
 Joseph Mel  
 David Meldrum  
 Samuel Menahem  
 John F Mills  
 P T Monagle  
 Martina Moorkamp  
 Kenneth R Mountain  
 Anna Murphy  
 Margot Nash  
 Terence M Nolan  
 M J Nowotny  
 Frank Oberklaid  
 Shane O'Dea  
 Anne O'Neill  
 Carl J Orkin  
 Greg M Pallas  
 Chris Pappas  
 Georgie Paxton  
 Beth Penington  
 Roderic J Phillips  
 Harley R Powell  
 Jenny Proimos  
 Susan Randle  
 Ian D Rawlinson  
 Dinah S Reddihough  
 Gehan Roberts  
 Colin F Robertson  
 Philip James Robinson  
 Sheryle Rogerson  
 Robert Roseby  
 Phillip Rosengarten

## Clinicians Returning 100% Monthly Report Cards in 2010

Elisa Rough  
Katherine S Rowe  
Margaret Rowell  
Suba Rudolph  
Monique Ryan  
Luke P Sammartino  
Christine Sanderson  
Kerryn R Saunders  
R Savarirayan  
Susan Sawyer  
Ingrid E Scheffer  
Adam M Scheinberg  
Jill R Sewell  
David Sholl  
Peter Simm  
Ian J Skelton  
Robert A Sloane  
Joanne Smart  
Elizabeth Smibert  
Lindsay J Smith  
Christopher Smith  
Jennifer A S Smith  
Andrea Smith  
Mike South  
John Stevens  
Michael J Stewart  
Amanda Stock  
Terry G Stubberfield  
Robert Stunden  
Joseph Tam  
Mimi Tang  
Russell G Taylor  
Nick H Thies  
Katherine Thomson  
David Tickell  
Karin Tiedemann  
Margerete Tilders  
Brian J M Timms  
David Gerald Tingay  
Jacinta M Tobin  
Sophie C Treleaven  
Anne-Marie Turner

Martin Tuszynski  
Friederike C M Veit  
Peter Jason Vuillermin  
Rowan G Walker  
Amanda M Walker  
Garry L Warne  
Keith D Waters  
Andrew M C Watkins  
Peter W Wearne  
Annette N Webb  
Robert G Weintraub  
Anthony P Weldon  
George Werther  
Susan White  
Sumitra F Wickramasinghe  
Katrina J Williams  
Joshua Wolf  
Martin C Wright  
Joy Yapliito-Lee  
Margaret Zacharin  
**WA**  
Sabine Afchani  
Angela J Alessandri  
Gareth Baynam  
Christopher Blyth  
Andrew M Bullock  
Mark Burrows  
Carole Caccetta  
Lynda M Chadwick  
Gervase M Chaney  
Catherine Choong  
Richard J Christie  
Hock Leng Chua  
Barry S Clements  
Harvey L C Coates  
Catherine H Cole  
Joanne Colvin  
Charles Crompton  
Riva Curtis  
Elizabeth Davis  
Luigi D'Orsogna  
Tonia Douglas

Harry Dumbell  
Jean Henri DuPlessis  
Simon J Erickson  
Ian James Everitt  
Annette M Finn  
Philomena Fitzgerald  
Noel P French  
Katharine Gardiner  
Andrew Gill  
Ian J Gollow  
Anna Gubbay  
Linda A Harris  
Petra Hartmann  
T Rex Henderson  
Louise Houliston  
Michelle Howell  
Christine A Jeffries-Stokes  
Mohammad Jehangir  
Kay H Johnston  
Timothy W Jones  
Bradley Jongeling  
Gareth Kameron  
Andrew Douglas Kennedy  
Blanche Khaw  
C Kikiros  
Cathy Kiraly-Borri  
Geoffrey J Knight  
Rolland Kohan  
Hemant Anant Kulkarni  
Katherine M Langdon  
Peter N Le Souef  
Helen Leonard  
Dominic Mallon  
Cherry Martin  
Andrew Martin  
Robert McClure  
Michaela McGregor  
Fiona McKenzie  
Judy E McMichael  
Helen J Mead  
Divyesh Mehta  
Catherine F Mews

Corrado Minutillo  
Jagapathireddy Mokala  
Kevin J Murray  
Lakshmi Nagarajan  
Rama Naidoo  
Murali Narayanan  
Flemming H Nielsen  
Mark Parker  
Aida Partridge  
Shveta T Patel  
Sanjay Patole  
Donald Payne  
Marianne Phillips  
Susan L Prescott  
P James S Price  
Shripada Rao  
Christiane Remke  
Steven Resnick  
Peter C Richmond  
David E Roberts  
Peter W Rowe  
Andrew Neil Savery  
Jacqueline M Scurlock  
Arvind Sharma  
Mary J Sharp  
Aris Siafarikas  
Peter J Silberstein  
Desiree Silva  
Karen N Simmer  
M Slattery  
Jennie Slee  
Alide Smit  
Colin Somerville  
Deirdre Speldewinde  
Janine Spencer  
Stephen Stick  
Sing Wui Tie  
Sharron Lee Townshend  
Jack B Vercos  
Michael Watson  
Andrew Michael Wawryk  
Amanda Wilkins-Shurmer

**Thank you to every clinician for your continued support of the important work of the APSU.  
We look forward to your ongoing participation.**

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