APSU

Research Report 2005-2006

Australian Paediatric Surveillance Unit

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Biannual Research Report 2005-2006

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Front Cover: Members of the Rett Syndrome Research Team: Dr Helen Leonard, Dr Lakshmi Nagarajan, Dr Mark Davis, Linda Slack-Smith, from the Telethon Institute for Child Health Research, and Mr Bill Callaghan from the Rett Syndrome Association of Australia, with a child with Rett Syndrome.

Photo kindly provided by Dr Helen Leonard.

The University of Sydney

The Royal Australasian College of Physicians
Paediatrics & Child Health Division

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Patron, Professor Fiona Stanley

It is extremely gratifying to see the continued and, indeed, growing success of the APSU – both in terms of the important studies they facilitate and in achieving a secure funding base, including significant research and Enabling grants. For most of the studies undertaken through the APSU, there is no other single source of data that could answer the research questions and, clearly, this is recognised by the nation's paediatricians, who regularly return their monthly report cards. This is a very effective and efficient method of surveillance and I congratulate the APSU team for persevering through some lean times to achieve their strong and valued place in improving the health of Australia's children.

Chair, APSU Board, Professor Carol Bower

2005-2006 has seen some important changes in the APSU. Perhaps the most rewarding has been the success in achieving an Enabling grant from the National Health and Medical Research Council of Australia. This grant, in recognition of the national value of the APSU, provides funds to expand and improve the surveillance system. Strategic planning in relation to this grant has been undertaken, including plans to ensure ongoing infrastructure funding for the APSU to secure its future.

The research output of the APSU has increased considerably over 2005-2006, in part due to the additional funding from NHMRC and other sources. This is reflected not only in peer-reviewed publications and presentations, but influences on policy and practice as a result of the findings of APSU-based studies.

I am honoured to be associated with this valuable and vibrant surveillance system and thank most warmly the paediatricians throughout Australia who continue to support the APSU so enthusiastically. Long may it continue.

APSU Director, Professor Elizabeth Elliott

The APSU underwent a period of growth in 2005-6. Continued support from reporting clinicians and increased funding support from the NHMRC enabled us to expand our staff, broaden our activities and increase our productivity.

APSU has now facilitated over 40 research studies on rare childhood disorders. As indicated in this report we initiated two new studies in 2005: Neonatal Group B Streptococcus sepsis (led by Professor Lyn Gilbert) and Hyperinsulinaemic hypoglycaemia of infancy (led by Dr Ristan Greer). In 2006 studies of severe seat belt injury in children (led by Dr Yvonne Zurynski) and Simple Vitamin D deficiency rickets (led by Dr Craig Munns) were added. New studies for 2007 include Intussusception (led by Prof Julie Bines) and Acute Rheumatic Fever (led by Prof Jonathan Carapetis).

These studies are all topical and relevant to public health. For example, Vitamin D deficiency rickets is a significant problem for some of our immigrant communities and this study will inform planning of services and preventive and treatment programs. The study of severe seat belt injuries is topical because Australian seat belt policy is out of line with international laws and Australian road rules are currently under revision. The range of studies allows us to involve paediatricians with different interests and to spread the load of reporting among general paediatricians and sub-specialists. Dissemination of APSU data and its incorporation into policy and practice is a high priority and its impact continues to grow with increased scientific output and involvement of APSU staff on policy, clinical and education committees.

APSU also has a role in education. In 2005 we ran a highly successful workshop on fetal alcohol syndrome for over 100 health professionals, educators, researchers and policymakers. We were delighted to welcome Prof Ken Jones – who, in 1973 first described FAS in the English literature – as our keynote speaker. In collaboration with the Rett Syndrome Association, we also ran two well-attended and highly rated workshops on Rett syndrome in 2005, one for health professionals and one for carers.

We have also maintained strong links with overseas units and in 2006 met in London to celebrate the 20th anniversary of the British Paediatric Surveillance unit and to attend the 4th Scientific and Business meeting of the International Network of Paediatric Surveillance Units (INoPSU). Publication in Archives of Diseases in Childhood of a joint paper on the Public Health Impacts of INoPSU, led by Dr Daniel Greiner from the Canadian Unit, was a direct outcome from this productive meeting.

The strong collaboration between APSU and paediatricians throughout Australia is demonstrated by continuing high monthly reporting rates (93% In 2005 and 97% in 2006) and provision of high quality data on reported cases. On behalf of the APSU and all the study investigators I thank clinicians for their unflagging support of the unit. The evaluation proposed for 2007 will give contributors an opportunity to provide feedback – both positive and negative - to the APSU.

I also thank the APSU Investigators, staff, Board and Scientific Review Panel for their hard work and the President of the Paediatrics and Child Health Division of the RACP, Neil Wigg for his wonderful support. We are grateful also to the NHMRC, (Enabling Grant and Practitioner Fellowship programs), the Department of Health and Ageing, the University of Sydney and the Royal Australasian College of Physicians for their support of the APSU.

APSU Board and Scientific Review Panel

Patron

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

Board

Carol Bower* (Chair)
Senior Principal Research Fellow, Division of Population Sciences and Clinical Professor, Centre for Child Health Research and School of Population Health, The University of Western Australia and the Telethon Institute for Child Health Research.

Elizabeth Elliott*
Professor, Discipline of Paediatrics and Child Health, University of Sydney. Consultant Paediatrician, The Children's Hospital at Westmead. Director, The Australian Paediatric Surveillance Unit.

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

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

Bin Jalaludin*
Associate Professor, School of Public Health and Community Medicine, University of New South Wales. Deputy Director, Epidemiology Unit South Western Sydney Area Health Service.

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

* Board and Scientific Review Panel members

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

Michael Nissen*
Director of Infectious Diseases & Clinical Microbiologist, Unit Head of Queensland Paediatric Infectious Disease Laboratory. Associate Professor in Biomolecular, Biomedical Science & Health, Royal Children's Hospital, Brisbane.

Lesley Podesta
Assistant Secretary, Communicable Diseases Branch, Australian Government Department of Health and Ageing – till August, 2005.

Susan Skull* (till mid 2005)
Head, Clinical Epidemiology and Biostatistics Unit, Royal Children's Hospital, Melbourne, Victoria.

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

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

Neil Wigg*
President, Paediatrics and Child Health Division, Royal Australasian College of Physicians. Executive Director, Community Child Health Service, Royal Children's Hospital and Health Service, Brisbane. Associate Professor, Department of Paediatrics and Child Health, University of Queensland.

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

Yvonne Zurynski*
Deputy Director, Australian Paediatric Surveillance Unit.
Senior Lecturer (Research Only), Discipline of Paediatrics and Child Health, The University of Sydney.

APSU Staff in 2005 - 2006

Professor Elizabeth Elliott, Director (January 1993 -)

Dr Yvonne Zurynski, Deputy Director (February 2006 -)

Ms Paula Cronin, Research and Publications Officer (October 2004-October 2006)

Dr Elizabeth Peadon, Medical Education Officer (January 2006 -)

Dr Katie Reeve, Research Officer (October 2006 -)

Ms Emily Fremantle, Research Assistant (December 2006 -)

Ms Nicole McKay, Data Manager (April 2006 -)

Ms Rosemary Robertson, Administration Officer (March 2005-May 2006)

Ms Karen Pattinson, Office Co-ordinator (August 2006 -)

Ms Ingrid Charters, Administration Officer (October 2004 -)

Institutions Collaborating with the APSU 1993-2006

National Organisations

- 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 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
- Regional Certification Committee for Polio
- Rett Syndrome Association of Australia & AussieRett

New South Wales

- Bankstown Hospital
- CAMSHNET
- Centre for Kidney Research
- Centre for Mental Health, NSW Health
- Gastroenterology & Liver Unit, Prince of Wales Hospital
- Institute for Neuromuscular Research
- Hunter Genetics
- Liverpool Health Service
- Macleay Hastings Health Service
- Millennium Institute of Health Research
- NSW Birth Defects Register
- NSW Centre for Perinatal Health Services Research
- NSW Health
- Paediatric HIV Services Unit, Sydney Children's Hospital
- Prince of Wales Medical Research Institute
- Royal Prince Alfred Hospital
- Royal North Shore Hospital
- Sydney Children's Hospital
- The Children Hospital at Westmead
- University of NSW
- University of Sydney
- South Eastern Sydney & Illawarra Area Health Service
- South Eastern Area Laboratory Services
- Sydney South West Area Health Service

Victoria

- Australian Mycobacterium Reference Laboratory Network
- Centre for Adolescent Health
- Victorian Infectious Diseases Reference Laboratory
- Monash Medical Centre
- Murdoch Children's Research Institute
- Public Health Group, Dept Human Services, Royal Womens Hospital, Melbourne
- Royal Children's Hospital, Melbourne
- University of Melbourne

Queensland

- Mater Children's Hospital
- Princess Alexandra Hospital
- Queensland University of Technology
- Royal Children's Hospital, Herston, QLD
- Tropical Public Health Unit
- 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

Western Australian

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

Tasmania

- Royal Hobart Hospital

Northern Territory

- Alice Springs Hospital
- Royal Darwin Hospital
- The Menzies School of Public Health, Darwin

International Organisations

- Great Ormond St Hospital, London, UK
- Hospital for Sick Children, Toronto, Canada
- Oakland Children's Hospital, USA
- Westkids, Auckland, NZ

International Network of Paediatric Surveillance Units (INoPSU)

- British Paediatric Surveillance Unit
- Canadian Paediatric Surveillance Programme
- German Paediatric Surveillance Unit
- Greece & Cyprus Paediatric Surveillance Unit
- Latvian Paediatric Association
- Malaysian Paediatric Surveillance Unit
- Netherlands Paediatric Surveillance Unit
- New Zealand Paediatric Surveillance Unit
- Papua New Guinea Paediatric Surveillance Unit
- Portuguese Paediatric Surveillance Unit
- Swiss Paediatric Surveillance Unit
- Trinidad and Tobago Paediatric Surveillance Unit
- Republic of Ireland Paediatric Surveillance Unit
- Welsh Paediatric Surveillance Unit

Funding and Sponsorships 2005 – 2006

The National Health and Medical Research Council of Australia supports The APSU with an Enabling Grant entitled "Australian Paediatric Surveillance Unit: A collaborative network for child health research." [Number 402784 (2006-2010)]
Principal Investigators: Elliott EJ, Bower C, Kaldor J, Booy R, Sullivan S.

The Australian Government Department of Health and Ageing, provides infrastructure support for APSU studies that relate to communicable and vaccine-preventable diseases.

The University of Sydney

The Faculty of Medicine, University of Sydney supports the APSU financially. The APSU Director and Assistant 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 APSU is a Unit of the Division of Paediatrics and Child Health of the RACP. The RACP provides support for APSU special projects including production of the annual report.

the children's hospital at Westmead

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

Additional financial supporters for individual surveillance studies include:

- 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: Dept of Immunology and Infectious Diseases, The Children's Hospital at Westmead, Herpes Simplex Virus Research Unit
- Rett syndrome: The Telethon Institute for Child Health Research, USA National Institutes of Health, Rett Syndrome Association of Australia
- Vitamin K deficiency bleeding: NSW Health, Roche Products Pty. Ltd, Australia
- Vitamin D deficiency rickets: Roche Products Pty. Ltd, Australia

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

The APSU

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

To the end of 2006, The APSU was used by over 200 individual researchers to run 41 surveillance studies, and has been influential in the development of international units. 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 (Table 1).

The APSU is a unit of the Division of Paediatrics and Child Health, Royal Australasian College of Physicians (RACP). 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), by the Faculty of Medicine, The University of Sydney, and by The National Health and Medical Research Council of Australia (NHMRC), and other competitive research funding.

Contributors to the APSU

Contributors to the APSU are clinicians working in paediatrics and child health in Australia. These are predominantly general paediatricians (56%) or paediatric sub-specialists. Neonatologists make up 6.4% of all contributors; surgeons 3.8%; geneticists 2.9% and neurologists 2.6%. 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 2006 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

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 condition through the APSU. Applications undergo a process of peer review by the SRP 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 between one to three years, although provision for on-going surveillance may be granted for diseases of 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 16 different conditions under surveillance and asked to return the report card whether they have seen a case or not. All positive reports of cases are then followed up by a brief questionnaire requesting de-identified information about the child's demographics, details of diagnosis, management and short-term outcome. For more detail on APSU methodology please see the 2004 APSU Annual Report www.apsu.org.au.

Conditions Studied

Between 1993 and 2006, the APSU has facilitated 41 studies. The major findings and impacts of these studies are documented in Table 1.

Table 1. Key findings of National Surveillance conducted through the APSU 1993-2006

Conditions Under Surveillance	Dates of Study	Key findings, implications and publications
Infectious/vaccine preventable conditions		
Acute flaccid paralysis	Mar 1995-	APSU reports cases of acute flaccid paralysis (AFP) via DoHA Polio Expert Committee to WHO to maintain 'polio-free' certification for Australia. The primary causes of AFP are Guillain-Barre syndrome and transverse myelitis. Sixteen countries, including Indonesia, reported importations of wild poliovirus in 2005. Continued surveillance for AFP in Australia is essential to enable detection of imported poliovirus especially after the recent outbreak in Indonesia and entry of an adult infected with polio to Australia in 2007. (1)
Congenital cytomegalovirus (cCMV) infection	Jan 1999-	Provides the only national data collection for cCMV. CMV is the most common infectious cause of congenital malformation in Australia. cCMV is not associated with maternal illness in approximately 30% of cases and should be considered regardless of maternal history. cCMV remains under-diagnosed. Although most cases are diagnosed by urine culture, use of PCR for urinary screening for cCMV may increase diagnostic yield. Universal neonatal hearing screening programs may also help identify new cases.
Congenital varicella and Neonatal varicella	Mar 1995-Dec 1997	Identified that birth defects may occur with 3rd trimester infection; affected pregnancies should be monitored and infants' eyes examined for visual impairment. (2, 3) Early identification, treatment of Neonatal varicella (acyclovir, Ig) recommended. (2)
Congenital varicella	May 2006-	Study reactivated after inclusion of Varicella vaccine on the National Immunisation Schedule in 2006. (4) One case of Congenital Varicella was reported from NSW in 2006.
Neonatal varicella	May 2006-	14 cases of Neonatal varicella were reported to end of 2006.
Severe Complications of Varicella	May 2006-	During the first seven months of surveillance, 14 children were hospitalised with complications of Varicella, including bacteraemia, osteomyelitis, cellulitis, pneumonia, hepatitis, encephalitis and ataxia. Only one child had been vaccinated against varicella.
Congenital rubella	May 1993-	Although the incidence of congenital rubella has declined, the risk remains particularly among immigrant women born in countries with poorly developed vaccination programs. Such women should have serological testing for rubella after arrival in Australia, and be vaccinated if appropriate. Travel to rubella endemic countries in the first trimester of pregnancy by women with no prior rubella immunity poses a risk to the fetus of congenital rubella. (5)
Haemolytic uraemic syndrome	Jul 1994-Dec 2001	The APSU study identified the types of Shiga-toxin producing *E.coli* prevalent in Australia; provided national data during the large HUS outbreak; and informed the code of production for fermented meats. (6, 7)
Hepatitis C virus infection	Jan 2003-	APSU is monitoring this emerging disease of national significance. It is anticipated that the results from this study will have impact on screening policy (8). Most (>80%) HCV infection in Australian children is acquired perinatally. Infants at risk were born to mothers who used IV drugs (~60%); had invasive procedures overseas; or had tattoos. Most HCV-infected children are clinically asymptomatic with mildly elevated liver function test at diagnosis.
HIV/AIDS, Perinatal exposure to HIV	May 1993-	APSU enhances mandatory reporting and identifies perinatal exposure and maternal risks. In 2005-06 all cases of HIV were due to perinatal transmission. The main source of infection in the mother was through heterosexual contact with a high risk partner. The transmission rate of infection has declined with increased use of interventions (including anti-retrovirals, elective caesarean delivery and avoidance of breastfeeding) in women diagnosed antenatally. (9)
Hospitalised pertussis in infancy	Jan 2001-Dec 2001	Identified adults as the main source of infection and informed revision of the immunisation schedule in 2003 to recommend vaccination of teenagers. Identified children less than 2 months of age to be at most risk and led to development of a trial of vaccination at birth. (10)
Invasive *Haemophilus Influenzae* infection	Jan 1998-Dec 2000	Confirmed success of (*Haemophilus Influenzae)* Type B vaccination; influenced infection prevention policy. (11)
Kawasaki disease	May 1993-Jun 1995	Identified that young affected children may not fulfil international diagnostic criteria. (12)
Neonatal herpes simplex virus infection	Jan 1997-	HSV type 1 identified as the cause of neonatal infection in 50% of Australian cases. Typical skin or mucosal lesions are not evident in about half of the infants affected. Disseminated HSV infection may present with pneumonitis which requires early antiviral therapy and has poor outcome.

Table 1. (Continued) Key findings of National Surveillance conducted through the APSU 1993-2006

Conditions Under Surveillance	Dates of Study	Key findings, implications and publications
Neonatal and Infant Group B Streptococcus Sepsis	Jan 2005-	Documents the incidence, morbidity and mortality of GBS while identifying genotype distribution. Preliminary results show that over half of reported cases have been 'early onset,' at less than 8 days of age.
Non Tuberculous Mycobacterial Infection (NTMI)	July 2004-	Usually presents with lymphadenopathy in healthy children aged < 5 yrs. *Mycobacterium avium intracellulare* and *mycobacterium fortuitum* most commonly isolated. Surgery is the most common therapy. Relapse occurs in about 20% of cases regardless of the medical therapy used. (13)
Subacute sclerosing panencephalitis	Jan 1995-Dec 1998	Very rare, reflecting high uptake of measles vaccination. (14)
Congenital/genetic disorders		
Arthrogryposis multiplex congenita	Jan 1996-Dec 1998	Documented risk factors, informed revision of new disease classification and informed causal pathways. (14)
CHARGE association	Jan 2000-Dec 2002	Increased awareness of diagnostic criteria for CHARGE (diagnosis of 87% of cases in first year of life) and enabled genetic studies in cohort. (15)
Congenital adrenal hyperplasia	Aug 1995-Dec 1997	Enabled cross-validation of potential neonatal screening program.
Congenital & idiopathic nephrotic syndrome	Jul 1998-Jun 2001	Identified non-adherence to evidence-based management guidelines. (16)
Extrahepatic biliary atresia	May 1993-Dec 1996	Identified late diagnosis and need for education. Quantified transplantation needs. (17)
Hyperinsulineamic Hypoglycaemia of Infancy	Jan 2005-	First Australian study to document epidemiology and record known risk factors and outcomes.
Fetal Alcohol Syndrome	Jan 2001-Dec 2004	Indigenous children over-represented; children often in foster care and have affected siblings. Informed causal pathways and educational strategies. (18)
Haemoglobinopathies	July 2004-Mar 2006	Demonstrated that a significant number of children with serious haemoglobinopathies are born in Australia each year, with an additional number migrating to Australia. Raised awareness among clinicians of the risks associated with haemoglobinopathies.
Hirschsprung disease	Jan 1997-Dec 2000	Primary surgical procedure most used is Soave operation. (19)
Prader-Willi syndrome	Jan 1998-Dec 2000	First DNA-confirmed estimate of birth prevalence. PWS often missed clinically in infants - education needed. (20)
Primary immunodeficiency disorders (PID)	Jan 1997-Dec 1999	Documented numbers affected, need for immunotherapy and bone marrow transplant. (21)
Rett syndrome	May 1993-Apr 1995; Jan 2000-ongoing	Enabled molecular epidemiological study of national cohort, phenotype/genotype correlation, establishment of international database. (22)
Severe combined immunodeficiency	May 1995-Dec 2001	Confirmed good outcome following bone marrow transplant. (23)
Mental health issues		
Childhood dementia	May 1993-Jun 1995	First national study worldwide. Clarified diagnostic criteria and identified large group with no identified cause. (24)
Childhood conversion disorder	Jan 2002-Dec 2003	First study to document the burden of this illness in Australian children and to clarify psychosocial risk factors. (25)
Munchausen by proxy syndrome	Jan 2000-Dec 2003	First study to document impact of the diagnosis on clinicians; data informed development of management policy.
Early onset eating disorder	Jul 2002-Jul 2005	First national study of children <13 yrs. Contributing to debate on relevance of adult diagnostic (DSM) criteria to children. Simultaneous Canadian and British study will allow for international comparison.
Other injury/illness		
Anaphylaxis following food ingestion	Jul 2002-Dec 2003	Peanut most common cause; also other nuts, soy, shellfish implicated.
Adverse reactions to complementary and alternative medicines	Jan 2001-Dec 2003	Sentinel adverse effects documented in infants and children range from mild to fatal. Dietary restrictions; use of CAM in pregnancy; and use of CAM in place of conventional medications pose significant risks.
Near drowning	May 1993-Dec 1996	Neurological outcomes poor; age determines near drowning site; most commonly home pool; significant proportion in rural areas. Informed rural water safety policy and education campaigns. (26)
Vitamin K deficiency bleeding	May 1993-	Monitoring disease during policy changes to vitamin K prophylaxis and universal use of new vitamin K preparation. (27)
Simple Vitamin D Deficiency Rickets	January 2006-	Highlighted Vitamin D Deficiency Rickets as a common problem among immigrant and refugee children.
Serious Seatbelt Injuries	January 2006-	In 2006, 30 cases of injuries related to inappropriate seatbelt use were identified with 70% of injured children in the 4 to 9 age group. (28) Most injured children were restrained by adult seatbelts rather than child restraints or booster seats. Serious injuries including abdominal, spinal and head injuries resulted in lengthy hospitalisation or admission to ICU. Results from this study will feed into the current review of child restraint laws by the Australian Transport Council.

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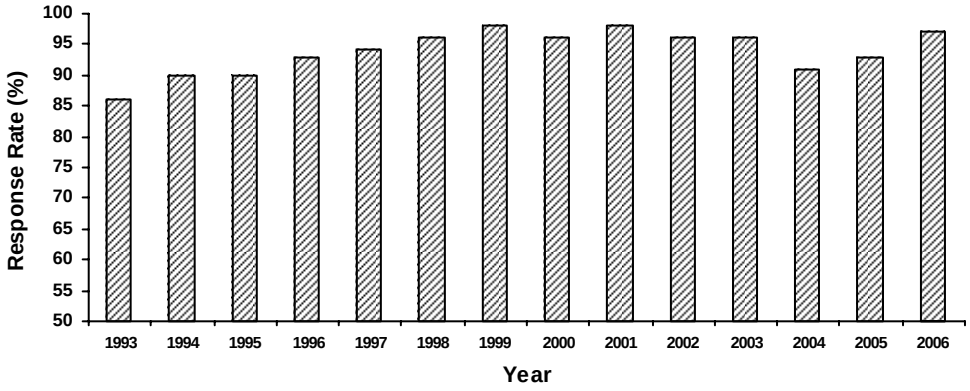
Response Rates

In 2005, 1148 clinicians participated in the monthly surveillance of 13 conditions, with an overall response rate of 93% (Figure 1). In 2006, 1247 clinicians participated in the monthly surveillance of 16 conditions and the overall response rate was 97% (Figure 1). This maintains the excellent participation level by contributing clinicians since APSU's inception in 1993. In 2005, 57% of clinicians reported by e-mail and this increased to 63% in 2006.

Figure 1. APSU annual response rate (%) 1993-2006.



New South Wales (NSW) has the greatest proportion of the national population of children aged under 15yrs (33.2%), Victoria has 24.1% and Queensland 20.3%. Correspondingly, NSW has the greatest number of participating clinicians. Response rates to the monthly report card have remained high among all states, with ACT and Tasmania recording the highest rates in 2005-2006 (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 2005 & 2006.**

STATE	RESPONSE RATE (%)		CLINICIANS REPORTING N (%)		PROPORTION OF AUSTRALIAN CHILDREN < 15yrs N (%)	
	2005	2006	2005	2006	2005	2006
ACT	95	99	19 (1.7)	20 (1.6)	62643 (1.6)	62569 (1.5)
NSW	93	97	460 (40.0)	491 (39.4)	1315433 (33.1)	1332808 (32.9)
NT	81	95	9 (0.8)	11 (0.9)	50551 (1.3)	51540 (1.3)
QLD	94	98	186 (16.2)	205 (16.4)	809847 (20.3)	834591 (20.6)
SA	93	96	88 (7.7)	100 (8.0)	284174 (7.1)	287383 (7.1)
TAS	94	100	19 (1.7)	22 (1.8)	96672 (2.4)	96515 (2.4)
VIC	93	95	266 (23.2)	288 (23.1)	960127 (24.1)	974172 (24.1)
WA	94	94	101 (8.7)	110 (8.8)	399942 (10.1)	410008 (10.1)
Australia Total	93	97	1148 (100)	1247 (100)	3980132 (100)	4050143 (100)

Respondent workload

Workload in completing questionnaires is low. During 2005 the majority of clinicians (81%) had no cases to report; 12.9% reported one case, 4% reported two and 2% reported three or more cases. During 2006, 76% clinicians had no cases to report; 15.3% reported one case, 6% reported two and 4% reported three or more cases.

Summary of surveillance study results 2005-2006

A summary of the classification of all reports received for the period 2005-2006 is presented in Table 3. Duplicate reports are identified according to 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. Errors include cases that do not meet case definition criteria or administrative errors including "report made by mistake".

Table 3. Summary of results for studies conducted during 2005-2006

Conditions Under Surveillance	Year	Total notifications	Questionnaires returned, n (%)	Duplicate cases	Errors	Probable/ unknown cases	Total confirmed cases
Acute flaccid paralysis (AFP) *	2005	60	60 (100)	12	17	-	31
	2006	71	71 (100)	15	13	-	43
Congenital cytomegalovirus (cCMV) infection *	2005	21	18 (86)	2	3	4	9
	2006	29	25 (86)	3	1	3	18
Congenital rubella (with defects)	2005	NIL	-	-	-	-	-
	2006	NIL	-	-	-	-	-
Hepatitis C virus infection (HCV)	2005	17	14 (82)	1	4	1	8
	2006	13	12 (92)	2	-	1	9
Perinatal exposure to HIV including 1 case of HIV acquired by other means *	2005	33	31 (91)	5	-	-	26
Perinatal exposure to HIV including 2 cases acquired by other means *	2006	42	30 (71)	5	-	-	25
Neonatal herpes simplex virus Infection (HSV)	2005	20	19 (95)	10	-	1	8
	2006	22	20 (91)	9	-	-	11
Non tuberculous mycobacterial Infection (NTMI) *	2005	49	41 (84)	5	5	18	13
	2006	62	44 (71)	7	4	16	17
Neonatal Group B Streptococcus Sepsis (GBS) *	2005	64	57 (89)	9	7	4	37
	2006	100	84 (84)	13	13	3	55
Rett syndrome *	2005	26	25 (96)	9	-	1	15
	2006	24	24(100)	7	2	7	8
Haemoglobinopathies	2005	43	35 (81)	3	4	-	28
Early onset eating disorder	2005	30	25 (83)	1	4	-	20
Hyperinsulinaemic hypoglycaemia	2005	62	39 (63)	6	10	2	21
	2006	48	39 (81)	12	5	-	22
Vitamin K deficiency bleeding	2005	3	2 (67)	1	-	-	1
	2006	9	7 (78)	3	1	1	2
Neonatal varicella	2006	11	10 (91)	1	1	-	8
Congenital varicella	2006	3	3 (100)	1	1	-	1
Severe complications of varicella infection	2006	22	16 (73)	-	3	-	13
Simple vitamin D deficiency Rickets	2006	655	619 (95)	138	224§	1	256
Serious seatbelt injuries	2006	52	47 (90)	6	11	-	30

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

Incidence is estimated as the reported number of newly diagnosed cases of disease in a defined population and 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 of disease'* is used in this report to represent estimates of minimum incidence. Reported rate of disease 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 aged under 15 years per annum (Table 4a and 4b). Population figures for the denominator are obtained from the Australian Bureau of Statistics. (1)

Table 4a & 4b shows the reported rate of disease for conditions studied through the APSU during 2005-2006. For conditions where cases were ascertained through additional 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.

References:

(1) Austats: Population by age and sex, Australian states and territories. *Australian Bureau of Statistics* 2005-2006; Cat. No. 3201.0

Table 4a. Reported rate for each condition studied to December 2005

Conditions Under Surveillance	Commencement date	Duration of study (years)	Total notifications	Questionnaires returned, n (%)	Total confirmed cases for duration of study*	Reported Rate for duration of study (per 10^5 per annum) [a b c d e]
Infectious/vaccine preventable conditions						
Acute flaccid paralysis	Mar 1995	10.75	594	530 (89%)	368	0.9 [b]
Congenital cytomegalovirus (cCMV) infection	Jan 1999	7	226	154 (68%)	57	3.2 [a]
Congenital rubella (with defects)	May 1993	12.5	106	102 (96%)	50	0.1 [b]
Hepatitis C virus infection	Jan 2003	3	74	62 (84%)	32	0.3 [b]
Perinatal exposure to HIV HIV infection (Perinatal and other)**	May 1993	12.5	432	396 (92%)	258 56	7.8 [a] 1.7 [a]
Neonatal herpes simplex virus infection	Jan 1997	9	163	156 (97%)	77	3.4 [a]
Non Tuberculosis Mycobacterial Infection (NTMI)	Jul 2004	1.5	104	88 (85%)	21	0.3 [b]
Neonatal Group B Streptococcus sepsis	Jul 2005	0.5	64	57 (89%)	37	†
Congenital/genetic disorders						
Rett syndrome	Jan 2000	5	189	184 (97%)	98	0.4 [b]
Haemoglobinopathies	Jul 2004	1.5	88	70 (80%)	52	0.7 [b]
Mental health						
Early onset eating disorder	Jul 2002 to Jul 2005	3	183	163 (89%)	101	1.4 [c]
Other injury/illness						
Hyperinsulinaemic Hypoglycaemia	Jan 2005	1	62	39 (63%)	21	8.0 [a]
Vitamin K deficiency bleeding	May 1993	12.5	116	115 (99%)	23	0.7 [a]

* Total confirmed cases indicate the number of “confirmed cases” as defined by 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 5-13 years

** HIV infection includes cases due to perinatal exposure and from other sources.

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

Table 4b. Reported rate for each condition studied to December 2006

Conditions Under Surveillance	Commencement date	Duration of study (years)	Total notifications	Questionnaires returned, n (%)	Total confirmed cases for duration of study*	Reported Rate for duration of study (per 10^5 per annum) [a b c]
Infectious/vaccine preventable conditions						
Acute flaccid paralysis	Mar 1995	11.75	672	601 (89%)	412	0.9 [b]
Congenital cytomegalovirus (cCMV) infection	Jan 1999	8	255	177 (69%)	75	3.7 [a]
Congenital rubella (with defects)	May 1993	13.5	106	102 (96%)	50	0.1 [b]
Hepatitis C virus infection	Jan 2003	4	87	74 (85%)	41	0.3 [b]
Perinatal exposure to HIV including HIV infection (Perinatal and other)**	May 1993	13.5	474	426 (90%)	283 61	8.0 [a] 1.7 [a]
Neonatal herpes simplex virus infection	Jan 1997	10	185	176 (95%)	88	3.5 [a]
Non Tuberculosis Mycobacterial Infection (NTMI)	Jul 2004	2.5	168	134 (80%)	38	0.3 [b]
Neonatal Group B Streptococcus sepsis	Jul 2005	1.5	164	141 (86%)	92	23.2 [a]
Neonatal Varicella	May 2006	0.7	11	10 (90%)	8	†
Congenital Varicella	May 2006	0.7	3	3 (100%)	1	†
Severe complications of Varicella infection	May 2006	0.7	22	16 (73%)	13	†
Congenital/genetic disorders						
Rett syndrome	Jan 2000	6	213	208 (98%)	106	0.4 [b]
Other injury/illness						
Hyperinsulinaemic Hypoglycaemia	Jan 2005	2	108	61 (57%)	43	8.2 [a]
Vitamin K deficiency bleeding	May 1993	13.5	125	122 (98%)	25	0.7 [a]
Simple Vitamin D Deficiency Rickets	Jan 2006	0.8	654	619(95%)	256	6.3 [b]
Serious Seatbelt Injuries	Jan 2006	0.8	52	47 (90%)	30	0.7 [c]

* Total confirmed cases indicate the number of “confirmed cases” as defined by 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 ≤12 years

** HIV infection includes cases due to perinatal exposure and from other sources.

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

Acute Flaccid Paralysis (AFP)

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Background: For objectives and case definitions please see www.apsu.org.au

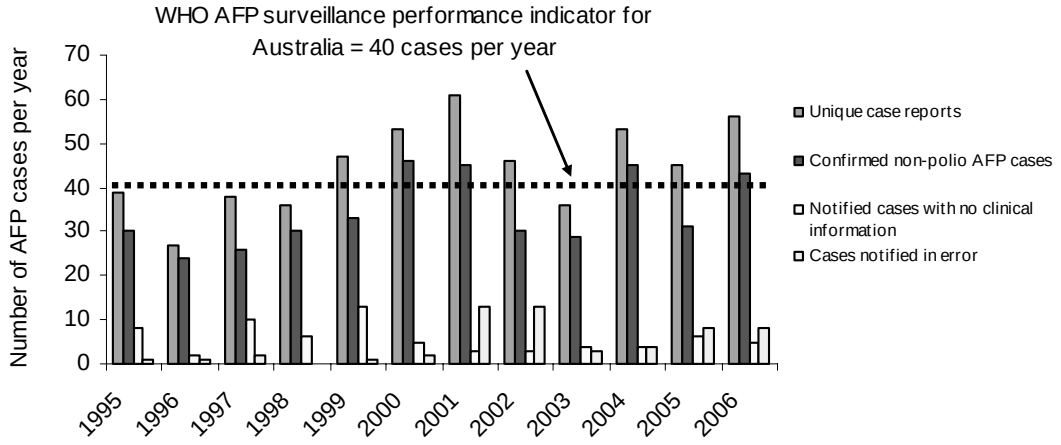
Results: During 2005-2006 there were 131 notifications of AFP, with 74 classified as non-polio AFP by the Polio Expert Committee (PEC); 31cases in 2005 and 43 in 2006 (Figure 2). The annual incidence rate for non-polio AFP was 0.78 in 2005 and 1.08 in 2006 reaching the WHO recommended target of 1 in 100,000. There was variation between the states and territories reporting AFP cases, with NSW, QLD and TAS reaching the recommended WHO target in 2005, while NSW, QLD and VIC reached the WHO target in 2006. WHO defines adequate faecal collection as two specimens collected 24 hours apart within 14 days of onset of paralysis. Adequate faecal collection was achieved in 23% of AFP cases notified in 2005, and 21% of cases in 2006, which is below the WHO recommended target of 80%. Guillain-Barre Syndrome continued to be the most common diagnosis (35%), followed by transverse myelitis (12%). Between 2000 and 2006, 11 cases of AFP were attributed to infant botulism. Incidental polioviruses were isolated from six of these cases, including one case in 2005. An incidental poliovirus was also isolated from a case of transverse myelitis in 2005. All polioviruses tested at the Australian National Polio Reference Laboratory were identified as oral polio vaccine-like.

For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- Australia exceeded the WHO performance indicator for AFP surveillance in 2006.
- Oral polio vaccine (OPV) was replaced with inactivated polio vaccine in the National Immunisation Program from November 2005, and continued surveillance is important for the monitoring of the vaccine program effectiveness.
- Any poliovirus isolated from clinical specimens from mid-2006 would be regarded as an importation and requires full clinical and laboratory investigation.
- It is imperative for Australia to maintain a sensitive AFP surveillance system to enable detection of imported poliomyelitis and to maintain Australia's polio free status.

Figure 2. Comparison of Australia's AFP surveillance data with the WHO performance indicator, 1995-2006.



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Stambos V, Brussen KA, Thorley BR. Annual report of the Australian National Poliovirus Reference Laboratory, 2004. *Communicable Diseases Intelligence* 2005; 29(3): 263-8.

Durrheim DN, Massey IP, Kelly H. Re-emerging poliomyelitis--is Australia's surveillance adequate? *Communicable Disease Intelligence* 2006; 30(3): 275-7.

Brussen KA, Roberts J, Ibrahim A, Stambos V, Thorley BR. Annual report of the Australian National Poliovirus Reference Laboratory 2005. *Communicable Diseases Intelligence* 2006; 30(3): 334-40.

Thorley BR, Brussen KA, Elliott EJ, Kelly HA. Vigilance is required for Australia to remain polio free. *Medical Journal of Australia* 2006; 184(9): 474-5.

Kelly HA, Brussen KA, Lawrence A, Elliot E, Pearn J, Thorley B. Polioviruses and other enteroviruses isolated from faecal samples of patients with acute flaccid paralysis in Australia, 1996-2004. *Journal of Paediatrics and Child Health* 2006; 42(6): 370-6.

Presentations

Thorley B, Brussen K A, Stambos V, Kelly H. The last case of wild poliovirus infection in Australia: a retrospective epidemiological and virological analysis. Communicable Diseases Control Conference, May 2005.

Brussen KA, Craig M, Stambos V, Lawson J, Thorley B, Rawlinson W. Isolation of EV75, a newly described enterovirus, from a patient with acute flaccid paralysis. Communicable Diseases Control Conference May 2005.

Thorley BR. The many faces of polio: endemic, imported, VAPP and VDPV. Australian Virology Group, December 2005.

Thorley B, Brussen KA and Kelly H. How do we know we are polio free? 10th National Immunisation / 2nd PHAA Asia Pacific Vaccine Preventable Diseases Conference, 2006.

Congenital Cytomegalovirus Infection (cCMV)

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Background: For objectives and case definitions please see www.apsu.org.au

Results: In 2005-2006 there were 50 notifications of cCMV and the questionnaire return rate was 86% (n=43). There were 27 confirmed cases, seven probable cases, four errors and five duplicate reports. Most mothers whose children were diagnosed with cCMV were multigravidas, reinforcing the fact that it is women with toddlers and older children who are most at risk of acquiring CMV infection in pregnancy and transmitting the infection to the unborn child. Congenital CMV was not associated with maternal illness in approximately one third of cases and is likely to be under-diagnosed in Australia. Hepatic, splenic and haematological signs and symptoms are the main presenting features of cCMV in the neonatal period as reported previously (Munro et al 2005). Universal neonatal screening programs may help to identify cases and the use of PCR for urinary screening may increase diagnostic yield.

For case classification details and reported rates please see Tables 3 & 4, page 12-14

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Study Highlights and Impacts:

- CMV continues to be the most common infectious cause of congenital malformations.
- It contributes to intrauterine and neonatal death (termination of pregnancy, stillbirth and miscarriage) and future investigations are being directed to the perinatal period.
- In this study data collection has concentrated on infants diagnosed at birth or in the first week of life and there is a lack of follow-up and outcome data.
- Since 2005 we commenced more detailed studies of the outcomes of cCMV infection, in close collaboration with paediatricians at the two major children's hospitals in NSW.
- We have demonstrated the cell lines infected with CMV in healthy and clinically affected children and working on the mechanisms of transplacental transmission of CMV (Trincado et al 2005).
- We have commenced preliminary perinatal viral studies in collaboration with obstetricians in NSW.

Original Articles:

Munro SC, Trincado D, Hall B, Rawlinson WD. Symptomatic infant characteristics of congenital cytomegalovirus disease in Australia. *Journal of Paediatrics and Child Health* 2005; 41(8): 449-452.

Trincado DE, Munro SC, Camaris C, Rawlinson WD. Highly sensitive detection and localisation of maternally acquired human cytomegalovirus in placental tissue by *in situ* PCR. *Journal of Infectious Diseases* 2005; 192(4): 650-657.

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Chow SSW, Scott GM, Catteau J, Hall B, Lahra MM, Rawlinson WD, Craig ME. Amniotic fluid study of congenital infections. Perinatal Society of Australia & New Zealand 9th Annual Congress, Adelaide, S.A, 2005. Poster Abstract No. P26.

Jacques CFH, Munro SC, Chow SSW, Ford CE, Craig M, Camaris C, Gordon A, Lahra MM, Jones C, Jeffrey HE, Rawlinson WD. Viral infections in stillbirths, pre-term births and high risk individuals. Perinatal Society of Australia & New Zealand 9th Annual Congress, Adelaide, S.A 2005. Poster Abstract No. P75.

Presentations :

Rawlinson WD, Jacques C, Chow S, Koelsch M, Ramachandran V, Brennan L. Vertically transmitted viral infections and consequences for the fetus. Australian Institute of Medical Scientists, 2005 National Scientific Meeting, Sydney.

Congenital Rubella

C Jones, J Forrest

Background: For objectives and case definitions please see www.apsu.org.au

Results: Since surveillance began in 1993 there have been 50 confirmed cases of congenital rubella in Australia with reports decreasing significantly in recent years. There was only one confirmed case in 2004 and no cases were identified during 2005-2006. The case confirmed in 2004 was of a child born to an immigrant woman who had not been vaccinated against rubella.

For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- Immigrant women born in countries with poorly developed vaccination programs should have serological testing for rubella after arrival in Australia and vaccination where appropriate.
- Travel to rubella endemic countries in the first trimester of pregnancy by women with no prior rubella immunity poses a risk of congenital rubella to the fetus.
- 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.

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Original articles: None

Abstracts: None

Group B Streptococcal (GBS) Sepsis

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Original Articles: None

Abstracts: None

Background: For objectives and case definitions please see www.apsu.org.au

Results: Of the 92 confirmed cases between July 2005 and December 2006, 52 (57%) have been classified as early onset GBS sepsis – the target of intrapartum antibiotic prophylaxis. This translates to a rate of 24/100,000 births in 2005 and 10/100,000 births in 2006. Reported rates were consistent across states, except for Queensland, whose rate was double the national average. For the 38 cases of late-onset sepsis, the rate was 7.3/100,000 births for 2005 and 2006.

Preliminary analysis of clinical data shows that, septicaemia is common to both early and late-onset cases. Pneumonia is the most frequently observed complication in early-onset cases, and meningitis is significantly associated with late-onset cases. This is consistent with previously published surveys of neonatal sepsis in major hospitals.

Part of our study involves retrieval from diagnostic laboratories of the group B streptococcus isolates from reported cases. Of the 92 confirmed cases, 69 (75%) isolates have been obtained, mostly from blood cultures, and are currently stored in our lab. To date genotypic investigation has been completed on more than half of the isolates obtained.

For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- This study has the potential to inform development of safer, more efficient ways to prevent GBS through better understanding of bacterial virulence and host susceptibility and better data on genotype distribution and antibiotic resistance.
- It may also inform development of methods to identify GBS carriers whose infants are at risk.

Early Onset Eating Disorder – Final Report

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Background: For objectives and case definitions please see www.apsu.org.au

Results: During the three years of surveillance there were 183 notifications and 101 confirmed cases. The median age was 12.2 years (range 5-13) and 25% of confirmed cases were boys. The median weight loss among the children was 7kg and the weight loss was greatest among children aged 9 years or more. Nineteen girls reached menarche and 18 of these had secondary amenorrhea.

Symptoms included abnormal cognitions such as preoccupation with food (90%), fear of weight gain or fat (74%), preoccupation with weight (73%) and perception that body is larger (66%). Depression and anxiety were the most commonly reported co-morbidities with atleast one psychological morbidity present in 62%. Excessive exercise was described in 54% and self-induced vomiting in 11% of cases.

Approximately a third of the confirmed cases had symptoms of significant medical instability including bradycardia in 40%, hypothermia in 33% and hypotension in 20%. The proportion of children with significant medical instability suggests that they are presenting to specialist child health professionals in the advanced stages of the illness.

According to DSM-IV, 67% of children met both psychological criteria for Anorexia Nervosa while only 51% met the weight loss criteria (85% of ideal body weight), despite 61% having potentially life threatening complications of malnutrition. This highlights the need for a review of DSM-IV criteria when applied to young children undergoing rapid natural growth.

For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- Young children aged 5 to 13 years with eating disorders do indeed present with significant weight loss and associated psychological and medical complications.
- These data will provide a very valuable contribution to the debate on definition and classification of eating disorders among young children.

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Original Articles: None

presentations:

Morris A, Madden S, Katzman D, Pinhas L. Early onset eating disorders in children: first report from the APSU and CPSP studies. INoPSU 4th Conference, London, May 2006.

Morris A, Madden S. The role of the brain in early onset eating disorders in Australian children: current patterns of management. Young people's health: what's it going to take. The 5th Australian & New Zealand Adolescent Health Conference, 13th to 15th November, 2006, Sydney, Australia. 2006.

Haemoglobinopathies – Final Report

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Original Articles: None

Abstracts: None

Background: For objectives and case definitions please see www.apsu.org.au

Results: Since 2004, there were 88 notifications and the questionnaire return rate was 80% (n=70). There were 52 confirmed cases, 13 errors and five duplicate reports. A breakdown of cases by state revealed that 59% of cases are from NSW and there were no reports from Tasmania or the Northern Territory in 2005-2006.

Of the 52 confirmed cases, 40% were homozygous sickle cell anaemia, 25% haemoglobin II disease, 10% beta thalassemia major and the remainder a variety of other disorders. One patient, with sickle cell anaemia, died during the course of the study.

Of the cases confirmed, 70% were born in Australia with the rest being immigrants. Nearly half of the mothers and 30% of the fathers knew of their carrier status prior to the pregnancy. Only 30% of these parents had the risks of having a child with haemoglobinopathy explained to them prior to pregnancy.

For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- A significant number of children with serious haemoglobinopathies are born in Australia each year with an additional number migrating to Australia.
- Although screening has increased over the last few years, the implications of carrier status for the infant are often overlooked with only 30% of parents who were carriers having the risks explained to them prior to pregnancy.
- There is a need for raising awareness among clinicians and carriers of the risks associated with haemoglobinopathy.

Hepatitis C Virus Infection

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Background: For objectives and case definitions please see www.apsu.org.au

Results: During 2003-2006, the return rate of detailed questionnaires was 85% and of 87 HCV notifications to the end of 2006, 41 were confirmed as HCV, 9 were duplicate reports, 22 were reporting errors, 2 were probable cases and 13 had missing data. Most HCV infected children were born in Australia (97%) to an Australian born mother (where maternal birth place was known) who was HCV-infected (93%). Other childhood risk factors for HCV included IV drug use in the child (3/38). Of the 3 children with documented IV drug use, 2 had HCV negative mothers, and the HCV status of the other child's mother was unknown. Maternal risk factors for HCV infection included maternal IV drug use in 29 (74%), invasive procedures in 3, tattoos in 11 (3 of whom also had a history of IV drug use), vaccination (1) and home electrolysis (1). Both the vaccination and home electrolysis occurred in an HCV endemic country. The median age at diagnosis of HCV in the child was 2.6 years (range 1m-15y) and 67% of children were diagnosed at less than 5 years of age. Most HCV infected children were asymptomatic at diagnosis. Reported clinical features at diagnosis were: lethargy (2), bruising (1), hepatomegaly (2) and failure to thrive (1, in a child with lethargy). Mildly elevated alanine transaminase levels at diagnosis were recorded in 81% of the cases.

For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- The majority of HCV infected children in Australia are born to HCV infected mothers, and are asymptomatic at diagnosis with mildly abnormal liver function tests. Some mothers had more than one risk factor recorded.
- The reported number of infected children is lower than predicted by Federal de-identified laboratory notifications. This may be a result of under-diagnosis and/or under-reporting and this discrepancy is being explored.

Original Articles:

Hardikar W, Elliott E, Jones CA. The silent infection: should we be testing for perinatal hepatitis C and, if so, how? *Medical Journal of Australia* 2006; 184 (2): 54-55.

Abstracts:

Jones CA, Polis S, Hardikar W, Elliott E, Dore G, Mews C, Kesson AM, Kaldor J. National surveillance of hepatitis C virus infections in Australian children. Abstracts of 5th Australian Hepatitis Meeting Sydney February 2006. page 94.

Elliott EJ, Jones CA, Mews C., Hardikar A, Kesson AM, Polis S, et al. Reported risk factors for Hepatitis C Virus Infection in Australian children results of National Surveillance. *Journal of Paediatrics and Child Health* 2005. 41(Suppl.): S3.

Presentations:

Polis S on behalf of the HCV APSU study team. National surveillance of hepatitis C virus Infections in Australian children. Oral presentation at the 5th Australian Hepatitis Meeting, Sydney, February 2006.

Jones CA. Hepatitis C virus infection in children. Oral presentation: 5th Update on HIV and Hepatitis Infection in Children. Randwick Sydney. 2005.

Elliott E. Reported risk factors for Hepatitis C Virus Infection in Australian children results of National Surveillance. Royal Australasian College of Physicians Annual Scientific Meeting. Wellington NZ, 2005 (Finalist, Rue Wright Award).

Hyperinsulinaemic Hypoglycaemia of Infancy (HI)

R Greer, A Cotterill, R Walker, D Cowley, J Bell, M Thomsett, M Jack

Background: For objectives and case definitions please see www.apsu.org.au

Results: Clinical data were analysed for 43 infants and children reported during 2005 and 2006. Thirty-three (77%) presented in a neonatal unit, 4 at an emergency facility, and 2 at other centres. Ten had a seizure at presentation, and others had a variety of signs such as jitteriness, floppiness, or a staring episode. Nineteen were diagnosed through routine neonatal surveillance. The mean birth weight was 3068±820g, range 1625-4740g. No definitive diagnosis was specified in 38 (93%), but one infant each was diagnosed with Beckwith-Wiedemann Syndrome, Congenital Disorder of Glycosylation, and likely ABCC8 mutation. Fifteen infants received ongoing treatment with diazoxide. Case follow-up after discharge from the neonatal unit was not possible, due mainly to the de-identification of case data collected through the APSU mechanism.

This study highlights the difficulties in determining a definitive diagnosis of HI, the need for increased awareness among clinicians of this condition, and the need for improved diagnostic services. It is not possible to reliably estimate incidence of HI from this study, as we speculate that many cases were associated with low birthweight, unlikely to require long-term diazoxide or to be associated with a genetic abnormality. Genetic diagnosis for rare conditions is hampered by the high cost of mutational analysis.

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For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- Delays in the recognition of hypoglycaemia and commencement of effective treatment have resulted in the past in permanent neurological impairment in up to 50% of patients.
- Severe HI associated with ABCC8 or KCNJ11 mutations is thought to occur in 1/50,000 births.
- This study has the potential to improve clinical outcomes by documenting the epidemiology and causes of HI in Australian infants.
- We plan to produce and disseminate a list of differential diagnoses for HI, including common genetic defects.

Original Articles: None

Abstracts:

Greer RM, Walker RM, Rogers MA, Cotterill AM. Hyperinsulinaemic Hypoglycaemia of Infancy in Australia. *Journal of Paediatrics and Child Health* 2007; 43(7-8): A16.

HIV Infection, AIDS and Perinatal Exposure to HIV

A McDonald, J Kaldor, K Nadew, J Ziegler, E Elliott

Background: For objectives and case definitions please see www.apsu.org.au

Results: A total of 283 children perinatally exposed to HIV have been reported between 1993 and 2006. The proportion of children acquiring HIV infection born to women diagnosed antenatally was only 8.8%, while 52.1% of children born to women diagnosed postnatally acquired HIV infection. This reflects lack of opportunity to prevent transmission of HIV to the child among women diagnosed postnatally. In the past five years, 110 cases of perinatal HIV exposure were notified, predominantly through the APSU (90%), with 11 cases notified through national HIV surveillance activities.

Of the 48 definite cases of perinatal exposure to HIV notified in 2005 – 2006, 45% were reported from NSW, 31% from VIC, 17% from QLD, 5% from SA and 2% from WA.

The mother's HIV infection was diagnosed antenatally in 38 mother-child pairs. Use of antiretroviral therapy in pregnancy and avoidance of breastfeeding was reported in 33; mode of delivery was elective caesatean in 23, emergency caesarean in 4 and vaginal delivery in 6; use of intervention was not reported in 5 cases. One child (2.6%) acquired HIV infection despite the reported use of all three interventions by the mother. Of the 4 children born to women diagnosed postnatally, 3 children acquired HIV infection. Two of these children were born in countries in sub-Saharan Africa.

In 2005-2006 the mother's risk for HIV infection was heterosexual exposure in a high prevalence country (42.5%), predominantly in sub-Saharan Africa, or heterosexual contact with a partner from a high prevalence country (17.5%), an injecting drug user (10%), a bisexual man (2.5%), heterosexual contact not further specified (25%) and an other/undetermined risk (2.5%). This trend remains unchanged for the last 5 years.

For case classification details and reported rates please see Tables 3 & 4, page 12-14

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Study Highlights and Impacts:

- National surveillance indicates that perinatal exposure to HIV and mother-to-child HIV transmission remains rare among children in Australia.
- HIV transmission continues among children whose mother's HIV is diagnosed postnatally and among women who do not make use of interventions known to decrease transmission.
- The APSU makes a substantial contribution to monitoring perinatal exposure to HIV in Australia and was the only source of information in 90% of cases reported in the last 5 years.
- Many women acquire HIV through heterosexual contact and interventions are available to prevent perinatal HIV transmission.
- The 2006 National HIV Testing Policy recommends that HIV testing should be routinely offered to all women antenatally.

Original Articles: None

Presentations:

Blyth CC, Palasanthrian P, Miller A, McDonald A, Kesson AM, Isaacs D, et al. Missed opportunities in prevention of paediatric HIV - has much changed? 18th Annual Conference of the Australasian Society for HIV Medicine, Melbourne, Victoria. 11th - 14th October 2006.

Giles ML, McDonald A, Elliott EJ, Ziegler JB, Hellard M, Lewin SR and Kaldor JM. Variable uptake of recommended interventions to reduce perinatal HIV transmission in Australia, 1982 – 2004. 18th Annual Conference of the Australasian Society for HIV Medicine, Melbourne, VIC. 11 - 14 October 2006.

McDonald A. Perinatal exposure to HIV in Australia, 1995-2004. 5th Australian Update on HIV and Hepatitis C in Children. Sydney Children's Hospital, Randwick. September 2005.

McDonald A. Perinatal exposure to HIV in Australia 1994-2005. Paediatric Research Seminar: Creating a Future for Children and Families, Friday 21st July 2006. Nursing and Allied Health Research Committee. The Children's Hospital at Westmead. APSU. 2006.

Surveillance Reports:

National Centre in HIV Epidemiology and Clinical Research. *HIV/AIDS,* viral hepatitis and sexually transmissible infections in Australia *Annual Surveillance Report 2005.* National Centre in HIV Epidemiology and Clinical Research, The University of New South Wales, Sydney, NSW; Australian Institute of Health and Welfare, Canberra, ACT. 2005 http://www.med.unsw.edu.au/nchecr

Neonatal Herpes Simplex Virus (HSV)

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

Background: For objectives and case definitions please see www.apsu.org.au

Results: Prospective national surveillance of neonatal HSV disease commenced in Australia in 1997. Between 1997-2006, there were 88 confirmed and 3 probable cases, 56% percent of which were caused by HSV-1. The majority of infants were born to primiparous women (51%), who were over 18 years of age (96%). Thirty four percent of infants were preterm (< 37 weeks), including 5.7% born before 28 weeks. Where reported, 56% of infants were born by normal vaginal delivery, 27% by caesarean section, and 9% by instrument-assisted delivery. A potential source of postnatal HSV transmission was reported in 11 cases, including 2 cases where the infection may have been hospital-acquired. In the remainder, only 17% of mothers and 5% of fathers had a history of prior genital herpes. Data on maternal serology was not provided in most cases. Forty percent of infants presented with localised mucoepithelial disease including 14% with eye involvement but 23% had multi-organ involvement and the remainder had pneumonitis or encephalitis alone. Sixty-six percent of infants received antiviral therapy with acyclovir, at a mean age of 14 days for a mean duration of 14 days. All but one of the nine infants who did not receive therapy died from their infection. The overall mortality rate was 25%, despite the availability of effective antiviral therapy.

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For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- Herpes simplex virus is an important neonatal pathogen with an incidence that ranges from 1:3,500 live births in the USA, to 1:10-50,000 live births in the UK and Australia.
- Neonatal infection manifests as disease localised to the skin, eye or mouth, as encephalitis, or as a highly lethal disseminated infection. Long term sequelae include developmental delay, seizures, and motor and visual impairment.
- The mortality associated with all but localised disease remains high despite the availability of antiviral agents.
- Recent (partial) successes in the development of a vaccine against genital herpes may see the future introduction of a prophylactic vaccine against maternal HSV infection.
- Prospective surveillance provides invaluable information and may be the means of assessing the effect of future maternal genital herpes vaccination programs on these devastating sequelae.

Original Articles: None

Abstracts:

Jones CA. Oral plenary session. "Transmission of herpesvirus from mother to baby." Abstracts of the Australian Institute of Microbiological Sciences. Sydney, July 2005.

Jones CA. Oral plenary session. "Viral Infectious Diseases in Pregnancy". Abstracts of the Viruses in May, Australian Society of Microbiology special interest meeting, Blue Mountains, May NSW 2005 p.19.

Jones CA. Oral Plenary session. "Congenital and Perinatal Herpes Simplex Virus Infection". Australian Society for Microbiology, annual scientific meeting, September, Canberra 2005.

Jones CA. "HSV in the newborn." XXIInd Cornea and Eye Bank Meeting, Sydney Eye Hospital, February 2005.

Presentations:

Jones CA. Oral plenary session. "Transmission of herpesvirus from mother to baby." Australian Institute of Microbiological Sciences. Sydney, July 2005.

Jones CA. "Viral Infectious Diseases in Pregnancy". Viruses in May, Australian Society of Microbiology Special Interest Meeting, Blue Mountains, May NSW 2005. p.19.

Jones CA. "HSV in the newborn." Abstracts of the XXIInd Cornea and Eye Bank Meeting, Sydney Eye Hospital, February 2005

Jones CA. "Congenital and Perinatal Herpes Simplex Virus Infection" Abstracts of the Australian Society for Microbiology, Annual Scientific Meeting, September, Canberra 2005.

Jones CA. Susan Ryan Seminar: Neonatal Infections. NSW Society of Neonatal Nurses 2006.

Jones CA. Viral causes of adverse outcomes of pregnancy. NSW Society of Neonatal Nurses 2006.

Jones CA. HSV infections in pregnancy. Westmead Hospital ICPMR Symposium on Sexually transmitted infections 2006.

Jones CA. HSV infections in pregnancy. .AHMF symposium at ASHM conference 2006.

Jones CA. Transmission of Infections in Pregnancy. NSW Rural Doctors Association 2006.

Non Tuberculous Mycobacterial Infection (NTMI)

P Palasanthiran, C Blyth, E Best, C Jones, A Daley, G Henry, D Burgner, C Nourse, P Goldwater

Background: For objectives and case definitions please see www.apsu.org.au

Results: Ninety cases (38 confirmed, 52 probable) have been included in the analysis to date. The incidence of NTM infection in Australian children is estimated to be <1 case per 100,000 children <15 years old. Lymphadenitis is the most frequent presentation (73%) and usually occurs without systemic features. Pulmonary and disseminated infection is seen infrequently (13% and 2% respectively). Most children affected have no predisposing condition. Biopsy is frequently used for diagnosis and skin tests were infrequently used. On biopsy, histopathological examination is more frequently positive than microbiological examination. *Mycobacterium avium intracellulare* is the most commonly isolated organism in Australian children. Surgery was performed in 77% of cases and 38% of children were prescribed antimicrobials. Marked heterogeneity was observed in the types of antimicrobials and regimens prescribed. In non tuberculous mycobacterial lymphadenitis, total lymph node excision is associated with a lower risk of relapse than incomplete surgery. Despite therapy, recurrence occured in up to 25% of the cases that were followed up.

For case classification details and reported rates please see Tables 3 & 4, page 12-14

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Study Highlights and Impact:

- The incidence of NTM infection in Australian children is estimated to be <1 cases per 100,000 children.
- Lymphadenitis is the most frequent presentation.
- Most children affected have no predisposing condition.
- *M. avium-intracellulare* is the most commonly isolated organism.
- There is significant variation in surgical and medical therapies administered by Australian doctors.
- Recurrence was documented in 25% of cases.

Original Articles: None

Abstracts:

Blyth CC, Palasanthiran P, Best E, Jones C, Daley AJ, Burgner D, Nourse C, Goldwater PN, Henry G. Non tuberculous mycobacterial infection: results from a national surveillance study. *Journal of Paediatrics and Child Health* 2006; 42(1): a11.

Blyth CC, Palasanthiran P, Best E, Jones C, Daley AJ, Burgner D, Nourse C, Goldwater PN, Henry G. Non tuberculous mycobacterial infection: a review of surgical cases. *Australian and New Zealand Journal of Surgery* 2006; 76(suppl.1): A52.

Rett Syndrome

H Leonard, C Bower, N de Klerk, S Silburn, L Nagarajan, S Fyfe, J Christodoulou, C Ellaway, H Woodhead, S Reilly, D Ravine

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Background: For objectives and case definitions please see www.apsu.org.au

Results: We have shown that in Rett syndrome the onset and course of epilepsy are related to the genotype. In particular, the likelihood of seizure onset can, at the time of diagnosis, be predicted to some extent from the child's earlier developmental history and genetic status. Our findings have relevance to understanding the biological consequences of the MECP2 mutations and to provision of practical clinical information.

We were also able to show that the median age at scoliosis onset was 9.8 years and that three quarters of subjects had developed scoliosis by 13 years of age. Children with compromised early development (< six months), those who were less mobile at ten months, and those who never walked, were more likely to have an earlier onset of scoliosis. The p.R294X mutation appeared to provide some protective effect against the development of scoliosis.

Although it is generally believed that the effect of a specific genotype on the phenotype is also modulated by the effects of X-inactivation, research evidence for this has been relatively sparse. By combining our Australian population-based data with cases from the UK and with the appropriate laboratory expertise from the University of Cardiff, it was possible to explore the association between clinical severity in two common mutations. We were able to demonstrate a statistically significant increase in clinical severity as the proportion of active mutated allele increased for both the p.R168X and p.T158M mutation. This has been the first study to show a quantitative relationship between the degree and direction of X inactivation and clinical severity overall in Rett syndrome.

For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- Analytical investigations using data relating to different aspects of the study continue to be undertaken and during 2006 ten articles relating to the study were published.
- The continuation of a consumer reference group which meets intermittently by teleconference and ensures family representation and input to the study.
- Production of the 2006 Australian Rett Syndrome Study report utilizing data collected from family questionnaires.
- The identification of a number of Australian males with a neonatal encephalopathic picture and the presence of a MECP2 mutation.

Original Articles:

Fyfe, S; Downs, J; McIlroy, O; Burford, B; Lister, J; Reilly, S; Laurvick, CL; Philippe, C; Msall, M; Kaufmann, W E; Ellaway, C; Leonard, H. Development of a video-based evaluation tool in Rett syndrome. *Journal of Autism & Developmental Disorders* 2007; 37(9): 1636-46.

Robertson, L; Hall, S; Jacoby, P; Ellaway C; de Klerk, N; Leonard, H. The association between behaviour and genotype in Rett Syndrome using the Australian Rett Syndrome Database. *American Journal of Medical Genetics- Part B, Neuropsychiatrics* 2006; 141 (2): 177-83.

Laurvick C; de Klerk N; Bower C; Christodoulou J; Ravine D; Ellaway C, et al. Rett syndrome in Australia: A review of the epidemiology. *Journal of Pediatrics* 2006; 148: 347-52.

Ager, S; Fyfe, S; Christodoulou,J; Jacoby,P; Schmitt L; Leonard, H. Predictors of scoliosis in Rett syndrome. *Journal of Child Neurology* 2006; 21(9): 809-813.

Jian, L; Nagarajan, L; de Klerk, N; Ravine, D; Bower, C; Anderson, A; Williamson, S; Christodoulou, J; Leonard, H. Predictors of seizure onset in Rett syndrome. *Journal of Pediatrics* 2006; 149(4): 542-547.

Archer, H; Evans, J; Leonard, H; Colvin, L; Ravine, D; Christodoulou, J; Williamson, S; Charman, T; Bailey, M; Sampson, J; de Klerk, N; Clarke, A: Correlation between clinical severity in Rett syndrome patients with a p.R168X or p.T158M MECP2 mutation and the direction and proportion of X chromosome inactivation. *Journal of Medical Genetics* 2007; 44(2): 148-152.

Laurvick, C; Msall, M; Silburn, S; Bower, C; de Klerk, N; Leonard, H. Physical and mental health in mothers caring for a child with Rett syndrome. *Pediatrics* 2006; 118(4): 1152-1164.

Abstracts: none

Presentations:

Clinical Trials in Rett syndrome: Potential for Early Intervention. San Francisco, USA, May 2006.

"InterRett" Scottish Rett Syndrome Association, Glasgow, Scotland, June 2006.

"The impact of having a sibling with a developmental disability: Parental perspectives in two disorders." Telethon Institute for Child Health Research Away Days, Perth, Australia, March 2006.

Vitamin K Deficiency Bleeding

K Chant, E Elliott, B Jalaludin, D Henderson-Smart, P McDougall, P Laughnan, L Taylor

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Background: For objectives and case definitions please see www.apsu.org.au

Results: Since 1993, 125 notifications have been received and questionnaire return rate was 98% (n=122). There were 30 errors, 33 duplicates and 28 unclassified notifications. There were 25 confirmed and 6 probable cases of Vitamin K Deficiency Bleeding (VKDB).

The study is still in progress and we are currently analysing trends over time (1993-2006) to assess the implications of a change in the mode of vitamin K administration. Of the 25 cases of VKDB, 20 were late onset cases and five early/classical cases of VKDB. Of the 20 late onset cases, liver disease was present in 11 infants. Six infants with definite VKDB did not receive vitamin K at birth. Three died (two of the deaths were in infants with liver disease and the other death was in an infant without liver disease who did not receive vitamin K at birth). Final results for this study will be available at the next annual report.

For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- During the data collection period, changes to policy on the mode of administration of vitamin K in newborns (introduction of oral preparations) were implemented, allowing the assessment of the impacts of this policy change, particularly in terms of incidence of VKDB.
- Most children with vitamin K deficiency bleeding did not receive vitamin K at birth or received insufficient Vitamin K.

Original Articles: None

Abstracts: None

Simple Vitamin D Deficiency Rickets (SVDD)

C Munns, M Zacharin, C Rodda, E Davis, M Harris, J Batch, M Pascoe, J Fairchild, A Lafferty, A Whybourne, L Ward, R Morley, S Garnett, D Burgner, M Williams, Y Zurynski

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Background: For objectives and case definitions please see www.apsu.org.au

Results: During 2006, 654 notifications of SVDD were made, with 256 confirmed cases. 65% were reported from Victoria, 20% from WA, 11% from NSW, 0.6 % from QLD, 0.9% from SA, 1.4% from Tasmania, 0.6% from ACT and 0.2% from NT. Mean age at diagnosis was 5.8 yrs±4.8. Presenting features included bone pain (6.3%), poor growth (5.5%), limb deformity (13%) and hypotonia (2%). Eighty-two percent of cases had dark skin. Seventy-one percent of the affected children were born outside Australia (Sudan 34%, Egypt 9%, 28% other). All but one of the mothers was born outside Australia and 93% were veiled during pregnancy for cultural or religious reasons. Majority of the cases were identified in refugee clinics in Melbourne, Perth and Sydney during routine screening.

For case classification details and reported rates please see Tables 3 & 4, page 12-15

Study Highlights and Impacts:

- This study suggests that Vitamin D Deficiency Rickets is not as rare in Australia as initially thought.
- The preliminary data confirm that SVDD in Australia is associated with significant morbidity and its incidence is highest amongst recent migrants to Australia and those with darker skin colour.
- If confirmed, this will have to be addressed through public health campaigns that incorporate all levels of government and the health care system.

Original Articles:

Munns C, Zacharin MR, Rodda CP, Batch JA, Morley R, Cranswick NE, et al. Prevention and treatment of infant and childhood vitamin D deficiency in Australia and New Zealand: a consensus statement. *Medical Journal of Australia* 2006; 185(5):268-72.

Abstracts: None

Serious Seatbelt Injuries

Y Zurynski, E Elliott, L Bliston, M McCaskill, A Dilley, F Leditschke

Background: For objectives and case definitions please see www.apsu.org.au

Results: In 2006, 30 cases of injuries related to inappropriate seatbelt use were identified. There were 16 males and 14 females aged between 3 and 12 years (mean age = 6.9), and 70% of injured children were in the 4 to 9 age group. Most injured children (70%) had been restrained by an adult lap-sash belt without a booster seat, while 20% were using booster seats and the remainder were travelling while restrained by a lap-only belt. Approximately one third were travelling in the front seat and another third in the rear centre position. Abdominal injuries were most common (76.7%) and included lacerations, haematomas and tears of the liver, spleen, kidneys and duodenum. Head and neck injuries were sustained by 36.7% and spinal injuries by 26.7%. The spinal injuries predominantly included lumbar-spine fractures associated with hyperextension of the lumbar spine. The most severe head, spinal and abdominal injuries were among younger children misusing adult seatbelts by placing the sash portion on the abdomen, under the arm or behind the back. Nineteen children required surgical intervention, mainly laparotomy for abdominal injuries. Fifteen children were admitted to a paediatric intensive care unit (average stay = 3.2 days; range: 1 to 11 days) and the average hospital stay was 15 days (range: 1 to 103 days). One child sustained a spinal cord injury leading to paraplegia and one child died due to severe head injuries.

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For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- Despite the reported high use of seatbelts in Australia (>92%), children inappropriately restrained by adult seatbelts suffer significant abdominal, lumbar spine, and head injuries in motor vehicle accidents.
- Current Australian laws mandate child restraints only for children aged up to 12 months and children aged 12 months or more may be restrained in either, a child restraint, a booster seat or an adult seatbelt.
- Results from this study will inform the current review of child restraint laws by the Australian Transport Commission.

Original Articles: None

Abstracts: None

Congenital Varicella

R Booy, D Burgner, M Nissen, J Buttery, Y Zurynski, E Elliott, M Gold, E Peadon

Background: For objectives and case definitions please see www.apsu.org.au

Results: This study commenced in May 2006. There was one case of Congenital Varicella reported to the end of 2006. The infant had cicatricial skin scars and developed herpes zoster at 5 months of age. The exposure occurred in the 2nd trimester. In the previous APSU Congenital varicella study (1995-97), there was an average of 2.3 confirmed cases per year.

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For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- Congenital varicella is a rare but serious consequence of varicella infection.
- Ongoing surveillance is needed to determine if the national varicella immunisation program has an impact on the incidence of congenital varicella.

Original Articles:
Peadon E, Burgner D, Nissen M, Buttery J, Zurynski Y, Elliott E, Gold M, Marshall H, Booy R. Case for varicella surveillance in Australia. *Journal of Paediatrics and Child Health* 2006; 42:663-4.

Abstracts: None

Neonatal Varicella

R Booy, D Burgner, M Nissen, J Buttery, Y Zurynski, E Elliott, M Gold, E Peadon

Background: For objectives and case definitions please see www.apsu.org.au

Results: This study commenced in May 2006 and these results are preliminary. There were eight confirmed cases of neonatal varicella infection reported to the end of 2006. All infants were born at term. The median age at onset of varicella infection was 16 days (range 10 to 22 days). Skin lesions were the only clinical feature in all eight infants. These infants were given zoster immunoglobulin. Five infants were admitted to hospital and treated with intravenous aciclovir. The infecting contact was a first degree relative living in the same household for seven infants. Six of the contacts were adults (five mothers, one father). Five infecting contacts were unvaccinated and the vaccination status of the other three was unknown.

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For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- The most common infecting contacts reported are unvaccinated adults.
- Two thirds of affected infants required hospital admission.
- Two thirds were not given zoster immunoglobulin. One third did not receive anti-viral therapy.
- There is a need for well disseminated guidelines on the management of perinatal exposure to varicella.

Original Articles:
Peadon E, Burgner D, Nissen M, Buttery J, Zurynski Y, Elliott E, Gold M, Marshall H, Booy R. Case for varicella surveillance in Australia. *Journal of Paediatrics and Child Health* 2006; 42: 663-4.

Abstracts: None

Severe Complications of Varicella Infection

R Booy, D Burgner, M Nissen, J Buttery, Y Zurynski, E Elliott, M Gold, E Peadon

Background: For objectives and case definitions please see www.apsu.org.au

Results: This study commenced in May 2006 and these results are preliminary. There were thirteen confirmed cases of severe complications of varicella infection to Dec. 2006. The median age was 3 years (range 10 months to 12 years). Clinical features included bacteraemia (4), septic arthritis and/or osteomyelitis (3), pneumonia (3) and neurological complications (2). Streptococcal organisms were isolated in four children and *Staphylococcus aureus* in five children, including two MRSA isolates. All children were admitted to hospital and the median length of stay was eight days (range 2 to 14 days). Three children had ongoing problems at discharge (2- neurological; 1- dermatological). Twelve of the 13 children were not vaccinated against varicella. Infecting contacts were all children including two unimmunised siblings. Samples from vesicular lesions have been obtained from some cases and genotyping is ongoing.

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For case classification details and reported rates please see Tables 3 & 4, page 12-14

Study Highlights and Impacts:

- 92% of the cases admitted to hospital with severe complications were unvaccinated.
- Regular collection and analysis of vesicle samples will help to monitor whether the viral pathogen is mutating.
- This study will assist in describing the effectiveness of the vaccination program over time.

Original Articles:
Peadon E, Burgner D, Nissen M, Buttery J, Zurynski Y, Elliott E, Gold M, Marshall H, Booy R. Case for varicella surveillance in Australia. *Journal of Paediatrics and Child Health* 2006; 42:663-4.

Abstracts: None

Neuromuscular disorders of childhood

BACKGROUND

Neuromuscular disorders have very variable signs and symptoms, severity and impact on quality of life and life span. Diagnosis of these conditions is based on clinical, neurophysiologic, pathologic and genetic criteria (Table). Recent advances in these areas have resulted in a marked increase in the complexity of classification of many of these conditions.

Worldwide incidence and prevalence data for neuromuscular conditions in children are often outdated and incomplete. There are no such Australian data. International studies have shown considerable variability in the incidence of specific conditions in different populations and ethnic groups [1-7], and the effect of antenatal diagnosis on disease incidence is generally unknown. While these disorders are individually rare, the impact of a single child with a neuromuscular disorder upon the family and community can be enormous. Affected children require extensive community and hospital services for diagnosis, management and therapy, hospitalisations, access to and assistance with school, adaptive equipment and home modification, respite care, and social and financial support. Support services are largely dependent on state or federal funding, which is contingent upon perceived need. In the absence of accurate epidemiologic data, such services may be inadequately funded.

Better epidemiologic data is required to secure adequate provision and funding of clinical, diagnostic and research services in order to maintain the current high standard of care for paediatric neuromuscular disorders in Australasia.

STUDY OBJECTIVES

1. To describe the epidemiology of inherited and chronic auto-immune neuromuscular disorders diagnosed in Australian children, including:
   a. Type and frequency
   b. Family history
   c. Clinical presentation
2. To determine methods of diagnosis of these disorders in Australia.

CASE DEFINITION

Please report any child seen in the last month, aged 15 years or less, with a newly diagnosed inherited or chronic auto-immune neuromuscular disorder as described in the table below.

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.

FOLLOW-UP OF REPORTED CASES

A brief questionnaire requesting further details will be forwarded to responders reporting a newly diagnosed case.

INVESTIGATOR CONTACT DETAILS (Principal Investigator)***

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Dr Kate Sinclair, Head, Neurology Department, Royal Children's Hospital Brisbane

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Table: Case definitions

Disorder	*Clinical characteristics*	*Method of diagnosis*
Spinal muscular atrophy	• A motor neuronopathy causing progressive weakness in childhood, with facial sparing and tongue fasciculations. • Classification into types I - III based on clinical severity: Type I – does not achieve sitting Type II – achieves sitting but not standing Type III – achieves standing and walking.	• Diagnostic: Recessive mutations in *SMN1.* • Diagnostic: Typical neurogenic abnormalities on muscle biopsy. • Supportive: EMG: chronic neuropathic abnormalities, normal sensory studies.
Charcot-Marie -Tooth disease (hereditary motor and sensory neuropathy)	• A group of chronic progressive nerve disorders. • Presentation with abnormal gait, progressive distal weakness and orthopaedic abnormalities. • Classification based on neurophysiology and genetic testing	• Diagnostic: Confirmatory genetic testing. • Diagnostic: NCS: axonal or demyelinating neuropathy. • Supportive: Exclusion of other causes of neuropathy.
Myasthenia gravis	• Auto-immune disorder caused by acquired antibodies to nicotinic post-synaptic acetylcholine receptors (AChR). • Associated with acquired fluctuating Ophthalmoplegia +/- ptosis, +/- weakness of the proximal limb musculature.	• Diagnostic: Positive anti-AChR antibody test. • Diagnostic: EMG: decremental response on Repetitive nerve stimulation. • Supportive: exclusion of hypothyroidism.
Congenital myasthenic syndromes	• Congenital myopathies affecting the extraocular, bulbar, and proximal limb muscles. • Onset in infancy or early childhood.	• Diagnostic: EMG: decremental response on Repetitive nerve stimulation. • Supportive: Negative anti-AChR antibody test.
Chronic inflammatory demyelinating polyneuropathy	• Acquired chronic inflammatory neuropathy with proximal or distal weakness and variable sensory loss.	• Diagnostic: NCS: Acquired demyelinating neuropathy (variable slowing of nerve conduction +/- conduction block). • Supportive: elevated CSF protein, abnormal nerve biopsy.
Congenital myopathies		
Nemaline myopathy	• Congenital myopathy: proximal weakness, hypotonia. • Classification into severe, intermediate and typical congenital, childhood-onset and adult-onset forms.	• Diagnostic: Muscle biopsy: rod-shaped bodies on LM. • Diagnostic: Genetic testing for *ACTA1, TPM3,* or other causative mutations. • Exclusions of other conditions causing development of nemaline bodies.
Central core disease	• Congenital myopathy with weakness, hypotonia and motor delay.	• Diagnostic: Muscle biopsy: central cores in type 1 fibres, type 1 fibre predominance. • Diagnostic: Genetic testing for *RYR1* mutations.
Myotubular (centronuclear) myopathy	• Congenital myopathy affecting the extraocular, facial, neck & limb muscles. • Classification: severe X-linked neonatal, later-onset milder forms (autosomal recessive and dominant).	• Diagnostic: Muscle biopsy: central nuclei in extrafusal muscle fibres. • Diagnostic: Genetic testing for *MTM1, DNM2* or other causative mutations.
Congenital fibre-type disproportion	• Congenital myopathy with weakness, hypotonia +/ multiple joint contractures. • Multiple aetiologies.	• Diagnostic: Muscle biopsy: discrepancy in size between type 1 and type 2 muscle fibres. • Diagnostic: Genetic testing for *TPM2, ACTA1, SEPN1* or other causative mutations.
Minicore myopathy	• Congenital myopathy often associated with contractures and scoliosis. • Variable association with ophthalmoplegia and respiratory insufficiency.	• Diagnostic: Muscle biopsy: multiple small cores (minicores) within muscle fibres. • Diagnostic: Genetic testing for *SEPN1, RYR1* or other causative mutations.
Muscular dystrophies		
Duchenne muscular dystrophy	• Muscular dystrophy presenting with delayed motor milestones <5y of age. • Progressive weakness with loss of ambulation by age 12-15y.	• Diagnostic: Dystrophin gene analysis: out of frame OR frameshifting point mutation • Diagnostic: Muscle biopsy: absent/ <3% dystrophin. • Supportive: Dystrophic muscle biopsy. • Supportive: Markedly elevated CK.
Becker muscular dystrophy	• Milder phenotype of Duchenne muscular dystrophy • Ambulation preserved >15 yrs	• Diagnostic: Muscle biopsy: decreased expression (3-20%) of quantitatively/ qualitatively abnormal dystrophin. • Diagnostic: Dystrophin gene analysis: in-frame deletion.
Congenital muscular dystrophies	• Genetic myopathies presenting at <2 years of age with weakness and hypotonia. • Variable elevation of serum CK.	• Diagnostic: Genetic testing: where available • Diagnostic: Muscle biopsy: dystrophic pattern, no specific EM changes, variable abnormalities on ICC.
Facioscapulohumeral muscular dystrophy	• Slowly progressive form of muscular dystrophy with onset <30 yrs. • Weakness in the facial, scapular and humeral muscles. • Autosomal dominant inheritance.	• Diagnostic: Genetic testing: decrease in the number of repeats of a 3.3 kb tandem repeat sequence *(D4Z4*) on chromosome 4q35.
Limb-girdle muscular dystrophy	• Slowly progressive form of muscular dystrophy. • Weakness preferentially affecting the shoulder or pelvic girdle muscles and generally sparing the face. • Dominant or recessive inheritance.	• Diagnostic: Diagnostic Western blot or genetic testing by a reference laboratory. • Supportive: Dystrophic changes on muscle biopsy. • Supportive: Muscle ICC: characteristic changes in some forms of LGMD.
Myotonic dystrophy (DM)	• Onset from infancy to adulthood • Generalised weakness • Classification based on age at presentation: o Congenital DM1 - Hypotonia, weakness or respiratory insufficiency in the first 4 wks of life. o DM1 - Presentation after the first 4 wks of life.	• Diagnostic: Genetic testing: abnormal CTG repeat expansion in the *DM1* protein kinase gene on chromosome 19.
Dermatomyositis	• An idiopathic inflammatory myopathy with characteristic cutaneous findings, causing myalgia, proximal weakness and variable involvement of the viscera.	• Diagnosis based on clinical presentation. • Supportive: EMG or pathologic evidence of an inflammatory/ necrotizing myopathy.

CK: creatine kinase ICC: immunocytochemistry LM: light microscopy NCS: nerve conduction studies EM: electron microscopy
EMG: electromyography

Acute Intussusception

BACKGROUND

Intussusception (IS) is the most common cause of bowel obstruction in infants and young children with a peak incidence at 4 to 10 months of age [1]. IS occurs when one segment of the bowel becomes enfolded within another segment. If this obstruction is not relieved, the vascular supply to the bowel becomes compromised resulting in bowel ischaemia and death. The symptoms and signs in children presenting with IS reflect this underlying pathophysiology. Intestinal obstruction results in vomiting, abdominal distension and abnormal or absent bowel sounds. The IS and associated oedema may be identified as a mass on abdominal examination. Obstruction to the venous return or arterial supply of the intestine may result in rectal bleeding or the classic "red current jelly" stool. Occasionally patients present in shock due to severe vascular compromise of the intestine, and, if untreated, IS may be fatal [1]. The diagnosis of IS is confirmed on air/liquid contrast enema, abdominal ultrasound or at 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 is proven to be reduced by hydrostatic enema on post-reduction ultrasound. IS is treated by air or hydrostatic reduction enema under x-ray or ultrasound guidance, or by surgery. About 10% of patients require an intestinal resection due to vascular injury to the intestine [1].

Rotavirus infection is the leading cause of severe dehydrating gastroenteritis responsible for >500,000 deaths per year in children <5 years of age worldwide [2]. The development of a rotavirus vaccine for the children of the developing world is an important component of the UN Millennium Development Goals. There was great optimism when the first oral rotavirus vaccine was licensed in the U.S. (Rotashield®, Wyeth). The vaccine was highly efficacious for the prevention of severe diarrhoea and hospitalisation due to rotavirus infection [3-5]. However, Rotashield® was withdrawn 9 months after introduction due to an uncommon association with IS [6-8]. This was a major setback in efforts to reduce the global burden of rotavirus disease. Although the risk of development of IS associated with receipt of Rotashield® vaccine is estimated to be <1 in 12,000 vaccine recipients it has had important implications for clinical trials of other rotavirus vaccine candidates. Alternate rotavirus vaccines (Rotarix®, GSK and Rotateq®, Merck) have been shown to be safe and effective in clinical trials of >65,000 infants however their safety and performance outside the clinical trial setting in a range of potential clinical or epidemiological scenarios has not been demonstrated [9, 10]. Therefore, post-marketing (or post-licensure) surveillance will be an important tool for the detection of rare or unexpected vaccine related adverse events. Both the Rotarix® and Rotateq® vaccines have recently been incorporated into the National Immunisation Program (NIP) as federally funded vaccines. Universal immunisation against rotavirus is currently being discussed with WHO and other relevant bodies. As these vaccines are introduced it is important to monitor for IS to establish if there is any temporal association with receipt of a rotavirus vaccine and IS in Australian children. Investigation of possible risk factors for IS may provide an insight into the aetiology of IS in unvaccinated and vaccinated infants.

The Australian Paediatric Surveillance Unit (APSU) was established in 1993 to provide information about rare paediatric diseases in Australia. It is a Unit of the Royal Australasian College of Physicians, Division of Paediatrics. It partially supported by a grant from the Department of Health and Aging, Commonwealth of Australia and an NHMRC Enabling Grant. Between 1993 and 2004, the APSU monitored 34 uncommon childhood conditions. A comprehensive list of the studies conducted through the APSU since inception are documented on the website www.apsu.org.au. The APSU provides a unique mechanism to conduct surveillance on rates of intussusception following introduction of a universal rotavirus vaccine program in Australia.

HYPOTHESIS

Rotavirus vaccines (Rotarix and Rotateq) recently introduced into Australia are not associated with a significant increase in the incidence of IS in infants ≤ 24 months of age.

STUDY AIMS

1. To document the incidence of acute IS in infants ≤ 24 months
2. To document any temporal relationship between the development of IS and receipt of a rotavirus vaccine or other vaccines
3. To describe the clinical presentation, diagnosis, management and short term outcome of IS

STUDY METHODS

Each month all clinicians (paediatricians, paediatric surgeons, paediatric radiologists, emergency room physicians) in Australia will be sent either a reply-paid report card or an e-mail 'card' listing conditions currently being studied through the APSU. Clinicians are asked to report children newly diagnosed with any of the conditions listed. Investigators conducting the IS study at RCH are informed weekly of new cases reported by APSU contributors. The IS investigators will then send a brief questionnaire to the clinician requesting further de-identified information.

The data will be collected by the IS study investigators with the assistance of local investigators in each state (Vic – Prof Julie Bines; NSW – Dr Robert Booy; QLD – Dr Michael Nissen; NT – Dr Vikki Krause; WA – Dr Peter Richmond; SA – Dr Michael Gold; Tas – Dr Sean Beggs) and stored and analysed at the Study Centre at RCH. Investigators at RCH

(Professor Julie Bines, Dr Jim Buttery, Dr Margie Danchin) are responsible for collation, analysis and publication of this data, and for reporting study findings annually to the APSU. A dedicated and secure computer database will be established to manage data. A 2 year period of surveillance is proposed to account for any season variability in the natural incidence of intussusception.

CASE DEFINITION

Please report all cases of newly diagnosed case acute intussusception in a child aged ≤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.

Virological Testing

Due to previous studies identifying 40% of IS cases positive for adenovirus in their stool [12], for best clinical practise a stool sample is to be collected for each patient and sent to your local laboratory to be tested for adenovirus and rotavirus. De-identified copies of the results should be sent with the completed questionnaire in the reply paid envelope provided.

Analysis

Data will be analysed with the assistance of the APSU, Co-investigators and CEBU at MCRI/RCH. Group data analysis will be provided annually to the APSU for publication in the Annual Report. It is anticipated that data will be presented at scientific meetings and published in scientific journals.

INVESTIGATOR CONTACT DETAILS *(*Principal Investigator)*

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Acute Rheumatic Fever

BACKGROUND

Acute rheumatic fever (ARF) is a multi-system disease caused by an immunological response to group A streptococcal (GAS) infection. Children who have had ARF are susceptible to recurrent episodes when subsequent GAS infections occur. These recurrences often cause accumulated damage to heart valves (rheumatic heart disease - RHD), and consequent cardiac failure, the need for valve surgery or death. GAS infections and subsequent recurring ARF can be prevented by regularly administering penicillin as a regimen of *secondary prophylaxis*.

The highest documented rates of ARF and RHD in the world are found in Aboriginal Australians, and Maori and Pacific Islander people in New Zealand and Pacific Island nations. Aboriginal and Torres Strait Islander people are reportedly up to 8 times more likely than non ATSI people to be hospitalised for ARF and RHD, and nearly 20 times as likely to die.[1] Approximately 43% of Aboriginal people with ARF or RHD in the Top End of the Northern Territory first present with established RHD.[2,3] As most rheumatic valve lesions are the result of repeated or prolonged episodes of ARF in childhood and adolescence, [4] these data suggest that the early episodes of ARF are not being diagnosed in many children in the Top End of NT.

ARF is predominantly, but not exclusively, a problem among Indigenous communities and our understanding of the epidemiology and impacts of ARF is currently restricted to the NT and QLD. However, there are no data on the incidence, management and outcomes for this debilitating condition for the southern regions of Australia where an estimated 57% of the Indigenous community lives. Furthermore, there are no data on the impact of ARF on children in other communities eg. immigrants and refugees.

This study aims to provide national data on ARF in Australian children and to determine where and in whom ARF is currently occurring. This study will also document recurrences of ARF and the extent of use of secondary prophylaxis. Using the information we will make recommendations on where ARF and RHD programs should be established to reduce the level of sickness and death that results from ARF and RHD.

STUDY OBJECTIVES

This study aims to:

- Estimate the incidence of ARF in the child population of Australia, particularly in regions from which there are currently no data, or only poor quality data.
- Determine the proportion of all ARF episodes that are recurrences.
- Identify populations, groups and regions at highest risk of ARF.

REPORTING INSTRUCTIONS

Please report 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 in the **case definition**.

FOLLOW UP OF NOTIFICATIONS:

A brief questionnaire requesting details about the diagnosis will be sent to clinicians who notify a case of ARF to the APSU. In the event that Sydenham's chorea is identified, a brief questionnaire on chorea will also be sent to clinicians who agree to participate in collection of chorea data (optional).

CASE DEFINITION

According to the National Heart Foundation Guidelines for Diagnosis and Management of ARF and RHD [5].

<table>
<tr><th></th><th>High Risk Groups</th><th>All Other Groups</th></tr>
<tr><td>Initial episode of ARF</td><td colspan="2">2 major or 1 major and 2 minor manifestations
Plus
Evidence of a preceding GAS infection</td></tr>
<tr><td>Recurrent attack of ARF (in a patient with known past ARF or RHD)</td><td colspan="2">2 major or 1 major and 2 minor or 3 minor manifestations
Plus
Evidence of a preceding GAS infection</td></tr>
<tr><td>Major Manifestations</td><td>▪ Carditis (including subclinical evidence of rheumatic valve disease on echocardiogram)
▪ Polyarthritis or aseptic mono-arthritis or polyarthralgia
▪ Chorea
▪ Erythema marginatum
▪ Subcutaneous nodules</td><td>▪ Carditis (including subclinical evidence of rheumatic valve disease on echocardiogram)
▪ Polyarthritis
▪ Chorea
▪ Erythema marginatum
▪ Subcutaneous nodules</td></tr>
<tr><td>Minor manifestations</td><td>▪ Fever
▪ ESR ≥30 mm/hr or CPR ≥30 mg/l
▪ Prolonged P-R interval on ECG</td><td>▪ Fever
▪ Polyarthralgia or aseptic mono-arthritis
▪ ESR ≥30 mm/hr or CPR ≥30 mg/l
▪ Prolonged P-R interval on ECG</td></tr>
<tr><td>Evidence of a preceding GAS infection</td><td colspan="2">▪ Elevated or rising antistreptolysin O or other streptococcal antibody, or a positive throat culture or rapid antigen test for GAS.
▪ Upper limits of normal for streptococcal antibody titres in Australia:
<table>
<tr><th>AGE GROUP</th><th colspan="2">UPPER LIMIT OF NORMAL (IU/ML)</th></tr>
<tr><th>(years)</th><th>ASO titre</th><th>Anti-DNase B titre</th></tr>
<tr><td>4–5</td><td>120</td><td>100</td></tr>
<tr><td>6–9</td><td>480</td><td>400</td></tr>
<tr><td>10–14</td><td>320</td><td>380</td></tr>
</table></td></tr>
</table>

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International Network of Paediatric Surveillance Units (INoPSU)

The International Network of Paediatric Surveillance Units (INoPSU) was established in 1998 to facilitate international collaboration among the 14 member paediatric surveillance units (PSUs) around the world. This collaboration allows for sharing of resources, simultaneous data collection and comparison across geographical regions. INoPSU have facilitated the surveillance of 70 rare conditions and have now undertaken 150 studies covering a child population of over 50 million children and involving over 10,000 clinicians (Table 5). Details on all of the activities of each surveillance unit are available from their respective websites and also from the INoPSU website (www.inopsu.com).

Table 5. Paediatric surveillance units comprising INoPSU

Paediatric Surveillance Unit	Year Founded	Population <15y (millions)	Participating clinicians (number)	Card return rate (%)	Questionnaire return rate (%)
Australian Paediatric Surveillance Unit	1993	3.9	1247	97	86
British Paediatric Surveillance Unit	1986	12.7	2550	91	92
Canadian Paediatric Surveillance Program	1996	7.6*	2500	82	96
Cyprus & Greece Paediatric Surveillance Unit	2003	1.3	110	100	100
German Paediatric Surveillance Unit	1992	12.0	462	98**	60-95**
Irish Paediatric Surveillance Unit	1996	1.5	150	80	80
Latvian Paediatric Surveillance Unit	1997	0.4	8	70	85
Malaysian Paediatric Surveillance Unit †	1994	7.7	395	75	n/a
Netherlands Paediatric Surveillance Unit	1992	3.0	692	0	70
New Zealand Paediatric Surveillance Unit	1997	0.8	208	94	n/a
Papua New Guinea Paediatric Surveillance Unit †	1996	2.0	40	79	n/a
Portuguese Paediatric Surveillance Unit	2001	1.4	1800	33	66
Swiss Paediatric Surveillance Unit	1994	1.3	38	100	98
Welsh Paediatric Surveillance Unit	1994	0.6	158	100	n/a

* Canadian Paediatric Surveillance Program paediatric population is aged 0-17.9 years

** 2004 Annual results

† Malaysian and Papua New Guinea Units have ceased surveillance

Acknowledging Contribution to Surveillance Studies

Paediatric surveillance units rely on the continued participation of paediatricians and other child health clinicians in the surveillance system. Their contribution is important and it should be encouraged and acknowledged in any publications that arise from surveillance studies. INoPSU recently published guidelines on acknowledging the important contribution of clinicians reporting cases to surveillance studies. They proposed the following recommendations in a letter in Archives of Disease in Childhood [1]:

- To qualify for authorship on publications, individuals must fulfil criteria set out in the Vancouver Protocol (www.icmje.org.au), and an acknowledgement of the clinicians contribution should also be included after the final author's name, ie. "On behalf of contributors to the (national PSU)"
- Investigating teams are encouraged to consider inviting clinicians who have contributed significant data through case reports onto the study team to provide expertise relevant to the condition being studied and authorship may then be offered if appropriate under the Vancouver protocol.
- Individual clinicians reporting cases may be acknowledged by name in the acknowledgement section of the publication provided prior permission is sought for the clinician.

Public Health Impacts of Surveillance Studies

Studies conducted by paediatric surveillance units aim to have impact by effecting changes to public health policy, health resource allocation and clinical practice and ultimately improving child health. Collaboration among the INoPSU members has led to the simultaneous conduct of surveillance studies in different countries allowing for the international comparison of data and identification of geographical differences for conditions studied. Examples of studies conducted by units, and their impacts are summarised in Table 6. (2)

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Table 6. Impacts of Paediatric Surveillance Unit studies

Study	Impact	Participating PSU
Acute flaccid paralysis	Confirmed absence of wild poliovirus and presence of vaccine-associated paralytic polio; contributed to WHO eradication and accreditation program.	APSU, BPSU, CPSP, NZPSU, SPSU
Haemophilus influenzae type B infection	Documented success of Hib vaccination programs including combined pentavalent vaccine.	APSU, ESPED, NSCK
Pertussis infection in infants	Informed changes to vaccination schedules; Identified need to review age of first vaccination and for targeted adult/adolescent vaccination.	APSU, BPSU, CGPSU, NSCK, NZPSU
Pneumococcal infection	Documented disease burden and supported universal vaccination programs.	ESPED, NZPSU
Congenital rubella syndrome (CRS)	Document persistence of CRS despite good vaccine coverage; and identify need for targeted vaccination for susceptible women (eg, immigrants, non-immune, pre-conception and postpartum).	APSU, BPSU, CPSP, NZPSU, SPSU, NSCK
Subacute sclerosing panencephalitis	Confirms disease is rare in countries with well implemented measles vaccination programs and is associated with wild measles virus infection.	APSU, BPSU, CPSP, ESPED,
Congenital Varicella; neonatal varicella; complications.	Supported need for universal vaccination; and education for community and health professionals regarding infection in pregnancy.	APSU, BPSU, CPSP, ESPED, SPSU
Neonatal herpes simplex virus infection	Confirms HSV-1 most prevalent in Australia and Canada; incidences is lower than in USA; disease is often severe. Identifies need for effective screening and development of vaccines both against HSV-1 & 2.	APSU, BPSU, CPSP, SPSU
HIV/AIDS, perinatal exposure to HIV	Support recommendation for anti-retroviral agents, caesarian section, bottle feeding in infected mothers; supported recommendation for universal prenatal screening.	APSU, BPSU, LPSU, NSCK, NZPSU
Invasive group B streptococcal disease	National prevention guidelines recommended, either based on risk factors or through universal screening in late pregnancy.	BPSU, CPSP, ESPED, NSCK, PPSU
Progressive intellectual and neurological deterioration (PIND) and childhood dementia.	Identified variant CJD in Britain but not Canada and no trend to increased rate. Identified PIND has many aetiologies; many cases idiopathic; all highly demanding of health services.	APSU, BPSU, CPSP
Early onset eating disorder (<13years old)	Confirms need for pre-adolescent diagnostic criteria; substantial proportion of cases are boys aged ≤ 9years.	APSU, BPSU, CPSP, NSCK
Conversion disorder	First national study; described clinical features, disease burden, co-morbidity and risk of recurrence.	APSU
Munchausen syndrome by proxy	Identified large disease burden; feelings of isolation in clinicians; and need for multidisciplinary support for diagnosis and management.	APSU, BPSU
Rett Syndrome; Prader Willi Syndrome; Smith-Lemli Opitz Syndrome (SLOS)	Describe molecular epidemiology and genotype-phenotype correlations; establish research cohorts for longitudinal and other studies.	APSU, BPSU, CPSP
CHARGE association	Identified the complexity of CHARGE; overlap with other syndromes; need for future health resources plan; facilitated genetic studies.	APSU, CPSP
Medium chain acyl CoA dehydrogenase deficiency	Confirmed the value of neonatal tandem mass spectrometry screening for early identification of disease	BPSU, NSCK
Vitamin K deficiency bleeding	Confirms most cases are late onset and related to underlying liver disease; high proportion of cases receive none or incomplete prophylaxis.	APSU, BPSU, CPSP, ESPED, NZPSU, SPSU, NSCK
Fetal alcohol syndrome	Identified need for universal diagnostic criteria, specialised services, education of health professionals and the community, and prevention	APSU, NZPSU
Haemolytic uraemic syndrome	Described geographic variation in aetiology, highlighting the need for new diagnostic tests. Supported preventative measures eg education; hygiene recommendations for kindy farms; legislation regarding food production.	APSU, BPSU, CPSP, LPSU, NZPSU, PPSU, SPSU
Chemistry set poisoning	Resulted in amended legislation in the UK regarding packaging and provision of information	BPSU
Reye syndrome	Resulted in ban of aspirin in paediatric/youth populations	BPSU, ESPED
Baby walkers	Supported ban on sale, re-sale, advertisement and importation of baby walkers in Canada	CPSP
Lap-belt syndrome	Resulted in call for age- and size-appropriate use of restraints for children in motor vehicles	CPSP, APSU

INoPSU Conference 2006

Following the successful 3rd INoPSU meeting held in Lisbon, Portugal during 2004, a fourth meeting was held in London in May 2007 to coincide with the BPSU's 20th Anniversary Conference. Representatives from the 12 active national units attended the meeting.

There were opportunities for networking and exchange of ideas and experiences of rare disease surveillance. Issues affecting most units included funding, the ethical approval of studies and the increasing need for data confidentiality. The morning session consisted of presentations from individual units. The Australian unit presented New Zealand and Australian data on Fetal Alcohol Syndrome. There was much interest in replicating the study by other units although concerns over case definition need to be addressed. The Canadian unit presented data on neonatal herpes and hyperbilirubinaemia. Talks on type 2 diabetes (Latvia), vitamin K deficiency bleeding (Netherlands) and acute flaccid paralysis (Switzerland) were also presented. On behalf of INoPSU the Australian Unit presented a paper on the public health impacts of surveillance studies. This paper has since been published in Archives of Disease in Childhood. At a business meeting in the afternoon, we discussed funding needs, the potential for international collaboration in developing studies and further development of the INoPSU website.

We look forward to the next meeting in Germany in 2008.

Representatives from the following national surveillance units attended the 4th INoPSU Conference, London:

Australian Paediatric Surveillance Unit
British Paediatric Surveillance Unit
Canadian Paediatric Surveillance Program
German Paediatric Surveillance Unit
Greece & Cyprus Paediatric Surveillance Unit
Irish Paediatric Surveillance Unit
Latvian Paediatric Surveillance Unit
Netherlands Paediatric Surveillance Unit
New Zealand Paediatric Surveillance Unit
Portuguese Paediatric Surveillance Unit
Swiss Paediatric Surveillance Unit
Welsh Paediatric Surveillance Unit

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Workshops run by APSU

1. Fetal Alcohol Syndrome (FAS) Workshop, APSU, The Children's Hospital Westmead, Sydney, May 2005.

2. Rett Syndrome Workshop, APSU, The Children's Hospital Westmead, Sydney, November 2005.

Fetal Alcohol Syndrome (FAS) Workshop: **Diagnosis, Epidemiology, Behaviours, and Prevention**

This workshop was held on 5 May 2005 at The Children's Hospital at Westmead and attracted an audience of over 100 clinicians, indigenous health workers, educators, researchers and interested policymakers.

International speakers were Prof Ken Jones, who is credited as being the first to report FAS in the English literature, and Dr Christina Chambers, an epidemiologist with a special interest in the prevention of FAS, both from San Diego School of Medicine, California.

Australian speakers included Prof Carol Bower and Heather D'Antoine from the Telethon Institute for Child Health Research in Western Australia; Anne Russell, mother of two adult children with FAS, who represented the National Organisation for Fetal Alcohol Syndrome and Related Disorders; Lorian Hayes, an indigenous educator in Health Promotion, and Colleen O'Leary who is currently working in the Child & Community Health Directorate of the Western Australia Department of Health and Prof Elizabeth Elliott.

The workshop was exceptionally well rated and was featured in *The Sydney Morning Herald* newspaper the next day: "Professor Elliott said data suggested Australia had a low rate of the syndrome – less than one case per thousand live births in the general population, and between two and three cases per thousand in the indigenous population. But a lack of awareness of the syndrome among GPs and women and the reluctance of mothers to admit to alcohol use during pregnancy meant many cases were being missed."

Rett Syndrome: Diagnosis, Genetics, Epidemiology, Clinical Management and the Parents Perspective

A two day workshop was held on 20 and 21 November 2005, at the Kerry Packer Institute for Child Health Research, The Children's Hospital at Westmead. The workshop was a joint venture between the APSU, the Telethon Institute for Child Health Research and the Rett Association. The first day was for parents and carers of children with Rett Syndrome and provided an opportunity for parents to network while having access to clinicians and researchers working in the area. This was also a valuable opportunity for clinicians to hear firsthand experiences about living with, and caring for, a child with Rett syndrome. Approximately 80 parents, carers and educationalists from around Australia attended.

Presentations on the second day were aimed at health professionals. The audience was multidisciplinary and included nurses, therapists, a special education teacher, senior consultants and other clinicians, researchers, dieticians, a genetics counsellor, and some parents and carers. The workshop highlighted the latest advances in clinical and genetic diagnosis and the need for a multidisciplinary approach to the care of children with Rett syndrome. Improved linkage of researchers through the "InterRett" study has enabled the development and comparison of cohorts internationally. Crystal Laurvick showed results from a study of the psychosocial impacts on families and communities, and this was echoed by two heartfelt presentations from parents. All presentations rated very highly and all who attended reported increased knowledge of Rett syndrome after the workshop. Guest Speakers included: Dr Helen Leonard, Professor John Christodoulou, Dr Gordon Baikie and Ms Crystal Laurvick. Materials related to the workshop are available from the APSU website www.apsu.org.au.

Clinicians Reporting Cases in 2005

Recipients of the wine prize draw are highlighted

ACT

Dr Ann Crawshaw
A Prof G David Croaker
Dr Alison Kent
Dr Antony Lafferty
Dr Grant A Mackenzie
Dr Suzanna Powell

NSW

Dr Susan Adams
Dr Geoff Ambler
Dr Ian Andrews
Dr Elizabeth Argent
Dr Andrew Berry
Dr Paul Bloomfield
Dr Christopher Blyth
Dr Jennifer R Bowen
Dr Adam Buckmaster
Dr Laurence E Budd
Dr Thomas A Campbell
Dr Paul Chidiac
Dr Des Cohen
Dr Richard J Cohn
Dr Heather Coughtrey
Dr Maria Craig
Dr Paul Craven
Dr Patricia Crock
Dr Clare A Cunningham
Dr P Davidson
Dr John A De Courcy
Dr Mark De Souza
Dr Kim Donaghue
Dr Peter E Doyle
Dr Matthew J Edwards
Dr Carolyn J Ellaway
Dr Phillip J Emder
Dr Adrienne G Epps
Dr John B Erikson
Dr Elizabeth R Fagan
Dr Michael Fasher
Dr Dominic A Fitzgerald
Dr Stuart M Gadd
Dr Deepak Gill
Dr Safak Goktogan
Dr P M Goodhew
Dr Sandra P Grass
Dr P Grattan-Smith
Dr Anne Hackett
Dr Maxwell Hopp
Dr Keith M Howard
Dr Neville J Howard
A Prof David Isaacs
Dr Stephen Jacobe
A Prof Cheryl A Jones
Dr Alyson M Kakakios
Dr Stewart J Kellie
Dr Allan M G Kerrigan
Dr Alison M Kesson
Dr Jan Klimek
Dr Martin R Kluckow
Dr Paul W Knight
Dr Phillip Kolos
Mr Erik La Hei
Dr John A Lawson
Dr A S C Lim
Dr Melissa C Luig
Dr Sloane Madden
Dr Albert Mansour
Dr Susan M Marks
Dr Glenn M Marshall
Dr Hugh C O Martin
Dr C R McClymont
Dr David W McDonald
Professor Peter B McIntyre
Dr Fiona McKenzie
Dr Tracey Merriman
Dr Joseph P Moloney
Dr P Palasanthiran
Dr P Patradoon-Ho
Dr Susan Piper
Dr Suzanna Powell
Dr J S Preddy
Dr Laurence G Roddick
Dr Susan J Russell
Dr Charles M Scarf
Dr John K H Sinn
Dr Robert Smith
Dr Jacqueline A Stack
Dr David R Starte
Dr Glenn Stephens
Dr Lee Sutton
Dr Juliana T K Teo
Dr Anne M Turner
Dr Peter Van Asperen
Dr J L Walker
Dr Mary-Clare Waugh
Dr Boyd Webster
Dr Meredith Wilson
Dr Catherine Wiltshire
Dr Ian Wright
A Prof John Ziegler

NT

Dr Keith N Edwards
Dr Rosemary E Fahy

QLD

Dr Erica Baer
Dr Leisha A Callaghan
Dr David W Cartwright
Dr Ronald C Clark
Dr John Coghlan
Prof Paul B Colditz
Dr Andrew Cotterill
Dr Maree G Crawford
Dr J A Cullen
Dr Alison Cupitt
Dr Peter J DeBuse
Dr Timothy J Donovan
Dr Aaron M Easterbrook
Dr Bruce Goodwin
Dr Leonie M Gray
Dr Wayne A Harris
Dr G J Harte
Dr E M Hurrion
Dr J Anne Kynaston
Dr Helen Liley
Dr Elena J Mantz
Dr John R McCreanor
Dr David B McCrossin
Dr Julie McEniery
Dr Susan Moloney
Dr David J Moore
Dr Clare Nourse
Dr Jose A Prado
Dr Ian F Robertson
Dr Patrick J Ryan
Dr Phil Sargent
Dr A J Slater
Dr H Stalewski
Dr Mark Stretton
Dr David I Tudehope
Dr Claire E Wainwright
Dr Timothy H Warnock
Dr Michael L Williams
Dr Nicholas F Woolfield

SA

Dr Christopher Barnett
Dr Janice M Fairchild
Mr W D A Ford
Dr Paul N Goldwater
Dr Ross R Haslam
Dr Simon L James
Dr Christopher L Munt
Dr Richard G Power
Dr Nicola J Spurrier
Prof Hock-Lim Tan
Dr M W Yung

TAS

Dr Christopher J Bailey
Prof Allan Carmichael
Dr Evelyn Funk-Bowles
Dr S J Parsons
Dr Mark M Pascoe
Dr A W Shugg
Dr Michelle Williams

VIC

Dr Roger C Allen
Dr Kym P Anderson
Dr Ylva Andersson
Dr Jim Buttery
Dr Donald J S Cameron
Dr William D Capell
Dr David J Carolane
Dr Elizabeth A Carse
Dr Peter G Churven
Dr Chris Cooper
Dr Martin B Delatycki
Dr Peter S Dewez
Dr Kevin B Dunne
Dr Maurice K Easton
Dr Daryl Efron
Dr Paul G Ekert
Dr Adrian M Elderhurst
Dr Michael Fahey
Dr Peter W Goss
Dr Michael D Harari
Dr Winita Hardikar
Dr James Holberton
Dr Andrew D Kennedy
Dr Maryanne Lobo
Dr Lionel Lubitz
Dr Catherine Lynch
Dr Catherine McAdam
Dr Brendan McCann
Dr Joanna McCubbin
Dr James A McLellan
Dr John A McLennan
A Prof P T Monagle
Prof Colin Morley
Dr C Andrew Ramsden
Dr Phillip Rosengarten
Dr Monique Ryan
Dr Luke P Sammartino
Dr Christine Sanderson
Dr Kerryn R Saunders
Dr Arnold L Smith
Mr Keith B Stokes
Dr T G Stubberfield
Mr Robert Stunden
Dr Russell G Taylor
Dr Margerete Tilders
Dr Peter W Wearne

WA

Dr David P Burgner
Dr Gervase M Chaney
Dr Catherine H Cole
Dr Ian J Gollow
Clin A Prof R Hagan
Dr Linda A Harris
Dr John D Hobday
Dr Lawrence T H Hu
Dr C A Jeffries-Stokes
Dr Anne F Kehoe
Dr Kishore Kumar
Dr Corrado Minutillo
Dr Sanjay Patole
Dr P C Richmond
Dr J M Scurlock
Dr J M Silberstein
Dr Peter Walsh
Dr M Watson

Clinicians returning 100% of cards in 2005

Recipients of the wine prize draw highlighted

ACT

Dr Judith L Bragg
Dr Michael Falk
Dr Amelia M Herath
Dr Ian W Hufton
Dr Paul I Jenkins
Dr Penelope J Johnson
Dr Alison Kent
Dr Antony Lafferty
Dr Suzanne M Packer
A Prof Graham J Reynolds
Dr E Simpson

NSW

Dr Jennifer E Ault

Clinicians returning 100% of cards in 2005

Dr C Abkiewicz
Dr Julie C Adamson
Dr Lesley C Ades
Dr Garth Alperstein
Dr Alan F Amos
Dr Donald G Anderson
Dr Jayne H Antony
Dr Michael Besser
Dr Nadia Badawi
Dr Lynn Banna
Prof Louise A Baur
Dr Graham J Bench
A Prof David L Bennett
Dr G P Bent
Dr Andrew Berry
Dr Martin Berry
Dr Michael Besser
Dr Paul Bloomfield
Dr Srinivas Bolisetty
Dr J J Brereton
Dr M P Brydon
Dr P Buckner
Dr Laurence E Budd
Dr P Ha Yuen Caldwell
Dr Thomas A Campbell
Dr Kity Chee
Dr Raymond Chin
Dr Robin K C Choong
Dr David Christie
Dr John Christodoulou
Dr Simon D Clarke
Dr John C Coakley
Dr Des Cohen
Dr Richard J Cohn
Dr Alison F Colley
Dr Felicity A Collins
Dr Patrick E Concannon
Dr Peter John Cooper
Dr Stephen G Cooper
Dr Carolyn Cooper
Dr Michael C Copeman
Dr Heather Coughtrey
Dr Jonathon Craig
Dr Paul Craven
Dr Patricia Crock
Dr Genevieve E Cummins
Dr P Davidson
Dr Robert Day
Dr Andrew Day
Dr John A De Courcy
Dr Mark De Souza
Dr Kim Donaghue
Dr Peter John Donald
Dr Clare Mary Doocey
Dr Stuart F A Dorney
Dr Ana Maria Dosen
Dr David Dossetor
Dr Lynette M Downe
Dr Peter Ernest Doyle
Dr Richard John Dunstan
Dr Linda Durojaiye
Dr Peter William Ebeling
Dr Carolyn Jane Ellaway
Prof Elizabeth J Elliott
Dr Phillip John Emder
Dr Adrienne G Epps
Dr Anthony D Epstein
Dr Elizabeth R Fagan
Dr Michael J Fairley
Dr Robert H Farnsworth
Dr Michael Fasher
Dr Dominic A Fitzgerald
Dr Stuart M Gadd
Dr Andrew J Gardiner
Prof Kevin J Gaskin
Dr Maurice D Gett
Dr Anna Clare Gill
Dr Jonathan Gillis
Dr Neil D Ginsberg
Dr Rebecca Glover
Dr Chin Lum Goh
Dr Safak Goktogan
Dr Maria Linette Gomes
Dr P M Goodhew
Dr Padraic Grattan-Smith
Dr Julie M Haas
Dr Robert J Halliday
Dr Nils F Hanson
Dr Michael J Harris
Dr Richard K Hart
Dr John G Harvey
Dr Richard E Hawker
Prof D J Henderson-Smart
Dr Elisabeth M Hodson
Dr Peter Yee-Tai Hong
Dr Maxwell Hopp
Dr Jason Hort
Dr Paul Hutchins
A Prof David Isaacs
Dr Michelle M Jack
Dr Stephen Jacobe
Dr Con A James
Dr Robyn Jamieson
Prof Heather E Jeffery
Dr Patricia M Johnson
Dr Heather Johnston
Dr Peter Dominic Jones
Dr Kristi J Jones
Dr Preeti Joshi
Dr G M Kainer
Dr Lisa Kane
Dr Stewart J Kellie
Dr Allan Kelly
Prof Andrew S Kemp
Dr Allan M G Kerrigan
Dr Alison M Kesson
A Prof Henry A Kilham
Dr Martin R Kluckow
Dr Paul W Knight
Dr Karen Knoll
Dr Michael Kohn
Dr Peter Kristidis
Dr Ahti T Lammi
Dr M Kumaradeva
Mr Erik La Hei
Dr Basiliki Lampropoulos
Dr Deborah J Lewis
Dr David Lillystone
Dr Daniel C S Lin
Dr Anthony Jun Wing Liu
Dr O Lozynsky
Dr Kei Lui
Dr Sloane Madden
Dr Annabel K Magoffin
Dr Glenn M Marshall
Dr Frank J Martin
Dr Emma McCahon
Dr Robert McCarthy
Dr David T McDonald
Dr Tracey Merriman
Dr Joseph P Moloney
Dr Kieran T Moran
Dr Desmond L Mulcahy
Dr Anthony O'Connell
Dr Patricia E Mutton
Prof Kathryn North
A Prof Victor Nossar
Prof R Kim Oates
Dr Stephen J O'Flaherty
Dr Pamela Palasanthiran
Dr Dimitrios Papadopoulos
Dr Mary Paradisis
Dr John Pereira
Dr Elizabeth Pickford
Dr Susan Piper
Dr Melvyn Polon
Dr Christopher C Poon
Dr Stephen D Pryde
Dr Bruce B Richards
Dr Peter Robinson
Dr Marilyn Rochefort
Dr A Ronan
A Prof A R Rosenberg
Dr Greg Rowell
Mr Gerard Roy
Dr Terry M Sands
Dr Charles M Scarf
Dr Adam M Scheinberg
Dr David N Schell
Dr Mark Selikowitz
Dr Christopher Seton
Dr Smita Shah
Dr Arun S Shanker
Dr Peter Shaw
Dr Gary F Sholler
Dr Albert Shun
Prof David O Sillence
Dr D Singer-Remeljan
Dr John K H Sinn
Dr Helen M Somerville
Dr Velencia Soutter
Dr Jean Starling
Dr Graeme Stein
A Prof Kate Steinbeck
Dr Glenn Stephens
Dr Michael M Stevens
Dr Lee Sutton
Dr Brian M Symons
Dr Arthur Teng
Dr Juliana Tze Khiang Teo
Dr Kathryn E Thacker
Dr Ganesha Thambipillay
Dr Ronda L Ticehurst
Dr Rodney L Tobiansky
Dr Susan J Towns
Dr A B Underwood
Dr Peter Van Asperen
Dr P K J Van Vliet
Prof Graham V Vimpani
Dr Chris Wake
Dr Murray T Webber
Dr Boyd Webster
Dr Mark A Westphalen
Dr Bruce Whitehead
Dr Bridget Wilcken
Dr Barry Wilkins
Dr Helen F Wilkinson
Dr George L Williams
Dr Helen Woodhead
Dr Meredith Wilson
Dr Melanie Wong
Dr Kylie Meredith Yates
Dr Simon Young

NT

Dr Paul A M Bauert
Dr Louise Martin
Dr Andrew White

QLD

Dr Donald B Adsett
Dr L Ah Yui
Dr Deborah Bailey
Dr Ruth Barker
Prof Jennifer A Batch
Dr David W Cartwright
Dr Ronald C Clark
Prof Geoffrey J Cleghorn
Prof Paul B Colditz
Dr Jan Connors
A Prof David M Cooper
Dr Mark W Davies
Dr Neville G Davis
Dr Roderic G Delbridge
Dr Loui Ee
Dr Ian I Findlay
Dr William Kin-Wah Fong
Dr Paul W J Francis
Dr William Frischman
Dr Donna Gandini
Dr John B Gavranich
Dr Bruce Goodwin
Dr Leonie M Gray
Dr G J Harte
Dr Tim E G Hassall
Dr Richard Heazlewood
Dr Alison Harris
Dr Margaret M Hogan
Dr Johanna M Holt
Dr Thomas M Hurley
Dr E M Hurrion
Dr Ronald W James
Dr Lisa Kane
Dr J Anne Kynaston
Mr Mervyn M Lander
Dr Helen Liley
Dr Elena J Mantz
Dr John R McCreanor
Dr David B McCrossin
Dr Michael McDowell
Dr Julie McEniery
Dr James J McGill
Dr Robert A L McGregor
Dr Lynne McKinlay
Dr David McMaster
Dr Steven McTaggart
Dr William R McWhirter
Dr Julian D Mellick
Dr Hilary P Mercer
Dr Malcolm N Miller
Dr Susan Moloney
Dr David J Moore
Dr Anthony Morosini
Dr Brian D Morris
A Prof Michael D Nissen
Dr Michael J O'Callaghan
Dr Tat-Hin Ong
Dr Peter S O'Regan
Dr Mansu Pabari
Dr Mark K Patrick
Dr James T Pelekanos
Dr Donald A Perry-Keene
Dr W Robert Pitt
Dr Jose A Prado
Dr Jeffrey J Prebble
Dr N Previtera
Dr Ian F Robertson
Dr Peter Roddenby
Dr David A Rogers
Dr Peter C Roper
Dr Patrick J Ryan
Dr Catherine Y Skellern
Dr B David Slaughter
Dr Peter Kenneth Smith
Dr H Stalewski
Dr Mark Stretton

Clinicians returning 100% of cards in 2005

Dr Kerry O Sullivan
Dr Ram Suppiah
Dr Felix K Y Tan
Dr Susan Thornton
Dr Deanna Kathryn True
Dr Jasper Van der Westhuyzen
Dr Alison Van Haeringen
Dr Claire E Wainwright
Dr Rosslyn M Walker
A Prof Neil R Wigg
Dr Judy A Williams
Dr David Wood
Dr Paul G Woodgate
Dr Nicholas F Woolfield

SA

Dr Phillip Adams
Dr George P Blake
Dr R Burnell
Dr Brian Coppin
Dr Richard T L Couper
Dr Terence G Donald
Dr Philip R Egan
Dr Janice M Fletcher
Prof Kevin D Forsyth
Dr Andrew W Grieve
Dr Eric A Haan
Dr T T S Han
Dr Michael G Harbord
Dr Paul H Henning
Dr Anthony M Hoby
Dr Anthony R Israel
Dr Kenneth F Jureidini
Dr Jon Jureidini
Dr J D Kennedy
Dr David B Ketteridge
Dr Maria Kirby
Dr Margaret Anne Kummerow
Dr Margaret R Kyrkou
Dr M A Measday
Dr Josie Nozza
Dr Peter A Petek
Dr Robert P Pollnitz
Dr Terence S Pouras
Dr Richard G Power
Dr Michael S Rice
Dr Malcolm Richardson
Prof Don M Roberton
Dr Remo (Ray) N Russo
Dr Michael J Smiley
Mr Anthony sparnon
Dr Gregory J Smith
Dr Rima E M Staugas
Dr Nigel L Stewart
Professor Hock-Lim Tan
Dr Ram Suppiah
Dr Billy S Tao
Dr Heather Tapp
Dr Andrew J Tidemann
Dr Deirdre A White

TAS

Dr Christopher J Bailey
A Prof K L Armstrong
Prof Allan Carmichael
Dr Patrick M T Fernando
Dr Peter J Flett
Dr Elizabeth Hallam
Dr Mark M Pascoe
Dr A W Shugg
Dr Ian G Stewart

VIC

Dr Roger C Allen
Dr Katie J Allen
Dr Stuart G Anderson
Mr Alexander W Auldist
Dr Gordon Baikie
Dr Enver Bajraszewski
Dr David G Bannister
Professor Graeme Barnes
Dr Noel McK Bennett
Dr Simon P Blair
Dr Fiona D Brown
Dr Fergus J Cameron
Dr William D Capell
Dr Bronwyn A Cathels
Dr C Chandran
Dr Jacinta M Coleman
Dr S Costello
Dr John M Court
Dr A J Daley
Dr Margot J Davey
Dr Peter Davis
Dr Noni M Davis
Dr Martin B Delatyck
Dr P Dewan
Dr Peter S Dewez
Dr Peter Andrew Downie
Dr David C Downing
A Prof Lex William Doyle
Dr John Hedley Drew
Dr Kevin Bernard Dunne
Dr Peter James Eastaugh
Dr Daryl Efron
Dr Paul G Ekert
Dr James Elder
Dr Adrian M Elderhurst
Dr Bronwyn M Francis
Dr Peter D Francis
Dr Simon Fraser
Dr Jeremy L Freeman
A Prof Paul D Fullerton
Dr Robert J M Gardner
Dr Danny E Garrick
Dr Susan Gibb
Dr Hugo Gold
Dr Peter W Goss
Dr Desmond H Guppy
Dr Dennis Hain
Dr C Hamilton
Dr Richard Haslam
Dr Sari Hayllar
Dr Michael Hayman
Dr Ralf Heine
Dr Peter H Hewson
Dr David J Hill
Dr Harriet Hiscock
Dr Nigel W J Hocking
Dr Geoffrey G Hogg
Dr James Holberton
Dr Alexander M Hopper
Dr Robyn L Hore
Dr Sian M C Hughes
Dr Rod W Hunt
Dr David I James
Dr Frederick C Jarman
Dr Bernard M Jenner
Dr Diana Lynne Johnston
Dr Lilian Johnstone
Mr Justin H Kelly
Dr Hugh Kelso
Dr Susan Kermond
Dr A Richard Kitching
Dr Annette Knoches
Dr A J Kornberg
Dr Anthony Lewis
Dr Catherine Lynch
Dr Leslie J Markman
Dr R John H Massie
Dr Catherine McAdam
Dr David A McCredie
Mr D McLaren
Dr James A McLellan
Dr Elizabeth McLeod
Dr Kathryn McMahon
Mr Neil D McMullin
Dr R B McNeill
Prof Samuel Menahem
Dr Margot Nash
Dr M J Nowotny
Prof Frank Oberklaid
Dr M R Oliver
Dr Greg M Pallas
Dr Chris Pappas
Dr Julian H Paxton
Dr V A Pearse
Dr Susan Randle
Dr I D Rawlinson
A Prof D S Reddihough
A Prof Colin F Robertson
Dr Sheryle Rogerson
Dr Margaret Rowell
Dr R Neil D Roy
Dr Monique Ryan
Dr Luke P Sammartino
Dr Christine Sanderson
Dr Kerryn R Saunders
Dr R Savarirayan
Prof Susan Sawyer
Dr Ingrid E Scheffer
Dr Jill R Sewell
Dr Lloyd K Shield
Dr Ian J Skelton
Dr Arnold L Smith
Dr Lindsay J Smith
Dr Christopher Smith
Dr Jennifer A S Smith
Dr John C Spensley
Dr Michael J Stewart
Dr T G Stubberfield
Dr Mimi Tang
Dr Russell G Taylor
Dr Nick H Thies
Dr Karin Tiedemann
Dr David Gerald Tingay
Dr Jacinta M Tobin
Dr Sophie C Treleaven
Dr Keith D Waters
Dr Peter W Wearne
Dr Annette N Webb
Dr Robert G Weintraub
Dr Anthony P Weldon
Prof George Werther
Dr Susan White
Mr S F Wickramasinghe
Dr James L Wilkinson
Dr Harry Zehnwirth

WA

Dr A J Alessandri
Dr David L Baker
Dr David P Burgner
Dr Lynda Chadwick
Dr Gervase M Chaney
Dr Peter J L Chauvel
Dr Richard J Christie
Dr Hock Leng Chua
Dr Harvey L C Coates AO
Dr Harry Dumbell
Dr Ian James Everitt
Dr Annette M Finn
Dr Philomena Fitzgerald
Dr Noel P French
Dr Anna Gubbay
Dr Richard Hill
Dr Michelle Howell
Dr Lawrence T H Hu
Dr Kay H Johnston
Clin A Prof T W Jones
Dr C Kikiros
Dr Geoffrey J Knight
Dr Rolland Kohan
Dr Helen Leonard
Dr Jane Mary Lesslie
Dr Dominic Mallon
Dr Cherry Martin
Dr Judy E McMichael
Dr Helen J Mead
Dr Corrado Minutillo
Dr Lakshmi Nagarajan
Dr Mark Parker
Dr Marianne Phillips
A Prof Susan L Prescott
Dr P C Richmond
Dr David E Roberts
Prof Karen N Simmer
Dr M Slattery
Dr Jennie Slee
Dr Russell G Troedson
Dr Jack B Vercoe
Dr A Wilkins-Shurmer
Dr Frank Willis

Clinicians Reporting Cases in 2006

Recipients of the wine prize draw highlighted

ACT

Dr Ann Crawshaw
Dr Ian F Crawshaw
A Prof G David Croaker
Dr Ian W Hufton
Dr Paul I Jenkins
Dr Alison Kent
Dr Antony Lafferty
Dr Timothy McDonald
Dr Suzanna Powell
A Prof Graham J Reynolds
Dr Michael J Rosier

NSW

Dr Susan Adams
Dr Stephen Alexander
A Prof Geoff Ambler
Dr Rosemary Ambler
Dr Alan F Amos
Dr Donald G Anderson
Dr Elizabeth Argent
Dr John D Arnold
Dr Nadia Badawi
Dr Yvonne Belessis
Dr Graham J Bench
Dr G P Bent
Dr Andrew Berry
Dr Christopher Blyth
Dr Gilda B Bonacruz-Kazzi
Dr Adam Buckmaster
Dr Laurence E Budd
Dr Anne M E Bye
Dr Paul C Chay
Prof John Christodoulou
Dr Yew-Wee Chua
Dr Des Cohen
Dr J R Coomarasamy
Dr Eric S Coudounaris
Dr Heather Coughtrey
Dr Christopher T Cowell
Dr Paul Craven
Dr Patricia Crock
Dr Genevieve E Cummins
Dr Shane Curran
Dr P Davidson
Dr Robert Davies
Dr John A De Courcy
Mr Anthony Dilley
Dr Peter John Donald
Dr Ana Maria Dosen
Dr Peter Ernest Doyle
Dr Scott Dunlop
Prof Elizabeth J Elliott
Dr Phillip John Emder
Dr Adrienne G Epps
Dr Anthony D Epstein
Dr Nick Evans
Ms Fiona Fahy
A Prof D A Fitzgerald
Dr Bob K J Fonseca
Dr P M Goodhew
Dr Padraic Grattan-Smith
Dr Toby D R Greenacre
Dr Katherine Hale
Dr Robert J Halliday
Dr Robert J Hardwick
Dr Richard K Hart
Dr John G Harvey
Dr Maxwell Hopp
Dr Keith M Howard
Prof David Isaacs
A Prof Cheryl Anne Jones
Prof Peter Dominic Jones
Dr Hala Katf
A Prof Alison M Kesson
A Prof Henry A Kilham
Dr Jan Klimek
Mr Erik La Hei
Dr John A Lawson
Dr Joanne Leal
Dr Ian D Lennon
Dr A S C Lim
Dr Daniel C S Lin
Dr Alison Loughran-Fowlds
Dr Kristine Macartney
Dr Rajesh Maheshwari
Dr Albert Mansour
Dr Hugh C O Martin
Dr Mary McCaskill
Dr Geoffrey McCowage
Dr Tim McCrossin
Dr David T McDonald
Dr Patricia McVeagh
Dr Tracey Merriman
Dr Patrick J Moore
Dr David R Mowat
Dr Desmond L Mulcahy
Dr Craig Munns
Dr Patricia E Mutton
Dr Anandhan P Naidoo
Dr David A Osborn
Prof Robert A Ouvrier
Dr Pamela Palasanthiran
Dr Con Papadopoulos
Dr Julianne Parle
Dr Patrick Patradoon-Ho
Dr Elizabeth Peadon
Dr Elizabeth Pickford
Dr Christopher C Poon
Dr Keith M Power
A Prof Peter G Procopis
Ms Kerry Quinn
Prof William Rawlinson
A Prof A R Rosenberg
Dr Greg Rowell
Dr David N Schell
Dr Vijay Shingde
Prof Martin Silink
Dr Jacqueline E Small
Dr Peter Smith
Dr David R Starte
Dr Michael Stormon
Dr Lee Sutton
Dr Paul R Tait
Dr Rodney L Tobiansky
Dr Toby Trahair
Dr Anne M Turner
Dr Dimitra Tzioumi
Dr Mary-Clare Waugh
Dr Boyd Webster
Dr Richard Webster
Dr Bridget Wilcken
Dr C R Wiles-Harrell
Dr Catherine Wiltshire
Dr Nicholas Wood
Dr Helen Woodhead
Dr Lisa Catherine Worgan
Dr Barry E Wyeth
Dr Kylie Meredith Yates
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Dr Deborah Bailey
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Dr Richard P B Brown
Dr Gregory I Carman
Dr David W Cartwright
Dr Richard E Cherry
Dr Kelvin Choo
Dr Ronald C Clark
Dr John Coghlan
Dr Lucy Helen Cooke
Dr Andrew Cotterill
Dr Maree G Crawford
Dr J A Cullen
Dr Alison Cupitt
Dr Mark W Davies
Dr Peter J DeBuse
Dr R D Diplock
Dr Timothy John Donovan
Dr Aaron M Easterbrook
Dr Michael R Gattas
Dr Kate Gibson
Dr Bruce Goodwin
Dr G J Harte
Dr E M Hurrion
Dr Susan Ireland
Dr J Anne Kynaston
Dr Helen Liley
Dr Bruce G Lister
Dr Julie McEniery
Dr Robert A L McGregor
Dr David McMaster
Dr Hilary P Mercer
Dr Ross D Messer
Dr Ryan Mills
Dr Susan Moloney
Dr Anthony Morosini
Dr Brian D Morris
Dr Clare Nourse
Dr Tat-Hin Ong
Dr Julie Panetta
Dr David R Pincus
Dr Jose A Prado
Dr Ian F Robertson
Dr Christopher J Ryan
A/Professor Alan A Sive
Dr H Stalewski
Dr Felix K Y Tan
Dr Fiona Thomson
Prof David I Tudehope
Dr Claire E Wainwright
Dr Timothy H Warnock
Dr Judy A Williams
Dr Geoffrey Withers
Dr Nicholas F Woolfield

SA

Dr Christopher Barnett
Dr David A Baulderstone
Dr R Burnell
Dr Brian Coppin
Dr Philip R Egan
Dr Janice M Fletcher
Mr W D A Ford
Dr Paul N Goldwater
Dr Paul Hammond
Dr Bevan Headley
Dr Paul H Henning
Dr Malcolm A Higgins
Dr David B Ketteridge
Dr Kathy Lee
Dr D M Lawrence
Dr Andrew J McPhee
Dr M A Measday
Dr Scott Morris
Dr Terence S Pouras
Dr Jeremy Raftos
Dr Jacqueline Kaye Schutz
Dr Gregory J Smith
Dr Heather Tapp

TAS

Dr Christopher J Bailey
Dr Sean Beggs
A Prof John Daubenton
Dr Peter J Flett
Dr Mark M Pascoe
Dr Margaret M Phelan
Dr A W Shugg
Dr David Strong

VIC

Dr Roger C Allen
Dr Kym P Anderson
Dr Stuart G Anderson
Dr Peter L J Barnett
Dr Penelope H Bolt
Dr Justin Brown
Dr Jim Buttery
A Prof D J S Cameron
Dr William D Capell
Dr Bronwyn A Cathels
Dr Tracy Coleman
Dr Kevin J Collins
Dr Nigel Curtis
Dr David A Cutting
Dr Peter S Dewez
Prof Richard R Doherty
Dr John Hedley Drew
Dr Peter James Eastaugh
Dr Adrian M Elderhurst
Dr Wei Qi Fan
Dr Wolf-Christian Fiedler
Dr Peter J Forrest
Dr Jolene M Fraser
Dr Paul N Goldwater
Dr Jeremy L Freeman
Dr David Fuller
Dr Vanessa Gabriel
Dr Danny E Garrick
Dr Hugo Gold
Dr Anton G M Harding
Dr Simon Harvey
Dr Simon Hauser
Dr Sari Hayllar
Dr Nigel W J Hocking
Dr James Holberton
Dr Susan E Jacobs
Dr Bernard M Jenner
Dr Diana Lynne Johnston
Dr Hugh Kelso
Dr S Khosrowpanah
Dr Teresa Lazzaro
Dr Robert F Lim
Dr Edwin J Lowther
Dr Leslie J Markman

Clinicians Reporting Cases in 2006

Dr Michael K Marks
Dr Catherine McAdam
Dr Elizabeth McLeod
Dr Kathy McMahon
Dr Joseph Mel
Dr Gillian Opie
Dr Greg M Pallas
Dr Georgie Paxton
Dr C Andrew Ramsden
Dr I D Rawlinson
Dr Christine Rodda
Dr Sheryle Rogerson
Dr Phillip Rosengarten
Dr Monique Ryan
Dr Lloyd K Shield
Dr Robert A Sloane
Prof Mike South
Dr Mike Starr
Mr Keith B Stokes
Dr Terry G Stubberfield
Mr Robert Stunden
Dr Russell G Taylor
Dr Anne-Marie Turner
Dr Andrew M C Watkins
Mr S F Wickramasinghe
Dr Margaret Zacharin
Dr Harry Zenwirth

WA

Dr David P Burgner
Dr Lynda Chadwick
Dr Gervase M Chaney
Dr Sarah Cherian
Dr Richard J Christie
Dr Elizabeth Davis
Dr Alan W Duncan
Dr Annette M Finn
Dr Katharine Gardiner
Dr Janet Geddes
Dr Ian J Gollow
Dr Elizabeth Green
Dr Louise Houliston
Dr Kay H Johnston
Clin A Prof T W Jones
Dr Bradley Jongeling
Dr Anne F Kehoe
Dr Helen J Mead
Dr Lakshmi Nagarajan
Dr Flemming H Nielsen
Dr P C Richmond
Dr Jacqueline M Scurlock
Dr Mary J Sharp
Dr Peter J Silberstein
Dr M Slattery
Dr Stephen Stick
Dr Jack B Vercoe
Dr A Wilkins-Shurmer

Clinicians returning 100% of monthly cards in 2006

Recipients of the wine prize draw highlighted

ACT

Dr Judith L Bragg
Dr Ian F Crawshaw
Dr Ann Crawshaw
A Prof G David Croaker
Dr Michael Falk
Dr Amelia M Herath
Dr Hilary A Holmes
Dr Ian W Hufton
Dr Paul I Jenkins
Dr Penelope J Johnson
Dr Zsuzsoka Kecskes
Dr Alison Kent
Dr Antony Lafferty
Dr G Malecky
Dr Timothy McDonald
Dr Suzanne M Packer
A Prof Graham J Reynolds
Dr Michael J Rosier
Dr Erroll Simpson

NSW

Dr C Abkiewicz
Dr Susan Adams
Dr Julie C Adamson
Dr Lesley C Ades
Dr Ion S Alexander
Dr Stephen Alexander
Dr Hugh D W Allen
Dr Garth Alperstein
A Prof Geoff Ambler
Dr Rosemary Ambler
Dr Alan F Amos
Dr Donald G Anderson
Dr Michael Anscombe
Dr Jayne H Antony
Dr John D Arnold
Dr Jennifer E Ault
Dr Nadia Badawi
Dr Lynn Banna
Dr Peter A Barr
Dr Karl Baumgart
Prof Louise A Baur
Dr Vivian V Bayl
Dr Philip J Beeby
Dr Graham J Bench
A Prof David L Bennett
Dr G P Bent
Dr Jennifer Berg
Dr Mary E Bergin
Dr Andrew Berry
Dr Martin Berry
Dr Roger Blackmore
Dr Paul Bloomfield
Dr Christopher Blyth
Dr Srinivas Bolisetty
Dr Jennifer R Bowen
Dr J J Brereton
Dr Kerry Brown
Dr Gary Browne
Dr M P Brydon
Dr Adam Buckmaster
Dr P Buckner
Dr Laurence E Budd
Dr Donald L Butler
Dr Anne M E Bye
Dr P Ha Yuen Caldwell
Dr Ian Callander
Dr Peter J Campbell
Dr Dianne Campbell
Dr Thomas A Campbell
Dr Jeffrey Chaitow
Dr Kity Chee
Dr Paul Chidiac
Dr Howard W Chilton
Dr Raymond Chin
Dr Alan Y H Chong
Dr Robin K C Choong
Dr David Christie
Prof John Christodoulou
Dr Simon D Clarke
Dr John C Coakley
Dr Ralph C Cohen
Dr Des Cohen
Dr Richard J Cohn
Dr Michael J Cole
Dr Felicity A Collins
Dr Patrick E Concannon
Dr J R Coomarasamy
Dr Peter John Cooper
Dr Stephen G Cooper
Dr Carolyn Cooper
Dr Michael C Copeman
Dr Heather Coughtrey
Dr Christopher T Cowell
Dr Jonathon Craig
Dr Maria Craig
Dr Paul Craven
Dr Geoffrey J Crawford
Dr Patricia Crock
Dr Genevieve E Cummins
Dr Shane Curran
Dr Bruce Currie
Dr Julie A Curtin
Dr Luce Dalla-Pozza
Dr P Davidson
Dr Robert Day
Dr Andrew Day
Dr John A De Courcy
Dr Mark De Souza
Dr Michael J Deloughery
Dr Kim Donaghue
Dr Peter John Donald
Dr Stuart F A Dorney
Dr Ana Maria Dosen
Dr David Dossetor
Dr Peter Ernest Doyle
Dr Barry John Duffy
Dr Richard John Dunstan
Dr Linda Durojaiye
Dr Peter William Ebeling
Dr Matthew J Edwards
Dr Carolyn Jane Ellaway
Prof Elizabeth J Elliott
Dr Phillip John Emder
Dr Adrienne G Epps
Dr Anthony D Epstein
Dr John B Erikson
Dr Nick Evans
Dr Elizabeth R Fagan
Dr Michael J Fairley
Dr Robert H Farnsworth
Dr Michael Fasher
Dr John Feller
Dr Penelope Field
A Prof D A Fitzgerald
Dr Fiona Fleming
Dr Bob K J Fonseca
Dr Michael R Freelander
Dr Stuart M Gadd
Dr Andrew J Gardiner
Dr P A Garvey
Prof Kevin J Gaskin
Dr Madlen Gazarian
Dr Maurice D Gett
Dr Henry J Gilbert
Dr Anna Clare Gill
A Prof Jonathan Gillis
Dr Neil D Ginsberg
Dr Anne F Glanville
Dr Rebecca Glover
Dr Chin Lum Goh
Dr Safak Goktogan
Dr Maria Linette Gomes
Dr P M Goodhew
Dr T M Grattan-Smith
Dr Padraic Grattan-Smith
Dr Toby D R Greenacre
Dr Robert Guaran
Ms Maree Guizzo
Dr Julia M Haas
Dr Anne Hackett
Dr Robert J Halliday
Dr Nils F Hanson
Dr Ralph M Hanson
Dr Robert J Hardwick
Dr Richard K Hart
Dr John G Harvey
Dr Richard E Hawker
Prof Philip L Hazell
Prof D J Henderson-Smart
Mr Guy Henry
Dr Steven Hing
A Prof Ken Ho
Dr Elisabeth M Hodson
Dr Peter Hogan
A Prof Andrew Holland
Dr James C S Hong
Dr Peter Yee-Tai Hong
Dr Maxwell Hopp
Dr Jason Hort
Dr Clifford S Hosking
Dr Keith M Howard
Dr Neville J Howard
Dr Christine Hughes
Dr Christopher B Ingall
Prof David Isaacs
Dr Michelle M Jack
Dr Stephen Jacobe
Dr Allan James
Dr Con A James
Dr Robyn Jamieson
Dr Arthur Jarrett
Prof Heather E Jeffery
Dr Sandra L J Johnson
Dr Patricia M Johnson
Dr Heather Johnston
Dr Owen Jones
Prof Peter Dominic Jones
Dr Kristi J Jones
Dr Preeti Joshi
Dr Colin Kable
Dr G M Kainer
Dr Alyson M Kakakios
Dr Lisa Kane
Dr Hala Katf
Dr Brian E Kearney
Dr Stewart J Kellie
Prof Andrew S Kemp
Dr Debra Kennedy

Clinicians returning 100% of monthly cards in 2006

Dr Allan M G Kerrigan
A Prof Henry A Kilham
Dr Bruce King
Dr Edwin P E Kirk
Dr Eli Kleiner
Dr Jan Klimek
Dr Martin R Kluckow
Dr Paul W Knight
Dr Karen Knoll
Dr Michael Kohn
Dr Anthony Kok
Dr Phillip Kolos
Dr Kasia Kozlowska
Dr U Krishnan
Dr Peter Kristidis
Dr M Kumaradeva
Mr Erik La Hei
Dr Ahti T Lammi
Dr Basiliki Lampropoulos
Dr K C Lau
Dr John A Lawson
Dr Joanne Leal
Dr J Lemoh
Dr Ian D Lennon
Dr Richard S Lennon
Dr Joyce Leong
Clin A Professor G I Leslie
Dr Wilfred R Levy
Dr Deborah J Lewis
Dr David Lillystone
Dr A S C Lim
Dr Daniel C S Lin
Dr Anthony Jun Wing Liu
Dr B H Lo
Dr Alison Loughran-Fowlds
Dr O Lozynsky
Dr Kei Lui
Dr Melissa Christine Luig
Dr John Macdessi
Dr K T MacDonald
Dr Sloane Madden
Dr Albert Mansour
Dr Susan M Marks
Dr Glenn M Marshall
Dr Frank J Martin
Dr Hugh C O Martin
Dr Andy Mather
Dr Tania May
Dr Robert McCarthy
Dr Mary McCaskill
Dr Tim McCrossin
Dr David T McDonald
Dr David W McDonald
Dr Jennifer L McDonald
Dr Anne McGeechan
Prof Peter B McIntyre
Dr Fiona McKenzie
Dr Tracey Merriman
Dr Susan M Messner
Dr Mark Miller
Dr Joseph P Moloney
Dr Patrick J Moore
Dr Kieran T Moran
Dr John R Morton
Dr David R Mowat
Dr Desmond L Mulcahy
Dr Craig Munns
Dr Marea W Murray
Dr Patricia E Mutton
Dr Anandhan P Naidoo
Prof Ranjit Nanra
Dr Kris Neville
Dr Charles New
Prof Kathryn North
A Prof Victor Nossar
Dr Karen O'Brien
Dr Anthony O'Connell
Dr Ju Oei
Dr Stephen J O'Flaherty
Dr Matthew W O'Meara
Dr David A Osborn
Prof Robert A Ouvrier
Dr Pamela Palasanthiran
Dr Dimitrios Papadopoulos
Dr Mary Paradisis
Dr Julianne Parle
Dr Patrick Patradoon-Ho
Dr James P Pendergast
Dr Victoria Pennington
Dr Deborah G Perkins
Dr Susan Phin
Dr Elizabeth Pickford
Dr Susan Piper
Dr Anne C Piper
Dr John Pitkin
Dr Jaqueline C Pollack
Dr Melvyn Polon
Dr Christopher C Poon
Dr Alison Poulton
Dr Keith M Power
Dr J S Preddy
A Prof Peter G Procopis
Dr Karin L Proudman
Dr Stephen D Pryde
Ms Kerry Quinn
Dr Patrick M Rahilly
Dr Shanti Raman
Prof William Rawlinson
Dr Gordon J Rennick
Dr Bruce B Richards
Dr Ingrid D Rieger
Dr Suzanne I Robertson
Dr Peter Robinson
Dr Marilyn Rochefort
Dr Laurence G Roddick
Dr A Ronan
A Prof A R Rosenberg
Dr Greg Rowell
Dr Susan J Russell
Dr Peter J Rye
Dr Terry M Sands
Dr Charles M Scarf
Dr Adam M Scheinberg
Dr David N Schell
Dr Mark Selikowitz
Dr Christopher Seton
Dr Arun S Shanker
Dr Peter Shaw
Dr E Shi
A Prof Gary F Sholler
Dr Albert Shun
Prof David O Sillence
Dr Natalie Silove
Dr D Singer-Remeljan
Dr Yashwant Sinha
Dr John K H Sinn
Dr Jacqueline E Small
Dr Grahame Smith
Dr Janine Margo Smith
Dr Robert Smith
Dr Helen M Somerville
Dr Velencia Soutter
Dr Barry J Springthorpe
Dr Bernard J N St George
Dr Jean Starling
Dr David R Starte
A Prof Kate Steinbeck
Dr Lila Stephens
Dr Glenn Stephens
Dr Michael M Stevens
Dr Monique Stone
Dr H Victor Storm
Dr Lee Sutton
Dr Paul R Tait
Dr J Taitz
Dr Arthur Teng
Dr Juliana Tze Khiang Teo
Dr Kathryn E Thacker
Dr Ganesha Thambipillay
Dr Ronda L Ticehurst
Dr Rodney L Tobiansky
Dr Susan J Towns
Dr Toby Trahair
Dr Anne M Turner
Dr Dimitra Tzioumi
Dr A B Underwood
Prof Peter Van Asperen
Dr P K J Van Vliet
Dr Charles Verge
Prof Graham V Vimpani
Dr Anne F Vimpani
Dr Chris Wake
Dr J L Walker
Dr Anna Ward
Dr Philip Watt
Dr Mary-Clare Waugh
Dr Christopher F Webber
Dr Murray T Webber
Dr Carolyn M West
Dr Mark A Westphalen
Dr Bruce Whitehead
Dr Bridget Wilcken
Dr C R Wiles-Harrell
Dr Barry Wilkins
Dr Ian Wilkinson
Dr Helen F Wilkinson
Dr George L Williams
Dr Gary Williams
Dr Katrina J Williams
Dr Meredith Wilson
Dr Catherine Wiltshire
Dr Melanie Wong
Dr Helen Woodhead
Dr Susan Woolfenden
Dr Ian Wright
Dr Michael Wu
Dr Barry E Wyeth
Dr Kylie Meredith Yates
Dr Simon Young
A Prof John B Ziegler
Dr Michael Zilibowitz
Dr Karen Zwi

NT

Prof Jonathan R Carapetis
Dr Keith Nicholas Edwards
Dr Rosemary E Fahy
Dr Peter S Morris
Dr Andrew White

QLD

Dr Jason Acworth
Dr Donald B Adsett
Dr L Ah Yui
Dr Donald B Appleton
Dr Erica Baer
Dr Deborah Bailey
Dr Ruth Barker
Prof Jennifer A Batch
Dr Andrew L Blair
Mr Christopher Bourke
Dr Robyn M Brady
Dr Richard P B Brown
Dr Scott Burgess
Dr John R Burke
Dr J Byrne
Dr Gregory I Carman
Dr David W Cartwright
Dr Richard E Cherry
Dr Ronald C Clark
Prof Geoffrey J Cleghorn
Dr John Coghlan
Prof Paul B Colditz
Dr Frances L Connor
Dr Jan Connors
Dr Lucy Helen Cooke
A Prof David M Cooper
Dr Andrew Cotterill
Dr Mark G Coulthard
Dr John W Cox
Dr Maree G Crawford
Dr J A Cullen
Dr Mark W Davies
Dr Neville G Davis
Dr Peter J DeBuse
Dr Roderic G Delbridge
Dr R D Diplock
Dr Timothy John Donovan
Dr Nigel David Dore
Dr Aaron M Easterbrook
Dr Priya Edwards
Dr Loui Ee
Dr Ian I Findlay
Dr Paul W J Francis
Dr William Frischman
Dr Donna Gandini
Dr Michael R Gattas
Dr John B Gavranich
Dr Kate Gibson
Dr Glen A Gole
Dr Bruce Goodwin
Dr Peter H Gray
Dr Leonie M Gray
Dr Alison Harris
Dr Margaret-Anne Harris
Dr Wayne A Harris
Dr G J Harte
Dr Phillip J Harvey
Dr Tim E G Hassall
Dr Richard Heazlewood
Dr Margaret M Hogan
Dr Johanna M Holt
Dr Thomas M Hurley
Dr E M Hurrion
Dr Helen Irving
Dr Ronald W James
Dr Christopher Johansson
Dr Robert N Justo
Dr Sumant Kevat
Dr Guan Koh
Dr J Anne Kynaston
Mr Mervyn M Lander
Dr Peter J Lewindon
Dr Bruce R Lewis
Dr Helen Liley
Dr Bruce G Lister
Dr Liane R Lockwood
Dr Elena J Mantz
Dr Louise Suzanne Marsh
Dr John R McCreanor
Dr David B McCrossin
Dr Michael McDowell
Dr Julie McEniery
Dr James J McGill
Dr Robert A L McGregor
Dr Lynne McKinlay
Dr Sarah McMahon
Dr David McMaster
Dr Steven McTaggart
Dr William R McWhirter
Dr Julian D Mellick
Dr Ross D Messer

Clinicians returning 100% of monthly cards in 2006

Dr Malcolm N Miller
Dr Susan Moloney
Dr David J Moore
Dr Anthony Morosini
Dr Brian D Morris
A Prof Michael D Nissen
Dr Gary Niven
Dr Clare Nourse
Dr Michael J O'Callaghan
Dr Trevor E Olsen
Dr Tat-Hin Ong
Dr Peter S O'Regan
Dr Mansu Pabari
Dr Julie Panetta
Dr Jane E Peake
Prof John H Pearn
Dr James T Pelekanos
Dr David R Pincus
Dr W Robert Pitt
Dr Jose A Prado
Dr Jeffrey J Prebble
Dr N Previtera
Dr Darrell A Price
Dr Dorothy J Radford
Dr Fergus A C Ring
Dr Peter Roddenby
Dr David A Rogers
Dr Peter C Roper
Dr Richard F Roylance
Dr Patrick J Ryan
Dr Christopher J Ryan
Dr Phil Sargent
Dr Geoffrey Seet
Dr Wei Seto
Dr Doug C Shelton
Dr Catherine Y Skellern
Dr B David Slaughter
Dr Peter Kenneth Smith
Dr H Stalewski
Dr S L Stathis
Dr Mark Stretton
Dr Kerry O Sullivan
Dr Felix K Y Tan
Dr Michael J Thomsett
Dr Fiona Thomson
Dr Susan Thornton
Dr Deanna Kathryn True
Prof David I Tudehope
Dr J Van der Westhuyzen
Dr Claire E Wainwright
Dr Rosslyn M Walker
Dr Cameron J B Ward
Dr Timothy H Warnock
Dr John H N Waugh
Dr Kerri-Lyn Webb
Dr R R Westmoreland
Dr John S Whitehall
A Prof Neil R Wigg
Dr Michael L Williams
Dr Judy A Williams
Dr Sue Wilson
Dr David C Winkle
Dr David Wood
Dr Nicholas F Woolfield

SA

Dr K Abbott
Dr Phillip Adams
Dr Christopher Barnett
Dr George P Blake
Dr Hilary Boucaut
Dr Yumin Chan
Dr Richard A Cockington
Dr Brian Coppin
Dr David G Corlis
Dr Richard T L Couper
A Prof Jenny Couper
A Prof G P Davidson
Dr Philip R Egan
Dr David S Everett
Mr W D A Ford
Prof Kevin D Forsyth
Dr Michael S Gold
Dr Paul N Goldwater
Dr Andrew W Grieve
Dr Eric A Haan
Dr Paul Hammond
Dr T T S Han
Dr Michael G Harbord
Dr Paul H Henning
Dr Malcolm A Higgins
Dr David J S Hill
Dr Anthony R Israel
Dr Judith A Jaensch
Dr Kenneth F Jureidini
Dr Jon Jureidini
Dr J D Kennedy
Dr David B Ketteridge
Dr Maria Kirby
Dr Margaret A Kummerow
Dr Margaret R Kyrkou
Dr Christopher M Lamb
Dr Paul Lang
Dr Peter B Marshall
Dr A James Martin
Dr Andrew J McPhee
Dr David J Moore
Dr P S Munt
Dr Christopher L Munt
Dr Josie Nozza
Dr Maree O'Keefe
Dr Christopher C Pearson
Dr Peter A Petek
Dr Robert P Pollnitz
Dr Nicola K Poplawski
Dr Terence S Pouras
Dr Richard G Power
Dr Jeremy Raftos
Dr Nicholas Ricci
Dr Michael S Rice
Dr Brett Kingsley Ritchie
Dr Terence P Robertson
Dr Remo (Ray) N Russo
Dr A Sabato
Dr Michael J Smiley
Dr Gregory J Smith
Mr Anthony Sparnon
Dr Rima E M Staugas
Dr Nigel L Stewart
Dr Ram Suppiah
Prof Hock-Lim Tan
Dr Billy S Tao
Dr Heather Tapp
Dr Mark A Thesinger
Dr David G Thomas
Dr Andrew J Tidemann
Dr Deirdre A White

TAS

Dr Christopher J Bailey
Prof Allan Carmichael
Dr Anthony J Dunstan
Dr Edmond J M Fenton
Dr Patrick M T Fernando
Dr Peter J Flett
Dr Evelyn Funk-Bowles
Dr Elizabeth Hallam
DrValerie M Hewitt
Dr Tom McDonagh
Dr S J Parsons
Dr Mark M Pascoe
Dr Margaret M Phelan
Dr A W Shugg
Dr Ian G Stewart
Dr Michelle Williams

VIC

Dr Roger C Allen
Dr David Amor
Dr Stuart G Anderson
Dr Ylva Andersson
A Prof K L Armstrong
Dr David S Armstrong
Mr Alexander W Auldist
Dr Gordon Baikie
Dr David G Bannister
Dr Charles Barfield
Dr Philip B Bergman
Dr Julie E Bines
Dr John M Bishop
Dr Simon P Blair
Dr Avihu Boneh
Dr Fiona D Brown
Dr A Douglas Bryan
Dr Jim Buttery
A Prof D J S Cameron
Dr Fergus J Cameron
Dr William D Capell
Dr David J Carolane
Dr Elizabeth A Carse
Dr Bronwyn A Cathels
A Prof A G Catto-Smith
Dr C Chandran
Dr Peter G Churven
Dr Tracy Coleman
Dr Jacinta M Coleman
Dr Kevin J Collins
Dr S Costello
Dr John M Court
Dr Noel E Cranswick
Dr Nigel Curtis
Dr David A Cutting
Dr A J Daley
Dr Margaret H Danchin
Dr Anita Lucia D'Aprano
Dr Margot J Davey
Dr Peter Davis
Dr Noni M Davis
Dr Martin B Delatycki
Prof Paddy Dewan
Dr Peter S Dewez
Dr Peter Andrew Downie
Dr David C Downing
A Prof Lex William Doyle
Dr John Hedley Drew
Dr Karen Leslie Dunn
Dr Kevin Bernard Dunne
Dr Peter James Eastaugh
Dr Maurice Kelvin Easton
Dr Daryl Efron
Dr James Elder
Dr Adrian M Elderhurst
Dr Michael Fahey
Dr Colin J Feekery
Dr Wolf-Christian Fiedler
Dr Lance V Fong
Dr Geoffrey W Ford
Dr Peter J Forrest
Dr Bronwyn M Francis
Dr Peter D Francis
Dr Simon Fraser
Dr Jeremy L Freeman
A Prof Nicholas J Freezer
Dr Vanessa Gabriel
Dr Danny E Garrick
Dr Susan Gibb
Dr Tiow-Hoe Goh
Dr Hugo Gold
Dr Peter W Goss
Dr Philip J Graves
Dr Desmond H Guppy
Dr Dennis Hain
Dr C Hamilton
Dr Michael D Harari
Dr Winita Hardikar
Dr Anton G M Harding
Dr Richard Haslam
Dr Simon Hauser
Dr Sari Hayllar
Dr Michael Hayman
Dr Ralf Heine
Dr Robert D Henning
A Prof Peter H Hewson
Dr David J Hill
Dr Harriet Hiscock
Dr Nigel W J Hocking
Dr Geoffrey G Hogg
Dr James Holberton
Dr Robyn L Hore
Dr Ian E Humphrey
Dr Rod W Hunt
Dr John G Hunter
Dr Susan E Jacobs
Dr Frederick C Jarman
Dr Bernard M Jenner
Dr David L Johnson
Dr Diana Lynne Johnston
Dr Lilian Johnstone
Dr Colin Lindsay Jones
Mr Justin H Kelly
Dr Hugh Kelso
Dr Andrew D Kennedy
Dr S Khosrowpanah
Dr A Richard Kitching
Dr Annette Knoches
Dr A J Kornberg
Dr David Krieser
Dr Thomas J Lee
Dr Anthony Lewis
Dr Robert F Lim
Dr Edwin J Lowther
Dr Lionel Lubitz
Dr Catherine Lynch
Dr Mark T Mackay
Dr Leslie J Markman
Dr Michael K Marks
Dr Catherine Marraffa
Dr R John H Massie
Dr Brendan McCann
Dr David A McCredie
Dr Joanna McCubbin
Dr Peter N McDougall
Dr James A McLellan
Dr Elizabeth McLeod
Dr Kathy McMahon
Mr Neil D McMullin
Dr R B McNeill
Dr Joseph Mel
Prof Samuel Menahem
Dr John F Mills
A Prof P T Monagle
Prof Colin Morley
Dr Anne L Moulden
Dr Kenneth R Mountain
Dr Jane Munro
Dr Margot Nash
Prof Terence M Nolan
Dr M J Nowotny
Prof Frank Oberklaid

Clinicians returning 100% of monthly cards in 2006

Dr M R Oliver
Dr Anne O'Neill
Dr Gillian Opie
Dr Greg M Pallas
Dr Chris Pappas
A Prof Campbell Paul
Dr Julian H Paxton
Dr V A Pearse
Dr Roderic J Phillips
Dr Anisha Pillay
Dr Harley R Powell
Dr Jenny Proimos
Dr Sarath Ranganathan
Dr I D Rawlinson
A Prof D S Reddihough
Dr Gehan Roberts
Dr Philip James Robinson
Dr Christine Rodda
Dr Phillip Rosengarten
Dr I D Rawlinson
Dr Gehan Roberts
Dr Philip James Robinson
Dr Christine Rodda
Dr Phillip Rosengarten
Dr Katherine S Rowe
Dr Margaret Rowell
Dr R Neil D Roy
Dr Monique Ryan
Dr Luke P Sammartino
Dr Christine Sanderson
Dr Kerryn R Saunders
Dr R Savarirayan
Prof Susan Sawyer
Dr Ingrid E Scheffer
Dr Jill R Sewell
Dr Lloyd K Shield
Dr David Sholl

Dr Ian J Skelton
Dr Susan Skull
Dr E Smibert
Dr Lindsay J Smith
Dr Christopher Smith
Dr Jennifer A S Smith
Dr Arnold L Smith
Dr Andrea Smith
Prof Mike South
Dr John C Spensley
Dr Michael J Stewart
Dr Terry G Stubberfield
Mr Robert Stunden
Dr Joseph Tam
Dr Mimi Tang
Dr Nick H Thies
Dr Karin Tiedemann
Dr Margerete Tilders
Dr Brian J M Timms
Dr David Gerald Tingay
Dr Jacinta M Tobin
Dr Sophie C Treleaven
Dr F C M Veit
Dr Rowan G Walker
Dr Amanda M Walker
Dr Craig S Walker
Dr Keith D Waters
Dr Andrew M C Watkins
Dr Peter W Wearne
Dr Annette N Webb
Dr Robert G Weintraub
Dr Anthony P Weldon
Dr Susan White
Mr S F Wickramasinghe
Dr James L Wilkinson
Dr Margaret Zacharin
Dr Harry Zehnwirth

WA

Dr A J Alessandri
Dr David L Baker
Dr Fiona Bettenay
Dr Carole Caccetta
Dr Lynda Chadwick
Dr Gervase M Chaney
Dr Richard J Christie
Dr Hock Leng Chua
Dr Harvey L C Coates AO
Dr Catherine H Cole
Dr Charles Crompton
Dr Luigi D'Orsogna
Dr Harry Dumbell
Dr Alan W Duncan
Dr Simon J Erickson
Dr Annette M Finn
Dr Philomena Fitzgerald
Dr Noel P French
Dr Gary C Geelhoed
Dr Andrew Gill
Dr Ian J Gollow
Dr Harvey Graham
Dr Elizabeth Green
Prof Sasson S Gubbay
Dr Anna Gubbay
Dr Linda A Harris
Dr T Rex Henderson
Dr Richard Hill
Dr Michelle Howell
Dr Lawrence T H Hu
Dr Kay H Johnston
Clin A Prof T W Jones
Dr Bradley Jongeling
Dr Blanche Khaw
Dr C Kikiros

Dr Geoffrey J Knight
Dr Rolland Kohan
Dr Alpana Kulkarni
Dr Hemant Anant Kulkarni
Dr Kishore Kumar
Dr Jane Mary Lesslie
Dr Cherry Martin
Dr Judy E McMichael
Dr Helen J Mead
Dr Catherine F Mews
Dr Ashanthi Munasinghe
Dr Lakshmi Nagarajan
Dr Rama Naidoo
Dr Mark Parker
Dr Sanjay Patole
Dr Bronwyn Peirce
Dr Marianne Phillips
Dr P James S Price
Dr P C Richmond
Dr Jacqueline M Scurlock
Dr Peter J Silberstein
Dr Desiree Silva
Dr M Slattery
Dr Jennie Slee
Dr Colin Somerville
Dr Janine Spencer
Dr Jeffrey B Stevens
Dr Stephen Stick
Dr Jeffrey R Tompkins
Dr Russell G Troedson
Dr Jack B Vercoe
Dr Ian R Walpole
Dr Andrew M Wawryk
Dr A Wilkins-Shurmer
Dr Frank Willis

Thank you to every clinician who participates in APSU surveillance, for your continued support of this important work. We look forward to your continued participation.

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