Australian Paediatric Surveillance Unit annual report, 2006

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Background

The Australian Paediatric Surveillance Unit (APSU) conducts national active surveillance of rare diseases of childhood, including infectious and vaccine preventable diseases, genetic disorders, childhood injuries and mental health conditions.[1] The study of communicable and vaccine preventable diseases is supported in part by the Australian Government Department of Health and Ageing through its communicable diseases program. This report is a summary of surveillance results for communicable and/or vaccine preventable diseases studied through the APSU in 2006.

In 2006, nine communicable or vaccine preventable conditions were studied:

- acute flaccid paralysis (AFP);
- congenital cytomegalovirus infection;
- congenital rubella infection;
- perinatal exposure to HIV and HIV infection;
- neonatal herpes simplex virus infection;
- hepatitis C virus infection;
- non-tuberculous mycobacterium infection (surveillance to end in 2007);
- neonatal group B streptococcus infection;
- varicella: neonatal, congenital and severe complications of varicella infection requiring hospitalisation.

Methods

APSU study protocols are developed with collaborating investigators and/or institutions and the objectives and chief investigators for each study are listed in Table 1. Detailed protocols including case definitions for each disease under surveillance are available at www.apsu.org.au

The APSU aims to provide epidemiological information that is representative of the Australian population and maximal case ascertainment is a high priority. Despite a representative mailing list (92% of all paediatricians in active clinical practice in Australia participate in monthly surveillance) and high response rates (97% for 2006), complete case ascertainment is unlikely. This is particularly relevant in remote communities where children have limited access to paediatricians. However, for most conditions studied by the APSU no national data are available to estimate completeness of ascertainment. APSU encourages the use of complementary data sources where available and reporting by a range of specialists to maximise cases identified. Reported rates for conditions ascertained through the APSU therefore represent a minimum estimate of the incidence of these conditions in the relevant Australian populations.

Results

All data provided in this report are accurate as at 30 July 2007. It is possible that some notifications may be reclassified or the outcomes may change as additional clinical data are received. In 2006, 1,248 clinicians participated in the monthly surveillance of 16 uncommon childhood conditions, including the nine communicable diseases listed above. The report card return rate for 2006 was 97%. Enhanced data detailing diagnosis, clinical management and short-term outcome were available for more than 85% for all cases notified. Table 2 shows the number of cases reported in 2006 and for the whole study period and the reported rate per 100,000 population.

APSU data contribute significantly to the national surveillance effort, providing valuable information for clinicians, policymakers and the community.[1,2] The APSU is often the only source of national data that includes clinical and/or laboratory details, and data on both inpatients and outpatients.[1,2] The key findings for infectious diseases under surveillance by the APSU in 2006 are summarised in Table 1.

Studies due to finish in 2007

Surveillance for non-tuberculous mycobacterial infection finished in 2007. Adequate data have been collected in order to address the specific aims for this surveillance as determined by the investigators group leading this study, and a journal article is in preparation.

Table 1. Results summary

Condition and principal investigator	Objectives	Key findings
Acute flaccid paralysis (AFP) Prof. Heath Kelly, Victorian Infectious Diseases Reference Laboratory	To determine the notification rate of AFP in children aged < 15 years To determine whether AFP is caused by poliovirus infection and if so, whether it is a wild, vaccine, or vaccine-derived strain of poliovirus To determine other causes and the clinical picture of AFP in Australia	In 2006, Australia reached the WHO AFP surveillance target of one case /10^5 children aged <15 years per annum. The primary diagnoses for AFP remain Guillain-Barre syndrome and transverse myelitis. Only approximately 20% of cases had adequate faecal specimen collection in 2006 – well below the 80% WHO target. An outbreak of approximately 300 cases of wild poliovirus recorded in Indonesia in 2005 and the recent importation into Australia of polio by an adult from Pakistan, highlights the need for continued surveillance to keep Australia polio free.[3]
Congenital cytomegalovirus (cCMV) infection Prof. William Rawlinson, Virology Division, Department of Microbiology, Prince of Wales Hospital, Sydney	To determine the incidence of congenital and suspected congenital CMV infection To determine the presenting features and clinical spectrum of disease due to congenital CMV To determine the genotypes of CMV which cause congenital disease To determine current therapy for congenital CMV infection To determine the epidemiology of congenital CMV prior to trials of vaccines and antivirals	cCMV continues to be the most common infectious cause of malformations in Australia. cCMV infection was not associated with maternal illness in approximately one third 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 CMV may increase diagnostic yield. Universal neonatal hearing screening programs may also help identify new cases.
Congenital rubella (with defects) A/Prof. Cheryl Jones, The Children's Hospital at Westmead & Discipline of Paediatrics & Child Health, University of Sydney	To document the incidence of congenital rubella infection To determine the vaccination status of mothers of infected infants To monitor the effectiveness of the current vaccination program	There were no cases of congenital rubella reported in 2006. As the risk of congenital rubella 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 vaccination when appropriate. Travel to rubella endemic counties in the first trimester by women with no prior rubella immunity poses a risk to the foetus of congenital rubella.
Perinatal exposure to HIV and HIV infection Ms Ann McDonald, National Centre in HIV Epidemiology and Clinical Research	To identify new cases of perinatal exposure to HIV, paediatric HIV infection, and AIDS To describe the pattern of perinatal exposure to HIV in Australia To monitor the perinatal HIV infection transmission rate and use of interventions for reducing the risk of mother-to-child transmission To describe the natural history of paediatric HIV infection	Data from this study informed the section on perinatal HIV testing in the HIV Testing Policy 2006. In 2006, 14 cases of perinatal exposure were reported. 11 mothers were diagnosed prenatally; nine of these made use of interventions, and no child in this group has acquired HIV infection to date (7 HIV status negative, 2 indeterminate). For the two mothers who did not use intervention one child acquired HIV infection Three mothers were diagnosed postnatally – two of these were migrants from sub-Saharan Africa. Antenatal diagnosis of the mother's HIV infection and use of interventions is required to minimise the risk of mother-to-child HIV transmission.[4]
Neonatal herpes simplex virus infection (HSV) A/Prof. Cheryl Jones, Herpes Virus Research Unit, The Children's Hospital at Westmead & Discipline of Paediatrics & Child Health, University of Sydney	To determine the incidence of neonatal HSV infection in Australia, its mortality and morbidity To determine its mode of presentation e.g. localised, disseminated or complicated by encephalitis or pneumonitis and mode of transmission To determine whether there is a delay between presentation, diagnosis and initiation of treatment	Over a half of neonatal HSV infections in Australia are caused by HSV type 1, in contrast to the USA where HSV type 2 predominates. Typical herpetic lesions of the skin, eye or mouth were not evident in half of infants identified with neonatal HSV infection, which makes early diagnosis difficult. Disseminated HSV infection in the newborn may be associated with the early onset of pneumonitis in infants (in whom the chest X-ray may be normal). This is highly lethal unless antiretroviral therapy is initiated.

Table 1. Results summary, *continued*

Condition and principal investigator	Objectives	Key findings
Hepatitis C virus infection (HCV) A/Prof Cheryl Jones, The Children's Hospital at Westmead & Discipline of Paediatrics & Child Health, University of Sydney	To determine the reported incidence of newly diagnosed HCV infection in Australian children To describe the clinical presentation, investigation and management of newly diagnosed HCV infection in Australian children To document the presence of known risk factors for HCV infection in an Australian paediatric population To determine the prevalence of co-infection with hepatitis B virus and/or HIV in Australian children with newly diagnosed HCV infection	Perinatal transmission is the main source of HCV infection in Australian children. In the APSU study infants at risk were born to mothers who used IV drugs, had invasive procedures overseas or had tattoos. Most HCV-infected children are clinically asymptomatic with mildly elevated liver function test at diagnosis, however, HCV induced chronic liver disease and liver failure have been reported among children.[6] Given that 1%–2% of Australian women of childbearing age are infected with HCV, the reported rates of infection are lower than predicted. This may be due to the lack of a consistent approach to identifying children with HCV infection.[6]
Non-tuberculous mycobacterium infection (NTMI) Dr Pamela Palasanthiran, Paediatric Infectious Diseases Specialist, Department of Immunology and Infectious Diseases, Sydney Children's Hospital Randwick, NSW	To estimate the incidence of newly diagnosed NTM infection in children seen by child health specialists in Australia To describe the epidemiology and spectrum of disease and document known risk factors To describe diagnostic investigations used in Australia; frequency of use of skin testing and the clinical utility of the test, including differential skin testing To describe the management of NTM in Australia and the response to treatment	This infection most often presents as lymphadenitis predominantly in immunocompetent children. *Mycobacterium avium intracellulare* and *Mycobacterium fortuitum* are the most common organisms isolated in Australian children. Surgery is the most commonly offered therapy and in NTMI lymphadenitis complete excision is associated with a lower risk of relapse. There is marked heterogeneity in the antimicrobials and course prescribed. Despite therapy, relapse occurs in about 20% of cases.[7]
Neonatal and infant Streptococcus agalactiae (group B streptococcus – GBS) sepsis Prof Lyn Gilbert, Centre for Infectious Diseases and Microbiology, Institute for Clinical Pathology and Medical Research, Westmead Hospital, Westmead, NSW	To determine the current incidence of early and late onset neonatal GBS infection To determine the incidence of maternal and infant risk factors To determine the proportion of early onset GBS infection in infants of women who have been given intrapartum antibiotic prophylaxis To determine the short-term mortality and morbidity of early and late onset GBS infection To determine the distribution of GBS genotypes between isolates	Over half (57%) of the reported cases have been early onset at less than eight days of age. The number of notifications received so far is consistent with other available data. Reported rates of GBS infection are higher in Queensland than in any other state. Meningitis is associated with late-onset cases (children aged 9 days or more). Group B streptococcus isolates have been collected for approximately 75% of cases and these will be genotyped.
Severe complications of varicella infection Prof Robert Booy, National Centre for Immunisation Research and Surveillance, The Children's Hospital at Westmead, NSW	To describe the incidence in children aged one month to 15 years To describe the demographics of affected children To describe the vaccination status To describe the management of the disease To describe The genotypes of varicella zoster viruses associated with severe complications of varicella in Australia[8]	**Preliminary results – surveillance period of seven months only** Fourteen children were hospitalised with complications of varicella; average age = 5; range 8 months to 12 years. The average stay in hospital was seven days; range 2–14 days. Complications included bacteraemia, osteomyelitis, cellulitis, pneumonia, hepatitis, encephalitis and ataxia. The main source of contact were siblings, other family members or friends at school or daycare. All but one affected child were unvaccinated.
Congenital and neonatal varicella As above	To describe the epidemiology of neonatal and congenital varicella and to compare results to a previous APSU study conducted in 1997.	One case of congenital varicella was reported in New South Wales. Fourteen cases of neonatal varicella were reported. Further analysis of these data is currently being completed by the investigators.

Table 2. Confirmed cases identified for 2006 and for the total study period

Condition	Date study commenced	Questionnaire response (%) for total study period	Number of confirmed cases for 2006	Reported Rate for 2006 (per 10^5)	Number of confirmed cases for total study period	Reported rate for total study period (per 10^5 per annum)
Acute flaccid paralysis	March 1995	90	44*	1.1†	412*	0.87†
Congenital cytomegalovirus	Jan 1999	69	18	6.8‡	75	3.70‡
Congenital rubella (with defects)	May 1993	96	NIL	NIL	50	0.09†
Perinatal exposure to HIV	May 1993	90	14	5.2‡	282	7.90‡
Neonatal herpes simplex virus infection	Jan 1997	95	11	4.1‡	88	3.52‡
Hepatitis C virus infection	Jan 2003	85	9	0.22†	41	0.26†
Non-tuberculous mycobacteria	July 2004	80	33§	0.81†	77§	0.64†
Neonatal B group streptococcus Infection	July 2005	86	55	20.7‡	92	23.20‡
Congenital varicella	May 2006	100	1	||	1	||
Neonatal varicella	May 2006	91	8	||	8	||
Severe complications of varicella	May 2006	90	14	||	14	||

* All reported cases that have been classified by the Polio Expert Committee were 'non-polio acute flaccid paralysis' according to World Health Organization criteria.

† Based on population of children aged ≤ 15 years as estimated by the Australian Bureau of Statistics.[9]

‡ Based on number of births as estimated by the Australian Bureau of Statistics.[9]

§ Includes confirmed and probable cases.

|| Surveillance for varicella commenced in May 2006. Due to the short surveillance period of only seven months, a rate is not reported for 2006.

New surveillance studies

Acute rheumatic fever

The acute rheumatic fever (ARF) surveillance is a joint project between the Menzies School of Public Health, The National Heart Foundation of Australia and the APSU. Surveillance commenced in September 2007. The burden of ARF has been recognised among Indigenous children and control programs and data collections in the top end of Australia have been invaluable. However, we know little about the incidence of ARF in the rest of Australia although the Australian Bureau of Statistics estimates that approximately 30% of Australia's Indigenous population lives in New South Wales.[10] The incidence of ARF in the non-Indigenous population is unknown, and this study may provide preliminary information on other high risk groups such as refugees. In order to improve surveillance coverage in rural and remote regions the APSU will recruit additional key clinicians from these areas. This is an important capacity building step for the surveillance mechanism.

Intussusception

Surveillance for intussusception commenced in July 2007. Intussusception has been recognised as a potential complication of rotavirus vaccination and the APSU study will provide information on the diagnosis and clinical management of intussusception and any temporal association between rotavirus vaccination and intussusception.

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