# Communicable and vaccine-preventable conditions under surveillance by the APSU: 2004 update

*Yvonne Zurynski,[1,2] Paula Cronin,[1] Elizabeth J Elliott[1,2,3]*

## *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. The study of communicable and vaccine-preventable diseases is supported 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 vaccine preventable diseases studied through the APSU in 2004.

In 2004, seven communicable or vaccine preventable conditions were studied:

- acute flaccid paralysis;*
- congenital cytomegalovirus infection;
- congenital rubella infection;
- perinatal exposure to HIV and HIV infection;
- neonatal herpes simplex virus infection;
- hepatitis C virus infection; and
- non-tuberculous mycobacterium infection.

* Although the aim of this surveillance is to identify acute flaccid paralysis due to poliomyelitis or associated with polio vaccination, there are many non-infectious causes of acute flaccid paralysis.

## *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. Conditions under surveillance are listed on a report card sent monthly to practising paediatricians and other selected child health specialists (APSU contributors). Over a half of the contributors report via email. The system is efficient and economical, enabling surveillance of up to 16 different conditions simultaneously. Contributors respond whether or not they have a case to report. This enables calculation of monthly response rates and identification of non-responders. Each week the APSU forwards positive reports to study investigators who collect de-identified clinical and/or laboratory data from reporting clinicians by questionnaire. A unique identification code for each case enables identification of duplicate reports. Information reported in the questionnaire is used to ensure that case criteria are met.[1,2]

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 and high response rates, 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 maximize cases identified. Reported rates for conditions ascertained through the APSU therefore represent a minimum estimate of these conditions in the relevant Australian populations.

1. Australian Paediatric Surveillance Unit, The Children's Hospital at Westmead, Westmead, New South Wales
2. Discipline of Paediatrics and Child Health, Faculty of Medicine, The University of Sydney, Sydney, New South Wales
3. The Children's Hospital at Westmead, Westmead, New South Wales

Corresponding author: Dr Yvonne Zurynski, Assistant Director, Australian Paediatric Surveillance Unit, The Children's Hospital at Westmead, Locked Bag 4001, Westmead NSW 2145. Telephone: +61 2 9845 1202 (or ext 3005). Email: apsu@chw.edu.au

**Table 1. Summary of findings**

| Condition and principal investigator | Objectives | Key findings |
|---|---|---|
| **Acute flaccid paralysis (AFP)**<br>A/Prof. Heath Kelly, Victorian Infectious Diseases Reference Laboratory | To determine the notification rate of AFP in children aged <15 years;<br>To determine whether AFP is caused by poliovirus infection and if so, whether it is a wild, vaccine, or vaccine-derived strain of poliovirus;<br>To determine other causes and the clinical picture of AFP in Australia. | In 2004, Australia exceeded the WHO AFP surveillance target of 1 case per $10^5$ persons aged <15 years, per annum.<br>The majority (approx. 70%) of AFP cases are due to Guillain-Barré syndrome or transverse myelitis. All reported cases were classified as non-polio AFP.[3]<br>40% of cases had 2 faecal specimens collected within 14 days of onset of paralysis, below the 80% target level identified by WHO.<br>Continued surveillance is required to keep Australia polio free, especially in view of recent reports of imported cases of wild poliovirus into Indonesia. |
| **Congenital cytomegalovirus (cCMV) infection**<br>A/Prof. William Rawlinson, Virology Division, Department of Microbiology, Prince of Wales Hospital, Sydney | The study aims to determine:<br>The incidence of congenital and suspected congenital CMV infection;<br>The presenting features and clinical spectrum of disease due to congenital CMV;<br>The genotypes of CMV which cause congenital disease;<br>Current therapy for congenital CMV infection; and<br>The epidemiology of congenital CMV prior to trials of vaccines and antivirals. | This is the first national study of cCMV in Australia, a major infectious cause of malformations.<br>cCMV infection was not associated with maternal illness in 8/17 cases in 2004 and should be considered regardless of maternal history.<br>cCMV remains under-diagnosed. Although most cases are diagnosed by urine culture, use of polymerase chain reaction for urinary screening for CMV may increase diagnostic yield.[4]<br>Universal neonatal hearing screening programs may also help identify new cases. |
| **Congenital rubella**<br>Dr Cheryl Jones, The Children's Hospital at Westmead, and Discipline of Paediatrics and Child Health, University of Sydney | To document the incidence of congenital rubella infection;<br>To determine the vaccination status of mothers of infected infants;<br>To monitor the effectiveness of the current vaccination program. | The only reported case in 2004 was born to an unvaccinated woman born overseas. We have previously documented this group as 'at risk.'[5]<br>Women born in countries with poorly developed vaccination programs should have serological testing for rubella after arrival in Australia, and vaccination when appropriate.<br>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**<br>Ann McDonald, National Centre in HIV Epidemiology and Clinical Research | To identify new cases of perinatal exposure to HIV, paediatric HIV infection, and AIDS;<br>To describe the pattern of perinatal exposure to HIV in Australia;<br>To monitor the perinatal HIV infection transmission rate and use of interventions for reducing the risk of mother-to-child transmission;<br>To describe the natural history of paediatric HIV infection. | No new cases of HIV infection were identified in children in 2004.<br>All cases reported in 2004 were of perinatal exposure to HIV. Consistent with our previous data 55% of these mothers were exposed to HIV through heterosexual contact in a high HIV prevalence country or in Australia with a partner from a high prevalence country and 32% used IV drugs or had a partner who used IV drug.[6]<br>Supporting previously reported trends,[6] the proportion of children with perinatal HIV exposure who become infected, declined from 41.2% (children born 1995–1996) to 2.4% (children born 2003–2004) due to increasing use of interventions in women diagnosed antenatally. |

**Table 1. Summary of findings, *continued***

| Condition and principal investigator | Objectives | Key findings |
|---|---|---|
| **Neonatal herpes simplex virus infection (HSV)**<br>Dr Cheryl Jones, Herpes Virus Research Unit, The Children's Hospital at Westmead, and Discipline of Paediatrics and Child Health, University of Sydney | To determine the incidence of neonatal HSV infection in Australia, its mortality and morbidity;<br>To determine its mode of presentation e.g. localised, disseminated or complicated by encephalitis or pneumonitis and mode of transmission;<br>To determine whether there is 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.<br>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.<br>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 antiviral therapy is initiated. |
| **Hepatitis C virus infection (HCV)**<br>Dr Cheryl Jones, The Children's Hospital at Westmead, and Discipline of Paediatrics and Child Health, University of Sydney | To determine the reported incidence of newly diagnosed HCV infection in Australian children;<br>To describe the clinical presentation, investigation and management of newly diagnosed HCV infection in Australian children;<br>To document the presence of known risk factors for HCV infection in an Australian paediatric population;<br>To determine the prevalence of co-infection with hepatitis B virus (HBV) and/or human immunodeficiency virus (HIV) in Australian children with newly diagnosed HCV infection. | Most (>80%) HCV infection in Australian children is acquired perinatally. In our study infants at risk were born to mothers who used IV drugs (approx. 60%), had invasive procedures overseas or had tattoos.[7]<br>Most HCV-infected children are clinically asymptomatic with mildly elevated liver function test at diagnosis.<br>The reported number of infected children is lower than predicted using national laboratory notifications. This may be due to under-diagnosis and/or under-reporting. |
| **Non-tuberculous mycobacterium infection (NTM)**<br>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;<br>To describe the epidemiology and spectrum of disease and document known risk factors;<br>To describe diagnostic investigations used in Australia; frequency of use of skin testing and the clinical utility of the test, including differential skin testing;<br>To describe the management of NTM in Australia and the response to treatment. | In accordance with the literature, this infection usually presents in otherwise healthy children <5 years with lymphadenopathy. Surgery is required in the majority.<br>*Mycobacterium avium intracellulare* and *Mycobacterium fortuitum* are the commonest organisms isolated.<br>Children with underlying conditions experience relapse regardless of management. |

Cases are classified according to the following criteria:

**Valid:** A *confirmed* case is one that satisfies the case definition criteria and a *probable* case is one that does not completely meet the case definition criteria but is highly probable on the basis of available information.

**Invalid:** A *duplicate* case is one that has already been reported and an *error* is a reported case that does not fulfil the case definition criteria; or for which the diagnosis was revised by the reporting clinician; or for which the APSU report card was ticked by mistake.

## Results

In 2004, 1,112 clinicians participated in the monthly surveillance of 13 conditions, with an overall monthly response rate of 91 per cent. Questionnaire return rate is >80 per cent for most studies. Table 2 shows the number of cases reported in 2004 and for the whole study period and the reported rate per 100,000 population.[2]

APSU data contribute significantly to the national surveillance effort, providing valuable information for clinicians, policy makers and the community. The APSU is often the only source of national data that includes clinical and or laboratory details and data from both inpatients and outpatients. The chief investigator, objectives and key findings for studies are summarised in Table 1.

Further information on the above studies may be obtained by contacting the APSU: website www.apsu.org.au; phone (02) 9845 3005; email: apsu@chw.edu.au, or the Principal Investigator for each study.

## Acknowledgements

The APSU is funded by the Australian Government Department of Health and Ageing; the Faculty of Medicine, the University of Sydney; and the Division of Paediatrics and Child Health, Royal Australasian College of Physicians.

We acknowledge the important continued contribution of all paediatricians and child health professionals who participate in surveillance studies conducted by the APSU.

## References

1. Elliott E, Cronin P, Rose D, Zurynski Y, Eds. APSU Annual Report 2002–2003. Australian Paediatric Surveillance Unit, 2005; ISSN:1443–3524.

2. Elliott E, Cronin P, Zurynski Y. Eds. APSU Annual Report 2004. Australian Paediatric Surveillance Unit, 2005; (in press).

3. Australian Bureau of Statistics. *Australian Demographic Statistics*, 3101.0, March Quarter; 2005.

**Table 2. Confirmed cases identified for 2004 and for the total study period**

| Condition | Date study commenced | Questionnaire response (%) for total study period | Number of confirmed cases for 2004 | Number of confirmed cases for total study period | Reported rate (per $10^5$ per annum) |
|---|---|---|---|---|---|
| Acute flaccid paralysis | March 1995 | 89 | 45* | 338* | 0.87§ |
| Congenital cytomegalovirus | Jan 1999 | 66 | 17 | 48 | 3.85‖ |
| Congenital rubella (with defects) | May 1993 | 96 | 1 | 50 | 0.11§ |
| Perinatal exposure to HIV;<br>HIV infection | May 1993 | 91 | 24†<br>0† | 253<br>39 | 8.37‖<br>1.29‖¶ |
| Neonatal herpes simplex virus infection | Jan 1997 | 96 | 11 | 71 | 4.10‖ |
| Hepatitis C virus infection | Jan 2003 | 84 | 12 | 24 | 0.30§ |
| Non-tuberculous mycobacterial infection | July 2004 | 85 | 20‡ | 20 | – |

* All reported cases that have been classified by the Polio Expert Committee were 'non-polio AFP' according to WHO criteria.
† In 2004 all reported cases were perinatal exposures to HIV infection. No new HIV infections were reported.
‖ Based on number of births as estimated by the Australian Bureau of Statistics.[8]
¶ All HIV infections resulted from perinatally acquired HIV.
‡ Includes confirmed and probable cases. Due to the short surveillance period a rate is not reported.
§ Based on population of children aged ≤ 15 years as estimated by the Australian Bureau of Statistics.[8]

4. Morris AMS, Elliott EJ, D'Souza RM, Antony J, Kennett M, Longbottom H. Acute flaccid paralysis in Australian children. *J Paediatr Child Health* 2003; 9:22–26.

5. Trincado DE, Rawlinson WD. Congenital and perinatal infections with cytomegalovirus. *J Paediatr Child Health* 2001;37:187–192.

6. Forrest J, Donovan T, Burgess M. A resurgence of congenital rubella in Australia? *Commun Dis Intell* 2003;27:533–535.

7. McDonald AM, Li Y, Cruickshank MA, Elliott EJ, Kaldor JM, Ziegler JB. Use of interventions for reducing mother-to-child transmission of HIV in Australia. *MJA* 2001;174:449–52.

8. Elliott E, Jones CA, Mews C, Hardiker W, Kesson A, Polis S, Dore G, Kaldor J. Reported risk factors for hepatitis C virus infection in Australian children: results of national surveillance. *J Paediatr Child Health* 2005;41:S3.