

# AUSTRALIAN PAEDIATRIC SURVEILLANCE UNIT ANNUAL REPORT, 2014

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## Introduction

The Australian Paediatric Surveillance Unit (APSU) was established in 1993 to facilitate national active surveillance of uncommon diseases of childhood including selected communicable diseases. This report includes data on the following conditions: acute flaccid paralysis (AFP), a surrogate condition for poliovirus infection; congenital cytomegalovirus (cCMV); congenital rubella; perinatal exposure to HIV and paediatric HIV infection; neonatal herpes simplex virus (HSV); congenital varicella; neonatal varicella; and juvenile onset recurrent respiratory papillomatosis (JoRRP). Surveillance of severe complications of influenza was undertaken during the influenza season (July to September 2014).

## Methods

### Australian Paediatric Surveillance Unit

APSU study protocols and case definitions are developed with collaborating study investigators who provide specialised clinical expertise for each condition studied listed in Table 1. Each month approximately 1,500 paediatricians and other child health clinicians nationally are sent the APSU report card. Over 90% of clinicians report via email; they respond each month whether or not they have a case to report for any of the conditions listed on the report card. The APSU collects de-identified clinical and/or laboratory data via a case report form completed by the doctor looking after the child. Completed case report forms are then forwarded on to study investigators. All study protocols including case definitions and case report forms are available for download on the [APSU web site](http://www.apsu.org.au) ([www.apsu.org.au](http://www.apsu.org.au)). The response rate to the monthly report card was 92% in 2014.

Surveillance of AFP is conducted by both the APSU and the Paediatric Active Enhanced Disease Surveillance (PAEDS). PAEDS was initiated in 2007 and is a hospital based surveillance system reliant on active case ascertainment by specialist surveillance nurses in each of the 5 participating hospitals.<sup>1</sup> All cases of AFP from both systems are reported to the Polio Expert Panel (PEP) and are classified according to World Health Organization criteria.

## Results

All reported rates are based on child population estimates published by the Australian Bureau of Statistics.<sup>2</sup>

### Acute flaccid paralysis

All cases of AFP reported to the APSU are submitted for review to the PEP. In 2014, there were 26 confirmed cases of AFP notified to the APSU. Of these, 14 were reported from Victoria, 6 from Queensland, 2 from New South Wales, 2 from Western Australia, 1 from South Australia and 1 case was reported from the Northern Territory. Cases of AFP were ascertained by the APSU from a variety of hospitals across Australia (Table 2).

All cases were reviewed by the PEP, and classified as non-polio AFP. The main diagnoses associated with reported cases of AFP were Guillain-Barré syndrome (33%) and transverse myelitis (13%). The National Polio Reference Laboratory (NPRL) combines cases ascertained by the APSU with those ascertained by PAEDS, and a final AFP report produced by NPRL is published in *Communicable Diseases Intelligence*. The NPRL ensures that duplicate notifications that are ascertained by both APSU and PAEDS are counted only once. These data contribute towards Australia's polio monitoring efforts and maintenance of polio-free certification as recommended by the World Health Organization as part of the Global Polio Eradication Initiative.

### Congenital cytomegalovirus

In 2014, 24 confirmed cases and 2 probable cases were reported to the APSU. A total of 273 confirmed cases were reported during the entire study period, 1999–2014. Ten cases were reported from New South Wales, 8 from Queensland, 2 from Victoria, 2 from Western Australia, 2 from the Northern Territory, 1 from South Australia and 1 from the Australian Capital Territory. Of the 14 cases, 11 were not of Aboriginal or Torres Strait Islander descent, and 3 were unknown.

The data collected since 1999 informed further research including current studies of hyperimmunoglobulin treatment during pregnancy and there is good evidence for the benefits of hygiene

**Table 1: Confirmed cases identified in 2014 and for the total study period, and reported rates per 100,000 of the relevant child population**

Condition	Date study commenced	Questionnaire returned (%)	Number of confirmed cases 2014	Reported rate for 2014 (per 100,000)	Number of confirmed cases for total study period	Reported rate for total study period (per 100,000 per annum)
Acute flaccid paralysis*	Mar 1995	100	26*	0.59†	839	1.03†
Congenital cytomegalovirus	Jan 1999	56	26	8.44‡	273	6.62‡
Congenital rubella (with defects)	May 1993	No notifications	Nil	Nil	53	0.06§
Perinatal exposure to HIV	May 1993	88	39	12.66‡	626	11.07‡
HIV Infection	May 1993		3	0.06§	87	0.10§
Neonatal – herpes simplex virus infection	Jan 1997	95	10	3.25‡	164	3.54‡
Infant – herpes simplex virus infection	Jan 2012		8	2.66	11	1.20
Congenital varicella	May 2006	No notifications	Nil	Nil	2	0.08‡
Neonatal varicella	May 2006	No notifications	Nil	Nil	22	0.93‡
Juvenile onset recurrent respiratory papillomatosis (JoRRP)¶	Oct 2011	100	2	0.05†	12	0.09†
Severe complications of influenza**	Influenza season each year since 2008	95	83	1.88†	380	1.27†

\* Includes all cases of acute flaccid paralysis (AFP) reported via the Australian Paediatric Surveillance Unit (APSU). All cases have been classified by the Polio Expert Panel as 'non-polio AFP' according to World Health Organization criteria. Number of confirmed cases for the total study period includes both the APSU and the Paediatric Active Enhanced Disease Surveillance data.

† Based on population of children aged less than 15 years.

‡ Based on number of births.

§ Based on population of children aged less than 16 years.

|| Based on population of children aged less than 12 months.

¶ Confirmed cases and probable cases are reported; a probable case is defined as a papilloma visualised by endoscopy but the histology results are pending.

\*\* Influenza surveillance was conducted each year since 2008 during the influenza season, July to September except in the pandemic year (2009) when surveillance occurred from June to October.

All reported rates based on child population estimates published by the Australian Bureau of Statistics.<sup>2</sup>

**Table 2: Acute flaccid paralysis cases, by state and hospital**

State or territory	Hospital(s)	Number of cases
NSW	Sydney Children's Hospital Randwick; The Children's Hospital at Westmead	2
NT	Alice Springs Hospital	1
SA	Women's and Children's Hospital Adelaide	1
Qld	Mater Hospital, Gold Coast University Hospital; Mackay Base Hospital	6
Vic.	Geelong Hospital; Monash Children's Hospital Clayton; Royal Children's Hospital Melbourne; Bendigo Hospital	14
WA	Princess Margaret Hospital	2

measures in the prevention of cCMV.<sup>3</sup> A study of postnatal valganciclovir therapy for infants with symptomatic congenital CMV disease, has shown moderate benefit for improved long term audiologic and neurodevelopmental outcomes, and no excess risk for adverse events.<sup>4</sup> Concerns regarding efficacy, and potential long term side effects of ganciclovir on gonadal function remain and the continued APSU surveillance for cCMV is extremely important. Whether vaccines under development<sup>5</sup> or trialled in pregnant women<sup>6</sup> can be used in the near future remains an open question in Australia. However, cCMV vaccination is likely to become available to Australians in the future, to prevent cCMV infection.

### Congenital rubella

There were no notifications of congenital rubella to the APSU during 2014. The last reported cases of congenital rubella were in 2008 (1 confirmed case) and 2013 (3 confirmed cases). In total, there have been 57 cases of congenital rubella (53 confirmed and 4 probable cases) reported to the APSU during the study period (1993–2014).<sup>7</sup> It is mainly due to the National Immunisation Program that Australia has seen a reduction in congenital rubella infection. However, reports of imported and locally acquired cases among immigrant unvaccinated women during previous years reinforces the need for continued surveillance and a vigilant vaccination program.<sup>7</sup>

### Perinatal exposure to HIV and HIV infection

There were 39 confirmed cases of perinatal exposure to HIV reported to the APSU in 2014. In addition, there were 3 cases of HIV infection in children born overseas (2 in Zimbabwe, 1 in Uzbekistan). Of the 39 confirmed cases of perinatal exposure to HIV, 17 were from Victoria, 12 were from New South Wales, 6 from Western Australia, 3 from the Australian Capital Territory and 1 from South Australia. None of the children with perinatal exposure to HIV identified as being of Aboriginal or Torres Strait Islander descent.

The majority of mothers of these cases were receiving antiretroviral therapy ( $n = 26$ ; 74%). The most common mode of delivery for the perinatally exposed cases was vaginal delivery ( $n = 11$ ; 31%), followed by elective caesarean ( $n = 7$ ; 20%) and emergency caesarean ( $n = 7$ ; 20%). Most mothers ( $n = 26$ ) avoided breastfeeding their children. Over the total study period (1993–2014) 627 cases of perinatal exposure to HIV and 87 cases of HIV infection have been reported.

### Neonatal or infant herpes simplex virus

There were 22 notifications of neonatal or infant HSV in 2014. Eighteen met the case definition criteria. Of these, 10 were neonatal cases (aged < 1 month) and 8 were infant onset cases (aged between 1 month and 1 year). Eight cases were reported from New South Wales, 5 from Queensland, 2 from Western Australia, 2 from Victoria and 1 from Tasmania. Of the 18 confirmed cases, 4 mothers identified as Aboriginal, 5 as Australian, 1 as African, and for 8 ethnicity was not provided.

Eleven had HSV-1; 5 had HSV-2 and in 2 cases the HSV strain was unknown. Eight children presented with central nervous system signs and 4 of these died.

HSV infection leads to significant mortality and morbidity. In the absence of screening in pregnancy, early detection and treatment is needed.<sup>8</sup>

### Congenital and neonatal varicella

There were no cases of congenital varicella or neonatal varicella reported to the APSU during 2014. The last case of congenital varicella reported to the APSU was in 2007, while the last case of neonatal varicella was reported in 2013. This supports the success of the varicella vaccination program under the NIP in preventing the most severe manifestations of varicella infection.

### Juvenile onset recurrent respiratory papillomatosis

There were 2 notifications of JoRRP to the APSU in 2014: 1 confirmed case (confirmed by visualisation via endoscopy and histology report), and 1 probable case (visualisation by endoscopy, but there was no histology report provided). A total of 12 cases (8 confirmed, 4 probable) were ascertained from 2012 to 2014. Of these 12 cases, 6 were from Western Australia, 5 from Queensland and 1 from New South Wales. The majority of children were Caucasian ( $n = 10$ ), 1 child was of Aboriginal descent and ethnicity was not provided for 1 case.

JoRRP is a very rare condition characterised by the recurrent growths (papillomas) in the upper airways caused by persistent infection with human papillomavirus (HPV) genotypes HPV 6 or HPV 11. Acquisition of infection occurs via vertical transmission before or during birth, with the susceptible child unable to mount an adequate immune response to permanently clear or suppress the virus. HPV6 and HPV11 are targeted by the

prophylactic quadrivalent HPV vaccine, meaning that JoRRP is now potentially a vaccine preventable disease, because women of child-bearing age become immune to infection with HPV6 and 11, and antibodies generated by immunisation are also known to cross the placenta and provide antibodies detectable in the cord blood of neonates.<sup>9</sup>

Following the commencement of Australia's National HPV Vaccination Program in 2007, genital warts (also caused by HPV types 6 and 11) have almost disappeared in young women and have also markedly declined in young men due to herd protection.<sup>10</sup>

The number of reported cases of JoRRP has also declined from 6 confirmed and 1 probable case in 2012, to 1 confirmed and 2 probable cases in 2013, and 1 confirmed and 1 probable case in 2014.

### **Severe complications of influenza**

A total of 83 children admitted to hospital with serious complications of laboratory confirmed influenza were reported to the APSU from July to September 2014. Of the 83 children, 37 were from Queensland, 28 from New South Wales, 9 from Western Australia, 8 from Victoria and 1 from South Australia. Six cases (7%) identified as being of Aboriginal or Torres Strait Islander descent.

This was a large increase in notifications compared with 2013 when only 13 cases were reported. Seventy-six (92%) had influenza A. Four children had influenza B and 1 child had both influenza A and influenza B. The most common serious complications were pneumonia (57%), seizures (19%) encephalitis (7%), and rhabdomyolysis (4%).

In 2014, 29 children required an intensive care unit admission and 1 child died. Of the 83 children, 62 were previously healthy, while 19 had chronic pre-disposing conditions (neuromuscular disorders, cerebral palsy, asthma, chronic lung disease, Rett syndrome).

Only 5 (6%) of the 83 children were vaccinated for influenza within the last 12 months. Of the 19 children with chronic predisposing conditions, only 3 (16%) were vaccinated. Children with chronic predisposing conditions are recommended and funded for annual influenza vaccination under the National Immunisation Program.

### **Conclusions and future directions**

APSU surveillance provides valuable clinical, treatment and outcome data on infectious and vaccine preventable conditions in Australian children. The data from the APSU contribute significantly

to the national surveillance effort, providing valuable information for clinicians, policymakers and the community.

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