Annual report

Australian Paediatric Surveillance Unit Annual Report, 2016

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Abstract

This report summarises the cases reported to the Australian Paediatric Surveillance Unit (APSU) of rare infectious diseases or rare complications of more common infectious diseases in children. During the calendar year 2016, there were approximately 1500 paediatricians reporting to the APSU and the monthly report card return rate was 90%. APSU continued to provide unique national data on the perinatal exposure to HIV, congenital rubella, congenital cytomegalovirus, neonatal and infant herpes simplex virus, and congenital and neonatal varicella. APSU contributed 10 unique cases of Acute Flaccid Paralysis (a surrogate for polio) – these data are combined with cases ascertained through other surveillance systems including the Paediatric Active Disease Surveillance (PAEDS) to meet the World Health Organisation surveillance target. There was a decline in the number of cases of juvenile onset Recurrent Respiratory Papillomatosis which is likely to be associated with the introduction of the National HPV Vaccination Program. The number of cases of severe complications of influenza was significantly less in 2016 (N=32) than in 2015 (N=84) and for the first time in the last nine years no deaths due to severe influenza were reported to the APSU. In June 2016 surveillance for microcephaly commenced to assist with the detection of potential cases of congenital Zika virus infection and during that time there were 21 confirmed cases – none had a relevant history to suspect congenital Zika virus infection, however, these cases are being followed up to determine the cause of microcephaly.

Introduction

The 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 and infant 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 2016). In addition, surveillance for Microcephaly began in June 2016 to detect potential cases of congenital Zika virus infection.

Methods

Australian Paediatric Surveillance Unit

Each month approximately 1500 paediatricians and other child health clinicians nationally are sent the APSU report card (Figure 1). The majority of clinicians (>90%) report via email, responding each month whether or not they have seen cases of any of the conditions listed on the report card (Figure 2).[1] APSU study protocols and case definitions are developed with collaborating study investigators who provide clinical expertise for each condition listed. All study protocols and case report forms are available for download on the APSU website (www.apsu.org.au).

For surveillance of AFP, the APSU collaborates with the Paediatric Active Enhanced Disease Surveillance (PAEDS) system. PAEDS is a hospital-based surveillance system reliant on active case ascertainment by specialist surveillance nurses and operates in five tertiary hospitals around Australia.[2] Data collected from the APSU is provided in this report. For data on AFP collected through PAEDS please refer to the PAEDS Annual Reports via the *Communicable Diseases Intelligence* website.[3]

Results

In 2016, the response rate to the APSU monthly report card was 90%, and completed questionnaires containing detailed clinical data were received for 81% to 100% of notifications (Table 1). The numbers of confirmed cases and the relevant reported rate estimates for 2016 as well as for the whole study period for each condition, are presented in Table 1. These estimates are accurate at the time of publication, however, should any additional cases be reported later, the estimates will be adjusted accordingly.

Figure 1: Example APSU Email Report Card

Dear xxx, *(APSU Dr code xxx)*

REMINDER: APSU REPORT CARD APRIL 2016A

NOTHING TO REPORT? PLEASE HIT REPLY AND TYPE 'NTR' IN THE SUBJECT LINE OF THIS EMAIL

DO YOU HAVE A CASE TO REPORT? HIT REPLY AND TYPE THE NUMBER OF CASES IN THE SPACE PROVIDED BELOW

If you report a case, please record patient details for later reference

NEWLY DIAGNOSED CASES ONLY - *Please report cases diagnosed within study period only*

Study case report forms are available through the hyperlinks below or via the APSU website www.apsu.org.au

 # See your protocol sheet for details regarding stool/serum specimens.

No of Cases	Study Case Report Forms (paper form for fax/email)	Web links for completion of Case Report Forms online
[ ]	EOED Case Report Form	EOED Online Questionnaire
[ ]	22q11.2 Deletion Syndrome	22q Online Questionnaire
[ ]	Chronic Fatigue Syndrome	CFS Online Questionnaire
[ ]	Fetal Alcohol Spectrum Disorders	FASD Online Questionnaire
[ ]	Childhood Interstitial Lung Disease	chILD Online Questionnaire
[ ]	MECP2 Duplication Syndrome	
[ ]	Juvenile onset Recurrent Respiratory Papillomatosis	
[ ]	Congenital varicella	Vcon Online Questionnaire
[ ]	Neonatal varicella	Vneo Online Questionnaire
[ ]	Rett syndrome	
[ ]	Congenital cytomegalovirus infection – NSW – Other States	
[ ]	Newborn and infant herpes simplex virus infection	HSV Online Questionnaire
[ ]	Acute flaccid paralysis +#	
[ ]	Paediatric HIV infection OR perinatal exposure to HIV – Mother – Child	
[ ]	Vitamin K deficiency bleeding (includes haemorrhagic disease of the newborn)	VitK/HDN Online Questionnaire
[ ]	Congenital rubella	RUB Online Questionnaire

Please ALSO report cases of acute flaccid paralysis immediately by telephone to the National Enterovirus Reference Laboratory on (03) 9342 9607 or email enterovirus@mh.org.au.

Please send all CMV and HIV Completed questionnaires directly back to the APSU.

If you have notified a previous case and are yet to complete a case report form, please forward via email SCHN-APSU@health.nsw.gov.au or fax 02 9845 3082 as soon as possible

CHANGED YOUR CONTACT DETAILS? CONTACT THE APSU ON 02 9845 3005 OR EMAIL SCHN-APSU@health.nsw.gov.au

Kind regards,

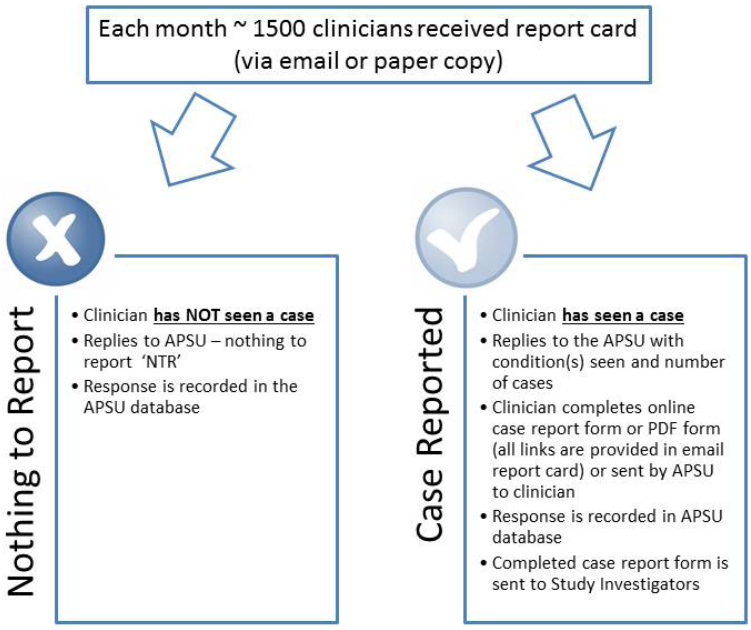
The APSU Team

Australian Paediatric Surveillance Unit (APSU)

t: (02) 9845 3005 | f: (02) 9845 3082 | e: SCHN-APSU@health.nsw.gov.au | w: www.apsu.org.au

kids research Institute the children's hospital at Westmead

Figure 2: Schematic of APSU Methodology



All reported rates are based on child population estimates published by the Australian Bureau of Statistics.[4]

Acute flaccid paralysis

Paediatricians are instructed to report all cases of AFP immediately as they are identified to the APSU and the National Polio Reference Laboratory. Data from the APSU are submitted regularly to the Polio Expert Panel (PEP). In 2016, there were 10 confirmed cases of AFP notified to the APSU. Of the 10 confirmed cases, 4 were reported from New South Wales, 4 from Victoria and 2 from Tasmania. All cases were reviewed by the PEP, and classified as non-polio AFP. The main diagnoses associated with AFP were transverse myelitis (30%) and Guillain-Barre syndrome (20%). Other diagnoses included acute disseminated encephalomyelitis, conversion disorder, encephalomyelitis, anterior horn cell disease and neuromyelitis spectrum disorder. APSU contributes to the national AFP surveillance efforts to reach the World Health Organisation surveillance target of 1/100,000 children aged <15 years per annum.[5]

Table 1: Confirmed cases identified Australian children aged < 16 years in 2016 and for the total study period, and reported rates per 100,000 of the relevant child population, by condition

Condition	Date study commenced	Questionnaires returned (%)	Number of confirmed cases 2016	Reported rate for 2016 (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	10*	0.22§	953	0.98‖
Congenital cytomegalovirus	Jan 1999	84	13	4.26§	306	6.47§
Congenital rubella (with defects)	May 1993	100	Nil	Nil	54	0.06§
Perinatal exposure to HIV	May 1993	98	40	13.10§	704	11.25§
HIV Infection	May 1993		Nil	Nil	87	0.09‖
Neonatal - herpes simplex virus infection	Jan 1997	89	6	1.96§	186	3.56§
Infant - herpes simplex virus infection	Jan 2012		1	0.33¶	16	1.04¶
Congenital varicella	May 2006	Nil	0	Nil	2	0.07§
Neonatal varicella	May 2006	100	1	0.09§	27	0.07§
Juvenile onset recurrent respiratory papillomatosis (JoRRP)**	Oct 2011	100	1	0.02†	15	0.07†
Severe complications of influenza††	Influenza season each year since 2008	100	28	0.62†	516	1.33†
Microcephaly	June 2016	81	21	6.67¶	21	6.67¶

* Includes all cases of acute flaccid paralysis (AFP) reported via the APSU. All cases have been classified by the Polio Expert Panel (PEP) as 'non-polio AFP' according to World Health Organization criteria. The number of confirmed cases for the total study period includes both the APSU and PAEDs data.
† Based on population of children aged < 15 years.
§ Based on number of births.
‖ Based on population of children aged < 16 years.
¶ Based on population < 12 months.
** Includes both confirmed (visualisation via endoscopy and histology report) and probable cases (visualisation via endoscopy but no histology report).
†† 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.

Congenital cytomegalovirus

In 2016, 13 confirmed cases were reported to the APSU, with 306 confirmed cases reported during the entire study period 1999 - 2016. Of the 13 confirmed cases, 7 were from Queensland, 2 were reported from New South Wales, 2 from Tasmania, 1 from Western Australia and 1 from the Northern Territory. All of the 13 children were born in Australia, none identified as Aboriginal or Torres Strait Islander.

Congenital rubella

There were no notifications of congenital rubella reported to the APSU during 2016. During the entire study period (1993 – 2016) there have been 59 cases of congenital rubella (54 confirmed and 5 probable) reported to the APSU. It is important to continue surveillance and vaccination as imported and locally acquired cases, especially among immigrant unvaccinated women, still occur. [6]

Perinatal exposure to HIV and HIV infection

There were 40 confirmed cases of perinatal exposure to HIV reported to the APSU in 2015, but no cases of HIV infection in children. Of the 40 confirmed cases, 21 were from Victoria, 13 were from New South Wales, 5 from Queensland and 1 from the Australian Capital Territory. No child with perinatal exposure to HIV was of Aboriginal or Torres Strait Islander descent.

The majority of mothers of these children were receiving antiretroviral therapy (n=38, 92%). Women most frequently gave birth by vaginal delivery (n=21, 51%) or by elective caesarean section (n=7, 17%) and emergency caesarean (n=4, 9%).

Neonatal and infant herpes simplex virus

Of 19 notifications, there were 7 confirmed cases of neonatal or infant HSV reported to the APSU in 2016. There were 6 neonatal cases (aged <1 month) and 1 was an infant onset case (aged between 1 month and 1 year). The 1 case of infant onset was reported from New South Wales, with HSV-1 and skin, eye, mouth (SEM) disease.

Of the 6 neonatal cases, 4 cases were reported from Queensland, 1 from New South Wales and 1 from Victoria. One had SEM disease, 1 had HSV CNS disease alone and 4 had disseminated disease (all 4 involving CNS symptoms). Five neonatal cases had HSV-1; 1 had HSV-2. There was 1 death in 2016 of a newborn infant with disseminated HSV disease.

Congenital and neonatal varicella

There was 1 notification of a case of congenital varicella reported during 2016, however, we were unable to obtain any further information about this case from the reporting clinician who was not the primary clinician caring for this child. The last case of congenital varicella reported to the APSU was in 2007. There was one case of neonatal varicella reported from Victoria. The the child required hospitalisation for 6 days and was treated with aciclovir.

Juvenile onset recurrent respiratory papillomatosis

There was 1 probable case of JoRRP reported in 2016 from Queensland; this case is currently awaiting confirmation via histopathology. During the total study period (2011 – 2016) there have been 21 notifications, with detailed clinical data available for 20 (95%) cases. Of the 20 completed case reports there were four duplicate reports and one error. Of the remaining 15 notifications there were 10 confirmed and 4 probable cases: 6 confirmed and 1 probable case in 2012; 2 confirmed and 1 probable 2013; 1 confirmed and 1 probable case in 2014; and 1 confirmed and 1 probable case in 2015. The data suggest a decline in JoRRP cases seen in Australia likely associated with the introduction of the National HPV Vaccination Program in 2007, and these results have been published in the The Journal of Infectious Diseases together with an expert editorial[7,8].

Severe complications of influenza

There was a decrease in the number of notifications of children admitted to hospital with serious complications of influenza reported to the APSU in 2016 (n=32) compared to 2015 (n=84). In 2015 the majority of cases were due to influenza B while influenza A was the most common strain detected in 2016. Of the 32 case reports, 3 were duplicates and 1 was an error. Of the 28 confirmed cases, 14 were from New South Wales, 8 from Queensland, 4 from Victoria, 1 from Western Australia and 1 from South Australia. Half of the children identified as Caucasian (54%), 1 child identified as Aboriginal or Torres Strait Islander.

The most commonly reported strain in 2016 was Influenza A (n=27), 1 child had Influenza B. Serious complications included pneumonia (n=11), seizures (n=2), laboratory proven bacterial co-infection (n=2) and encephalitis (n=2).

In 2016, 17 (61%) children required an ICU admission and no deaths were reported. Of the 28 children, 12 were previously healthy, while 16

had chronic pre-disposing conditions including asthma, chronic lung disease, neuromuscular conditions and congenital heart disease.

Only 1 of the 28 children was vaccinated for influenza within the last 12 months. Of the children with a chronic pre-disposing condition, who are recommended and eligible for a free vaccine under the National Immunisation Program, only 1 child was vaccinated. An increased awareness among parents and clinicians of the importance of influenza vaccination in this high risk group is required.

Microcephaly

Microcephaly surveillance commenced in June 2016. APSU clinicians were asked to report any child < 12 months of age with microcephaly when the occipito-frontal head circumference (OFC) is more than two standard deviations (<3rd percentile) below the mean for age and gender according to standard growth charts, with adjustment for gestational age. There were 37 notifications from June to December 2016. Of the 37 notifications there were 21 confirmed cases (57%), eight outside case definition (22%), 1 administrative error (2%) and 7 (19%) case report forms were not returned. Of the confirmed cases, 14 were from New South Wales, 3 from Victoria, 2 from Queensland, 1 from Western Australia and 1 from the Northern Territory. A third of children (29%) identified as Caucasian, one third identified as Asian (29%) and 1 child identified as Aboriginal or Torres Strait Islander.

In half of the children (n=10) were diagnosed with microcephaly was detected during the neonatal period (<30 days old), in another 10 it was detected later (>31 days old) and 1 child was diagnosed with microcephaly in-utero. In most cases (67%) the definitive cause of microcephaly was unknown and children were undergoing investigations to determine the cause. Identified causes included single gene defects (20%), congenital cytomegalovirus (5%), severe CNS trauma, ischaemic or haemorrhagic stroke (5%) and severe deprivation including malnutrition, or placental insufficiency (5%). A follow-up of confirmed cases at six months is currently being undertaken to obtain a confirmation of the cause of microcephaly where available. No children were identified as having Zika virus-associated microcephaly.

We conducted a 10-year retrospective medical record audit of microcephaly cases that presented to the Children's Hospital at Westmead. Using the ICD-10AM code for microcephaly (Q02) we identified 102 potential cases which had Q02 assigned as the primary ICD-10AM code. Of the 102 cases, 78 met case definition criteria, 22 were coded inappropriately as the OFC was not less than the 3rd percentile. Ten (12.8%) had a confirmed congenital infection – nine CMV and one had both CMV and HSV. The microcephaly was attributed to a chromosomal anomaly or a single gene defect in 24(30.7%). This current analysis is limited to the primary ICD-10 code and will be expanded to cases for which the Q02 ICD-10AM code had been assigned as one of the first three codes for each case.

Conclusions and future directions

The APSU has been facilitating active surveillance of uncommon rare childhood diseases for twenty-four years. Last year, the Department of Health requested that APSU introduce surveillance for microcephaly. This rare condition is often associated with symptoms of neurological impairment including seizures and may also be associated with developmental delay, intellectual impairment, problems with vision, hearing and feeding. Microcephaly is of current interest due to the proven relationship between maternal Zika virus infections during pregnancy and certain congenital abnormalities including microcephaly.

The APSU continues to lead the way in rare disease epidemiological research and provides valuable data on diagnosis, treatment and outcome for infectious and vaccine preventable conditions in Australian children. The APSU continues to be a vital resource to gather information on new and emerging conditions such as congenital Zika virus infection, through microcephaly surveillance. The data collected through the APSU contribute significantly to the national surveillance effort, providing valuable information for clinicians, policymakers and the community.

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