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Australian Paediatric Surveillance Unit (APSU) Annual Surveillance Report 2024

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Abstract

Since 1993, the Australian Paediatric Surveillance Unit (APSU) has been conducting prospective national surveillance of rare conditions in Australian children, including communicable diseases and complications of communicable diseases. In 2024, fifteen communicable diseases and complications were under APSU surveillance: acute flaccid paralysis (AFP); congenital cytomegalovirus (cCMV) infection; dengue; severe acute hepatitis; neonatal/infant herpes simplex virus (HSV) infection; perinatal exposure to human immunodeficiency virus (HIV); paediatric HIV infection, juvenile-onset recurrent respiratory papillomatosis (JoRRP); severe complications of influenza (Flu); Japanese encephalitis virus infection; paediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2 (PIMS-TS); Q fever; congenital rubella infection/syndrome; congenital varicella syndrome; and neonatal varicella infection. A total of 1,350 paediatricians and other child health specialists received the monthly APSU report card (97% electronically) in 2024. A total of 237 notifications were received, with 174 confirmed as incident cases after excluding duplicates, errors and prevalent (historic) cases not previously reported. The incident cases included: Flu (n = 34) – one child died and only two children had received influenza vaccination; JoRRP (n = 1); NVI (n = 1); cCMV (n = 26); HSV (n = 8) – neurological sequelae were common; perinatal exposure to HIV (n = 15) – no cases of mother-to-child transmission identified; and rare emerging diseases dengue (n = 4) and PIMS-TS (n = 2). The non-polio AFP rate of ≥ 1 case per 100,000 children aged < 15 years was again achieved. The APSU continues to be an important mechanism for obtaining enriched data on rare communicable diseases and their complications in Australian children, to better understand disease burden, and the effects of health interventions, over time.

Keywords: Australia; child; communicable diseases; emerging infectious diseases; population surveillance; rare diseases

Introduction

For over 30 years, the Australian Paediatric Surveillance Unit (APSU) has conducted prospective national surveillance of rare childhood conditions, including rare genetic and neurological diseases, uncommon injuries, allergies, adverse reactions to medications, and rare communicable diseases and complications,[1] the latter of which are the focus of this report. In 2024, the APSU conducted surveillance of 15 communicable diseases and complications: acute flaccid paralysis (AFP); congenital cytomegalovirus (cCMV); dengue; severe acute hepatitis (SAH); neonatal/infant herpes simplex virus (HSV) infection; perinatal exposure to human immunodeficiency virus (HIV); paediatric HIV infection; juvenile-onset recurrent respiratory papillomatosis (JoRRP); severe complications of influenza (Flu); Japanese encephalitis virus (JEV) infection; paediatric inflammatory multisystem syndrome temporally associated with SARS-Cov-2 (PIMS-TS); Q fever; congenital rubella infection/syndrome; congenital varicella syndrome (CVS); and neonatal varicella infection (NVI).

In this report, we describe the 2024 findings for each communicable disease and complication under surveillance, including frequency, incidence or birth prevalence estimates, demographic and clinical characteristics, risk factors, treatment or management, and outcomes; and we provide measures of clinician reporting.

Methods

Surveillance method

In brief, during 1 January to 31 December 2024, a report card listing up to 18 rare conditions, including the 15 communicable diseases and complications described in this report, was either emailed (97%) or mailed as a paper copy (3%) each month to approximately 1,350 paediatricians and other child health specialists ('APSU Contributors') registered with the APSU. Contributors were asked to reply to the card and indicate whether they had seen a child(ren) with one or more of the conditions listed or to reply with 'nothing to report' if they had not, to enable measures of clinician reporting to be calculated. If Contributors had seen a case(s), they were asked to complete a case report form (CRF) for each child, either online using the REDCap data capture system,[i] hosted by the University of Sydney, or in paper format. Detailed case definitions for each of the communicable diseases and complications described in this report are presented in Appendix A, Table A.1.

The CRF requested minimal patient identifiers (initials and date of birth) to identify duplicate reports and information on patient demographics, symptoms and clinical characteristics, diagnosis, treatment and management, outcomes, and risk factors. Data from paper CRFs were entered in REDCap by APSU staff and all data were extracted into MS-Excel files and patient identifiers removed before analysis. APSU Contributors were provided with a pdf copy of the CRF in REDCap format for their records and were contacted if any data were missing or unclear.

All cases were classified by the individual study investigators/clinical advisory group as either 'confirmed' (including definite and probable classifications for the cCMV, dengue, Q fever, PIMS-TS, JoRRP, congenital rubella and congenital varicella studies, which were aggregated); 'duplicate'; 'error' (e.g., outside case definition, administrative error, missing CRF or insufficient data provided to confirm); or 'prevalent' (historic cases not previously reported). AFP cases were classified by the polio expert panel (PEP) according to specialised case classifications as 'non-polio AFP', 'polio-compatible AFP', or 'poliomyelitis'.[4]

Overarching ethics approval was obtained for the AFP, CMV, dengue, SAH, HSV, severe complications of influenza, JEV, PIMS-TS, Q fever, JoRRP, rubella, CVS and NVI surveillance studies from the Sydney Children's Hospitals Network Human Research Ethics Committee (HREC) (approval number 2020/ETH03310). Ethics approval for the perinatal exposure to HIV and paediatric HIV studies was obtained from The University of New South Wales HREC (approval number HC210300).

Calculation of incidence and birth prevalence estimates

For each childhood disease and complication under surveillance, incidence or birth prevalence estimates per annum, with 95% confidence intervals (95% CI), were calculated using standard formulae; this calculation was performed only when reported case numbers for 2024 were ≥ 10. Population denominators were obtained from the Australian Bureau of Statistics:[5] < 15 years for the AFP, JoRRP, severe influenza and Q fever studies, < 16 years for the dengue and paediatric HIV studies, < 17 years for the severe acute hepatitis study, < 18 years for the JEV infection study, and < 19 years for the PIMS-TS study; numbers of live births were obtained from the Australian Institute for Health and Welfare[6] for the cCMV, HSV, perinatal exposure to HIV, congenital rubella, CVS and NVI studies.

i REDCap (Research Electronic Data Capture)[2,3] is a secure, web-based software platform designed to support data capture for research studies, providing 1) an intuitive interface for validated data capture; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for data integration and interoperability with external sources.

Results

Representativeness of clinician reporting and response rates

APSU Contributors who received the monthly report card in 2024 worked in every Australian state and territory, and their distribution approximately matched the state/territory population of children aged < 15 years (data not shown). Contributors reported cases from inpatient and outpatient settings and from urban, regional, and locations.

The annual response rate to the monthly report card by APSU Contributors in 2024 (including case notifications and 'nothing to report' responses) was 78%, which was lower than the 2023 and 2022 response rates of 80% and 81% respectively.[7,8]

Summary of notifications, confirmed cases and annual incidence/birth prevalence estimates

A total of 237 notifications was received by the APSU in 2024, comprising 174 confirmed, definite and probable cases (aggregated); 23 prevalent (historic) cases not previously reported; 24 duplicate reports; and 16 errors (outside case definition, insufficient data to classify, or CRF not completed). A detailed breakdown of case numbers is presented in Appendix A, Table A.2. It should be noted that the reporting period for AFP cases is the date of symptom onset, rather than the date of notification receipt, consistent with reporting of AFP cases by the National Enterovirus Reference Laboratory (NERL) (cases ascertained by APSU and NERL) and the Paediatric Active Enhanced Disease Surveillance (PAEDS) surveillance mechanisms to the World Health Organization (WHO).[9]

A summary of confirmed case numbers, study duration and annual incidence or birth prevalence estimates for each communicable disease or complication under surveillance for 2024, and for the total study period, is presented in Table 1.

Demographic, clinical, management, risk and outcome data

Table 2 presents summaries of data received on the CRF by the APSU in 2024 on demographics, clinical features, treatment/management, risk factors, and outcomes of confirmed cases for each communicable disease and complication.

Trends in disease incidence for each disease and complication, including comparisons to historical trends, and recent outputs containing APSU data are presented in the text below.

Table 1: Confirmed cases identified by APSU surveillance during the period 1 January – 31 December 2024 and for the total study period, and estimated incidence or birth prevalence per 10^5 children of the relevant population/age per annum, by communicable disease or complication

Communicable disease or disease complication	Surveillance study date of commencement	Confirmed cases for 2024 (1 January – 31 December)	Incidence or birth prevalence estimate per 10^5 per annum and 95% CI for 2024[a,b]	Confirmed cases for the whole study period to 31 December 2024	Incidence or birth prevalence estimate per 10^5 per annum for the whole study period to 31 December 2024[a,b]
Acute flaccid paralysis	March 1995	81[c,d]	1.69 [1.36–2.10][e]	1,490[c,d]	1.16 [1.10–1.22][e]
Congenital cytomegalovirus	January 1999	26[f]	8.77 [5.94–12.88][g]	611[f]	8.14 [7.52–8.81][g]
Dengue	February 2022	4[f]	—	8[f]	—
Severe acute hepatitis	September 2022	4	—	18	0.11 [0.07–0.18][h]
Neonatal and infant herpes simplex virus	January 1997	6	—	263	3.28 [2.91–3.70][g]
Perinatal exposure to HIV	May 1993	15	5.06 [3.05–8.39][g]	1,033	11.42 [10.74–12.14][g]
Paediatric HIV infection	May 1993	0	—	102	0.07 [0.06–0.09][i]
Severe complications of influenza[j]	2008 (flu season only)	34	0.71 [0.51–0.99][e]	822	1.07 [1.00–1.14][e]
Japanese encephalitis virus infection	May 2023	0	—	0	—
PIMS-TS[k]	February 2023	2[f]	—	7[f]	—
Q fever	February 2022	0	—	3[f]	—
Juvenile-onset recurrent respiratory papillomatosis	September 2011	1[f]	—	24[f]	0.04 [0.03–0.06][e]
Congenital rubella infection/syndrome	May 1993	0	—	54[f]	0.60 [0.46–0.78][g]
Congenital varicella syndrome	May 2006	0	—	4[f]	—
Neonatal varicella	May 2006	1	—	33	0.58 [0.41–0.81][g]

a Incidence estimate or birth prevalence were not calculated for case numbers < 10, as they were deemed to be inaccurate.

b 95% CI: 95% confidence interval.

c Includes all cases of acute flaccid paralysis (AFP) reported via the APSU/National Enterovirus Reference Laboratory (NERL) and PAEDS surveillance systems. All cases were classified by the Polio Expert Panel (PEP) as 'non-polio AFP' according to World Health Organization criteria.[9,10]

d Note: the reporting period for AFP case notifications is that the date of symptom onset occurs within the calendar year rather than date of notification receipt, in line with NERL reporting of AFP cases ascertained by APSU/NERL and PAEDS surveillance systems to WHO.[9]

e Based on population of children aged < 15 years.[5]

f Includes both definite and probable cases.

g Based on number of live births.[6]

h Based on population of children aged < 17 years.[5]

i Based on population of children aged < 16 years.[5]

j Influenza surveillance was conducted each year during the influenza season, from July to September (inclusive) for 2008 and 2010–2015; June to October (inclusive) in the 2009 H1N1 influenza pandemic year; June to September (inclusive) 2016–2019 and 2022; and May to September (inclusive) in the 2020–2021 SARS-CoV-2 coronavirus pandemic years, and in 2023 and 2024.

k PIMS-TS: paediatric inflammatory multisystem syndrome temporarily associated with SARS-CoV-2.

Table 2: Demographic, clinical, management characteristics, risk factors and outcomes of confirmed cases reported to the APSU during the period 1 January – 31 December 2024, by communicable disease and complication of communicable disease

Communicable disease or complication	Case definition (in brief)	Demographics, clinical features, management, risk factors and outcomes[a]
Acute flaccid paralysis[b,c]	Any child aged < 15 years with acute flaccid paralysis in one or more limbs or acute onset of bulbar paralysis	• Of 98 notifications, 81 were confirmed as non-polio AFP cases[b] and were reported from Vic. (37), NSW (19), Qld (15), WA (7), SA (2), and ACT (1). No cases were reported from Tas. or NT and five cases were Indigenous. • The most common diagnoses assigned by the PEP[b] for the non-polio AFP cases were Guillain-Barré syndrome in 34 children, acute disseminated encephalomyelitis in 12, transverse myelitis in 11, and tick bite paralysis in five children. Two children had acute flaccid myelitis. • 'Adequate' stool samples, which the WHO defines as two stool samples collected at least 24 hours apart and within 14 days of onset of paralysis in ≥ 80% of cases[10] were collected from 57/81 children with confirmed AFP (70%).
Congenital cytomegalovirus	Any child from whom CMV is isolated in the first three (3) weeks of life (confirmed case) or up to 12 months of age (probable case)	• Of 57 notifications, 26 were confirmed as cases (25 definite and one probable), and 21 were prevalent cases diagnosed in 2023 and 2022. Cases were reported from NSW (9), Qld (9), WA (3), NT (2), Tas. (2), and ACT (1), and three were Indigenous. • cCMV was most frequently diagnosed by urine polymerase chain reaction (PCR) in 20/26 cases. Of the cases, 18 (69%) were symptomatic, with the most common clinical conditions being small for gestational age (n = 10), jaundice (n = 7), thrombocytopenia (n = 7), petechiae or purpura (n = 6), microcephaly (n = 6), and hepatitis (n = 3). Hearing impairment was diagnosed in 10/24 children (42%) and was sensorineural in five children. • Eleven infants who had moderate to severe cCMV symptoms, including neurological symptoms, received antiviral treatment with valganciclovir or ganciclovir according to current recommendations,[11–13] and no infants died. • A symptomatic illness suggestive of maternal CMV infection was reported during pregnancy in six of 15 mothers (40%) for whom these data were available. A positive immunoglobulin G (IgG) and/or IgM for CMV infection was reported in 16 mothers.

Communicable disease or complication	Case definition (in brief)	Demographics, clinical features, management, risk factors and outcomes[a]
Dengue	Any child aged < 16 years with laboratory definitive (confirmed case), or suggestive (probable case) evidence of dengue, and clinical evidence of dengue	• Four notifications were received and confirmed as definite cases in non-Indigenous children from WA (3) and SA (1). • Clinical symptoms at presentation included fever, vomiting, rash, itchiness, headache, retro-orbital pain, severe abdominal pain, myalgia/arthralgia joint pains, nausea and diarrhoea. All children were hospitalised, and none required intensive care. Complications included sepsis and shock in one child, and bacterial co-infection with *Escherichia (E.) coli* in two children. • One child each had dengue serotype DENV-2 and DENV-3, and the serotype was not documented for the other children. • All children received supportive therapies (intravenous fluids, pain relief). Four children received antibiotics: two with *E. coli* urinary tract infection (cephalexin), one with sepsis and shock (cefotaxime, vancomycin) and one with hepatomegaly (doxycline, ceftriaxone). One child received an antihistamine. • No child had a previous history of dengue but one had an underlying medical condition. All children had recently travelled to countries outside of Australia where dengue is known to be endemic. • All children had been discharged at the time of reporting with no ongoing problems.
Severe acute hepatitis	Any newly diagnosed case of severe acute hepatitis of any aetiology in any child aged < 17 years	• There were four notifications, all confirmed as cases, from Vic. (2), NSW (1), and Qld (1), and none were Indigenous. None of the children were known to have travelled overseas during the previous six months. • All children were hospitalised, and one child was admitted to the intensive care unit. Clinical symptoms at presentation included fever, jaundice, abdominal pain, fatigue, loss of appetite, rash, dark urine, nausea and vomiting. • The final diagnoses were viral hepatitis, drug (paracetamol)-induced hepatitis, Kawasaki disease, and presumed gestational alloimmune liver disease. • Two children recovered, one child was discharged (had an underlying medical condition) and one child died.

Communicable disease or complication	Case definition (in brief)	Demographics, clinical features, management, risk factors and outcomes[a]
Neonatal and infant herpes simplex virus	Any neonate or infant aged < 3 months of age (regardless of gestation) with laboratory confirmation of HSV infection *and* with either clinical evidence of HSV infection *or* laboratory confirmation of maternal perinatal HSV infection in an asymptomatic infant	• Of eight notifications, six were confirmed cases, and all were neonates (aged < 28 days). • Cases were reported from NSW (4), Qld (1), and ACT (1), and one child was Indigenous. All children were born in Australia. • Three cases were classified with central nervous system (CNS) disease, one of whom also had skin, eye, mouth (SEM) disease. Two had disseminated disease (both had CNS involvement), and one had SEM disease. All cases tested positive for HSV-1 infection. • All six cases received aciclovir and all survived. Three were prescribed antiviral therapy to prevent recurrences of HSV infection. • All infants survived. Four infants had no obvious short-term sequelae, and this information was not recorded for the remaining two infants. However, two infants with HSV-1 CNS disease alone had abnormal brain imaging results, and one also had an abnormal electroencephalogram result. • One mother had genital herpes before (and during) the pregnancy, while another mother and two fathers had a known history of non-genital herpes.
Perinatal exposure to HIV	Any infant born to a woman with diagnosed HIV infection, including by *in utero* exposure or through breastfeeding	• Of 20 notifications, 15 were confirmed as cases and one was a prevalent case who was born and first tested for HIV in 2023. Cases were reported from NSW (10), Qld (4), and Tas. (1), and none were Indigenous. • Of the children, 13/15 were born in Australia. At their most recent test, 14 infants were HIV negative, and one infant had an HIV indeterminate test result. Follow-up of these infants will be conducted at 18 months to retest for HIV infection, in accordance with clinical recommendations.[14] • Ten infants received antiretroviral therapy and 11 received prophylactic antiviral treatment after birth. • A separate CRF was completed for 11 mothers of the 15 infants confirmed as cases. Five mothers were born outside Australia, eight were diagnosed with HIV antenatally, but the time of diagnosis was not known for three. All mothers received antiretroviral therapy during pregnancy. Most infants (7/11) were delivered by elective caesarean section, two by emergency caesarean, and one vaginally. Breastfeeding was avoided for all 11 infants.
Paediatric HIV infection	Any child aged < 16 years at diagnosis of HIV infection in Australia	• There were no notifications of paediatric HIV infection during the 2024 reporting period.

Communicable disease or complication	Case definition (in brief)	Demographics, clinical features, management, risk factors and outcomes[a]
Severe complications of influenza	Any child aged < 15 years with laboratory confirmed influenza admitted to hospital with severe complications	• During seasonal influenza surveillance (1 May to 30 September 2024), there were 38 notifications, of which 34 were confirmed as cases of severe complications. Cases were reported from NSW (19), Vic. (9), WA (3), Qld (2), and SA (1), and one child was Indigenous. • Of the 34 children, 18 (53%) were aged < 5 years and nine (26%) were aged 5–9 years. Four children (12%) were admitted to intensive care unit. • Influenza A was laboratory-confirmed in 33 children (97%) and influenza B in one child. Influenza A H3N2 subtype was recorded for nine children and H10N9 subtype for one child. • The most common presenting symptoms were fever, cough, shortness of breath and malaise/lethargy. Twenty-eight different severe complications were recorded; most commonly pneumonia in 16 children (47%), seizures in eight (24%), shock requiring fluid resuscitation in seven (21%), acute kidney injury and viral co-infection in five (15%) children each, encephalitis/encephalopathy/meningoencephalitis in three (9%) children and hepatitis in three (9%) children. The most common viral co-infection was respiratory syncytial virus in 3/5 children. • Of the children, 16/34 (47%) received oseltamivir and one received peramivir antiviral treatment. Twenty-seven of 32 children (84%) received antibiotics. • Only two children (6%) were previously vaccinated against seasonal influenza, 14 (41%) were not vaccinated, and vaccination status was unavailable for 16 children. • Twenty-three (68%) children were previously healthy and 11 (32%) had an underlying medical condition that predisposes to severe influenza complications, most commonly genetic disorders (4 children), asthma (3), neurodevelopmental delay (2) and prematurity (2). • Two children had previously contracted COVID-19 (in 2021 and in 2024, respectively), and one child was hospitalised. Two children had each received two doses of a COVID-19 vaccine, six were unvaccinated, and COVID-19 vaccination status was unavailable for 26 children. • One child reported with severe complications of influenza died, and two children were still in hospital at the time of reporting.
Japanese encephalitis virus infection	Any child aged <18 years with: acute onset of symptoms consistent with Japanese Encephalitis OR • later stage symptoms/signs AND • Laboratory confirmation of JEV infection	• There were no notifications of Japanese encephalitis virus (JEV) infection in 2024.

Communicable disease or complication	Case definition (in brief)	Demographics, clinical features, management, risk factors and outcomes[a]
PIMS-TS[d]	Any child aged < 19 years with fever ≥ 3 days AND two of the following: • Rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs. • Age specific hypotension or "shock" within first 24 hours of presentation. • Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities. • Evidence of coagulopathy. AND • Elevated markers of inflammation. AND • Exclusion of other infectious causes of inflammation. AND • Evidence of SARS-CoV-2 infection OR contact with a confirmed COVID-19 case	• Of three notifications, two were confirmed as definite cases, from Vic. (1) and WA (1), and none were Indigenous. • Clinical symptoms included: fever (≥ 38 °C), rash, vomiting, abdominal pain, diarrhoea, joint/muscle pain, headache, conjunctival injection, age specific hypotension, mucosal changes (strawberry tongue, red lips, pharyngeal erythema), peripheral cutaneous inflammation signs (hands and feet), lymphadenopathy, and shock. • Both children were hospitalised, neither were admitted to intensive care unit, and both had laboratory evidence of recent or previous infection with SARS-CoV-2. One child had an underlying medical condition, and only one child received a COVID-19 vaccine. • Both children received treatment with antibiotics, corticosteroids and aspirin. In addition, one child received intravenous immunoglobulin, and one child received immunosuppressive and anti-inflammatory pain relief treatments. One child also received supportive therapy with oxygen. • Both children survived and were discharged at the time of reporting.

Communicable disease or complication	Case definition (in brief)	Demographics, clinical features, management, risk factors and outcomes[a]
Q fever	Any child aged < 15 years who has either: • Confirmed acute Q fever (by laboratory confirmation) OR • Probable acute Q fever (laboratory evidence, plus clinical presentation compatible with acute Q fever) OR • Chronic Q fever (laboratory confirmation, plus clinical presentation consistent with chronic Q fever)	• There was one notification, which was classified as an error outside of the case definition (age was > 15 years).
JoRRP[e]	Any infant or child aged < 15 years diagnosed JoRRP confirmed by endoscopy of the larynx and by histology. Probable case: as above but without histological confirmation	• There were three notifications including one definite case, one prevalent case diagnosed in 2021, and one error (aged ≥ 15 years at the time of diagnosis by histology in 2024). It is to be noted that this case had previously been diagnosed overseas at age nine by direct visualisation so could be considered an imported childhood case of JoRRP. • The confirmed 2024 incident case was reported from Qld, born in Australia and not Indigenous. • Clinical symptoms at presentation included stridor and dyspnoea. Diagnosis of JoRRP was made by histology. HPV genotypes were not detected. • The child was treated with debulking surgery and symptoms had resolved at the time of reporting. • The child's mother had not received an HPV vaccine.
Congenital rubella infection/ syndrome	• Confirmed case: any infant with laboratory definitive evidence (fetal or infant) AND clinical evidence (live or stillborn infant) with or without compatible defects. • Probable case: epidemiological evidence of infection in pregnancy AND laboratory suggestive evidence (in an infant).	• There were no notifications of congenital rubella infection or syndrome in 2024.

Communicable disease or complication	Case definition (in brief)	Demographics, clinical features, management, risk factors and outcomes[a]
Congenital varicella	Any stillbirth, newborn infant, or child up to the age of 2 years, who has definite or suspected congenital varicella infection, with or without defects	• There were no notifications of congenital varicella in 2024.
Neonatal varicella	Any infant who has neonatal varicella based on history, clinical and/or laboratory findings in the first month of life (without features of congenital varicella syndrome).	• There was one notification, which was confirmed as a case. The infant was born in Australia and reported from WA and was not Indigenous. • The infant presented with skin lesions and was diagnosed with varicella infection by PCR testing. • The infant was hospitalised and received aciclovir antiviral therapy and was discharged with no ongoing problems. • The infant had a history of postnatal contact with a family relative who had varicella infection, but their vaccination status was unknown.

a ACT: Australian Capital Territory; NSW: New South Wales; NT: Northern Territory; Qld: Queensland; SA: South Australia; Tas.: Tasmania; Vic.: Victoria; WA: Western Australia.

b Includes all cases of acute flaccid paralysis (AFP) reported via the APSU/National Enterovirus Reference Laboratory (NERL) and PAEDS surveillance systems. All cases have been classified by the Polio Expert Panel (PEP) as 'non-polio AFP' according to World Health Organization criteria.[9,10]

c Note: the reporting period for AFP case notifications is that the date of symptom onset occurs within the calendar year, rather than the date of notification receipt, in line with NERL reporting of AFP cases ascertained by APSU/NERL and PAEDS surveillance systems to WHO.[9]

d PIMS-TS: paediatric inflammatory multisystem syndrome temporarily associated with SARS-Cov-2.

e JoRRP: juvenile-onset recurrent respiratory papillomatosis.

Acute flaccid paralysis

For the past 30 years (for the past 18 years in conjunction with the PAEDS network), the APSU has conducted surveillance of acute flaccid paralysis (AFP) at the request of the Australian Government and has contributed to achieving and maintaining Australia's 'polio-free' status since 2000.[15]

In 2024, the annual incidence of 1.69 non-polio AFP cases per 100,000 children aged < 15 years met the minimum surveillance target, set by the WHO, of one AFP case per 100,000 children in this age group.[10] Of the 2024 AFP cases, 20 were notified using the APSU case report form, and seven of these cases were confirmed. These confirmed cases were reported from hospitals outside of the eight hospitals where the PAEDS network operated and therefore would have been missed by using PAEDS surveillance alone. Eleven cases were duplicated by PAEDS surveillance. The receipt of duplicate reports is indicative of the effectiveness of AFP case ascertainment by both surveillance systems.

Since AFP surveillance commenced in 1995, a total of 1,490 confirmed non-polio AFP cases have been reported, with the WHO target annual incidence of ≥ 1 non-polio AFP case per 100,000 children consistently met each year since 2008.[9]

AFP data collected by the APSU were published in the Australian National Enterovirus Reference Laboratory annual report 2023,[9] and in the WHO Western Pacific Polio fortnightly bulletins.[16] AFP data collected by the APSU also contribute to Australia's annual polio-free certification by the WHO in the Western Pacific region.[17,18]

A capture-recapture study conducted in 2024, of AFP ascertainment in the Australian Capital Territory (ACT) by the APSU versus hospital medical records, indicated under-reporting of cases to the APSU.[ii] This led to efforts to promote the importance of reporting AFP and increased engagement with the APSU by paediatricians in the ACT.

Congenital cytomegalovirus infection

A total of 611 cases has been reported to the APSU since surveillance of congenital cytomegalovirus (cCMV) commenced in 1999, which is the longest running prospective surveillance study of cCMV internationally. Overall annual birth prevalence estimates have remained unchanged for the last decade,[19] and a high proportion of cases among children have been diagnosed with hearing loss resulting from CMV infection.[20]

In 2024, a manuscript describing 25 years of APSU cCMV data collected between January 1999 and January 2024 was prepared.[iii]

Dengue

In 2024, there was a doubling in the number of dengue cases (n = 4) reported to the APSU compared with 2023,[7] bringing the total number of confirmed cases to eight. Cases have been reported each year since surveillance commenced in 2022.[7,8] Notably, all children had travelled to countries known to be endemic for dengue before infection.[7,8] According to the WHO, the global burden of dengue has significantly increased during the past five years.[21]

A systematic review and meta-analysis conducted by the APSU in 2024 showed that the global seroprevalence of dengue in children and adolescents aged < 20 years was widespread across endemic regions.[iv]

ii S Alland et al, manuscript in press.

iii E Egilmezer et al, manuscript in press.

iv Nunez C, Eslick GD, Teutsch S, Khandaker G, Elliott EJ. Global burden of dengue in paediatric and adolescent populations: a systematic review and meta-analysis. *Infectious Dis*. (Accepted).

Severe acute hepatitis

Since APSU commenced surveillance for severe acute hepatitis (SAH) in February 2022, in response to the global outbreak of severe hepatitis of unknown aetiology in children in early 2022,[22,23] a total of 18 confirmed cases of severe hepatitis of any cause have been reported, including six in 2023[7] and eight in 2022.[8] Most cases (11/18) received a final diagnosis of viral hepatitis; however, the cause of hepatitis was not determined in two cases reported in 2022.[8]

Neonatal and infant herpes simplex virus infection

A total of 263 confirmed cases of neonatal and infant herpes simplex virus (HSV) infection has been reported to the APSU since surveillance commenced in January 1997, in the longest running prospective surveillance study of neonatal HSV internationally. Overall, annual HSV birth prevalence estimates have remained unchanged in the last decade.[19] Neurological HSV disease occurred in most cases reported in 2024 and it is concerning that only half of these infants were prescribed antiviral therapy to prevent recurrences of HSV infection, which has been recommended.[14]

In 2024, an analysis of 25 years of APSU neonatal HSV study data was conducted and presented by study investigator Angela Berkhout at the Australasian Society for Infectious Diseases Annual Scientific Meeting and the Annual Meeting of the European Society for Paediatric Infectious Diseases (ESPID), showing that incidence had not appreciably changed but mortality had decreased.[v]

Perinatal exposure to HIV and paediatric HIV infection

A total of 1,033 confirmed cases of perinatal exposure to human immunodeficiency virus (HIV), and 102 confirmed cases of paediatric HIV, have been reported since APSU surveillance commenced in 1993.

Case numbers of perinatal exposure to HIV reported in 2024 (15) were similar to those reported in 2023 (18)[7] and 2022 (20).[8] In 2024, data was available on 11 of 15 mothers who had been diagnosed antenatally; five were born in countries where HIV is known to be endemic. Our findings confirmed a high uptake of interventions by mothers in 2024 that have been shown to reduce the risk of mother-to-child transmission (MTCT) of HIV, including breastfeeding avoidance and anti-retroviral therapy in exposed newborn infants.[24] Most mothers (64%) gave birth via elective Caesarean section, which has been shown to reduce risk of MTCT.[24]

Cases of paediatric HIV during > 30 years of surveillance have significantly decreased, with most new cases imported from countries where HIV is endemic.[8] No cases of MTCT were identified in 2024; however, final HIV infection status cannot be determined until all children are tested 18 months after initial testing.

APSU surveillance data of perinatal exposure to HIV and paediatric HIV are routinely reported in the Australian Annual Surveillance Report on HIV, viral hepatitis and sexually transmissible infections,[25] and were also presented as a poster entitled 'Evaluating progress towards elimination of vertical transmission of HIV in Australia' at the Australasian Society for HIV Medicine (ASHM) HIV & AIDS Conference, 17 September 2024, Sydney, Australia by Laila Khawar (Kirby Institute), on behalf of all study investigators.[vi]

v A Berkhout et al, manuscript submitted.

vi L Khawar et al, manuscript in preparation.

Severe complications of influenza

As in 2023, APSU surveillance of seasonal influenza in 2024 commenced in May, one month earlier than previously, to capture cases seen by APSU Contributors before the usual start of the winter season.[7] This concurs with the observation of an earlier commencement of influenza seasons in Australia since the COVID-19 pandemic.[26]

Fewer cases of severe influenza were reported in 2024 (34) than in 2023 (65);[7] however, the total was higher than in 2022 (27)[8] and in the 2020 and 2021 COVID-19 pandemic years, when no cases were reported.[27,28] In 2024, a large number of severe influenza complications were reported (> 25) and all children, except one, had Influenza A (see Table 2), in contrast to 2023 when the majority of children had Influenza B.[7] One child died and only two (6%) children had received a seasonal influenza vaccine (see Table 2). Moreover, most children (> 65%) were previously healthy.

Since APSU surveillance of severe influenza commenced in 2008, a total of 822 confirmed cases have been reported, with the majority (631 or 77%) reported from hospitals where PAEDS surveillance does not operate, or did not operate at the time of APSU reporting.

Japanese encephalitis virus (JEV) infection

No cases of JEV in children and adolescents have been reported to the APSU since surveillance commenced in May 2023[7] in response to the 2022 outbreak of JEV, which was the first on mainland Australia and the first to affect the south-eastern states.[29,30]

Paediatric inflammatory multisystem syndrome temporally associated with SARS Cov-2 (PIMS-TS)

APSU surveillance of PIMS-TS commenced in 2023, as part of a national collective of reporters, which is coordinated by the PAEDS. In 2024, two cases of PIMS-TS (both definite) were reported to the APSU, and both were duplicated by PAEDS surveillance (see Table 2). In comparison, five PIMS-TS cases (four definite and one probable) were reported in 2023 and two of these cases were duplicated by PAEDS surveillance.[7] Of the seven children reported to the APSU in 2023–2024, only three children had received a COVID-19 vaccine. A total of 21 cases of PIMS-TS were reported nationally through APSU and/or PAEDS surveillance systems in 2024.

Q fever

There were no new confirmed cases of Q fever reported in 2024, with only three confirmed cases since APSU surveillance of Q fever commenced in February 2022.[7,8] All resided in or visited rural areas and had contact with large domestic animals.[7,8]

In 2024, a systematic review and meta-analysis was conducted, which showed that global prevalence of Q fever seroprevalence in children and adolescents aged < 20 years was low but occurred in a wide range of geographic regions.[vii]

vii S Teutsch et al, manuscript in preparation.

Juvenile-onset recurrent respiratory papillomatosis

A total of 24 cases of juvenile-onset recurrent respiratory papillomatosis (JoRRP) have been reported since surveillance commenced in late 2011. Cases of JoRRP were reported each year between 2012 and 2017,[31] with case numbers declining from a maximum of seven cases in 2012. This is attributed to increased uptake of universal human papillomavirus (HPV) vaccination in Australia since its introduction in 2007.[31] However, since 2021, new cases have been reported to the APSU each year[7,8,28] The total of seven cases reported since 2021 includes two in 2024, one of whom was an incident case and the other a prevalent case diagnosed in 2023 (see Table 2). These data suggest that gaps persist in HPV vaccination coverage in women of childbearing age. Three of five mothers of the seven JoRRP cases diagnosed since 2021, who had ethnicity data available, originated from countries that have no established universal HPV vaccination programs; however, all mothers were older when free universal HPV vaccination in Australia became available in 2007 under the NIP for those aged 12–26 years.[32]

In 2024, a summary of APSU JoRRP data from 2011–2023 was presented by study investigator Dr Hannah Burns, entitled: 'JoRRP in Australia: an evidence-based success story in eliminating new cases of RRP on the continent', at the thirty-sixth International Papilloma Virus Conference (held in Edinburgh, Scotland, 12–15 November 2024).

Congenital rubella infection and syndrome

There were no new notifications of congenital rubella infection or syndrome reported in 2024.

Since surveillance commenced in 1993, a total of 54 cases has been reported, with no cases reported since 2015,[33] indicating the ongoing success of universal vaccination programs.[34]

Congenital varicella syndrome and neonatal varicella infection

No new cases of congenital varicella syndrome (CVS) were reported to the APSU again in 2024, similar to the previous three years,[7,8,28] with a total of four cases of CVS notified since APSU surveillance of CVS commenced in 2006. However, one new case of neonatal varicella infection (NVI) was reported to the APSU in 2024 for the first time since 2022,[8] with a total of 33 cases reported since APSU surveillance of NVI commenced in 2006. We previously showed a significant decline in CVS and NVI following the introduction of universal varicella vaccination in 2005.[35] However, our present data indicate potential gaps in vaccination coverage in women of childbearing age and their close contacts.

Discussion and conclusions

Since 1993, the APSU has proven to be an important national resource for collecting prospective national data on communicable diseases and complications in order to understand the epidemiology and burden of these conditions, including morbidity and mortality, in Australian children.[1,36] These data have contributed in some instances to identifying the first national estimates of incidence and birth prevalence, monitoring trends over time, assessing the impacts of interventions such as vaccination and new treatments, and to policy and clinical guidelines.[1]

In 2024, key findings from the 15 communicable diseases and complications under surveillance are summarised in the following paragraphs.

Although case numbers of severe complications from seasonal influenza in children in 2024 were not as high as in 2023 when 65 cases were reported, seasonal influenza vaccination uptake was again low, with only two children of the 34 with severe complications recorded as having received a vaccine, despite this vaccine being available fully free under the National Immunisation Program (NIP) for all children aged ≥ 6 months to < 5 years, and for all children aged ≥ 6 months with an underlying medical condition or who are Indigenous.[37] Furthermore, free influenza vaccines were made available by the governments of Queensland and Western Australia in 2024 for all residents aged ≥ 6 months in those states.[38] Given these incentives, 22 of the 34 children (65%) reported to APSU with severe influenza in 2024 would therefore have been potentially eligible to receive free vaccination prior to the 2024 winter season. Our findings concur with national influenza vaccination coverage data collected in 2024 of children aged ≥ 6 months to < 5 years, which was only 26%,[26,39] a proportion which has been decreasing since 2020 when coverage in this age group was > 40%.[40] Strategies to overcome barriers to influenza vaccination of children, by their parents and primary caregivers,[41] will be critical for lifting vaccination coverage in order to reduce the likelihood of complications and deaths in future influenza seasons.

New cases of vaccine preventable JoRRP and NVI were reported, indicating likely gaps in vaccination coverage of women of childbearing age and their close contacts. While no cases of congenital rubella or CVS were reported, continued surveillance of all of these rare vaccine-preventable conditions in children is required to monitor the effectiveness of current vaccination programs. Our finding that mothers of recent JoRRP cases would have been older when free universal vaccination of HPV was introduced in 2007 under the NIP for school-aged adolescents,[32] and again in 2023 as catch-up doses were made available free to those of age up to 26 years,[32] indicates that the effect of universal vaccination may take some years for HPV-related conditions such as JoRRP to be fully eliminated. Our findings also show that varicella vaccination may also need to be recommended and made freely available to non-immune women of child-bearing age and their close contacts rather than only to young children. The National Immunisation Handbook recommends varicella vaccination to non-immune adolescents and adults aged ≥ 14 years, but not for women during pregnancy due to concerns over transmission of the varicella virus from the vaccine to the developing foetus.[42] Non-immune household contacts of pregnant women may be vaccinated though.[42]

In 2024, the WHO expected incidence of ≥ 1 non-polio AFP case per 100,000 children aged < 15 years was again exceeded by combined APSU/NERL and PAEDS surveillance mechanisms.

The annual birth prevalence estimates of neonatal and infant HSV infection and cCMV were again unchanged from previous years. However, neurological sequelae persist in the absence of suitable vaccines, and current management of these diseases is unable to prevent adverse outcomes.

Case numbers for perinatal exposure to HIV were unchanged from previous years. While no new MTCT infections were recorded, ongoing surveillance is required if Australia is to meet the WHO target of elimination of MTCT.[43]

Cases of rare emerging diseases, including dengue and PIMS-TS, were again reported in 2024, indicating the need for ongoing surveillance. No cases of Q fever or JEV were reported. However, in December 2024, the New South Wales Department of Health issued reports of mosquitos found to be infected with JEV near Griffith in regional New South Wales,[44] and the subsequent infection and death of an adult visiting the region in January 2025,[45] indicating the importance of ongoing surveillance.

Cases of severe acute hepatitis were again reported; however, none had unknown aetiology.

Implications

APSU surveillance data reported in 2024 have the following important implications:

- Increasing the uptake of seasonal influenza vaccination in children in 2025 will be critical to reduce the incidence of severe complications resulting from influenza infection, including deaths, in this population group.
- Ongoing monitoring of vaccine-preventable JoRRP, neonatal and congenital varicella and congenital rubella is required, as is expansion of free vaccination for population groups most at risk, such as women of child-bearing age and their close contacts.
- Neurological sequelae from HSV and cCMV (including sensorineural deafness in children with cCMV) continue to occur. These adverse outcomes have not substantially improved over time, and so the long running APSU studies of these diseases are well-placed to assess the effectiveness of any future vaccines and/or adjuvant treatments.
- Eliminating paediatric cases of HIV in Australia via MTCT will require continued screening of women at risk of HIV infection and continued encouraging of expectant mothers diagnosed with HIV to utilise established interventions known to prevent MTCT.
- Case numbers of rare emerging communicable diseases and complications vary, and the APSU is well-place to rapidly implement surveillance of new diseases following for example, outbreaks, to assess the extent, improve health outcomes and clinical care, reduce health inequalities, provide epidemiological insights and inform national strategies of such diseases in Australian children.

Note added in proof

Two submissions identified as 'manuscript in press', in footnotes (ii) and (iii), have now been published. These are:

Alland SE, Britton PN, Thorley B, Hobday L, Kelly M, Fasugba O et al. Staying polio free: A capture-recapture analysis of acute flaccid paralysis surveillance in the Australian Capital Territory. *Aust NZ J Public Health*. 2025;49(5):100281. doi: https://doi.org/10.1016/j.anzjph.2025.100281.

Egilmezer E, Teutsch SM, Nunez C, Hamilton ST, Bartlett AW, Palasanthiran P et al. Birth prevalence, clinical sequelae, and management of congenital cytomegalovirus infections in Australia, 1999–2023: a national prospective study. *Med J Aust. 2025*. doi: https://doi.org/10.5694/mja2.70047.

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Appendix A

Table A.1: Case definitions of APSU communicable diseases and disease complications under surveillance in 2024

Surveillance study	Case definition
Acute flaccid paralysis (AFP)	• Any child aged < 15 years with acute flaccid paralysis in one or more limbs or acute onset of bulbar paralysis • All cases reported through APSU, NERL and PAEDS are reviewed by the polio expert panel (PEP) and classified as: confirmed poliomyelitis; non-polio AFP, polio-compatible or non-AFP. The NERL determines whether there is an infectious cause of AFP including enteroviruses. • The PEP secretariat reports all Australian cases to the World Health Organization (WHO)
Congenital cytomegalovirus (CMV) infection	• Congenital CMV: Any child from whom CMV is isolated in the first three (3) weeks of life, from urine, blood, saliva, or any tissue taken at biopsy • Suspected congenital CMV: any child up to 12 months of age, in whom CMV is isolated from urine, blood, saliva or any tissue taken at biopsy and/or a positive serum IgM is found and in whom clinical features exist that may be due to intrauterine CMV infection • Clinical features associated with congenital CMV infection include prematurity, low birth weight, sensorineural deafness, and other abnormalities such as: encephalitis, microcephaly, developmental delay, seizures, microphthalmia, chorioretinitis, cataracts, hepatitis, hepatosplenomegaly, thrombocytopenia, pneumonitis and myocarditis
Dengue	Children aged < 16 years who are either a: *Confirmed case*: a confirmed case requires laboratory definitive evidence AND clinical evidence: • Laboratory definitive evidence: isolation of dengue virus or detection of dengue virus by nucleic acid testing, detection of dengue non-structural protein 1 (NS1) antigen in blood by EIA, IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre to dengue virus, proven by neutralisation or another specific test or detection of dengue virus-specific IgM in cerebrospinal fluid, in the absence of IgM to Murray Valley encephalitis, West Nile virus/Kunjin or Japanese encephalitis viruses • Clinical evidence: a clinically compatible illness includes fever, headache, arthralgia, myalgia, rash, nausea, and vomiting, with possible progression to severe plasma leakage, severe haemorrhage, or severe organ impairment – CNS, liver, heart or other OR *Probable case*: requires laboratory suggestive evidence AND clinical evidence AND epidemiological evidence OR clinical evidence AND household epidemiological evidence: • Laboratory suggestive evidence: Detection of NS1 antigen in blood by a rapid antigen test (unless dengue NS1 antigen by EIA is negative) or detection of dengue virus-specific IgM in blood. • Clinical evidence: A clinically compatible illness (e.g., fever, headache, arthralgia, myalgia, rash, nausea/vomiting)

Surveillance study	Case definition
Severe acute hepatitis	Any newly diagnosed case of severe acute hepatitis of any aetiology in any child aged < 17 years with: • Acute onset of symptoms consistent with hepatitis (e.g. fever, jaundice, abdominal pain, fatigue, loss of appetite, rash, itch, joint or muscle ache, dark urine, pale-coloured stools, nausea or vomiting); AND • Elevated serum alanine aminotransferase (ALT) OR aspartate aminotransferase (AST) levels (> 500 IU/L); AND • Hepatitis, of known or unknown cause, including infections, drugs, metabolic or auto-immune causes
Neonatal and infant herpes simplex virus (HSV) infection	• Any neonate or infant aged < 3 months of age (regardless of gestation) seen in the last month with laboratory confirmation of HSV infection and with either clinical evidence of HSV infection or laboratory confirmation of maternal perinatal HSV infection in an asymptomatic infant. • Laboratory confirmation is by detection of HSV by PCR in a surface swab, respiratory specimen and/or sterile site (CSF or blood) (or by virus isolation), or by immunofluorescence • Clinical evidence of neonatal HSV infection is one or more of: typical herpetic lesions of the skin, eye or mouth; evidence of disseminated infection (bleeding, bruising or coagulopathy, jaundice or elevated serum bilirubin, hepatosplenomegaly or elevated liver transaminases), pneumonitis (respiratory distress or chest radiograph) or encephalitis (lethargy, seizures, apnoea or abnormalities on neuroimaging or EEG) • Laboratory evidence of maternal perinatal HSV infection is provided by detection of HSV in maternal genital swab and /or mother seroconverted to HSV or IgM positive in pregnancy or early postnatal period
Perinatal exposure to HIV	• Any infant born to a woman with diagnosed HIV infection. Children born to women with HIV infection and who are known to have been exposed to HIV perinatally, by *in utero* exposure or through breastfeeding, should be notified, even if they are subsequently confirmed as HIV antibody negative
Paediatric HIV infection	• Any child aged < 16 years at diagnosis of HIV infection in Australia

Surveillance study	Case definition
Severe complications of influenza	Any child aged < 15 years with laboratory confirmed influenza admitted to hospital with at least one of the following complications: • Pneumonia (confirmed radiologically and/or microbiology) • Acute respiratory distress syndrome (ARDS) • Laboratory proven viral co-infection including COVID-19 • Laboratory proven bacterial co-infection; bacteraemia; septicaemia • Encephalitis / encephalopathy • Seizures (including simple febrile seizure, prolonged or focal seizure or status epilepticus) • Transverse myelitis • Polyneuritis / mononeuritis • Guillain-Barré syndrome • Reye Syndrome • Myocarditis; pericarditis; cardiomyopathy • Rhabdomyolysis • Purpura fulminans • Disseminated intravascular coagulopathy • Shock (requiring > 40 ml/kg fluid resuscitation) • Acute renal failure • Death, including death at presentation to hospital • Requirement for supplementary oxygen, non-invasive ventilation, invasive ventilation or extracorporeal membrane oxygenation (ECMO)
Japanese encephalitis virus (JEV) infection	Any newly diagnosed case of JEV infection in children and adolescents aged < 18 years with: • acute onset of symptoms consistent with JEV infection (e.g., high fever, rigors, headache, weakness, vomiting, diarrhoea, and seizures) OR • later stage symptoms/signs (e.g., altered mental status, hemiplegia, tetraplegia, cranial nerve palsies) AND • Laboratory IgM antibody confirmation of JEV infection

Surveillance study	Case definition
PIMS-TS	Children and adolescents aged < 19 years with fever ≥ 3 days AND two of the following: • Rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs (oral, hands or feet). • Age specific hypotension or 'shock' within first 24 hours of presentation, • Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities (including ECHO findings or elevated Troponin/NT-proBNP), • Evidence of coagulopathy (by PT, PTT, elevated d-Dimers) • Acute gastrointestinal problems (diarrhoea, vomiting, or abdominal pain) AND • Elevated markers of inflammation such as ESR, C-reactive protein, or procalcitonin AND • Exclusion of other infectious causes of inflammation, including bacterial sepsis, staphylococcal or streptococcal toxic shock syndromes AND • Evidence of SARS-CoV-2 infection including one or more of: positive RT-PCR or antigen test or confirmed positive SARS-CoV-2 serology (noting testing may be delayed, particularly serology. If all other criteria are met, collect data pending results) • OR contact with a confirmed COVID-19 case

Surveillance study	Case definition
Q fever	Children aged < 15 years who have either: *Confirmed acute Q fever* as determined by: • Laboratory detection of *Coxiella burnetii* by PCR testing of unclotted blood or serum OR • Laboratory detection of a ≥ four-fold increase in IgG antibody titres to phase II *C. burnetii* antigen by indirect immunofluorescence antibody (IFA) in a serum sample collected 2–3 weeks after onset (convalescent), when compared with a serum sample collected at onset, in the absence of recent vaccination OR *Probable acute Q fever* as determined by: • Laboratory detection of IgM antibody to phase II *C. burnetii* antigen in serum in the absence of recent vaccination AND • Clinical presentation compatible with acute Q fever disease (fatigue, cough, headache and fever) OR Chronic Q fever as determined by: • Clinical presentation consistent with chronic Q fever disease (e.g., endocarditis, osteomyelitis, hepatitis, encephalitis or other) AND • Laboratory detection by IFA of elevated IgG antibody titres to phase I *C. burnetii* antigen, with or without detection of IgA in serum OR • Laboratory detection of *C. burnetii* by PCR in blood or tissue at infection site (e.g., bone, joint)
Juvenile onset recurrent respiratory papillomatosis (JoRRP)	Any infant or child aged < 15 years diagnosed with juvenile onset recurrent respiratory papillomatosis (JoRRP) confirmed by endoscopy of the larynx and by histology • Probable case: as above but without histological confirmation

Surveillance study	Case definition
Congenital rubella infection/ syndrome	*Confirmed case*: a confirmed case requires laboratory definitive evidence (fetal) OR laboratory definitive evidence (infant) AND epidemiological evidence: • Laboratory definitive evidence: Fetal: isolation or detection of rubella virus from an appropriate clinical sample (i.e. fetal blood or tissue, amniotic fluid, chorionic villus sample) by culture or nucleic acid testing. Infant: Isolation or detection of rubella virus from an appropriate clinical sample in an infant, by culture or nucleic acid testing OR detection of rubella-specific IgM antibody in the serum of the infant. • Epidemiological evidence: the mother has confirmed rubella infection during pregnancy *Probable case*: epidemiological evidence (first trimester infection) OR epidemiological evidence (second and third trimester infection) AND laboratory suggestive evidence (infant): • Laboratory suggestive evidence Infant: High / rising rubella-specific IgG level in first year of life. *Congenital rubella syndrome*: a confirmed case requires laboratory definitive evidence (fetal or infant), as described above AND clinical evidence: Clinical evidence: A live or still born infant with ANY of the following compatible defects: • Cataracts • Congenital glaucoma • Congenital heart disease • Hearing defects • Microcephaly • Pigmentary retinopathy • Development delay • Purpura • Hepatosplenomegaly • Meninigoencephalitis • Radioluscent bone disease • Other defect not better explained by an alternative diagnosis

Surveillance study	Case definition
Congenital varicella syndrome (CVS)	Any stillbirth, newborn infant, or child up to the age of 2 years who, has definite or suspected congenital varicella infection, with or without defects and meets at least one of the following criteria: • Cicatricial skin lesions in a dermatomal distribution and/or pox-like skin scars and/ or limb hypoplasia • Development of herpes zoster in the first year of life • Spontaneous abortion, termination, stillbirth or early death following varicella infection during pregnancy Confirm varicella infection by one or more of the following: • Detection of varicella-specific IgM antibodies in cord blood or in serum specimen taken in the first 3 months of life (only 25% of cases are positive) • Persistence of varicella specific IgG antibody in a child aged beyond 6 months of age • Identification of varicella virus in skin lesions or autopsy tissue • History of maternal varicella during pregnancy or maternal contact with varicella in pregnancy in the mother of an infant with congenital abnormalities The following clinical signs may also be present in cases of CVS: • Microcephaly, hydrocephalus, cerebellar hypoplasia, motor or sensory deficits, sphincter dysfunction and peripheral nervous system defects • Microphthalmia, cataracts, Horner's syndrome, chorioretinitis, nystagmus, retinal scars, optic atrophy • Gastrointestinal abnormalities including colonic atresia, hepatitis, liver failure • Genito-urinary abnormalities • Cardiovascular abnormalities • Intrauterine growth retardation
Neonatal varicella infection (NVI)	Any infant who has neonatal varicella based on history, clinical and/or laboratory findings in the first month of life without features of CVS). Features of neonatal varicella infection include pox-like rash which may be papulovesicular, vesiculopustular or haemorrhagic, and fever. Other systemic symptoms may be present. Complications of neonatal varicella include bacterial superinfection, neurological and haematological problems and general visceral involvement. The diagnosis of neonatal varicella can be made when an infant in the first month of life presents with clinical features of varicella infection. There may be a history of maternal varicella infection in the last 1–4 weeks of pregnancy or contact with a varicella infected person after birth. The diagnosis can be confirmed by laboratory tests to detect: • Viral antigen/viral isolate from scrapings of the skin lesions or viral DNA from lesion fluid. • Varicella specific IgM in a serum sample from the infant (or from the contact).

Table A.2: Table of notifications received during the period 1 January – 31 December 2024 of communicable diseases and complications of communicable diseases under surveillance by the APSU, and their categorisation

Disease or complication under surveillance	Total notifications	Confirmed cases	Duplicates	Errors[a]	Other[b]
Acute flaccid paralysis[c]	98[d]	81[d]	15	2	0
Congenital cytomegalovirus	57	26[e]	5	5	21
Dengue	4	4[e]	0	0	0
Severe acute hepatitis	4	4	0	0	0
Neonatal and infant herpes simplex virus infection	8	6	1	1	0
Perinatal exposure to HIV	20	15	2	2	1
Paediatric HIV infection	0	0	0	0	0
Severe complications of influenza	38	34	1	3	0
Japanese encephalitis virus infection	0	0	0	0	0
PIMS-TS[f]	3	2[e]	0	1	0
Q fever	1	0	0	1	0
Juvenile-onset recurrent respiratory papillomatosis	3	1[e]	0	1[g]	1
Congenital rubella syndrome	0	0	0	0	0
Congenital varicella syndrome	0	0	0	0	0
Neonatal varicella infection	1	1	0	0	0
	237	**174**	**24**	**16**	**23**

a Includes administrative errors, cases outside of study definition, missing case report forms or insufficient data provided to confirm.

b Historical (prevalent) cases not previously reported.

c Includes all cases of acute flaccid paralysis (AFP) reported via the APSU/National Enterovirus Reference Laboratory (NERL) and PAEDS surveillance systems. All confirmed cases have been classified by the Polio Expert Panel (PEP) as 'non-polio AFP' according to World Health Organization criteria.[9,10] Twenty cases were reported using the APSU case report form, with seven of these cases confirmed and eleven cases duplicated by PAEDS surveillance.

d Note: the reporting period for AFP case notifications was that symptom onset occurred between 1 January and 31 December 2024, in line with PEP classification and reporting of AFP cases ascertained by APSU/NERL and PAEDS surveillance systems to WHO.[9]

e Includes both definite and probable cases.

f Paediatric inflammatory multisystem syndrome temporarily associated with Sars-CoV-2.

g Note: the case was an error outside of case definition as age was ≥ 15 years at the time of diagnosis but was confirmed as a childhood immigrant case of JoRRP.