Annual report

Australian National Enterovirus Reference Laboratory annual report, 2013

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Abstract

Australia conducts surveillance for cases of acute flaccid paralysis (AFP) in children less than 15 years of age as the main method to monitor its polio-free status in accordance with the World Health Organization (WHO) recommendations. Cases of AFP in children are notified to the Australian Paediatric Surveillance Unit or the Paediatric Active Enhanced Disease Surveillance System and faecal specimens are referred for virological investigation to the National Enterovirus Reference Laboratory. In 2013, no cases of poliomyelitis were reported from clinical surveillance and Australia reported 1.4 non-polio AFP cases per 100,000 children, meeting the WHO performance criterion for a sensitive surveillance system. Non-polio enteroviruses can also be associated with AFP and enterovirus A71 was identified from nine of the 61 cases classified as non-polio AFP in 2013, which was part of a larger outbreak associated with this virus. A Sabin poliovirus was detected in an infant recently returned from Pakistan and who had been vaccinated while abroad. Globally, 416 cases of polio were reported in 2013, with the 3 endemic countries: Afghanistan; Nigeri;a and Pakistan, accounting for 38% of the cases. To safeguard the progress made towards polio eradication, in May 2014, WHO recommended travellers from the 10 countries that are currently reporting wild poliovirus transmission have documented evidence of recent polio vaccination before departure. *Commun Dis Intell* 2015;39(2):E208–E216.

Keywords: poliovirus, acute flaccid paralysis, surveillance, enterovirus, poliomyelitis, eradication, vaccination

Introduction

Australia has established clinical and virological surveillance schemes to monitor its polio-free status. The clinical surveillance follows the World Health Organization (WHO) recommendation of investigating cases of acute flaccid paralysis (AFP) in children less than 15 years of age. AFP cases are ascertained either by clinicians notifying the Australian Paediatric Surveillance Unit (APSU) via a monthly report card or through the Paediatric Active Enhanced Disease Surveillance System (PAEDS) at 5 sentinel tertiary paediatric hospitals.[1,2,3] The WHO recommends that 2 faecal specimens be collected for virological investigation at least 24 hours apart and within 14 days of the onset of paralysis from cases of AFP to exclude poliovirus as the causative agent. It is a requirement of the WHO polio eradication program that the specimens are tested in a WHO accredited laboratory, which for Australia is the National Enterovirus Reference Laboratory (NERL) at the Victorian Infectious Diseases Reference Laboratory (VIDRL). The clinical and laboratory data from AFP cases in children is reviewed by the Polio Expert Panel (PEP) and reported to the WHO as evidence of Australia's continued polio-free status.

Enterovirus and environmental surveillance programs were established as virological surveillance for poliovirus to complement the clinical surveillance program focussed on AFP cases in children. Enteroviruses other than poliovirus have been associated with AFP and poliovirus infection may manifest clinically without paralysis. The Enterovirus Reference Laboratory Network of Australia (ERLNA) involves public diagnostic virology laboratories reporting enterovirus typing results from clinical specimens to exclude poliovirus and establish the epidemiology of non-polio enteroviruses (NPEVs) in Australia. WHO supports environmental surveillance as a sensitive means of detecting poliovirus through the testing of sewage samples. In 2013, Israel reported the detection of wild poliovirus type 1 in sewage samples without reports of cases of poliomyelitis. The importation and sustained transmission of the virus occurred despite the national polio vaccine coverage being over 90%.[4] Pakistan was identified as the original source of the wild poliovirus importation by genetic sequencing.

The number of wild polio cases worldwide increased from 223 in 2012 to 416 in 2013.[5] This was mainly due to an outbreak of 194 cases in Somalia that originated from Nigeria and led to a further 23 cases in Ethiopia and Kenya, while 160 cases were reported in the three remaining polio endemic countries: Afghanistan, Nigeria and Pakistan. All wild polioviruses detected were serotype 1 with the most recent detections of type 3 in November 2012 in Nigeria and April 2012 in Pakistan. The last detection of wild poliovirus serotype 2 was in India in 1999 leading WHO to

recommend that this serotype be removed from the oral polio vaccine from 2016.[6] All 3 serotypes will still be incorporated in the inactivated polio vaccine. In May 2014, the WHO declared the transmission of polio during the low transmission season in the Northern Hemisphere to be a public health emergency of international concern and recommended travellers from the 10 countries reporting detection of wild poliovirus to have documented evidence of recent polio vaccination.[7]

This report summarises the polio surveillance program in Australia for 2013 encompassing clinical surveillance for AFP cases in children and virological surveillance for poliovirus.

Methods

Acute flaccid paralysis surveillance

Paediatricians reviewing a patient less than 15 years of age presenting with AFP, or clinicians reviewing a patient of any age with suspected poliomyelitis, are requested to notify the NERL (telephone 03-9342 9607, email enterovirus@mh.org.au). Paediatricians also notify the AFP case to the APSU (http://www.apsu.org.au/) via a monthly report card. Upon receipt of the notification, the AFP National Surveillance Co-ordinator based at VIDRL forwards a clinical questionnaire for the clinician to complete. Alternatively, AFP cases are ascertained by PAEDS nursing staff from medical records and are enrolled in the surveillance program with parental or guardian consent.

According to the WHO surveillance criterion 2 faecal specimens must be collected more than 24 hours apart due to intermittent virus shedding, and within 14 days of the onset of paralysis, while the virus titre remains high, to be classified as adequate. The faecal specimens are tested free of charge by the NERL.

The PEP, a subcommittee of the Communicable Diseases Network Australia, reviews the clinical and laboratory data for all notified cases of AFP, irrespective of whether they are an eligible or ineligible case. An eligible case is an Australian child 14 years or younger with AFP (including Guillain-Barré syndrome and transverse myelitis) or an Australian of any age with suspected polio. Ineligible cases include patients aged 15 years or over, overseas residents and cases notified in error or later determined not to be AFP.

The PEP classifies cases of AFP as:

- poliomyelitis due to wild poliovirus, vaccine-derived poliovirus (VDPV) or vaccine associated paralytic poliomyelitis (VAPP);
- polio compatible if there is insufficient evidence to exclude poliomyelitis;
- non-polio AFP or;
- non-AFP.

A follow-up questionnaire is sent to notifying clinicians if the PEP requires more information regarding the AFP case before a final classification can be made. After each PEP meeting the Australian AFP case classifications are forwarded to WHO for inclusion in the global AFP surveillance data published in the *Weekly Epidemiological Record* (http://www.who.int/wer/en/). Ineligible cases are not reported to WHO.

The WHO AFP surveillance performance indicator for a polio non-endemic country is 1 case of non-polio AFP per 100,000 children aged less than 15 years. For Australia in 2013, this equated to 43 cases per year, based on the Australian Bureau of Statistics data released in December 2012. An AFP surveillance scheme that satisfies the WHO surveillance performance indicator is deemed sufficiently sensitive to detect a wild poliovirus importation in children of that country. The WHO surveillance performance indicator for laboratory testing is that at least 80% of notified AFP cases have adequate faecal specimens collected and tested in a WHO accredited laboratory.

At the end of each calendar year, a number of AFP notifications remain pending as there is insufficient clinical and laboratory data for the PEP to report a final classification. The PEP classifies such notifications as 'polio compatible-zero evidence' if a final review reveals no evidence of clustering among the cases.

Virus culture

Upon receipt at the NERL, faecal specimens are treated with minimum essential medium containing Hank's salts, chloroform (9.1% v/v) and foetal bovine serum (2%). The suspension is clarified and the supernatant inoculated onto a series of mammalian cell lines. Two WHO recommended cell lines are used for the isolation of poliovirus, L20B (a transgenic mouse epithelial cell line expressing the human poliovirus receptor, CD155) and RD-A (human rhabdomyosarcoma).[8,9] Diagnostic laboratories in Australia are encouraged to refer enteroviruses of unknown serotype to the NERL for further characterisation as poliovirus infection can lead to clinical presentations without paralysis such as aseptic meningitis.

Two WHO real time reverse transcription polymerase chain reaction (RT-PCR) tests are used to determine whether a poliovirus is a wild strain, oral poliomyelitis vaccine (OPV) strain (Sabin-

like) or a VDPV, in a process known as intratypic differentiation (ITD).[10] The NERL sequences the complete poliovirus viral protein 1 (VP1) genomic region, which contains a major neutralising antibody binding site. The VP1 genomic sequence provides valuable biological information, including the number of mutations within a significant region of the OPV virus strain and it enables phylogenetic analysis of wild poliovirus to rapidly determine the likely source of the virus, as utilised in the 2007 wild poliovirus importation.[11]

Enterovirus surveillance

The ERLNA was established primarily as a means of detecting imported poliovirus among untyped enteroviruses from clinical specimens. The network consists of 10 public sector diagnostic virology laboratories in the Australian Capital Territory (Canberra Hospital), New South Wales (Royal Prince Alfred Hospital), Queensland (Queensland Health and Scientific Services), South Australia (Flinders Medical Centre and the Institute of Medical and Veterinary Science), Tasmania (Royal Hobart Hospital), Victoria (Royal Children's Hospital and VIDRL) and Western Australia (Queen Elizabeth II Medical Centre and the Princess Margaret Hospital for Children).

The NERL encourages members of ERLNA to perform their own enterovirus typing. It has advised members of ERLNA on enterovirus detection, supplied laboratory and computer analysis protocols and performed tests in parallel with other laboratories for quality assurance purposes. The NERL receives untyped enteroviruses from 3 laboratories for typing on a regular basis. The other laboratories perform their own enterovirus typing and report the results to the NERL for inclusion in the national enterovirus database.

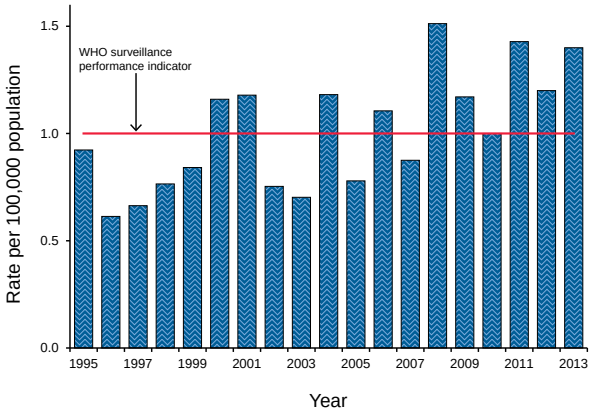
The NERL screens clinical specimens for enterovirus using a semi-nested RT-PCR directed to highly conserved sequence in the 5' non-translated region.[12] Enterovirus typing is primarily performed by amplifying a fragment of the VP1 genomic region according to a published method,[13] but the complete nucleotide sequence of VP1 is required to type some enteroviruses. The enterovirus typing RT-PCR is directed to a region of sequence divergence that allows differentiation between enterovirus genomes. As a consequence, the enterovirus sequence based typing assay is not as sensitive as the pan-enterovirus detection assay. This can result in an enterovirus being detected by pan-enterovirus RT-PCR in a clinical specimen without subsequent identification by the VP1 enterovirus typing assay.

Results

Classification of acute flaccid paralysis cases

A total of 100 notifications of AFP cases were received in 2013 (Table 1). The PEP classified 61 cases as non-polio AFP, which equated to a rate of 1.4 cases per 100,000 children less than 15 years of age, exceeding the WHO AFP surveillance performance criterion for a polio-free country of 1 case of non-polio AFP per 100,000 children (Table 2, Figure 1).

Figure 1: Non-polio acute flaccid paralysis rate after final classification, 1995 to 2013, by the Polio Expert Panel



* The World Health Organization acute flaccid paralysis surveillance performance indicator for a polio non-endemic country is 1 case per 100,000 children <15 years of age.

An enterovirus A71 (EV-A71) outbreak occurred along the eastern seaboard of Australia in 2013, with most cases reported in Sydney that included at least 2 deaths associated with EV-A71 infection in children.[14] Between February and September, EV-A71 subgenogroup C4a was isolated by virus culture or detected by RT-PCR from the stool specimens of 9 AFP cases and a further 3 non-polio AFP cases were associated with EV-A71 based on the clinical evidence, representing 20% of AFP cases with onset of paralysis in 2013. Ten of the cases were from New South Wales and two in Victoria and involved children less than 6 years of age. NPEVs were isolated from another 4 AFP cases in New South Wales and Victoria and identified as coxsackievirus A4 (CV-A4), coxsackievirus A10 (CV-A10), echovirus 7 (E7) and echovirus 11 (E11). In total, NPEVs were reported from 16 cases; a quarter of the non-polio AFP cases classified by the PEP in 2013.

Table 1: Notification of acute flaccid paralysis cases, 2013 by state or territory

State or territory	Estimated population aged <15 years*	Expected number of AFP cases in 2013	Total number of notifications	Ineligible notifications	Duplicate notifications	Polio compatible	Eligible cases with final classification by PEC	Non-polio AFP rate per 100,000 children
ACT	68,177	0.5	0	0	0	0	0	0.0
NSW	1,367,952	14	37	3	11	1	22	1.6
NT	52,914	0.5	1	0	0	0	1	2.0
Qld	902,387	9	9	2	1	0	6	0.7
SA	291,942	3	3	1	0	0	2	0.7
Tas.	94,805	1	1	0	0	0	1	1.0
Vic.	1,024,646	10	39	2	15	0	22	2.2
WA	464,882	5	10	2	1	0	7	1.4
Australia	4,267,705	43	100	10	28	1	61	1.4

* Australian Bureau of Statistics, Estimated population at 30 June 2012 (www.abs.gov.au).

AFP Acute flaccid paralysis

PEC Polio Executive Committee

Table 2: Surveillance for acute flaccid paralysis cases in Australia, 2013, compared with the main World Health Organization performance indicators

WHO surveillance performance indicator for AFP cases in children <15 years	Performance of Australia's AFP surveillance	
≥1.0 non-polio AFP case / 100,000 children (43 cases for Australia in 2013).	61 cases classified as non-polio AFP.	1.4 (61 / 43) non-polio AFP cases / 100,000 children <15 years.
≥80% of classified AFP cases with adequate specimens (2 faecal specimens collected at least 24 hours apart and within 14 days of onset of paralysis.	25 AFP cases with adequate specimens collected.	41% (25 / 61) classified non-polio AFP cases with adequate specimens.

AFP Acute flaccid paralysis

A patient fully immunised against polio was diagnosed with anterior myelitis due to an enteroviral infection. Stool specimens were not collected for testing at the NERL and the case was classified as polio compatible by the PEP as polio could not be excluded based on the available clinical evidence (Table 1). Twenty-eight AFP cases were notified by more than 1 source: either 2 clinicians returned a clinical questionnaire about the same case or a clinician returned a clinical questionnaire about a case also enrolled in the PAEDS system, and were regarded as duplicate notifications (Table 1). A further 10 AFP notifications did not meet the criteria for an eligible case as the patients were greater than 14 years of age, the patient's clinical condition was later considered not to be consistent with AFP or consent to enrol the case through PAEDS was not granted.

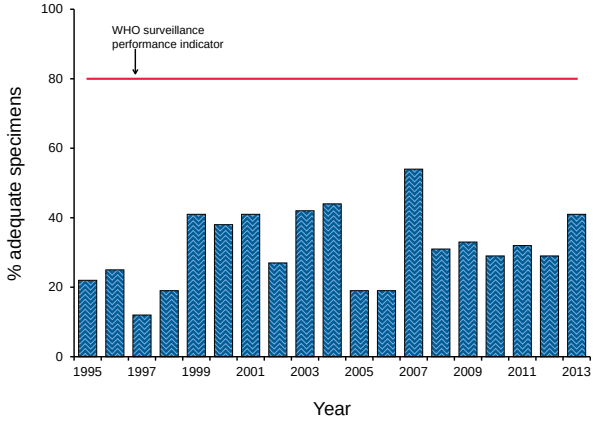
Notification of acute flaccid paralysis cases by state and territory

In 2013, AFP cases were notified from all jurisdictions in Australia except the Australian Capital Territory (Table 1). The non-polio AFP rates for eligible cases per jurisdiction exceeded the WHO AFP surveillance performance indicator of 1 case per 100,000 children in New South Wales, the Northern Territory, Tasmania, Victoria and Western Australia. Queensland did not achieve the expected rate of non-polio AFP cases despite the syndrome being included in the state's Notifiable Conditions System since 2001.[15]

Faecal collection from acute flaccid paralysis cases

A total of 81 faecal specimens from 44 of the 61 eligible cases were tested at the NERL but only 25 AFP cases had two specimens collected within 14 days of the onset of paralysis in 2013 (Tables 2 and 3). While the proportion of cases that met the WHO criteria for specimen collection was 41% compared with the target of 80% (Figure 2), 61% of AFP cases had at least 1 specimen collected within 14 days of onset, and 72% of cases had a specimen collected at any time after the onset of paralysis. Five different types of NPEV (CA-A4, CA-A10, E7, E11 and EV-A71) were isolated by virus culture from 15 of the 81 stool specimens, an isolation rate of 19%. EV-A71 was isolated from 5 AFP cases by virus culture and detected direct in the stool extract by RT-PCR of a further 4 AFP cases.

Figure 2: Percentage of acute flaccid paralysis cases with adequate faecal specimens, 1995 to 2013*



* The WHO surveillance performance indicator is 2 faecal specimens collected more than 24 hours apart and within 14 days of the onset of paralysis from 80% of classified non-polio AFP cases.

Enterovirus surveillance

A poliovirus type 2 was referred through the ERLNA for ITD in March 2013 (Tables 3 and 4). An infant was hospitalised in Perth with diarrhoea after returning from Pakistan where the patient was vaccinated with OPV and also likely to have acquired a rotavirus infection. The laboratory in Perth identified rotavirus and poliovirus type 2

Table 3: Test results of acute flaccid paralysis cases with onset in 2013, and specimens referred to the Australian National Enterovirus Reference Laboratory from within Australia

Result	Specimens from AFP cases involving children < 15 years of age	Specimens from AFP cases involving patients ≥15 years of age	Specimens from sources other than AFP	Total
Sabin poliovirus type 2	0	0	1	1
Non-polio enterovirus	22	0	133	155
Rhinovirus	0	0	9	9
No enterovirus identified	59	1	136	196
Total	81	1	279	361

AFP Acute flaccid paralysis.

and referred the latter to the NERL for further investigation. The poliovirus type 2 was Sabin-like by the WHO recommended test that differentiates between wild and vaccine strains. The full VP1 genomic region had 100% sequence identity to prototype Sabin poliovirus type 2, consistent with recent vaccination with OPV.

The ERLNA typed 461 NPEVs, of which the NERL contributed 242 identifications (Table 4). The most common serotypes identified by ERLNA were, in order of decreasing frequency, echovirus 6, coxsackievirus A6, echovirus 9 and EV-A71.

Regional reference laboratory activities

The following activities were performed as a Polio Regional Reference Laboratory in 2013.

- Specimens from AFP cases were referred from Brunei Darussalam (2 cases), Pacific Island countries (8 cases) and Papua New Guinea (19 cases). No poliovirus was isolated from any of the specimens but NPEVs were reported from 5 cases from the Pacific Islands and 14 cases from Papua New Guinea.
- Twelve poliovirus type 1, 2 poliovirus type 2 and 2 poliovirus type 3 isolates were referred from AFP cases in the Philippines for ITD and all were characterised as Sabin-like. The national polio laboratory of Malaysia referred a poliovirus type 1 and a type 2 isolate from environmental samples for sequencing after the ITD tests indicated both had significant mutations that required further investigation. The VP1 genomic regions were sequenced at VIDRL and both were confirmed as Sabin-like polioviruses.

Table 4: Summary of enterovirus testing at the Australian National Enterovirus Reference Laboratory for samples referred within Australia 1995 to 2013

Year	Poliovirus		Non-poli enterovirus	No enterovirus detected	EVID results referred[||]	Total samples reviewed
	Sabin-like	Non-Sabin-like				
1995	190	0	200	13	0	403
1996	224	0	198	9	0	431
1997	124	0	76	0	0	200
1998	52	0	15	4	0	71
1999*	60	1	9	9	0	79
2000	45	0	44	47	0	136
2001*	46	5	33	75	0	159
2002	36	0	21	49	0	106
2003	9	0	15	47	0	71
2004	6	0	26	61	0	93
2005	18	0	10	39	0	67
2006	2	0	6	71	29	108
2007[†]	0	2	32	115	107	256
2008	0	0	20	92	77	189
2009[‡]	1	0	63	78	113	255
2010	0	0	170	39	108	317
2011	0	0	174	61	205	440
2012	0	0	155	97	123	375
2013[§]	1	0	242	189	219	671

* Untyped enterovirus or uncharacterised poliovirus isolates were referred for further testing after completion of a laboratory inventory. The 6 isolates tested as non-Sabin-like and were subsequently identified as wild type poliovirus prototype strains and were destroyed.

† Wild poliovirus type 1 was imported from Pakistan.

‡ A Sabin-like poliovirus type 1 was identified from an unimmunised infant.

§ A Sabin-like poliovirus type 2 was identified from an infant who was immunised overseas with oral polio vaccine and hospitalised with diarrhoea upon return to Australia.

|| Enterovirus identification (EVID) results include retrospective data made available via the Enterovirus Reference Laboratory Network of Australia.

Quality assurance programs

In 2013, the NERL was accredited as a WHO Polio Regional Reference Laboratory through participation in the annual WHO poliovirus quality assurance panels for isolation by cell culture, RT-PCR for ITD, vaccine derived poliovirus and sequencing and an on-site visit in October. The laboratory also participated in the Royal College of Pathologists of Australasia quality assurance panel for enterovirus detection by RT-PCR.

Discussion

In 2013, Australia reached the WHO surveillance target of ≥1 non-polio AFP cases per 100,000 children, for the 6th year in a row. The combination of clinicians notifying AFP cases via the APSU monthly report card and nurses ascertaining cases through the PAEDS system provided Australia with a polio surveillance system that meets the international standard to detect an imported case of polio in children less than 15 years of age through these well-established schemes.[3,16]

Australia has never met the strict WHO surveillance target for adequate stool collection from 80% of AFP cases, with 41% of cases having 2 specimens tested in 2013, and 61% of cases with at least a single specimen. In 2014, the Chair of the National Polio Certification Commission published a letter reminding paediatricians that it was critical to notify cases of AFP and arrange for collection of 2 stool specimens as part of Australia's vigilance for poliovirus importations.[17]

Virological investigation of AFP cases is important to confirm the presence of poliovirus and also serves to establish an association between NPEVs and AFP cases. This was reinforced in 2013, with 5 different types of NPEV reported from AFP cases by the NERL, including EV-A71 from 9 AFP cases. This was part of a larger EV-A71 outbreak first reported in Sydney that included at least 2 fatalities.[14,18] In 2010, WHO undertook a risk assessment of EV-A71 infection in the Western Pacific region and concluded that outbreaks will increase in frequency due to the virus's continued evolution and production of novel recombinants with severe cases likely to occur due to the introduction of novel strains.[19] WHO noted that the level of uncertainty for the risk assessment was moderate due to incomplete surveillance such as determining the EV-A71 subgenogroup, which would provide more information on virus transmission. The sudden increase in association of EV-A71 with AFP cases in 2013, coincided with a switch from subgenogroup B5 being the predominant strain detected in Australia, as reported by the Enterovirus Reference Laboratory Network of Australia,[20] to subgenogroup C4a. This highlights the value of routine enterovirus typing to establish the epidemiology of enterovirus circulation in Australia.

Outbreaks of hand, foot and mouth disease due to EV-A71 with instances of fatal neurological complications have occurred in many Asian countries since the late 1990s, which has led to research and development of candidate vaccines.[21,22] Two independently produced, inactivated whole-virus vaccines were reported to be safe, immunogenic and protective against EV-A71 associated hand, foot and mouth disease in phase 3 clinical trials in China.[23,24] Both vaccines were produced from the C genogroup strain and cross-protection against the other EV-A71 genogroups needs to be determined.

The referral of a poliovirus detected from a patient recently returned from Pakistan, through the ERNLA, demonstrates the additional value of virological surveillance to complement the clinical surveillance program. While the reporting of a type 2 Sabin-like poliovirus in Australia in 2013, may be considered inconsequential, it is important that all polioviruses are fully characterised by the NERL. VDPVs can evolve in areas with low oral polio vaccine coverage through person-to-person transmission leading to loss of attenuation, and were reported in 8 countries worldwide in 2013.[25] The NERL is accredited by WHO to perform specific tests that detect VDPVs, which must be reported under the International Health Regulations (2005), the same as for a wild poliovirus detection. Seven of the 8 VDPV outbreaks in 2013, involved poliovirus type 2 with only 1 event involving poliovirus type 3. The risk of type 2 VDPV outbreaks in the absence of wild poliovirus type 2, which was last detected in 1999, has led WHO to recommend the Sabin 2 poliovirus strain be removed from OPV by the end of 2016, as part of the polio eradication and endgame strategic plan.[26] As a safeguard, the plan recommends at least 1 dose of trivalent inactivated polio vaccine (IPV) be introduced into all routine immunisation schedules prior to the switch from trivalent to bivalent OPV. Australia ceased use of OPV from November 2005 and IPV is available as a paediatric combination vaccine and as an individual vaccine for booster immunisations.[27]

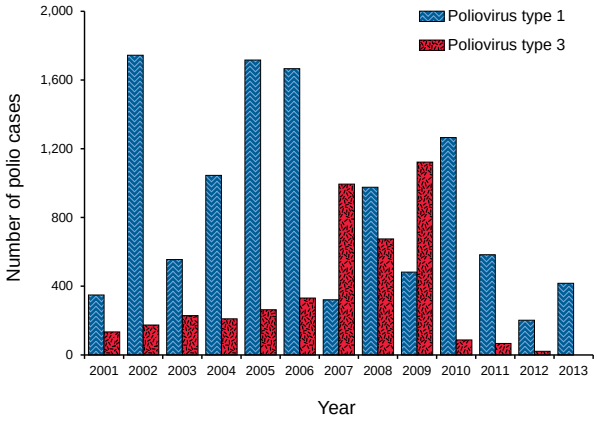
In 2012, the National Polio Certification Commission for Poliomyelitis Eradication undertook a review of polio surveillance that found support for the existing systems that were deemed to be appropriate for Australia.[28] Gaps in surveillance were identified with regard to the detection of adult cases, ensuring clinicians would recognise a case of polio, the risk of polio importations, the need to improve stool collection rates and the importation and storage of biological samples containing poliovirus. The review made 10 recommendations:

1. Australia should continue to undertake active polio surveillance;
2. the existing active surveillance systems should occur for 3 years post-eradication and enterovirus surveillance should continue post-eradication;
3. the purpose, objectives and activities of the Australian polio surveillance system should be documented by the Department of Health;
4. AFP surveillance should continue in its current form;
5. stool collection rates should be improved including through enhancing the effectiveness of the PAEDS program;
6. polio should remain a nationally notifiable condition but AFP should not be nationally notifiable;
7. sentinel environmental surveillance sites should be maintained and trialed in a major metropolitan area;
8. communication to raise awareness of the importance of completing global poliovirus eradication and highlighting the need for clinicians to remain vigilant for cases of poliomyelitis should be developed by the Department of Health;
9. the Department of Health should review current vaccination policies to determine if they are adequate to address the risk of polio importations by immigrants refugees and travellers to and from endemic countries; and
10. a review of biosecurity arrangements for the laboratory containment of polioviruses should be conducted.

Despite an increase in the number of polio cases worldwide from 223 in 2012, to 416 in 2013, it is significant that the last reports of the 2 remaining genetic lineages of wild poliovirus type 3 were in November 2012 in Nigeria and April 2012 in Pakistan (Figure 3).[5] While three years of surveillance will be required to confirm the eradication of another poliovirus serotype, the data looks promising that this important milestone will be achieved.

Three countries remain endemic for wild poliovirus, having never interrupted transmission: Afghanistan, Nigeria, Pakistan, and another seven have wild poliovirus due to importations; Cameroon, Equatorial Guinea, Ethiopia, Iraq, Israel, Somalia and Syria. In May, WHO announced that the continued spread of wild poliovirus from Cameroon, Pakistan and Syria to neighbouring countries during January to April 2014, considered as the low season for transmission, is considered a public health emergency of international concern.[7] In response, WHO issued temporary recommendations under the International Health Regulations (2005) that people travelling from the 3 countries linked to the recent importations should have documented evidence of polio vaccination within 4 weeks to 12 months of departure and travellers from the other 7 countries are encouraged to be vaccinated with documented evidence before departure. The Australian Government Department of Health issued recommendations for Australian travellers in light of this development.[29] The new international recommendations will be reviewed by WHO after 3 months but such a proactive international stance may be needed to herald the end of the last remaining reservoirs of wild poliovirus.

Figure 3: Number of wild polio cases, worldwide, 2000 to 2013, by poliovirus serotype



Source: Global Polio Elimination Initiative [online]. Accessed on 4 May 2014 (http://www.polioeradication.org/Dataandmonitoring/Poliothisweek/Wildpolioviruslist.aspx).

Acknowledgements

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