Surveillance of adverse events following immunisation, NSW, 2014

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Abstract: Aim: This report summarises passive surveillance data for adverse events following immunisation (AEFI) in NSW from 1 January 2014 to 31 December 2014. **Methods:** Analysis of de-identified data on all AEFI reported to the Therapeutic Goods Administration (TGA) for persons from NSW. **Results:** There were 518 AEFI reported for vaccines administered from 1 January to 31 December 2014. The overall AEFI reporting rate was 6.9 per 100 000 population in 2014, compared with 8.6 in 2013. This decline in reported adverse events in 2014 compared with the previous year is most likely related to several immunisation program changes and the ceasing of enhanced surveillance of the adolescent HPV program. Overall, the most commonly reported reactions were associated with seasonal influenza (22%) followed by HPV vaccine (21%), MMR (14%), DTPa-IPV (12%), dTpa (11%) and PCV13 (10%). Only 11% of the reported adverse events were categorised as serious. There was one reported death; however, no clear causal relationship with vaccination was found after investigation by the TGA. **Conclusion:** There were no vaccine safety signals or concerns observed in this reporting period. Overall, declines in the numbers and rates of reports were observed in 2014 compared with 2013.

Abbreviations of vaccine types

BCG	Bacille Calmette-Guérin
dT	diphtheria-tetanus – adolescent and adult formulation
DTPa	diphtheria-tetanus-pertussis (acellular) – paediatric formulation
dTpa	diphtheria-tetanus-pertussis (acellular) – adolescent and adult formulation
dTpa-IPV	combined dTpa and inactivated poliovirus
DTPa-HepB	combined diphtheria-tetanus-pertussis (acellular) and hepatitis B
DTPa-IPV	combined diphtheria-tetanus-pertussis (acellular) and inactivated poliovirus (quadrivalent)
DTPa-IPV-HepB-Hib	combined diphtheria-tetanus-pertussis (acellular), inactivated poliovirus, hepatitis B and *Haemophilus influenzae* type b vaccine (hexavalent)
HepB	hepatitis B
Hib	*Haemophilus influenzae* type b
Hib-MenC	combined *Haemophilus influenzae* type b and meningococcal C vaccine
HPV	human papillomavirus
IPV	inactivated poliovirus vaccine
Men4PV	meningococcal polysaccharide tetravalent vaccine
MenCCV	meningococcal C conjugate vaccine
MMR	measles-mumps-rubella
MMRV	measles-mumps-rubella-varicella
7vPCV	7-valent pneumococcal conjugate vaccine
13vPCV	13-valent pneumococcal conjugate vaccine
23vPPV	23-valent pneumococcal polysaccharide vaccine

Introduction

This is the sixth in a series of annual reports of adverse events following immunisation (AEFI) in New South Wales (NSW). This report summarises passive surveillance data reported from NSW for 2014 and describes reporting trends over the 15-year period 2000–2014.

An AEFI is defined as any untoward medical occurrence that follows immunisation.[1] The adverse event may be any

unfavourable or unintended sign, abnormal laboratory finding, symptom or disease.[1]

Thus, AEFI may be caused by a vaccine(s) or may be coincidental. Adverse events may also include conditions that occur following the incorrect handling and/or administration of a vaccine(s). The post-licensure surveillance of AEFI is particularly important to detect rare, late onset and unexpected events, and new vaccine safety signals that are difficult to detect in pre-licensure vaccine trials.

Trends in reported adverse events following immunisation are heavily influenced by changes to vaccines provided through the National Immunisation Program (NIP). Changes in previous years have been reported elsewhere.[2–12] Recent changes that impact on AEFI surveillance data presented in this report are:

- At the end of December 2013, the secondary school Year 7 hepatitis B vaccine catch-up program ceased, as all younger age cohorts were eligible for infant immunisation under the NIP (commenced 2000).[13]
- From July 2013, the second dose of MMR vaccine, previously given at 4 years, was brought forward to 18 months of age and delivered as a combination MMRV vaccine.[14]
- A measles-mumps-rubella (MMR) high school catch-up vaccination program was implemented from August to December 2014 in NSW. Public health units offered catch-up MMR vaccination in 145 high schools in Terms 3 and 4 in 2014 as a supplementary immunisation activity (SIA).[13]

Methods

Adverse events following immunisation are notifiable to NSW public health units by medical practitioners and hospital CEOs under the NSW *Public Health Act 2010*. Cases with any outstanding information and all serious AEFI are followed up by public health units and Health Protection NSW. All notifications are forwarded to the Therapeutic Goods Administration (TGA). The TGA also receives reports directly from vaccine manufacturers, members of the public and other sources.[15,16]

Adverse events following immunisation data

Reports from all sources across Australia are assessed by the TGA using internationally consistent criteria[17] and entered into the Australian Adverse Drug Reaction Reporting System (ADRS) database. The term 'AEFI record' is used throughout this report to signify occurrence of an AEFI because a single adverse event can result in more than one notification and generate more than one record in the ADRS database. This may occur if there is a time sequence of separate adverse reactions in a single patient or if more than one vaccine was administered prior to the event.

Typically, each AEFI record lists several symptoms, signs and diagnoses that have been coded by TGA staff from the description provided by the reporter into standardised terms using the Medical Dictionary for Regulatory Activities (MedDRA®).[18]

In reports published previously,[8,9] analysis was conducted using MedDRA® terms grouped into 'reaction categories' that were broadly analogous to the reactions listed in previous *Australian Immunisation Handbooks*.[15,16] However, the methodological framework for reporting of adverse events was recently revised by the National Centre for Immunisation Research and Surveillance (NCIRS) and the TGA. This new format for AEFI analysis uses MedDRA preferred terms (PTs)[19] for data analysis in this and the previous report.[20] Grouping of reactions using PTs is more comparable with data from other countries and internationally accepted.[21–23] In conjunction with the national vaccine-specific reporting form,[24] the use of PTs allows better description of post-marketing surveillance data on vaccine safety in Australia.

Definitions of AEFI outcomes and reactions

This report includes only AEFI records that are classified as 'suspected' to be causally related to immunisation by medical officers within the TGA. An AEFI record is classified as 'not suspected' and excluded from the ADRS database if: (1) there is no reasonable temporal association between the use of a drug and the clinical event; (2) the record does not contain enough information for an adequate assessment or the information is contradictory; or (3) a clinical event is explained as likely to have arisen from other causes.

AEFI were defined as 'serious' or 'non-serious' based on information in the report sent to the TGA and criteria similar to those used by the World Health Organization[16] and the US Vaccine Adverse Events Reporting System (VAERS).[25] In this report, an AEFI is defined as 'serious' if it meets one or more of the following criteria: (1) results in death; (2) is life-threatening; (3) requires inpatient hospitalisation or prolongation of existing hospitalisation; (4) results in persistent or significant disability/incapacity; (5) is a congenital anomaly/birth defect; and/or (6) is a medically important event or reaction.

Data analysis

De-identified information on AEFI reports from the TGA's ADRS database was released to NCIRS for analysis and reporting. AEFI records contained in the ADRS database were eligible for inclusion in the analysis if: a vaccine was recorded as 'suspected' of involvement in the reported adverse event; the vaccination occurred between 1 January

2014 and 31 December 2014; and the residential address of the individual was recorded as NSW.

All data analyses were performed using SAS (version 9.1.3, SAS Institute, Cary, NC, USA).[26] Average annual population-based reporting rates were calculated using population estimates obtained from the Australian Bureau of Statistics.[27]

AEFI reporting rates per 100 000 administered doses were estimated where information on dose numbers was available from: the Australian Childhood Immunisation Register (ACIR) for NIP vaccines for children aged less than 7 years; and NSW Health data on vaccines administered in schools for 12–17 year olds. Data on adolescents do not include doses given outside the school program.

Notes on interpretation

The data reported here are provisional only, particularly for the fourth quarter of 2014, because of reporting delays and the late onset of some reported AEFIs. Numbers are updated for previous years. The information collated in the ADRS database is intended primarily to detect signals of adverse events and to inform hypothesis generation. While AEFI reporting rates can be estimated using appropriate denominators, they cannot be interpreted as incidence rates due to under-reporting, biased reporting of suspected events, and the variable quality and completeness of information provided in individual notification reports.[12]

It is important to note that this report is based on vaccine and reaction term information collated in the ADRS database and not on comprehensive clinical notes.

Results

There was a total of 518 AEFI records for NSW in the ADRS database with a date of vaccination in 2014. Of all reports, 35% ($n = 184$) were for children aged less than 7 years and 59% ($n = 305$) were for people aged 7 years and over. Approximately 6% ($n = 29$) had age missing in the database. Fifty per cent of AEFI ($n = 258$) were reported to the TGA via NSW Health and the remainder were reported directly to the TGA; 22% ($n = 112$) by doctors/other health care providers, 14% ($n = 74$) by members of the public, 10% ($n = 51$) by drug companies and 4% ($n = 21$) by hospitals.

Reporting trends

The overall AEFI reporting rate for 2014 was 6.9 per 100 000 population, compared with 8.6 in 2013.

Figure 1 shows a decline in the reported events and annual reporting rate per 100 000 population during 2014 compared with 2013. The vast majority of reported events were of a non-serious nature similar to the previous years.[8,12] Figures 2a, 2b and 3 demonstrate marked variations in reporting levels in association with previous changes to the NIP from 2000 onwards. The decrease in reports in 2014 was predominantly

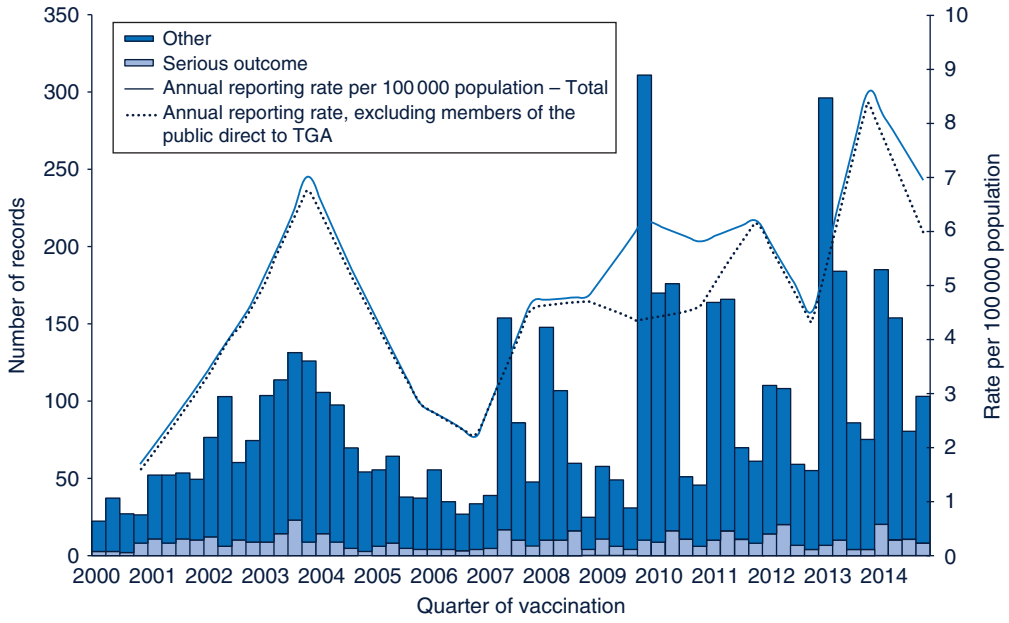

Figure 1. Reports of adverse events following immunisation, NSW, 2014, by quarter of vaccination.

NB: For reports where the date of vaccination was not recorded, the date of onset was used as a proxy for vaccination date.

Source: Adverse Drug Reactions Reporting System database, TGA.

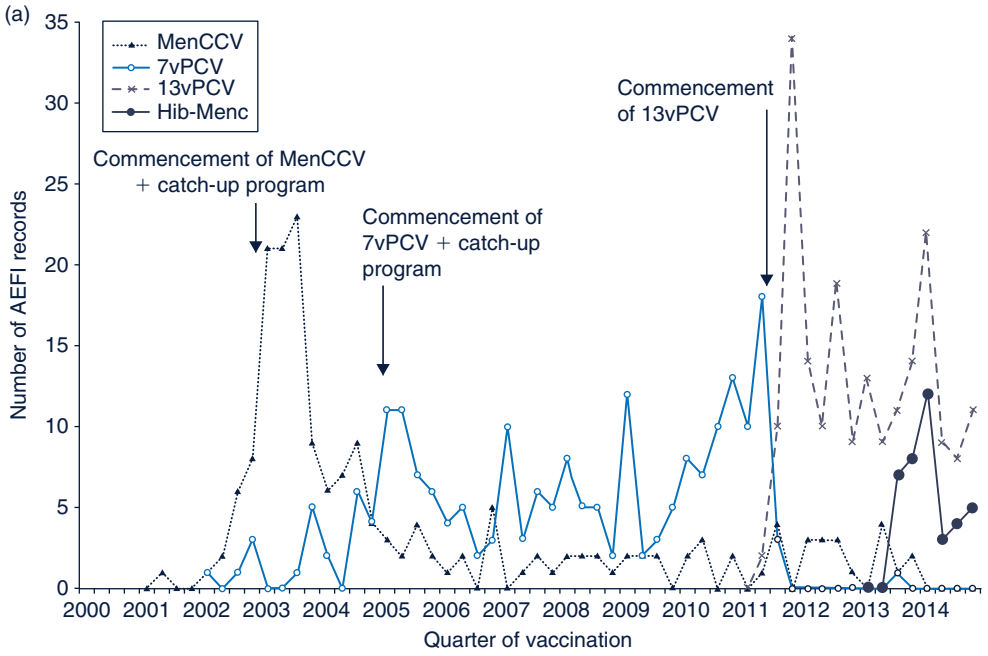

Figure 2a. Adverse events following immunisation in children aged <7 years for selected vaccines, NSW, 2014, by quarter of vaccination.

NB: Meningococcal C conjugate vaccine (MenCCV) was introduced into the National Immunisation Program schedule on 1 January 2003; 7-valent pneumococcal conjugate vaccine (7vPCV) on 1 January 2005; 13-valent pneumococcal conjugate vaccine (13vPCV) on 1 July 2011; and HibMenC on 1 July 2013.

Source: Adverse Drug Reactions Reporting System database, TGA.

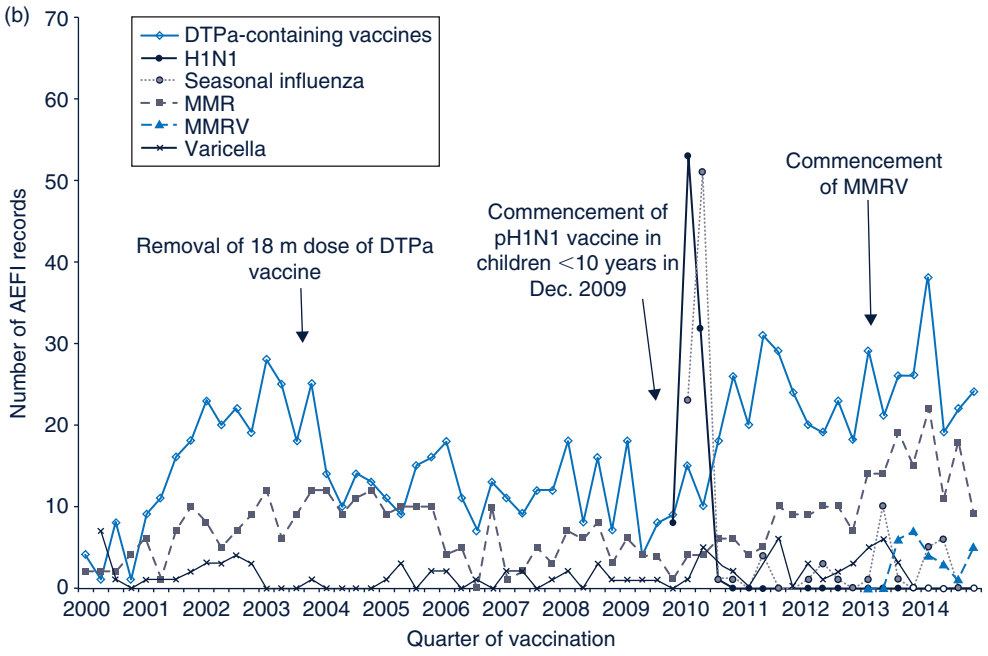

Figure 2b. Adverse events following immunisation in children aged <7 years for selected vaccines, NSW, 2000–2014, by quarter of vaccination.

NB: DTPa-IPV was introduced into the NIP schedule in November 2005 replacing DTPa and OPV; seasonal trivalent influenza vaccine was extended to medically at risk children in 2010; MMRV vaccine was introduced on 1 July 2013.

Source: Adverse Drug Reactions Reporting System database, TGA.

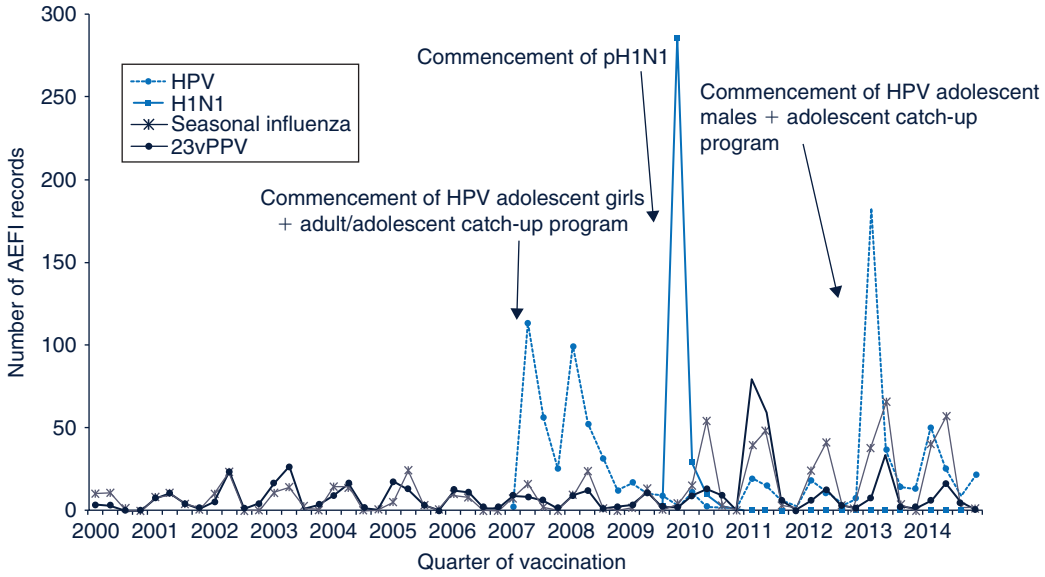

Figure 3. Adverse events following immunisation for people aged ≥7 years in frequently reported vaccines, NSW, 2000–2014, by quarter of vaccination.

Source: Adverse Drug Reactions Reporting System database, TGA.

associated with replacement of monovalent vaccines with combination vaccines in children (Figures 2a and 2b) and also decline in reports of AEFI with HPV vaccines in adolescents (Figure 3).

The usual seasonal pattern of AEFI reporting from older Australians receiving 23vPPV and influenza vaccine during the autumn months (March–June) is evident in Figure 3.

Age group and vaccine

Figure 4a shows that the reporting rates were highest in 2–<7 year olds during 2014 (20.8 per 100 000 doses), although the rates decreased in 2014 compared with 2013 (35.8 per 100 000 doses). A decline was also observed in <1 year and 1–<2 year olds in 2014 compared with 2013.

Since vaccine dose information was not available for persons aged ≥7 years, population-based AEFI reporting rates were estimated as shown in Figure 4b. There was a 56% decline in the 7–<20 year age group during 2014 compared with 2013 (from 24.8 to 10.9), which has contributed to the overall drop in rate for the current reporting period.

Reporting rates per 100 000 doses in <7 year olds, which exclude influenza due to the absence of reliable dose data, did not change significantly for any vaccine (Table 1).

In 2014 there was a decline in HPV rates compared with the previous reporting period. HPV vaccine accounted for 21% of records in 2014 compared with 29% in the previous reporting period. Of the records associated with HPV, it was the only suspected vaccine on 70 occasions (65%) in the current reporting period (Table 2).

There were no reports of adverse events following administration of monovalent vaccines such as varicella, meningococcal C (MenC) and *Haemophilus influenzae* type B (Hib) in 2014.

MMRV vaccine was recorded in 13 reports and three of these were coded as serious (Tables 1 and 2). The reporting rate for <7 year olds was 13.3 per 100 000 doses in 2014 compared with 30.5 in 2013. In 92% of the reports MMRV ($n = 12$) was administered alone.

For MMR vaccine, a slightly higher proportion of reports in those aged 7 years and older (18%) was observed as shown in Table 2 compared with the previous reporting period (10%).

Seasonal influenza vaccine was reported in 22% of records in 2014 compared with 20% of records in the previous reporting period.

There were no reports of adverse events following hepatitis B for adolescents aged 12–17 years (Table 1).

Overall, as shown in Table 2, the most frequently reported individual vaccines during 2014 were seasonal influenza ($n = 115$; 22%) followed by HPV vaccine ($n = 107$; 21%); MMR ($n = 74$; 14%), DTPa-IPV ($n = 60$; 12%), dTpa ($n = 59$; 11%) and PCV13 ($n = 50$; 10%).

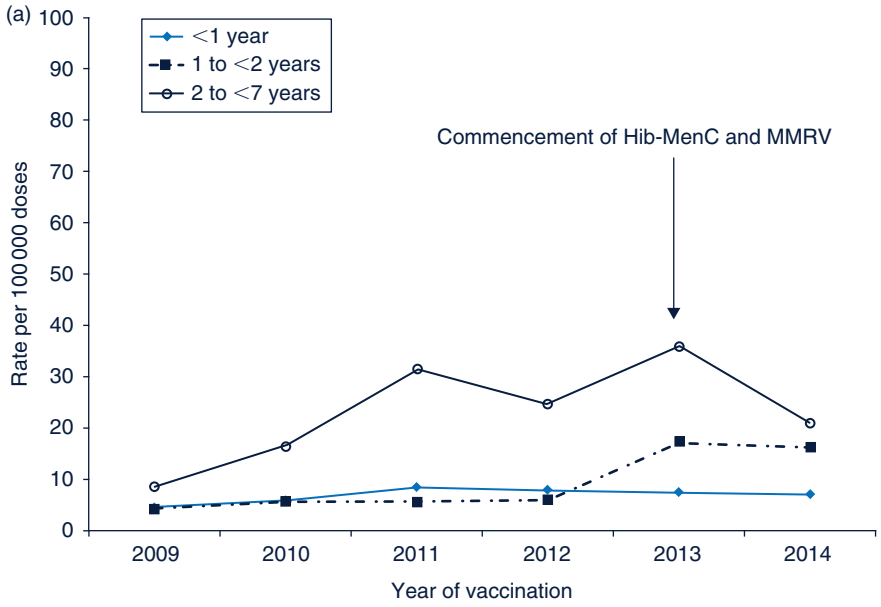

Figure 4a. Reporting rates of adverse events following immunisation for NSW per 100 000 doses, 2009–2014, for people aged <7 years, by year of vaccination.

Source: Adverse Drug Reactions Reporting System database, TGA.

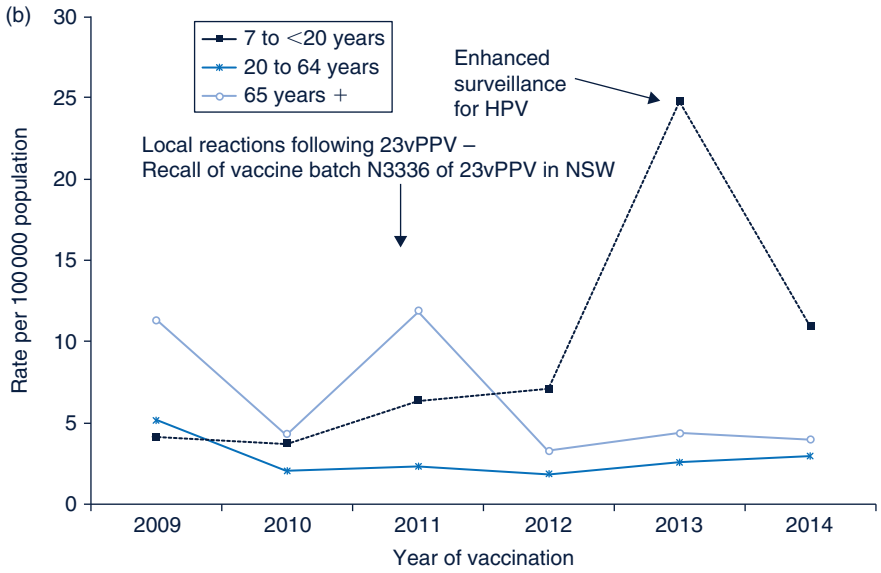

Figure 4b. Reporting rates of adverse events following immunisation for NSW per 100 000 population, 2009–2014, for people aged ≥7 years, by year of vaccination.

Reactions

The distribution and frequency of reactions listed in AEFI records for 2014 are shown in Table 3. The most frequently reported adverse events were injection site reaction (ISR) ($n = 121$; 23%), pyrexia ($n = 112$; 22%), rash ($n = 82$; 16%) and headache ($n = 47$; 9%).

Of the total 121 cases of ISR, the majority ($n = 80$; 66%) were in those aged ≥7 years. Also, more than half of the pyrexia ($n = 57$) and all of the headache ($n = 47$) cases were reported in those aged ≥7 years while 61% ($n = 50$) of rash was observed in children aged <7 years.

There were only 10 reported cases of syncope and 12 cases of presyncope during 2014. Eighty per cent ($n = 8$) of cases of syncope and 75% of presyncope ($n = 9$) were reported in ≥7 year olds.

There were only six reports of hypotonic-hyporesponsive episode (HHE) and all were reported from children aged <7 years.

Table 1. Vaccine types listed as 'suspected' in records of adverse events following immunisation for four age groups (<7, 12–17, 18–64 and ≥65 years), NSW, 2014

Vaccines[a]	AEFI records[b] 2014	Serious outcome[c] 2014	Reporting rate per 100 000 doses[d] 2014	
	n	*n*	Rate	(95% CI)
<7 years				
Measles-mumps-rubella	60	6	31.1	(24.1–39.9)
DTPa-IPV	56	6	56.6	(43.5–73.5)
PCV	50	6	17.9	(13.6–23.6)
Hexavalent (DTPa-IPV-HepB-Hib)	47	5	17.0	(12.8–22.6)
Rotavirus	44	7	24.6	(18.3–33.1)
Hib-MenC	24	2	25.2	(16.9–37.6)
MMRV	13	3	13.3	(7.7–22.9)
Seasonal influenza[e]	11	1	–	–
Varicella	0	0	–	–
MenC	0	0	–	–
Haemophilus influenzae type b	0	0	–	–
12–17 years				
HPV	96	11	31.1	(25.4–37.9)
dTpa	35	3	47.4	(34.0–66.0)
Varicella	4	0	10.8	(4.0–28.7)
Seasonal influenza	3	1	–	–
Hepatitis B	0	0	–	–
18–64 years				
Seasonal Influenza	80	6	–	–
dTpa	13	1	–	–
23vPPV	8	0	–	–
Yellow fever	4	0	–	–
Hepatitis B	3	0	–	–
≥65 years				
23vPPV	19	0	–	–
Seasonal Influenza	16	1	–	–
dTpa	2	0	–	–

[a]Records where at least one of the vaccines shown in the table was suspected of involvement in the reported adverse event.
[b]Number of AEFI records in which the vaccine was coded as 'suspected' of involvement in the reported adverse event and the vaccination was administered between 1 January 2014 and 31 December 2014. More than one vaccine may be coded as 'suspected' if several were administered at the same time.
[c]'Serious' outcomes are defined in the Methods section.
[d]The estimated AEFI reporting rate per 100 000 vaccine doses recorded.
[e]Rates for seasonal influenza are not provided as dose data not reliable.
AEFI: adverse events following immunisation
Source: Adverse Drug Reactions Reporting System database, TGA.

Anaphylaxis was reported in seven people during 2014. Of the seven reports, two occurred in children <5 years, three in adolescents and two in adults. The suspected vaccines varied by age groups: MMR, MMRV and DTPa-IPV in children; HPV and dTpa in adolescents; and 23vPPV, seasonal influenza, MMR and varicella in adults. Six of the seven cases were taken to hospital emergency departments and all recovered.

Furthermore, there were two reported cases of Guillain-Barre syndrome (GBS) during this period. Of the two cases, age/date of birth was not reported to the TGA for one (presumed to be an adult from report description) and the other was a 38-year-old adult. The suspected vaccine was seasonal influenza in both cases. For the person with unreported age, who had experienced unconfirmed GBS in 2009 following the influenza vaccine, laboratory investigations, treatment or hospitalisation were not reported. For the 38-year-old adult who was hospitalised, GBS was considered in the differential diagnosis and symptoms improved while in hospital.

Table 2. Vaccine types listed as 'suspected' in records of adverse events following immunisation (AEFI), NSW, 2014

Suspected vaccine type	AEFI records		One suspected vaccine only[a]		'Serious' outcome		Age group[b]			
							<7 years		≥7 years	
	n	(%)	*n*	(%)[c]	*n*	(%)[c]	*n*	(%)[c]	*n*	(%)[c]
Influenza	115	(22.0)	100	(87)	10	(9)	11	(10)	100	(87)
HPV	107	(20.5)	70	(65)	12	(11)	1	(1)	105	(98)
MMR	74	(14.2)	17	(23)	7	(9)	60	(81)	13	(18)
DTPa-IPV	60	(11.5)	28	(47)	6	(10)	56	(93)	4	(7)
dTpa	59	(11.3)	23	(39)	5	(8)	2	(3)	57	(97)
PCV13	50	(9.6)	4	(8)	6	(12)	50	(100)	0	(0)
DTPa-IPV-HepB-Hib	47	(9.0)	3	(6)	5	(11)	47	(100)	0	(0)
Rotavirus	44	(8.4)	7	(16)	7	(16)	44	(100)	0	(0)
23vPPV	30	(5.7)	21	(70)	1	(3)	0	(0)	27	(90)
Hib-MenC	25	(4.8)	0	(0)	2	(8)	24	(96)	1	(4)
Hepatitis B	24	(4.6)	21	(88)	0	(0)	2	(8)	4	(17)
Meningococcal B	20	(3.8)	20	(100)	2	(10)	11	(55)	6	(30)
MMRV	13	(2.5)	12	(92)	3	(23)	13	(100)	0	(0)
Varicella	10	(1.9)	5	(50)	1	(10)	0	(0)	9	(90)
Rabies	7	(1.3)	5	(71)	0	(0)	0	(0)	7	(100)
Hepatitis A-Typhoid	6	(1.1)	3	(50)	0	(0)	0	(0)	5	(83)
Zoster	5	(1.0)	4	(80)	1	(20)	0	(0)	5	(100)
Yellow fever	4	(0.8)	2	(50)	0	(0)	0	(0)	4	(100)
dT	4	(0.8)	3	(75)	1	(25)	0	(0)	4	(100)
Typhoid	3	(0.6)	3	(100)	2	(67)	1	(33)	2	(67)
Hepatitis A	2	(0.4)	0	(0)	0	(0)	1	(50)	1	(50)
Q fever	2	(0.4)	2	(100)	0	(0)	0	(0)	2	(100)
Hepatitis A + B	2	(0.4)	1	(50)	0	(0)	0	(0)	2	(100)
MenCCV	1	(0.2)	1	(100)	0	(0)	0	(0)	1	(100)
Hib	1	(0.2)	0	(0)	0	(0)	0	(0)	1	(100)
Cholera	1	(0.2)	1	(100)	0	(0)	0	(0)	1	(100)
BCG	1	(0.2)	1	(100)	0	(0)	0	(0)	1	(100)
Tetanus	1	(0.2)	0	(0)	0	(0)	0	(0)	1	(100)
Japanese encephalitis	1	(0.2)	0	(0)	0	(0)	0	(0)	1	(100)
Total[d]	518	(100)	357	(69)	48	(9)	184	(35)	305	(59)

[a]AEFI records where only one vaccine was suspected of involvement in a reported adverse event.
[b]AEFI records are not shown if both age and date of birth were not reported.
[c]Percentages are calculated for the number of AEFI records where the vaccine was suspected of involvement in the AEFI, e.g. Influenza was 'suspected' in 115 AEFI records; this was the only suspected vaccine in 87% of the 115 AEFI records, 9% were defined as 'serious' and 87% were for those aged ≥7 years.
[d]Total number of AEFI records analysed, not the total in each column as categories are not mutually exclusive and an AEFI record may list more than one vaccine.
Source: Adverse Drug Reactions Reporting System database, TGA.

Severity of outcomes

Eleven per cent ($n = 57$) of events were defined as 'serious' (i.e. recovery with sequelae, requiring hospitalisation, experiencing a life-threatening event or death).

Reactions recorded as 'serious' were pyrexia ($n = 11$); vomiting ($n = 8$); anaphylaxis ($n = 7$); hypotonic-hyporesponsive episodes ($n = 2$), diarrhoea and intussusception (two each); one case each of Guillain-Barre syndrome (GBS), syncope and presyncope and others as shown in Table 3.

There was one death reported in NSW in 2014 as temporally associated with receipt of vaccines.

- A 58-year-old man had an infected leg wound prior to vaccination with diphtheria and tetanus vaccine (ADT) and seasonal influenza vaccine. He developed acute disseminated myeloencephalitis (ADEM), which

Table 3. Selected reported adverse events and reactions of interest[a] as classified predominantly by MedDRA Preferred Terms in records of adverse events following immunisation (AEFI), NSW, 2014[b]

MedDRA Preferred Terms (adverse events)	AEFI records	Only reaction reported[c]		'Serious' outcome		Age group[d]			
						<7 years		≥7 years	
	n	*n*	(%)[e]	*n*	(%)[e]	*n*	(%)[e]	*n*	(%)[e]
Injection site reaction[f]	121	51	(42)	2	(2)	38	(31)	80	(66)
Pyrexia	112	4	(4)	11	(10)	52	(46)	57	(51)
Rash[g]	82	28	(34)	6	(7)	50	(61)	32	(39)
Headache	47	1	(2)	2	(4)	0	(0)	47	(100)
Vomiting	43	2	(5)	8	(19)	12	(28)	31	(72)
Nausea	28	0	(0)	1	(4)	2	(7)	26	(93)
Urticaria	24	8	(33)	2	(8)	13	(54)	11	(46)
Malaise	23	1	(4)	1	(4)	3	(13)	20	(87)
Diarrhoea	22	2	(9)	2	(9)	13	(59)	9	(41)
Extensive limb swelling	22	8	(36)	2	(9)	6	(27)	16	(73)
Fatigue	22	0	(0)	1	(5)	1	(5)	21	(95)
Pain	22	1	(5)	1	(5)	1	(5)	21	(95)
Myalgia	21	0	(0)	1	(5)	2	(10)	19	(90)
Dizziness	20	0	(0)	2	(10)	0	(0)	20	(100)
Cough	18	1	(6)	3	(17)	9	(50)	9	(50)
Irritability	18	0	(0)	4	(22)	17	(94)	1	(6)
Abdominal pain	16	1	(6)	3	(19)	2	(13)	14	(88)
Lethargy	15	0	(0)	1	(7)	4	(27)	11	(73)
Arthralgia	14	1	(7)	0	(0)	0	(0)	14	(100)
Erythema	13	1	(8)	1	(8)	1	(8)	12	(92)
Pallor	13	1	(8)	2	(15)	10	(77)	3	(23)
Presyncope	12	2	(17)	1	(8)	2	(17)	9	(75)
Convulsions[h]	11	7	(64)	1	(9)	10	(91)	1	(9)
Febrile convulsion	11	7	(64)	1	(9)	10	(91)	1	(9)
Pruritus	11	0	(0)	0	(0)	2	(18)	9	(82)
Rhinorrhoea	11	0	(0)	2	(18)	7	(64)	4	(36)
Syncope	10	5	(50)	1	(10)	2	(20)	8	(80)
Paraesthesia	9	0	(0)	0	(0)	0	(0)	9	(100)
Somnolence	9	0	(0)	0	(0)	5	(56)	4	(44)
Oropharyngeal pain	8	0	(0)	0	(0)	1	(13)	7	(88)
Chills	8	0	(0)	0	(0)	0	(0)	8	(100)
Anaphylactic reaction[i]	7	7	(100)	7	(100)	2	(29)	5	(71)
Dyspnoea	7	0	(0)	1	(14)	1	(14)	6	(86)
Tachycardia	7	0	(0)	2	(29)	3	(43)	4	(57)
Decreased appetite	6	0	(0)	1	(17)	4	(67)	2	(33)
Hyperhidrosis	6	0	(0)	1	(17)	1	(17)	5	(83)
Hypotonic-hyporesponsive episodes	6	5	(83)	2	(33)	6	(100)	0	(0)
Crying	5	0	(0)	0	(0)	5	(100)	0	(0)
Swelling face	5	0	(0)	0	(0)	0	(0)	5	(100)
Hypoaesthesia	4	0	(0)	0	(0)	0	(0)	4	(100)
Intussusception	4	2	(50)	2	(50)	4	(100)	0	(0)
Chest discomfort	3	0	(0)	1	(33)	0	(0)	3	(100)
Lymphadenitis	3	1	(33)	0	(0)	0	(0)	3	(100)
Guillain-Barre Syndrome	2	1	(50)	1	(50)	0	(0)	1	(50)

[a]Selected reported adverse events reported during January 2014–December 2014. Note: for injection site reaction, rash and convulsions, Preferred Terms were grouped as described below.
[b]A complete list of adverse reactions as classified by individual Preferred Terms is available on request.
[c]AEFI records where only one reaction was reported.
[d]Not shown if neither age nor date of birth were recorded or missing data.
[e]Percentages relate to the number of AEFI records in which the specific reaction term was listed.
[f]Injection site reaction MedDRA codes include injection site reaction, injection site swelling, injection site pain, injection site mass, injection site erythema, injection site cellulitis, injection site rash, injection site induration, injection site abscess, injection site pruritus, injection site nodule, injected limb mobility decreased, injection site urticaria, injection site inflammation, injection site bruising, injection site infection, and injection site warmth.
[g]Rash MedDRA codes include rash, rash generalised, rash maculo-papular, rash macular, rash vesicular, rash papular, rash morbilliform, and rash pustular.
[h]Convulsion MedDRA codes include convulsion, grand mal convulsion, and partial seizures.
[i]All anaphylaxis cases were categorised as 'serious' by Health Protection, NSW.
Source: Adverse Drug Reactions Reporting System database, TGA.

progressed over 6 weeks leading to death. Symptom onset date was 5 days after vaccination.

This was investigated by the TGA and no clear causal relationship with vaccination was found.

Discussion

There was an overall drop in the number of reports and population-based rates in 2014 compared with the previous reporting period, predominantly due to a large decline in reports following the HPV vaccine. This drop was likely due to it being the second year of the extension of the National HPV Vaccination Program to males. There is usually an increase in reporting of adverse events when a program is newly implemented. Historical data have shown that initial high levels of AEFI reporting occur each time a new vaccine is introduced, as immunisation providers are more likely to report milder, less serious AEFIs for vaccines they are not familiar with. This is then followed by a reduction and stabilisation of reporting over time (Weber effect).[28] In 2013 and 2014, the TGA, together with NSW Health, closely monitored adverse events reported following HPV vaccination as the program was extended to males, with particularly enhanced surveillance using rapid reporting from school-based programs.

In 2014, the drop in number of adverse events could partially be attributed to ceasing of the school-based hepatitis B vaccination program[13] by the end of 2013 and therefore no reports of adverse events for hepatitis B vaccine in this cohort of children. In addition, there were no reports of adverse events following administration of monovalent vaccines such as varicella, meningococcal C (MenC) and Haemophilus B (Hib) in children <7 years in this reporting period. This was anticipated since the combined Hib–MenC vaccine replaced the respective monovalent MenC and Hib vaccines in July 2013.[29] Also, from July 2013, the second dose of MMR vaccine was brought forward to 18 months of age and delivered as a combination MMRV vaccine.[14]

Injection site reaction, pyrexia and rash were the most commonly reported reactions in 2014. Vaccines such as MMR, DTPa-containing vaccines, Hib-MenC and rotavirus had higher reporting rates than other vaccines for children aged <7 years in the current reporting period. However, these rates were not significantly higher than the previous reporting period.[20] For MMR vaccine, there was a slightly higher proportion of reports in those aged 7 years and older (18%) compared with the previous reporting period (10%), which may be related to the MMR high school catch-up vaccination program that was implemented from August to December 2014 in NSW with 11 305 doses used in the program.

Also, in this reporting period, a 58-year-old man with ADEM died, however, it was not causally associated with the vaccine. ADEM, commonly seen in children, has an estimated annual incidence of 0.8 per 100 000 and the underlying causes include infectious, toxic, neoplastic, autoimmune and metabolic aetiologies.[30,31]

Conclusion

Overall, the total number of reported AEFIs decreased during 2014 compared with the previous reporting period. The majority of AEFIs reported to the TGA were mild transient events. The data reported here are consistent with an overall high level of safety for vaccines included in the NIP schedule.

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