

Vaccine Preventable Diseases: 2009

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Introduction

This is the first in what is planned to be an annual series of reports on vaccine preventable disease surveillance in NSW. The objectives of vaccine preventable disease surveillance are to:

- Identify close contacts of the patient who may be at risk of infection
- Monitor the epidemiology of vaccine preventable diseases, including the impact of immunisation, and so inform the development of prevention strategies
- Identify cases of possible vaccine failure
- Detect and investigate outbreaks of vaccine preventable disease

In NSW, all notifications of *Haemophilus influenzae* type b, measles, meningococcal disease, pertussis, pneumococcal disease (cases aged <5 years and 50 years and over) and tetanus require public health follow-up. The objective of this follow-up is to ascertain exposure risk, implement appropriate public health interventions and prevent further transmission in the community. Notifications of mumps and rubella are not routinely followed-up by public health in NSW.

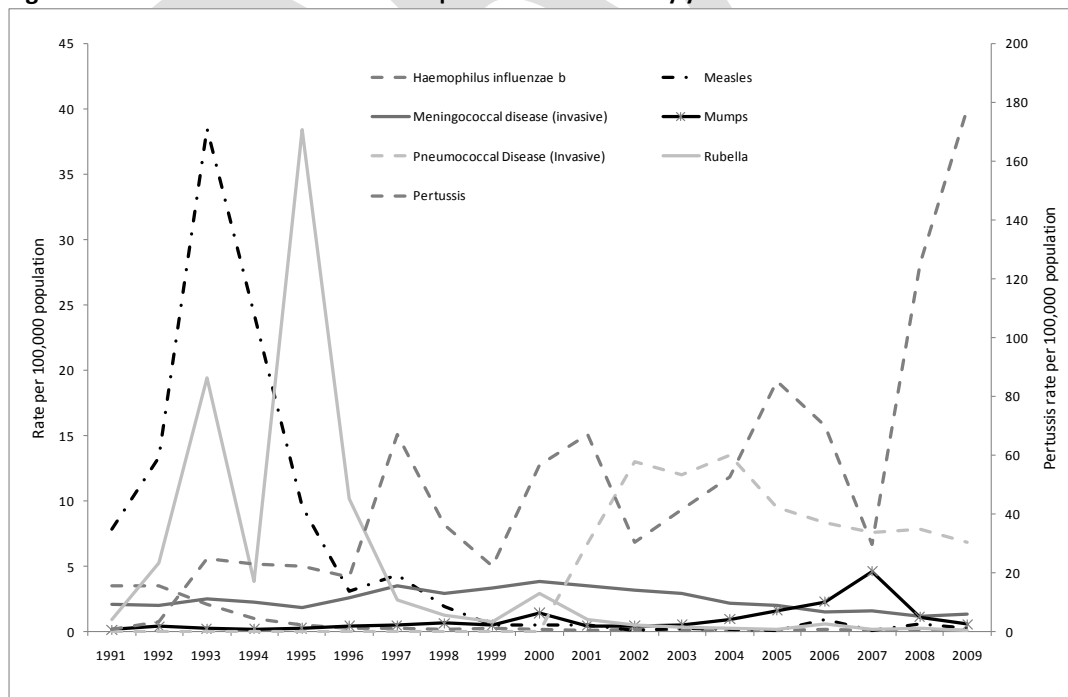
The following report describes notification data for vaccine preventable diseases in NSW from 1 January to 31 December 2009.

Method

Notification data from the New South Wales Notifiable Diseases Database (NDD) was reviewed for cases with a date of onset between 1 January 1991 and 31 December 2009. All rates were calculated using ABS population estimates for the relevant year. Rates are presented as annual rates per 100,000 total population or population in age groups, as appropriate.

Results

Figure 1. NSW notification rates of vaccine preventable diseases by year of onset: 1991 – 2009



Haemophilus influenzae serotype b

Haemophilus influenzae type B (Hib) is a bacillus which is part of the normal flora of the upper respiratory tract. The bacteria are spread through contact with droplets from the nose or throat of an infected person, in household-like settings. Infection can result in invasive disease, including meningitis, epiglottitis, septic arthritis, cellulitis and pneumonia. In Australia, vaccination against Hib is available for infants at 2, 4, 6, and 12 months of age.

Summary of notifications

Notifications have significantly decreased in NSW since the introduction of vaccine, from 124 in 1993 to 6 notifications in 2009 (Figure 1). In 2009, no notifications were from Aboriginal people.

Vaccination status

Of the 6 cases in 2009, 3 were not vaccinated, 2 cases had received 2 doses of vaccine and for 1 case vaccination status was unknown.

Measles

Measles is an acute, highly infectious, viral disease that can have serious complications. Prodromal symptoms of measles include fever, tiredness, cough, runny nose, sore red eyes and feeling unwell. A characteristic rash appears from 3-7 days after the prodrome, beginning on the face, and spreading down the body. The rash usually lasts for 4-7 days. In the past, measles infection was very common in childhood.

Summary of notifications

In 2009, 19 cases of measles were notified in NSW, compared to 39 cases in 2008. Two cases were unvaccinated infants aged less than 1 year, 2 were aged 5-9 years, 6 were 10-19 years and 9 were 20-40 years. Ten cases were female and nine were male. No cases were reported in Aboriginal people in 2009. The highest notification rates were reported from Central Sydney (1.4 per 100,000 population).

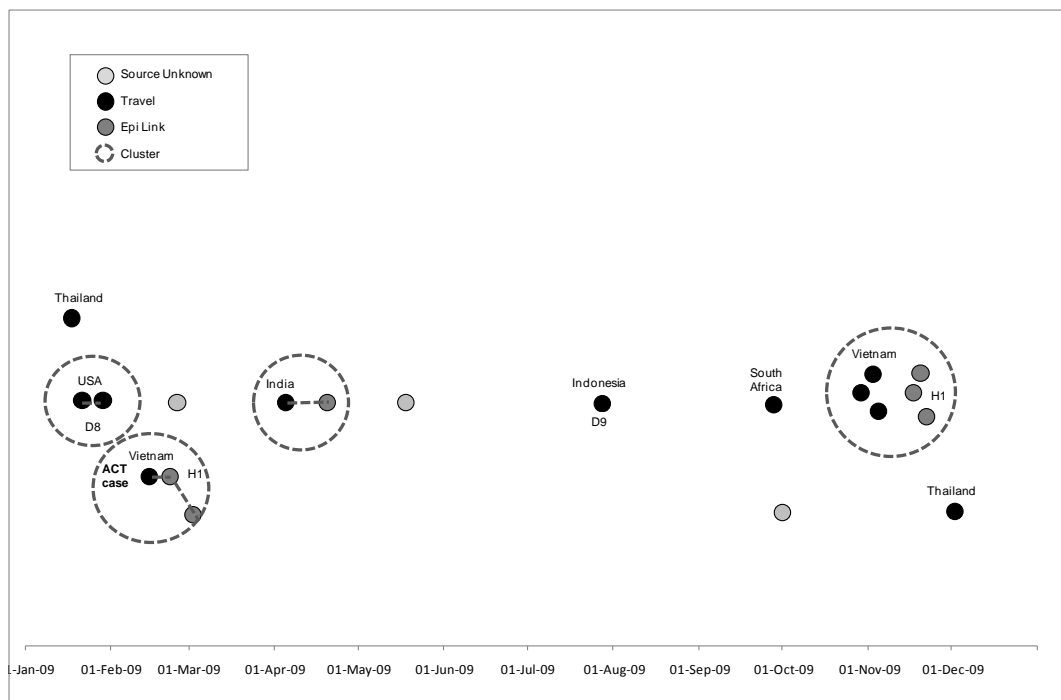
Vaccination status

Of the 7 cases that reported previous vaccination, 4 had 1 dose, 1 reported 2 doses, and for 2 cases the number of doses of vaccine was unknown. Five cases were not vaccinated and for 7 cases the vaccination status was unknown.

Outbreaks

In NSW, most cases of measles are seen in non-immune travellers who return with the infection from countries where measles is endemic or non-immune people who are exposed to a known case. Of the 19 cases, 11 (58%) were associated overseas travel, a further 5 (26%) cases were secondary contacts of overseas travellers, and for 3 (16%) cases the source was unknown (Figure 2). In 2009, one cluster of measles in metropolitan Sydney (involving 6 cases) was identified and associated with a secondary school overseas trip to Vietnam.

Figure 2. NSW measles notifications by source of infection and genotype, 2009



Genotype

There are several different genotypes of the measles virus. In 2009, 5 cases had measles genotype information identified. Of these, 3 were identified as H1 (associated with travel to Vietnam), 1 was D8 (associated with travel to the USA), and 1 was D9 (associated with travel to Indonesia).

Comment

In the past, measles infection was very common in childhood. Now, because of immunisation, measles is a rare condition. People at risk of measles include those who have never had measles and those born during or since 1966 (after measles was common). A second dose of Measles-Mumps-Rubella (MMR) was added to the national immunisation schedule in 1992. People who have not had two doses of MMR are also at risk of measles infection. Non-immune travellers who return with the infection from countries where measles is endemic or non-immune people who are exposed to a known case make up the majority of notifications in NSW.

Meningococcal Disease (Invasive)

Meningococcal disease is an acute bacterial disease that typically causes septic shock or meningitis (or a combination of these syndromes). Meningococcal disease is caused by infection with meningococcus bacteria of which there are several serogroups. A vaccine against serogroup C meningococcal disease was added to the National Immunisation Program in 2003 for children at 12 months of age and given to all children aged 1-19 years of age during 2003 through the school based immunisation program. There is no vaccine for disease caused by serogroup B in Australia.

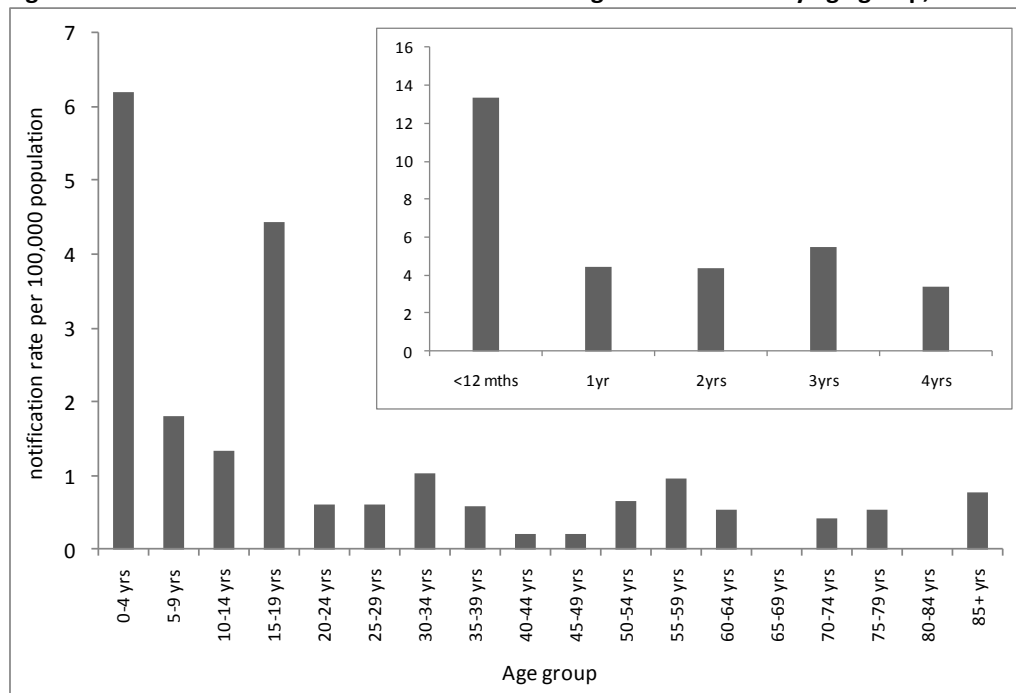
Summary of notifications

In 2009, 91 cases of invasive meningococcal disease were reported in NSW (80 confirmed and 11 probable cases) compared to 80 cases in 2008 and 108 in 2007. The greatest reduction in notifications of meningococcal disease has been for serogroup C meningococcal disease (from 28% of known serogroup cases in 2003 to 9% in 2009). Four deaths were reported in 2009 compared to 3 deaths in 2008. Eight cases were reported in Aboriginal people in 2009.

The highest notification rates of meningococcal disease were reported among children aged less than five years of age at onset (29 cases, 6.2 per 100,000 population) and young people aged 15-19 years (21 cases, 4.4 per 100,000 population). Of the notifications from children aged less than 5

years, the highest rates were reported from infants aged less than 12 months (12 cases, 13.3 per 100,000 population) (Figure 3). Geographically, the highest notification rates were reported from Central Sydney (1.4 per 100,000 population).

Figure 3. NSW annual notifications of invasive meningococcal disease by age group, 2009



Serogroup

Of the 91 cases of invasive meningococcal disease reported in 2009, serogroup information was recorded for 74 (81%) cases. In 2009, 59 (80%) cases with known serogroup information were caused by serogroup B (for which there is no vaccine), 7 (9%) cases of serogroup C, 5 (7%) cases of serogroup W 135 and 3 (4%) cases of serogroup Y infection were reported in NSW. Of the 17 (19%) cases with unknown serogroup data, 8 were not able to be typed and 6 were clinical diagnoses.

Vaccination status

Vaccination status was complete for 84 cases (92%) and of these, 43 were vaccinated. Of the vaccinated cases, 31 (74%) were serogroup B, 1 serogroup W 135, 1 serogroup Y, 8 unknown serogroup and 1 case of serogroup C (an apparent vaccine failure).

Comment

Notifications of meningococcal disease have declined significantly since the National Meningococcal C Immunisation Program commenced in 2003 and serogroup C meningococcal disease is now mainly seen in adults and unimmunised children. Meningococcal disease associated with serogroup B has also decreased (although not to the extent of serogroup C disease and non-vaccine serogroups (W 135 and Y) have remained relatively stable over time.

Mumps

Mumps is an acute infectious disease caused by the mumps virus. Common symptoms of mumps include fever, loss of appetite, tiredness and headaches followed by swelling and tenderness of the salivary glands and illness is usually more severe in people infected after puberty. In NSW, vaccination is provided using measles-mumps-rubella vaccine (MMR) at 12 months and four years of age.

Summary of notifications

In 2009, 39 cases of mumps were reported compared to 76 in 2008 and 318 in 2007. The highest numbers of mumps cases were reported among young adults aged 20-29 years of age at onset (10 cases, 1.0 per 100,000 population). In 2009, 62% of cases were male. The highest rates were reported from Central Sydney (1.1 per 100,000 population) and Northern Rivers (1.0 per 100,000 population).

Comment

In NSW, notifications of mumps are not routinely followed up by public health units. In 2007 a significant increase in mumps notifications (largely from young adults in South Eastern Sydney) was reported in NSW. Since then notifications have returned to baseline levels. No outbreaks or clusters were reported in 2009.

Pertussis

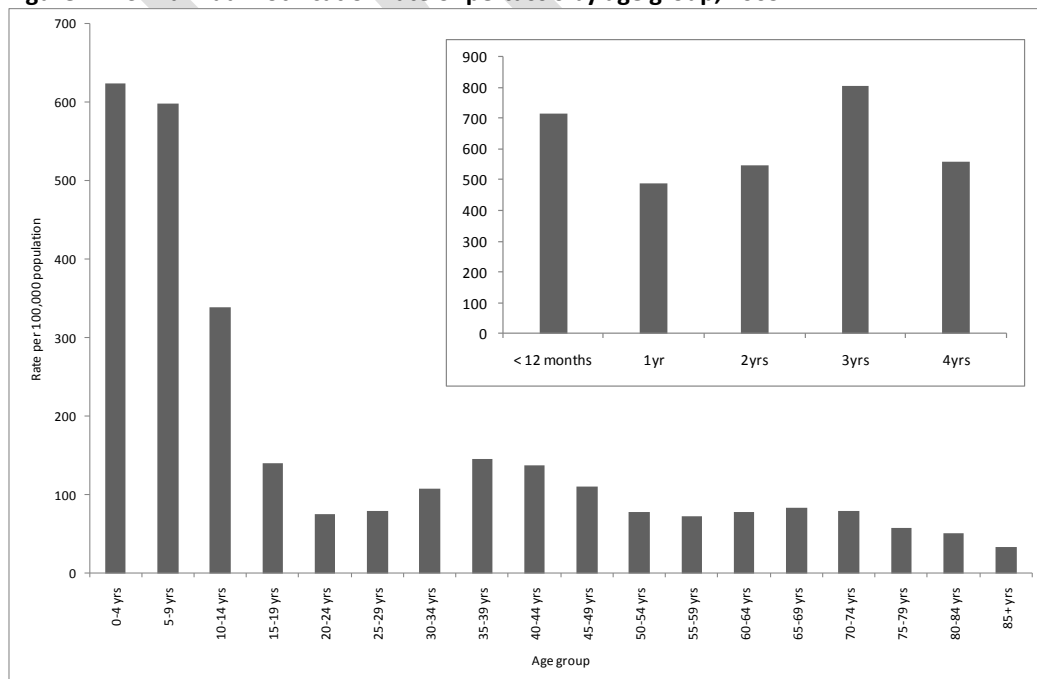
Pertussis (or whooping cough) is a disease caused by infection of the throat with the bacteria *Bordetella pertussis*. Pertussis can be very serious in small children. Older children and adults may have a less serious illness, with bouts of coughing that continue for many weeks regardless of treatment. Pertussis vaccination is combined with diphtheria and tetanus (DTPa) in a primary course at 2, 4, and 6 months of age with a booster at 4 years. A second booster dose is given between 15 and 17 years using the adult dTpa formulation.

Summary of notifications

In 2009, 12,578 notifications of pertussis were reported in NSW following significant increases in 2008 (8,759) and compared with previous years a significant increase in pertussis notifications was recorded (8,757 notifications) compared with 2,100 in 2007. While epidemics of pertussis occur every 3 to 5 years, notifications in 2008 and 2009 far exceeded previous epidemic years (Figure 1).

The highest pertussis notification rates were reported from children aged less than five years of age (2,826 cases, 623.5 per 100,000 population) and 5-9 years (2,653 cases, 598.4 per 100,000 population). Of the cases aged less than 5 years, the highest notification rates were reported from children aged 3 years (807.0 per 100,000 population) and infants aged less than 12 months (713.5 per 100,000 population) (Figure 4). The highest notification rates were reported from Illawarra (363.3per 100,000 population) and Northern Rivers (278.3per 100,000 population).

Figure 4. NSW annual notification rate of pertussis by age group, 2009



Vaccination status

In 2009, 2,426 (85.8%) notifications of pertussis aged 0-4 years had complete immunisation status data. Of these, 423 (17%) were unimmunised or partially immunised infants aged less than 12 months.

Method of diagnosis

Prior to the 2008 and 2009 epidemic, the majority of pertussis notifications were identified through serological testing largely for people aged 20 years and over. During 2008, there was an increase in the use of PCR to diagnose pertussis, occurring across all age groups and in 2009, PCR diagnoses accounted for 83% of pertussis notifications.

Comment

Pertussis notifications increased significantly in the second half of 2008 and peaked during the first quarter of 2009. In 2009, the number of notifications in children aged 1- 4 years of age increased dramatically, and in disproportion to previous years patterns. This was particularly striking for children aged 3 years at onset. Of the cases aged 3 years at onset 82% (of those with complete vaccination data) were reported to have received the full primary course (3 doses) of vaccine, but had not received the 4 year old booster dose. One reason for the increase in notifications from the 3 to 4 years age group may be associated with waning immunity prior to the first booster dose recommended at four years.

There has been a significant shift in testing practices for pertussis in NSW from serology to use of PCR (a more sensitive test) for diagnosis. In addition, the cut off levels for a commonly used serological test changed across NSW. As a result, it may be difficult to compare 2008 and 2009 data with previous epidemic years.

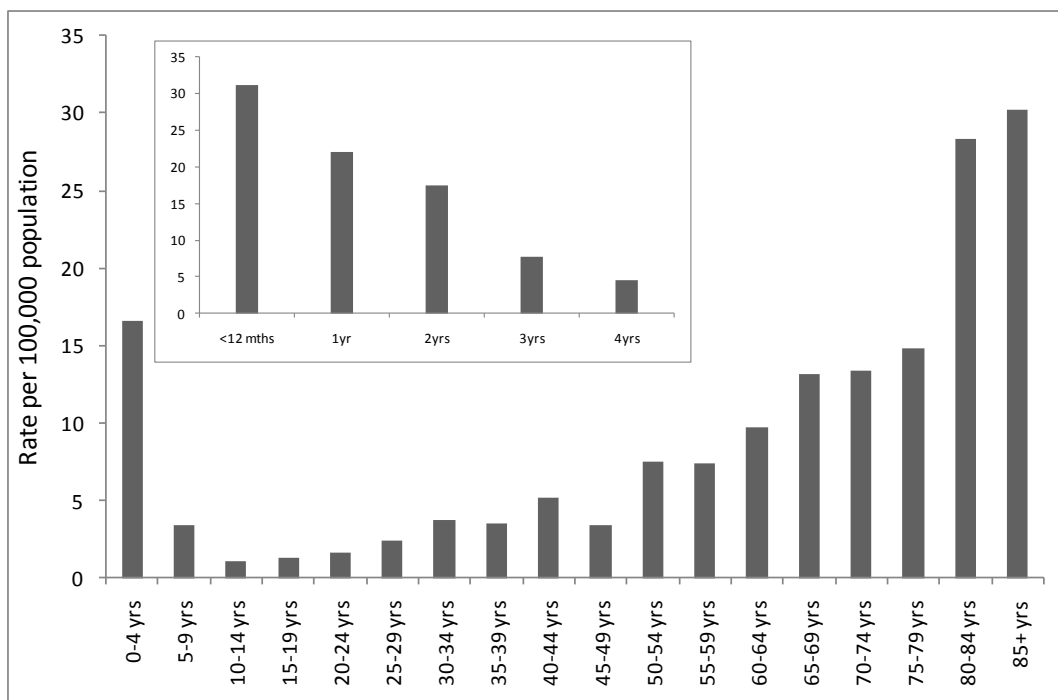
Pneumococcal Disease (Invasive)

Pneumococcal disease is caused by infection with the bacteria *Streptococcus pneumoniae* and is a frequent cause of serious bacterial infections. There are more than 90 different serotypes that can cause disease. Vaccines for children under 5 years (7-valent pneumococcal conjugate vaccine - PCV7) and adults older than 65 years (23-valent pneumococcal polysaccharide vaccine - PPV) were to the Australian immunisation schedule in 2005. In NSW, cases aged 5 to 49 years are not routinely followed up by public health units.

Summary of notifications

Notifications of invasive pneumococcal disease (IPD) have declined significantly since 2005 (Figure 1). In 2009, 481 cases of IPD were reported in NSW (6.8 per 100 000 population). The highest notification rates of IPD were reported from adults aged older than 80 years (29.2 per 100,000 population) and children aged less than 5 years (16.6 per 100,000 population) (Figure 5). Of the cases aged less than 5 years, the highest notification rates were reported from infants aged less than 12 months (31.1 per 100,00 population) and children aged 1 year (22.1 per 100,000 population). Geographically, the highest notification rates were reported from Central Coast (11.5 per 100,000 population) and Hunter (10.5 per 100,000 population). In 2009, Aboriginal status was complete for 70% of cases and 8 cases were Aboriginal.

Figure 5. NSW annual notifications of Invasive Pneumococcal Disease by age group, 2008



Serotype

Of the 481 cases of IPD in 2009, 353 (73%) cases had complete serotype information. In 2009, of the notifications from children aged less than 5 years with known serotype information, 5 (8%) were caused by serotypes included in the current. Of the notifications of disease caused by serotypes not included in current vaccines in children aged less than 5 years, 32 (54% were caused by serotype 19A).

Vaccination status

Of the 75 notifications from children aged less than 5 years, X (X%) were fully vaccinated. Of these, X (X%) were from serotypes included in the vaccine, X (X%) were from serotypes not included in the current vaccine and X (X%) the serotype was unknown.

Of the 282 notifications from adults aged 50 years and over, X (X%) were fully vaccinated. Of these, X (X%) were from serotypes included in the vaccine, X (X%) were from serotypes not included in the current vaccine and X (X%) the serotype was unknown.

Comment

A significant reduction notification of IPD in children and moderate decreases in adults followed the inclusion of pneumococcal vaccines (PCV7 and PPV) on the immunisation schedule for children and adults in 2005. Disease caused by serotypes included in the vaccine are uncommon, however, replacement invasive disease (disease caused by serotypes not included in the PCV7) have been increasing in recent years (particularly disease caused by serotype 19A).

Rubella

Rubella (or German measles) is an infectious viral disease of humans. Although in most people infection is mild, infection in early pregnancy can cause serious birth defects or miscarriage. Rubella is spread from an infected person by droplets from the nose or mouth or by direct contact. Rubella is easily spread to people who have not been vaccinated or previously infected. Rubella vaccination is provided using measles-mumps-rubella vaccine (MMR) at 12 months and four years of age.

Summary of rubella notifications

In 2009, 7 cases of rubella were reported in NSW compared to 17 in 2008. Rubella notifications have remained stable since 2005 years with an average of 18 cases reported annually. The highest notification rates of rubella were reported among young adults aged 25-29 years of age (0.6 per 100,000 population). In 2009, 3 (43%) cases were female. The highest rates were reported from North Sydney (0.2 per 100,000 population).

Comment

In NSW, notifications of rubella are not routinely followed up by public health units. Notification trends for rubella are similar to those observed for measles and mumps with cases generally declining over time. Young adults continue to be most effected.

Tetanus

Tetanus (sometimes called lock-jaw) is a disease caused by the bacteria *Clostridium tetani*. Toxin made by the bacteria, which grows at the site of an injury, attacks a person's nervous system. Although the disease is now rare (because of immunisation), it can be fatal. *Clostridium tetani* bacteria are found in dust and animal faeces and infection may occur after minor injury (sometimes unnoticed punctures to the skin that are contaminated with soil, dust or manure) or after major injuries such as open fractures, dirty or deep penetrating wounds, and burns. Tetanus is not passed from one person to another.

Vaccination against tetanus is given to children with diphtheria and pertussis (DTPa) in a primary course at 2, 4, and 6 months of age. A booster dose of DTPa is given at 4 years. A second booster dose has been included in the National Immunisation Program for 15-17 year olds since 2004 using the adult dTpa formulation.

Summary of tetanus notifications

In 2009, 1 case of tetanus was notified in NSW. The case, a man in his 30s, reported symptoms after standing on a nail.

Comment

Notifications for tetanus remained have relatively stable over the past 5 years, ranging from one to two notifications annually. In Australia, tetanus mostly occurs in older adults who are not adequately immunised.

Table 1. NSW notifications by Area Health Service NSW, 2009

Area Health Service		H.influenzae b		Measles		Meningococcal Disease (Invasive)		Mumps		Pertussis		Pneumococcal disease (invasive)		Rubella		Tetanus	
		No.	rate	No.	rate	No.	rate	No.	rate	No.	rate	No.	rate	No.	rate	No.	rate
Northern Sydney Central Coast	CCA	0	0	0	0	2	0.6	1	0.3	665	212.4	36	11.5	0	0	0	0
	NSA	0	0	3	0.4	7	0.9	7	0.9	1113	135.3	43	5.2	2	0.2	0	0
South Eastern Sydney Illawarra	ILL	0	0	1	0.3	10	2.6	2	0.5	1386	363.3	30	7.9	0	0	0	0
	SES	1	0.1	3	0.4	20	2.5	8	1	1064	133.5	62	7.8	1	0.1	0	0
Sydney South West	CSA	0	0	8	1.4	8	1.4	6	1	641	112	40	7	1	0.2	0	0
	SWS	0	0	2	0.2	7	0.8	3	0.4	1044	122.4	62	7.3	0	0	1	0.1
Sydney West	WEN	2	0.6	0	0	4	1.2	0	0	952	295.8	51	6.3	0	0	0	0
	WSA	1	0.1	1	0.1	6	0.7	4	0.5	1182	146.3	18	5.6	1	0.1	0	0
Greater Southern	GMA	0	0	0	0	1	0.4	1	0.4	550	203.5	8	3	0	0	0	0
	SA	0	0	0	0	2	0.9	0	0	367	170.5	11	5.1	1	0.5	0	0
Greater Western	FWA	0	0	0	0	0	0	0	0	58	131.5	4	3.8	0	0	0	0
	MAC	0	0	0	0	3	2.9	1	1	283	271	13	7.5	0	0	0	0
	MWA	0	0	0	0	2	1.1	0	0	392	225.1	1	2.3	0	0	0	0
Hunter New England	HUN	2	0.3	1	0.2	9	1.5	2	0.3	1251	209	63	10.5	1	0.2	0	0
	NEA	0	0	0	0	4	2.2	1	0.6	226	124.7	15	8.3	0	0	0	0
North Coast	MNC	0	0	0	0	2	0.7	0	0	531	179	13	4.5	0	0	0	0
	NRA	0	0	0	0	4	1.4	3	1	811	278.3	9	3	0	0	0	0

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