Surveillance objectives

In general, the objectives of vaccine preventable disease surveillance are to:

- Monitor the epidemiology of vaccine preventable diseases in terms of time, person and place;
- Detect and investigate outbreaks of vaccine preventable diseases to implement appropriate public health interventions and prevent further transmission;
- Communicate the patterns, risks and trends about vaccine preventable diseases to the public, government and other key stakeholders;
- Monitor the impact of immunisation programs.

All notified cases of Haemophilus influenzae type b infection, diphtheria, measles, mumps, poliomyelitis and rubella, and some cases of pertussis, are investigated because of their high public health importance. The principal objective of this case-based surveillance and investigation is to implement appropriate public health interventions and prevent further transmission. Enhanced surveillance data are also collected for all notified cases of invasive pneumococcal disease.

Haemophilus influenzae type b infection

Summary of notifications

Seven cases of Haemophilus influenzae type b infection were notified in 2008; the highest annual total since 1996, when nine cases were notified. Two cases were in male children aged 17 months and four months respectively; neither were of Aboriginal and/or Torres Strait Islander origin. The remaining five cases were among adults born prior to the introduction of the Haemophilus influenzae type b vaccine, aged between 19 and 44 years. The median age for all adult cases was 39 years. There was one death.

Risk factors

Risk factors for Haemophilus influenzae type b infection include indigenous status, immunosuppression, asplenia, premature birth and immunisation status. Of the two cases in children notified in 2008, the first notified case was a 17 month-old male who had presented to a major metropolitan emergency department with septicaemia and subsequently died. The case had received two doses of vaccine at two and four months of age, as indicated by the National Immunisation Program (NIP), but not the booster dose at 12 months of age. The case was born a twin, prematurely at 33 weeks gestation. He had severe disabilities including cerebral palsy, infantile spasms and recurrent pneumonia. The cause of death was attributed to Haemophilus influenzae meningitis.

The second case, a four-month-old male, presented with periorbital cellulitis. The case had received the first dose of vaccine at two months of age as indicated by the NIP, but not the second. No other risk factors were reported.

Outbreak investigations

No outbreaks or epidemiological links between cases were identified.

Comment

Victoria had fewer than four notifications per year since 2000, having benefited from the introduction in 1993 of the Haemophilus influenzae type b vaccine to the routine childhood immunisation schedule. However, the number of cases notified in 2008 was unusually high, the reasons for which are unclear, although most were among the adult population.
Influenza (laboratory confirmed)

Summary of notifications

A total of 1,299 cases of laboratory confirmed influenza were notified in 2008, roughly equivalent to the number of cases notified in 2007. Fifty-four per cent of cases were influenza type B infections, and 43 per cent were due to type A virus infections. There were two cases with a type A virus and type B virus co-infection, and type was not specified for 38 cases (three per cent). Most cases (n=1,126, 87 per cent) were identified by routine clinical presentation with a further 117 cases (nine per cent) and 56 cases (four per cent) identified from VIDRL general practitioner (GP) sentinel surveillance program and outbreak investigations respectively.

Consistent with the previous year, the largest numbers of cases identified by routine clinical presentation were notified in August and September, comprising 26 and 42 per cent of the annual total respectively (figure 47). Cases identified from VIDRL’s GP sentinel surveillance and outbreak investigations were excluded from the figure to avoid inflated peaks and temporal clustering of cases arising from the restricted time period of the GP sentinel surveillance and active case finding in outbreak investigations.

A slight majority of cases (52 per cent) were female, and sex was not stated for two cases. The age range of total cases was 16 days to 100 years, of which 34 (three per cent) were aged less than one year, 122 (nine per cent) were aged less than
five years and 164 (13 per cent) were aged 65 years or older. Excluding those cases identified from outbreak investigations (in which older age groups are usually over-represented) the number of notified cases and age specific notification rate was highest in those aged less than five years (figure 48). There was a secondary peak in cases and notification rates among adolescents and young adults (particularly those aged 15 to 24 years). The majority of cases identified from GP sentinel surveillance were young and middle aged adults (the modal five-year age group was 20 to 24 years).

Among the cases identified by routine clinical presentation, region of residence was available for 1,116 cases. The region with the highest number and rate of cases was the Southern Metropolitan Region with 36 cases per 100,000 population. Among the rural regions, the number of cases was greatest among residents of the Barwon-South Western Region, with 53 cases; however, the notification rate was highest in the Hume Region, with 17 cases per 100,000 population (figure 49).

Risk factors
Risk factor data were not routinely collected on all notified cases. The receipt of at least one influenza immunisation was recorded for 455 cases (40 per cent).

Outbreak investigations
Twelve respiratory outbreaks were notified to the department in 2008, affecting 56 people. Eight were reported to be in aged care facilities and three were in military facilities. One outbreak was identified in New South Wales, in which seven Victorian residents were affected.

Among the aged care facility outbreaks, six (75 per cent) were caused by influenza type A virus, with the remaining two outbreaks caused by influenza type B virus. Of the three outbreaks in military facilities, two were caused by influenza type B virus, the other by influenza type A virus. The outbreak identified in Sydney, New South Wales was during World Youth Day, a mass gathering of Catholic youth held over several days in July. Seven Victorian cases were identified by New South Wales authorities during the active surveillance that took place during the event. All cases were caused by infection with influenza type A. A national review of influenza surveillance in 2008, with reference to the cases identified during this event, was published in Volume 34 Issue 1 of Communicable Diseases Intelligence.

Comment
The number of notified cases of laboratory confirmed influenza in 2008 was similar to that observed in 2007. However, the number of cases notified in 2007 was 2.5 times the previous highest total in 2003, and as such, the number of cases notified in 2008 was high relative to the years preceding 2007.

Rates of influenza-like illness as measured by sentinel GP practices indicated the magnitude of the season to be lower than that of 2007, but greater than 2006. This was consistent with surveillance data utilising laboratory confirmed influenza notifications to the department. A more detailed analysis of the 2008 Victorian influenza season utilising data collected by the department and VIDRL is published in Volume 34 Issue 1 of Communicable Diseases Intelligence.

Under the National Immunisation Program, influenza vaccine is provided free for all adults aged 65 years or older; Aboriginal and Torres Strait Islander people aged between 15 and 49 years with medical risk factors and; all Aboriginal and Torres Strait Islander people aged 50 years or older. The Victorian Government provides free influenza vaccine for healthcare workers in public hospitals, public hospital outpatients and inpatients at high risk for complications of influenza. Influenza vaccine is also strongly recommended for people aged six months or older with any of the following risk factors: chronic heart disorders; diabetes and kidney disorders; asthma and respiratory disorders; immunosuppression; resident or staff in a nursing home, hostel or long term care facility; living or caring for someone who has a chronic illness or is aged.
Invasive pneumococcal disease

Summary of notifications

There were 359 cases of invasive pneumococcal disease (IPD) notified in 2008, a 29 per cent increase on the number of cases notified in 2007. There was a marked increase in the number cases aged 0 to 4 years: from 37 in 2007 to 46 in 2008. In addition, the number of cases aged 65 years or older also increased from 110 cases in 2008 to 141 cases over the same period. The age specific notification rate was highest in those aged 80 years and older, but was also elevated in the 0 to 4 year age group (figure 50). Overall, 58 per cent of cases were male, which was slightly higher than 2007. A total of 30 cases were reported to have died, of which 23 died due to the infection. This corresponds to an overall case fatality rate of six per cent, which is identical to the previous year; however the 12 per cent case fatality rate in those aged 65 years and over was almost double the 2007 rate. There was one death in a child aged one month, and the remainder were aged from 41 to 91 years.

Data on Indigenous status were available for 326 cases (91 per cent). Seven cases (two per cent) were reported to be of Aboriginal and/or Torres Strait Islander origin of which two were infants aged nine months and 11 months, and the remainder aged between 43 and 56 years inclusive. Of the seven cases identified as Aboriginal and/or Torres Strait Islanders, five were reported to have recovered from their infections, one 85-year-old male was reported to have died due to the disease, and one 56-year-old male died due to other causes.

Clinical presentation data were collected for 328 cases (91 per cent). Among those, bacteraemia and pneumonia were the equal most common presentation for cases aged 0 to 4 years. Amongst the adult age groups, pneumonia was the most common presentation (table 32).

Serotyping of isolates was completed for 344 cases (96 per cent). Of the remaining 15 cases, five were unable to be serotyped because they were diagnosed by PCR only and serotyping was not conducted for 10 cases. Children born in 2003 or later are eligible for free conjugate pneumococcal vaccine under the National Immunisation Program (NIP). There were 48 notified cases in children born in 2003 or later in 2008, of which six (12 per cent) were infected by serotypes against which the vaccine protects and 40 (85 per cent) were infected by serotypes against which the vaccine does not protect. All adults aged 65 years or older are eligible for free polysaccharide pneumococcal vaccine under the NIP, and of the 113 notified cases in this age group in 2008, 26 (23 per cent) were infected with serotypes against which the vaccine protects, 81 (72 per cent) were infected by serotypes against which the vaccine does not protect and six (5 per cent) were unknown.
Following the introduction of the conjugate (7-valent) vaccine for children in 2005, a sharp drop in the notification rate of IPD caused by these seven serotypes in the 0 to 4 years age group was observed (figure 51). This downward trend continued in 2008 but was accompanied by an increase in rates of infections caused by non-conjugate vaccine serotypes, which accounted for the number of notified cases in this age group remaining stable. The number of cases aged 0 to 4 years caused by non-vaccine serotypes has more than doubled from 15 cases in 2005. Since 2005 there has also been a decrease in the rates of IPD infections caused by conjugate vaccine serotypes in the 65 years or older age group, but there has also been an increase in rates of infections caused by non-conjugate vaccine serotypes (other 23-valent polysaccharide vaccine serotypes and non-polysaccharide vaccine serotypes).

Risk factors
Of the 48 cases born since 2003 that were notified in 2008, 32 (67 per cent) were fully vaccinated for age, five (10 per cent) were partially vaccinated, six (13 per cent) were not vaccinated and another five (10 per cent) were of unknown vaccination status. Of the 46 cases aged 0 to 4 years, 42 (91 per cent) were infected with non-vaccine serotypes, primarily 19A (18 cases).

Among the cases aged 65 years or older, 49 cases were reported to be fully vaccinated of which 32 (65 per cent) were infected by serotypes contained in the polysaccharide vaccine and were thus considered vaccine failures. Among this group, all but four cases (eight per cent) had a risk factor for disease, including nine cases (18 per cent) who were reported as immunocompromised. There were 37 cases that were reported as not vaccinated (76 per cent) or partially vaccinated (vaccinated more than five years prior to illness onset) for which there were 10 cases (27 per cent) caused by polysaccharide vaccine serotypes. There were 22 cases of unknown vaccination status.

Risk factor data were collected for 338 cases (94 per cent), of which 149 (44 per cent) were reported to have a chronic disease, 72 (21 per cent) were immunosuppressed, 69 (20 per cent) had smoked previously, 59 (17 per cent) were current smokers, 24 (per cent) lived in a house with a smoker(s) and no risk factor was identified for 45 cases (13 per cent). Among the 141 cases aged 65 years or older, 122 (87 per cent) were reported to have a risk factor for their illness, of which the most common was a chronic medical condition (47 per cent), being a previous smoker (27 per cent), and immunosuppression (23 per cent). Of the 46 cases aged less than five years, 13 were reported to have risk factors, 15 had no reported risk factors, and 18 were of unknown risk factor status.

Outbreak investigations
No outbreaks or links between cases were identified.

Comment
The total number of IPD cases notified annually had decreased every year to 2007 since it became a notifiable disease in 2001, although the rate of decrease has slowed each year. However, in 2008, the number of cases increased markedly, up from 279 cases in 2007 to 359 cases. The number of cases aged 0 to 4 years increased from 37 cases in 2007 to 46 cases in 2008, after a sharp drop following the introduction of the conjugate vaccine program in 2005. The number of cases in this age group caused by vaccine serotypes has continued to decrease in 2008, with four cases caused by vaccine-
preventable serotypes, down from five cases in 2007. Whilst this continues to indicate the success of the immunisation program, the increase in non-vaccine serotypes up from 32 cases in 2007 to 42 cases in 2008 will continue to be monitored to inform vaccine policy.

From 1 January 2005, two pneumococcal vaccines were provided free for target age groups under the NIP: 7-valent pneumococcal conjugate vaccine for those born from 1 January 2003 onwards and 23-valent pneumococcal polysaccharide vaccine for all adults aged 65 years and over, all Aboriginal and Torres Strait islander people aged 50 years and over, Aboriginal and Torres Strait Islander people aged 15 to 49 years with certain medical risk factors and Aboriginal and Torres Strait Islander children aged 18 to 24 months in high risk areas. Previously the Victorian Government funded 23-valent-pneumococcal polysaccharide vaccine from 1998 to 2004 for people aged 65 years and over.

Measles

Summary of notifications
There were two cases of measles notified in 2008, both of which were notified in the month of January. This is identical to the number of measles cases notified in 2007 (figure 52). Both cases were in females, aged eight and 16 years.

Risk factors
Both cases were unvaccinated and had acquired their illness overseas in India and China respectively.

Outbreak investigations
No outbreaks or links between cases were identified.

Comment
The number of notified cases of measles was static compared with the number notified in 2007, and represents a continuation of the long term decline in measles notifications.

Figure 52: Notified cases of measles by month, Victoria, 2003–2008

Usually the majority of notified measles cases in Victoria are among people born after 1966 (who were not exposed to the pre-vaccine era of large measles outbreaks) and before 1983 (who were not vaccinated or only received one dose of the vaccine). This, however, was not observed in 2008. Both notified cases were born after 1982, and were therefore eligible to receive both the recommended doses of measles-mumps-rubella (MMR) vaccine.
Mumps

Summary of notifications
There were 14 cases of mumps notified in 2008, three fewer than the number notified in 2007 (figure 53). Eight cases (57 per cent) were male and six cases (43 per cent) were female. The age range of cases was 13 to 48 years with a median age of 27 years. Six cases (43 per cent) were born after 1982 and there were three cases aged between 27 and 29 years inclusive.

Risk factors
Three cases were reported as not vaccinated, all of whom were born after 1982. The remaining cases were of unknown vaccination status.

Eight cases acquired their illness from recent travel overseas. One case each reported travel to Brazil, China, Iran, Thailand and Pakistan. Two cases reported travel to multiple locations in South East Asia, and one case reported travel overseas, however a location was not specified. The source of illness in the remaining six cases was unknown.

Outbreak investigations
No outbreaks or links between cases were identified.

Comment
Since 2005, mumps notifications have remained relatively static with between 14 and 18 cases per year. Travel to overseas countries where mumps remains endemic is the predominant risk factor for Victorians acquiring the illness.

As with measles, people born after 1966 (who were not exposed to the large pre-vaccine era outbreaks) and before 1983 (who were not vaccinated or only received one dose of the vaccination) are especially at risk of acquiring mumps infection. It is therefore important to encourage vaccination of people born during or since 1966 who are embarking on international travel if they do not have evidence of receipt of two doses of MMR.

Figure 53: Notified cases of mumps by month, Victoria, 2003–2008
Pertussis

Summary of notifications
A total of 1,644 cases of probable and confirmed pertussis were notified in 2008. This equates to an age-standardised notification rate of 30 per 100,000 population and represents a significant increase on the notification rate in 2007 of 20.1 per 100,000 population (figure 54).

The number of notified cases continued to rise in a relatively linear fashion throughout the year with a peak in December of 254 notified cases (figure 55). Consistent with surveillance data from previous years, a majority of cases (61 per cent) were female.

The five-year age-specific notification rates for pertussis in 2008 were higher than the equivalent rates in 2007 for all age groups except those aged 75 to 79 years (figure 56). Among children, notification rates were substantially higher in those aged 0 to 4 years, 5 to 9 years and 10 to 14 years.

Babies are at particular risk of the complications of pertussis, and in 2008 there were 56 cases aged less than 12 months, compared to 25 in 2007. Of those, 44 (79 per cent) were aged less than six months, compared to 18 (72 per cent) in 2007.

A marked increase in the age-specific notification rates was also observed in adult cases, particularly those aged 35 to 59 years. Notification rates were highest in those aged 45 to 49 years.
No deaths attributable to or associated with pertussis were notified in 2008.

Consistent with previous years, two-thirds of the notified cases of pertussis were among residents of metropolitan regions, and a further 14 per cent were residents of Gippsland Region (figure 57). The notification rate per 100,000 population for Gippsland Region was three times higher than the Victorian rate.

Risk factors
All cases aged less than ten years were followed up for collection of immunisation status data.

Among the 44 cases aged less than six months, 12 cases aged one month or less were too young to be vaccinated, seven cases aged two to three months inclusive had received one dose of vaccine; and 16 cases had not received any doses of vaccine. Of the nine cases aged four to five months inclusive, two cases had received two doses of vaccine, five cases had received one dose of vaccine, and the remaining two cases had not received any doses of vaccine.

There were 61 notified cases aged between four and eight years inclusive. Under the National Immunisation Program (NIP), children in this age range should have received four doses of vaccine. Of these, 21 (34 per cent) had received four doses of vaccine, and the remaining 40 cases were either partially vaccinated for age, not vaccinated, or their immunisation status was unknown.

Outbreak investigations
No outbreaks or epidemiological links between cases were identified.

Comment
Pertussis epidemics usually occur every three to four years. The increase in the number of cases observed in 2008 may signal the beginning of the next pertussis epidemic, after four years of relatively stable notifications.

The increase in notification rates among all age groups is of concern, but particularly so among children. Vaccination remains the cornerstone of pertussis control, particularly for the prevention of infection in infants for whom the disease is serious and more likely to cause death.
Rubella

Summary of notifications
There were eight cases of confirmed rubella notified in 2008 including one case of congenital rubella.

Notifications of cases were spread throughout the year (figure 58) and comparable to the seven notifications received in 2007. Five cases were in females, one of whom was pregnant, with an age range of between 17 and 47 years. Two adult male cases were aged 39 and 47 years. All cases were residents of metropolitan Melbourne.

One congenital rubella case was notified in an eight-week-old boy. At seven weeks of age, the baby was seen by a maternal and child health nurse who noted cataracts. The child was referred for specialist review, and was confirmed to have bilateral cataracts as well as an enlarged liver and spleen, widely spaced cranial features, a cardiac anomaly, and a hearing impairment. Public health investigation revealed no history of illness or travel in the Indian-born mother during her pregnancy. A test for rubella antibody titre had been done on the mother at 12 weeks gestation, which demonstrated an elevated IgG of greater than 400IU/ml.

Risk factors
The vaccination status for all of the female cases was unknown. Both male cases were not vaccinated for the disease. Two cases reported recent overseas travel (one case travelled to China, and the other had travelled to both Thailand and Malaysia). A source of illness could not be ascertained for the remaining cases.

Outbreak investigations
A 47-year-old female was epidemiologically linked to her 47-year-old husband. The husband had no history of overseas travel but had travelled interstate during his infectious period and had contact with an overseas visitor. The overseas visitor was reportedly well, so an exact source of illness could not be ascertained.

Comment
The number of notified cases of rubella has remained relatively stable since 2005, with a three-year median (2005-2007) of seven cases.

Congenital rubella is rarely seen in Victoria, with only one other case notified in 2005. The case highlights the important need for an accurate interpretation of elevated rubella IgG during antenatal screening. The IgG of 400IU/ml is greater than would be expected for a vaccinated or previously infected individual, and is more likely a reflection of a developing IgG following recent infection with rubella. Subsequent testing of the same antenatal specimen revealed a low positive IgM titre – consistent with the hypothesis that the mother had been infected with rubella early in her pregnancy.

The risk of congenital rubella remains, particularly among women born in countries with poorly developed vaccination programs. Travel to countries where rubella is endemic among women in their first trimester of pregnancy who have no immunity to rubella also poses a risk.
Tetanus

Summary of notifications
One case of tetanus was notified in an 83-year-old female who experienced a fall whilst gardening and sustained wounds to her ankle and arm. The case presented to her general practitioner the day following her fall who administered adult diphtheria-tetanus (ADT) booster. In the ensuing days, the case experienced difficulty in opening her mouth and subsequently trismus and severe carpopedal spasms. Tetanus was diagnosed at a regional hospital and the case was treated.

Risk factors
Gardening in soil replete with cow manure was identified as the risk factor in this case. The case was reported to have not been vaccinated against tetanus in the past.

Outbreak investigations
No outbreaks were identified.

Comment
Tetanus is caused by Clostridium tetani, a spore forming bacterium that is found in manured soil. It can enter wounds and grow anaerobically, producing a potent toxin, which acts on the central nervous system to cause muscle rigidity. Early symptoms and signs include lockjaw, dysphagia, stiffness or pain in the neck, shoulders and back muscles.

Tetanus in Australia is very rare but can occur in older adults who have never been vaccinated or were vaccinated in the remote past. Tetanus toxoid vaccine was available from the mid 1920s, and was introduced progressively into the childhood vaccination schedule after World War II. Given that the case was born in the early 1920s, she may well have missed receiving a primary course of tetanus under the childhood vaccination schedule.

Adults who have not received a primary course of tetanus toxoid previously are recommended to be given three doses of diphtheria-tetanus (dT) – the vaccine for use in adults – at minimum intervals of four weeks followed by booster doses at 10 and 20 years after the primary course. Booster vaccinations of dT or dTpa should be given to all adults who reach the age of 50 years if they have not received a booster dose in the previous 10 years.

For people who present with a tetanus prone wound as in the case described, if they have never had a tetanus vaccine in the past or they are uncertain of previous vaccination history, they should be given a dose of tetanus immunoglobulin at the same time as the first dose of tetanus vaccine.
Varicella zoster virus

Summary of notifications
On 21 September 2008, varicella zoster virus (VZV) became notifiable in Victoria. As a group B notifiable disease, both confirmed and probable cases of VZV are required to be notified by medical practitioners and laboratories within five days of diagnosis. Notifications for VZV are grouped into three categories: varicella-zoster infection (unspecified), varicella-zoster infection (chickenpox), and varicella-zoster infection (shingles). This is because chickenpox and shingles can only be diagnosed by a medical practitioner; whilst laboratory testing detects VZV, it does not differentiate between the manifestation of the infection as either chickenpox or shingles.

There were 526 notified cases of varicella zoster virus in 2008, of which 221 (42 per cent) were probable or confirmed cases of chickenpox and 167 (32 per cent) were probable or confirmed cases of herpes zoster (shingles). The clinical manifestation was unspecified for the remaining 138 cases (26 per cent).

Varicella zoster – Chickenpox
Of the chickenpox cases, 54 per cent were female, 45 per cent were male and sex was missing in the remaining one per cent of cases. The median age was six years. Region of residence was available for all cases. A majority of chickenpox cases resided in the North and West Metropolitan Region (35 per cent).

Varicella zoster – Shingles
Of the shingles cases, 54 per cent were female, 45 per cent were male and sex was missing in the remaining one per cent of cases. The median age was 60 years. Region of residence was available for all cases. A majority of herpes zoster (shingles) case resided in the Eastern Metropolitan Region (28 per cent).

Risk factors
Risk factor data were not routinely collected.

Outbreak investigations
No outbreaks were identified.

Comment
Varicella zoster virus causes the very common childhood disease of chickenpox. It is also the cause of shingles, which occurs when the virus is reactivated in the dorsal root ganglia of infected individuals. Shingles is less common, and although it can occur throughout life, is much more common in adulthood. It is associated with longer lasting morbidity, especially in older adults.

In November 2005, the vaccine against VZV was included in the National Immunisation Program. As a corollary, in 2008 VZV was listed as a notifiable infectious disease in all Australian states and territories (except New South Wales) with the principal aim of monitoring the impact of the publicly funded immunisation program.
Immunisation programs

Immunisation coverage

The Australian Childhood Immunisation Register (ACIR) reports the level of complete immunisation coverage for three age cohorts (12 to <15 months; 24 to <27 months and 60 to <63 months) at the end of each quarter. Only vaccines administered before 12 months of age are included in the coverage calculation for the first age cohort and only those vaccines administered before 24 and 63 months of age are included in the coverage calculation for the second and third age cohorts, respectively. The ACIR quarterly reports do not include vaccine coverage for rotavirus, pneumococcal disease, meningococcal C disease and varicella (chickenpox).

In 2008, the National Immunisation Committee decided that the earlier age of 60 to <63 months would be the reporting point by ACIR instead of 72 to <75 months. This measure of vaccination coverage in an earlier cohort enables a closer alignment with the final immunisation schedule point of four years of age.

In 2008, the annualised immunisation coverage was 91.8, 93.6 and 83 per cent for the three cohorts 12 to <15 months, 24 to <27 months and 60 to <63 months respectively (table 33). The coverage has remained relatively static since 2004 for the 12 to <15 months and 24 to <27 months cohorts. Coverage between the 72 to <75 months and the new 60 to <63 months cohorts are not directly comparable.

Figure 59: Complete immunisation coverage in children aged 12 to <15 months by quarter, Victoria and Australia, 2008

Figure 60: Complete immunisation coverage in children aged 24 to <27 months by quarter, Victoria and Australia, 2008

Figure 61: Complete immunisation coverage in children aged 60 to <63 months by quarter, Victoria and Australia, 2008
Medicare Australia advised the previous reported ACIR data since 31 March 2008 inadvertently used the vaccination cut-off date of 66 months for coverage assessment instead of the correct cut-off date of 60 months. This meant that the 60 to <63 month coverage rate was inflated by around eight per cent nationally since the reporting of this cohort began in March 2008. March data were adjusted to reflect the correct age assessment for cohort three. All data for the oldest cohort presented in the tables reflects the correct assessment of 60 to <63 months.

Immunisation coverage in Victoria for all three cohorts and for all four quarters of 2008 was higher than the equivalent national coverage rates.

**Immunisation schedule changes from March 2008**

Due to a manufacturing problem in the United States of America, CSL/Merck advised that Comvax® and Pedvax® vaccines would be out of stock from March 2008 until late 2008. Comvax® is a combination of Haemophilus influenzae type b (Hib) and hepatitis B vaccine. Pedvax® is a monovalent Hib vaccine.

The Comvax® shortage led to a change in the combination of vaccines used in Victoria in the National Immunisation Program schedule from 1 March 2008. The change to the schedule affected immunisation at two, four, six months and 12 months. It was a complicated and confusing time for immunisation providers to administer the new combination vaccine within a partially started vaccine schedule.

Infanrix-IPV® (diphtheria, tetanus, pertussis, polio) was replaced by Infanrix hexa® (diphtheria, tetanus, pertussis, polio, hepatitis B and Hib) for the primary schedule at two, four and six months of age. Hiberix® vaccine was introduced on 1 September 2008. Hiberix® vaccine contains the antigen *Haemophilus influenzae* type b. Hiberix® is administered to babies at 12 month of age who had one or more doses of Infanrix hexa® in their vaccine schedule. Hiberix® replaced Comvax® vaccine at 12 months of age.

**Human papillomavirus vaccine program**

Human Papillomavirus (HPV) is a sexually transmissible infection, mostly affecting women 20 to 24 years of age. Almost all abnormal Pap smear results are caused by HPV. In 98 per cent of cases, HPV clears by itself. In rare cases if the virus persists and is left undetected, it can lead to cervical cancer. There are many strains of HPV, only some of which can cause cancer. HPV strains 16 and 18 cause around 80 per cent of all cervical cancers. The Gardasil® vaccine protects against HPV strains 16 and 18 as well as strains 6 and 11 which are responsible for about 90 per cent of genital warts.

The Australian Government announced funding for a HPV vaccine program for females aged 12 to 26 years in April 2007 for a three year period. The vaccine administered is Gardasil®. A course of three doses is recommended to be given at zero, two and six months. The phased roll out program targeted the following age groups:

- 12 to 13 years as part of a Year 7 secondary school program (ongoing);
- 13 to 18 years (catch-up secondary school immunisation program funded for two years);
- 18 to 26 years (catch-up funded for two years).

In 2008, secondary school aged girls in Year 7 (ongoing annual program), Year 9 and Year 10 were offered the vaccine. The previous year in 2007, girls in Year 7, Year 11 and Year 12 were offered the HPV vaccine. The school program is predominantly administered by local government. Women aged 18 to 26 years are predominantly administered the vaccine by general practitioners.

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* Annualised data shown using quarterly data for each cohort (calculated by ACIR).