PART 3 VACCINATION FOR SPECIAL RISK GROUPS

3.1 VACCINATION FOR ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLE

After European colonisation, Aboriginal and Torres Strait Islander (Indigenous) peoples experienced successive epidemics of infectious diseases with very high morbidity and mortality; many of these diseases have now become vaccine preventable. The diseases with the most serious impact were smallpox, tuberculosis, influenza, measles and syphilis, with estimated mortality rates of over 30% for smallpox epidemics and 20% for measles epidemics. These high rates of disease were mainly due to a lack of previous exposure, followed by high-density living in newly established settlements. Over many decades, higher rates of infectious disease have been associated with lower standards of living and poorer access to water, housing and health care. Social determinants of health, such as low educational outcomes, lack of control over life circumstances and lack of cultural safety, are also associated with poor health outcomes, including increased infectious disease risk.

In recent decades, vaccination has been very successful in eliminating or substantially reducing the rates of many vaccine-preventable diseases (VPDs), such as diphtheria, polio, tetanus, hepatitis B, measles, mumps and rubella, in all Australians, and has made a substantial contribution to improvements in Indigenous child mortality. For some VPDs, control is suboptimal in the general population despite high vaccination coverage (e.g. pertussis). For others, such as invasive pneumococcal disease (IPD), greater burdens of illness still occur in Indigenous persons than in non-Indigenous persons, largely due to the greater prevalence in Indigenous persons of serotypes for which vaccines do not protect, and high exposure levels associated with the environmental issues mentioned above. Timeliness of immunisation can also be a factor.

In recognition of the higher rates of disease in the Indigenous population, some vaccines are specifically recommended for use in Indigenous persons, or for administration to a broader age range than is recommended for non-Indigenous persons (refer to Table 3.1.1). This chapter discusses the vaccines for which there are currently different recommendations for Indigenous persons in at least some parts of Australia, or for which there have been recent changes in this respect. For children, these are bacille Calmette-Guérin (BCG), Haemophilus influenzae type b, hepatitis A, influenza and pneumococcal vaccines. For adults, these are hepatitis B, influenza and pneumococcal polysaccharide vaccines.

Table 3.1.1: Additional* vaccines recommended for Indigenous persons, due to their higher risk of disease

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Recommendation for Indigenous persons</th>
</tr>
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<tbody>
<tr>
<td>BCG</td>
<td>Neonates living in areas of high TB incidence†</td>
</tr>
<tr>
<td></td>
<td>1 dose</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>Children resident in the Northern Territory, Queensland, South Australia and Western Australia</td>
</tr>
<tr>
<td></td>
<td>2 doses in the 2nd year of life‡</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Adults who have not previously been vaccinated against hepatitis B and are non-immune</td>
</tr>
<tr>
<td>Influenza</td>
<td>All persons aged ≥6 months§</td>
</tr>
<tr>
<td></td>
<td>Annual vaccination</td>
</tr>
<tr>
<td>Pneumococcal conjugate (13vPCV)</td>
<td>Children resident in the Northern Territory, Queensland, South Australia and Western Australia</td>
</tr>
<tr>
<td></td>
<td>Booster dose in 2nd year of life in addition to primary course‡</td>
</tr>
<tr>
<td>Pneumococcal polysaccharide (23vPPV)</td>
<td>Persons aged 15–49 years with underlying conditions increasing the risk of IPD‡</td>
</tr>
<tr>
<td></td>
<td>All persons aged ≥50 years§</td>
</tr>
</tbody>
</table>

* In addition to those vaccines recommended for all Australians or those in particular medical, occupational, behavioural or other risk groups.
† Northern Territory, Queensland, northern South Australia
‡ Exact ages may differ between jurisdictions.
§ Refer to 4.7 Influenza.
¶ Refer to 4.13 Pneumococcal disease for recommendations on revaccination.
3.1.1 Children

BCG vaccine and tuberculosis

BCG vaccine is recommended for Indigenous neonates in regions of high tuberculosis (TB) incidence, where infants are at higher risk of acquiring this serious condition. BCG vaccine is provided for Indigenous neonates in the Northern Territory, Queensland and parts of northern South Australia, but no longer in Western Australia. State/territory health authorities should be consulted to determine the recommendations for particular areas, including where BCG vaccination is being considered for neonates <2.5 kg in weight. (Refer also to 4.20 Tuberculosis.)

Tuberculosis was most likely introduced to the Indigenous population in the early years of European settlement. It became the largest single cause of death for Indigenous persons in the last quarter of the 19th century and the first quarter of the 20th century, coinciding with large-scale movement from nomadic life to settlements. In some communities tuberculosis was responsible for more than 20% of deaths. Control measures in the second half of the 20th century were effective for both Indigenous and non-Indigenous populations, but disparities have persisted. In southern states the notification rate for tuberculosis in Indigenous persons is comparable to that of Australian-born non-Indigenous persons, but there is considerable geographic variation. The Northern Territory has consistently had the highest rates of any jurisdiction, and, in 2007, TB incidence was 13-fold higher among Indigenous persons than non-Indigenous persons. Very high rates among Indigenous persons have been documented in Far North Queensland and northern South Australia, but not in New South Wales in recent years. BCG vaccine reduces pulmonary tuberculosis and provides substantial protection against disseminated forms of the disease in young children. Nevertheless, as the incidence of pulmonary tuberculosis in adults and the risk of disseminated tuberculosis in infants decreases, the risk of severe complications of BCG vaccination, documented in indigenous persons of other countries, becomes a significant consideration. BCG vaccine is usually administered to eligible infants by hospital staff (i.e. midwives or nurses who have been specially trained) soon after delivery. Injection technique is particularly important for BCG vaccination, which must be administered intradermally. Adverse events, such as regional lymphadenitis, are less common when vaccination is performed by trained staff.

*Haemophilus influenzae* type b

Since October 2009, only one type of *Haemophilus influenzae* type b (Hib) vaccine (PRP-T) has been used in Australian infants (refer to 4.3 *Haemophilus influenzae* type b).

Before the introduction of an effective Hib vaccine, not only was the incidence of invasive Hib disease very high in Indigenous children, particularly in more remote areas, it also occurred at a younger age than in non-Indigenous children. Thus, a vaccine to prevent Hib disease in Indigenous children needed to be immunogenic as early as possible in infancy. The previously used Hib-containing vaccines, known by the abbreviation PRP-OMP, were more immunogenic at 2 months of age than the other conjugate Hib (PRP-T) vaccines, and so were the preferred Hib vaccine type for Indigenous children in the first Hib vaccination programs beginning in 1993. Since then, there has been a dramatic decline in Hib disease in Indigenous children. New combination vaccines that include a Hib (PRP-T) component, and have the advantage of reducing the number of injections, were introduced in some jurisdictions from November 2005. Initially PRP-T vaccines were not recommended for Indigenous children in jurisdictions with higher disease incidence, but either PRP-OMP or PRP-T vaccine could be given to other children. Following an international shortage of PRP-OMP vaccine, it was progressively replaced by PRP-T-containing vaccines for all children. Invasive Hib disease and nasopharyngeal colonisation with Hib are being closely monitored in high-incidence settings such as the Northern Territory and Western Australia following this change. To date, there has not been any change in Hib epidemiology found in association with the change to PRP-T-containing vaccines for Indigenous children.

Hepatitis A

Hepatitis A vaccination is recommended for Indigenous children in those jurisdictions with high disease incidence: the Northern Territory, Queensland, South Australia and Western Australia (refer to 4.4 Hepatitis A). Two doses should be given, commencing in the 2nd year of life. The recommended ages of administration vary between states and territories, so jurisdictional health authorities should be contacted for further details about local vaccination schedules.

Hepatitis A infection was common during the 1990s in Indigenous children across northern and central Australia. Most children acquired the virus in the first 5 years of life, which is a typical finding in populations with disadvantaged living conditions. Although the symptoms of infection in early childhood are usually mild or absent, cases complicated by liver failure and death have been reported among Indigenous children in Far North Queensland and the Kimberley, and recorded hospitalisation rates are more than 50 times higher in Indigenous children than in non-Indigenous children. A vaccination program for Indigenous children was introduced in north Queensland in 1999 and resulted in a 92% decrease in the number of reported cases, from 787 cases in all children during the period 1996–1999 to 66 cases in the period 2000–2003. This decrease in hepatitis A disease was observed in both Indigenous and non-Indigenous children, suggesting a substantial herd immunity effect. From 2005, the hepatitis A vaccination program was extended to include all Indigenous children aged ≤2 years resident in the Northern Territory, Queensland, South Australia and Western Australia. Notifications have fallen by over 90%, from more than 50 per 100 000 in 2005 to less than 5 per 100 000 in 2009.
**Hepatitis B**

Refer to ‘Hepatitis B’ under ‘Adults’ below.

**Influenza**

Annual influenza vaccination is recommended for all Aboriginal and Torres Strait Islander children. In particular, Aboriginal and Torres Strait Islander children 6 months to <5 years and ≥15 years of age are at greater risk of influenza and its complications than non-Indigenous children of the same age. (Refer also to ‘Influenza’ in 3.1.2 Adults below). The risk of influenza complications is not as high in children aged 5–14 years. However, annual influenza vaccination of children in this age group can still offer individual protection against influenza as well as potential indirect protection to other members of their household (refer to 4.7 Influenza). Indigenous adults are also recommended to receive annual influenza vaccine (refer to 3.1.2 Adults below).

**Pneumococcal disease**

The 13-valent pneumococcal conjugate vaccine (13vPCV) is recommended for all children in a 3-dose infant vaccination schedule, replacing the 7-valent pneumococcal conjugate vaccine (7vPCV) in all jurisdictions except the Northern Territory, where it replaced the 4-dose schedule of the 10-valent pneumococcal conjugate vaccine (10vPCV).

In addition to a primary course of 3 doses of 13vPCV, at 2, 4 and 6 months of age, a booster dose of 13vPCV is also recommended at 12–18 months of age for Indigenous children in areas of high incidence (i.e. the Northern Territory, Queensland, South Australia and Western Australia). This 13vPCV booster dose replaces the 23-valent pneumococcal polysaccharide booster or 4th dose of 10vPCV (which was used at this schedule point for a short time in the Northern Territory) (refer to 4.13 Pneumococcal disease).

Prior to the availability of conjugate pneumococcal vaccines, Central Australian Indigenous children had rates of IPD that were among the highest ever reported in the world. Very high rates were also reported in Indigenous children in other parts of northern Australia. High rates of pneumococcal pneumonia have also been documented in Central Australian Indigenous children, and *Streptococcus pneumoniae* has been implicated in the high rates of otitis media in Indigenous children. 7vPCV was made available for Indigenous children, and non-Indigenous children with medical risk factors, from 2001, 4 years prior to the universal program for all children in Australia. The initial program was highly successful, resulting in a rapid decline in invasive pneumococcal disease due to the serotypes contained in the 7vPCV among Indigenous and non-Indigenous children. However, a wider range of serotypes is responsible for disease in Indigenous children, and therefore a smaller proportion of cases is vaccine preventable. While an initial reduction in IPD was observed, IPD incidence still remains higher in Indigenous children than in non-Indigenous children.

### 3.1.2 Adults

**Hepatitis B**

Indigenous persons should have their risks and vaccination status for hepatitis B reviewed, be offered testing for previous hepatitis B infection, and be offered vaccination if non-immune. (Refer also to 4.5 Hepatitis B.)

High rates of mortality and morbidity from hepatitis B among Indigenous persons have been recognised ever since the original identification of the ‘Australia antigen’ in 1965. Prior to vaccination, estimates of the prevalence of markers of previous infection in Indigenous communities ranged from 20 to 100%. In the Northern Territory, the incidence of primary hepatocellular carcinoma was 10 times greater in Indigenous persons than in non-Indigenous persons, and comparable to high-incidence countries such as China. Vaccination programs have had substantial impacts on infection and carriage rates in both Indigenous and non-Indigenous Australians. However, there is evidence that new infections continue to occur at a higher rate in Indigenous persons, probably due to a combination of pre-existing high carriage rates, susceptible persons in older age groups (who were not eligible for vaccination programs), low coverage in early targeted programs, and a poorer immunological response to vaccination.

**Influenza**

Annual influenza vaccination is recommended for all Indigenous persons (refer to 3.1.1 Children above and 4.7 Influenza).

Influenza and its complications, especially secondary pneumonia, have historically been major causes of morbidity and mortality in Indigenous persons, both during and outside pandemic periods. This is probably related to a high prevalence of medical risk factors such as diabetes, renal disease and excessive alcohol use, as well as poorer environmental living conditions that facilitate disease transmission. Past pandemics have had disproportionately severe impacts on Indigenous persons, as did the influenza A(H1N1)pdm09 pandemic in 2009. Reported rates of infection, hospitalisation and death due to pandemic A(H1N1)pdm09 were 6.6, 6.2 and 5.2 times higher, respectively, in Indigenous persons than in non-Indigenous persons. In recent times, respiratory disease has been responsible for around 8% of deaths in Indigenous persons, the vast majority being in adults. Influenza disease incidence is greatest in young children and the elderly.
due to influenza and pneumonia are highest in young children and lowest in older children. Hospitalisation and death rates increase with age in all adults, but increase much earlier in Indigenous adults than in non-Indigenous adults. The vast majority of these hospitalisations and deaths are due to pneumonia, but it is not clear what proportion of these are associated with influenza. Younger Indigenous adults (aged 25–49 years) have influenza and pneumonia disease rates similar to older non-Indigenous adults (aged ≥50 years), but have much higher rates than non-Indigenous persons of the same age. In younger Indigenous adults rates are at least 8 times higher for hospitalisations and 20 times higher for deaths, compared to younger non-Indigenous adults. In addition, hospitalisation rates in Indigenous children aged <5 years are more than twice the rates in non-Indigenous children of the same age, and a similar disparity exists for hospitalisation and death rates in Indigenous adults aged ≥50 years compared with non-Indigenous adults of the same age. Some have suggested that previous estimates of substantial reductions in hospitalisation and mortality due to respiratory and cardiovascular disease that were attributed to influenza vaccination have over-estimated this impact. However, the balance of evidence suggests influenza vaccines are effective in preventing influenza-associated disease, hospitalisation and death in healthy adults, the elderly and the medically at risk, including Indigenous persons, although this varies with the antigenic similarity between vaccine and circulating strains.

Pneumococcal disease

Pneumococcal polysaccharide vaccine is recommended for all Indigenous adults aged ≥50 years, and those aged 15–49 years who have conditions associated with an increased risk of IPD. The broader age-based recommendation for Indigenous adults is due to the high rates of pneumococcal disease and higher prevalence of risk factors (certain medical conditions and tobacco smoking) in Indigenous adults, compared to non-Indigenous adults. Revaccination is recommended 5 years after the 1st dose for those first vaccinated at ≥50 years of age, and a further revaccination is recommended in some circumstances (refer to 4.13 Pneumococcal disease). In the Northern Territory, 23-valent pneumococcal polysaccharide vaccine (23vPPV) is provided for all Indigenous persons aged ≥15 years. This can be counted as a 1st adult dose of 23vPPV (refer to 4.13 Pneumococcal disease). Jurisdictional health authorities should also be contacted to confirm local practices as they may vary, especially regarding revaccination.

Before the widespread use of pneumococcal conjugate vaccine in infants, IPD rates in Indigenous adults were up to 20 times higher than in non-Indigenous adults. Studies in Far North Queensland and the Kimberley have demonstrated a favourable impact of 23vPPV on rates of invasive pneumococcal disease in Indigenous adults. In other regions there has been no decrease in disease, perhaps due to low vaccination coverage and/or non-vaccine serotype replacement. At a national level, disparities remain in disease rates between Indigenous and non-Indigenous adults. As is the case for influenza and pneumonia, rates of invasive pneumococcal disease are highest in older Indigenous adults, with rates around 4 times higher in Indigenous than non-Indigenous adults aged ≥50 years. Rates in younger adults are slightly lower, but the relative difference between Indigenous and non-Indigenous persons is much greater, around 12 times higher in Indigenous than in non-Indigenous adults aged 25–49 years. Vaccination coverage has been low in younger Indigenous adults, an issue that requires attention if the full benefits of vaccination are to be realised.

Other diseases

Japanese encephalitis

The first ever outbreak of Japanese encephalitis (JE) in Australia occurred in the remote outer islands of the Torres Strait in 1995, with 3 cases, 2 of them fatal. There have been 5 cases to date acquired in Australia. Since then, JE virus has been detected frequently in sentinel animal surveillance in the outer islands. However, the sentinel pig surveillance system has been gradually disbanded since 2006, with surveillance of the last remaining herd on Cape York ceasing from the 2011–2012 wet season.

A JE vaccine (JE-Vax) was first offered to the residents of the Torres Strait Islands in late 1995 and the vaccine was integrated into the vaccination schedule for children resident in the Torres Strait Islands, commencing at 12 months of age.

There has not been a case of JE in the Torres Strait since 1998 and the risk of JE has diminished considerably in the outer islands since the mid-1990s. Most communities have relocated pigs well away from homes, and major drainage works on most islands have markedly reduced potential breeding sites for vector mosquitoes.

In 2007, the supply of JE-Vax vaccine into Australia ceased as the manufacturer stopped production. Because of this shortage of vaccine, for a short period from September 2007 JE-Vax was restricted to use on the six outer Torres Strait Islands: Badu, Boigu, Dauan, Mabuiag, Moa and Sabai. Two new JE vaccines, Imojev and JEspect, are now available for use in those at risk in the Torres Strait (refer to 4.8 Japanese encephalitis).

Rubella

Although evidence suggests that endemic rubella is well controlled in Australia, Indigenous women living in rural and remote regions are more likely to be non-immune to rubella than non-Indigenous non-overseas-born Australians. Every effort should be made to identify non-pregnant seronegative Indigenous women of child-bearing age and provide measles-mumps-rubella (MMR) vaccine, in order to prevent congenital rubella syndrome (refer to 4.18 Rubella). Vaccination with MMR vaccine also ensures adequate protection against measles (refer to 4.9 Measles).
3.1.3 Service delivery

General practitioners, Aboriginal Community Controlled Health Services, Community Health Services, the Royal Flying Doctor Service and state/territory corrective services all provide vaccination services to Indigenous persons and are important to the success of programs to vaccinate Indigenous persons. While vaccination coverage estimates vary over time and between communities, a relatively consistent finding has been higher coverage in Indigenous persons in remote areas than in urban areas.47-48 More recently, however, this has not been the case for Indigenous children, where coverage has been high in both remote and urban areas;49 coverage in remote areas is lower for adults than for children.5 For vaccines recommended for both Indigenous and non-Indigenous persons, coverage is as high, or higher, in Indigenous persons as in non-Indigenous persons,5 but vaccination is more frequently delayed.50-53 For example, one study reported that at 7 months of age over 45.2% of Indigenous infants in the Northern Territory had completed the recommended schedule for that age point (DTPa-hepB-IPV-Hib/PCV/rotavirus), but by 18 months of age this figure had risen to 81.2%.54 Coverage for vaccines recommended only for Indigenous persons is generally lower than for vaccines that are funded for all persons in a particular age group.55

These disparities point to the importance of identification of Indigenous status, particularly in mainstream health services, and particularly in urban areas. The use of patient information systems to record Indigenous status and schedule preventive health services has the potential to increase opportunistic vaccination and enable the provision of patient reminders, with resultant improvements in coverage and timeliness.55 Culturally appropriate service delivery and communication strategies, as well as use of Indigenous-specific Medicare items, will also assist in improving access to health services for Indigenous Australians.56-58

References

A full reference list is available on the electronic Handbook or website www.immunise.health.gov.au.


54. Hull BP, McIntyre PB. What do we know about 7vPCV coverage in Aboriginal and Torres Strait Islander children? Communicable Diseases Intelligence 2004;28:238-43.


