IMMUNISATION COALITION

2024 PNEUMOCOCCAL DISEASE GUIDE

FOR HEALTHCARE PROFESSIONALS

ABOUT PNEUMOCOCCAL DISEASE

Pneumococcal disease is caused by the Gram-negative bacterium, Streptococcus pneumoniae (pneumococcus). Infection usually starts with a colonising event in the nose and throat, which is asymptomatic, and most infections do not progress beyond colonisation. However, some infections spread locally or invasively to cause disease.

Certain pneumococcal diseases are non-invasive, such as middle ear infections (otitis media), sinusitis, or bronchitis.[1] Others are invasive, involving the blood or a major organ, and are potentially life-threatening. Examples of invasive pneumococcal diseases (IPDs) include septicaemia (sepsis), meningitis, or bacteraemic pneumonia.

Pneumococci usually possess a polysaccharide capsule, which appears as more than 100 serotypes,[2] and immunity to the organism is capsule-type specific. Although many serotypes cause disease, only a few cause most infections. The predominant serotypes vary with age, time, and geography.[3][4]

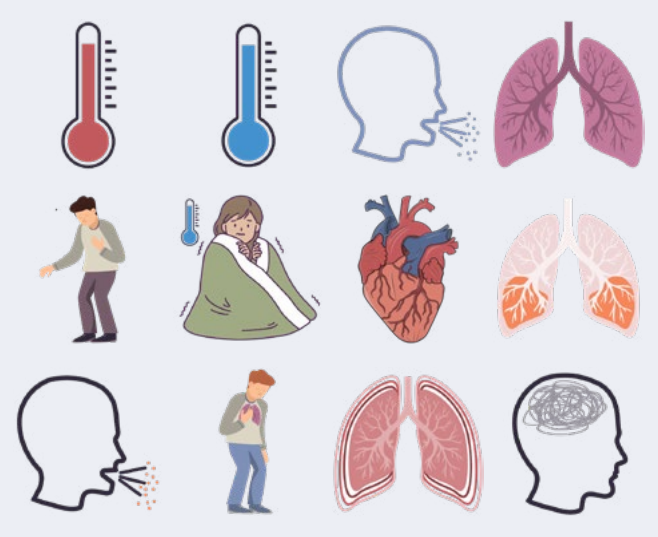
TRANSMISSION

Transmission occurs through respiratory droplets from people with pneumococcal disease or healthy carriers. If an infected person coughs or sneezes in close proximity to others, the infection may spread.

Following acquisition, the bacterium becomes established in the nasopharynx of the host, leading to asymptomatic colonisation. It may then spread to other parts of the body, causing disease. The bacteria's polysaccharide capsule helps it resist phagocytosis. If no anti-capsular antibody pre-exists, alveolar macrophages cannot kill the pneumococci.[6][7][8][9]

CLINICAL FEATURES

The major clinical syndromes of IPD are pneumonia, septicaemia, and meningitis.[10][11] Symptoms of pneumonia include **fever, chills, coughing, rapid or difficult breathing, chest pain, rigors, tachycardia, rusty-coloured sputum, cough** productive of mucopurulent material, **dyspnoea, tachypnoea, hypoxia,** or, in older patients, **confusion or low alertness.**



Meningitis, although the least common, is the most severe category of IPD and is often fatal.[12][13] Symptoms include a stiff neck, fever, lethargy, nuchal rigidity, cranial nerve signs, seizures, coma, headache, pain when looking into bright lights, confusion; or, in babies, poor feeding, low alertness, or vomiting.

Septicaemia is the most common IPD among young children. Symptoms include fever, chills, and low alertness. By 12 months, most children have also experienced otitis media. Pneumococcus is detected in 28 to 55% of middle ear aspirates from children with otitis media. Symptoms include ear pain, a red, swollen eardrum, fever, and sleepiness. Complications of otitis media may include mastoiditis and meningitis.[14][15][16]

ANTIBIOTIC RESISTANCE

Pneumococcal disease is mainly treated using β-lactam antibiotics, though pneumococci are increasingly developing antibiotic resistance. Strains have variably become resistant to penicillin, cephalosporins, macrolides, tetracycline, clindamycin, and quinolones.[5]

WHO IS MOST AT RISK

Anyone can contract IPD, though some groups are at heightened risk. These include:

- People <2 or >70 years of age
- Children in group childcare
- Children in developing countries
- Nursing home residents
- Smokers
- People suffering from chronic conditions such as lung, heart, liver, or kidney disease, asthma, diabetes, or alcoholism
- People with cochlear ear implants, cerebrospinal fluid (CSF) leaks, or impaired immunity for any reason, including those arising from conditions such as HIV/AIDS, cancer, or a damaged or absent spleen
- Aboriginal and/or Torres Strait Islander people[17][18][19]

Vaccination is strongly recommended for groups at risk.

YOUNG CHILDREN

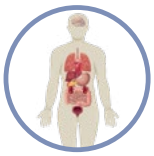
IPD still causes serious illness and occasional deaths. By 2011, this had become much less common than it was before the widespread introduction of the infant pneumococcal vaccine in 2005. However, several harmful strains of the pneumococcal germ continue to circulate and cause illness.

The introduction of Prevenar 13 in 2011 is expected to provide protection against the most important of these remaining strains. Routine vaccination of children under the age of five is recommended.

PEOPLE AGED OVER 70 YEARS

Pneumococcal disease is an important cause of pneumonia in adults aged 70 years or older. The elderly are especially at risk of serious illness and death from this disease.

PEOPLE WITH UNDERLYING MEDICAL RISK CONDITIONS



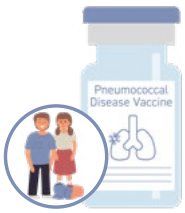
Adults and children with the following serious medical conditions are at greater risk of life-threatening infection and hospitalisation from pneumococcal disease:

- People with chronic illnesses such as diabetes, heart, lung, or kidney disease
- People without a spleen or whose spleen does not work properly
- People with serious problems with their immune system
- Aboriginal and/or Torres Strait Islander people

All Aboriginal and Torres Strait Islander people over the age of 50 should be offered the pneumococcal vaccine.

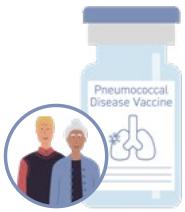
WHO SHOULD RECEIVE PNEUMOCOCCAL DISEASE VACCINATION

Pneumococcal disease vaccination is recommended for all children under 5 years of age.

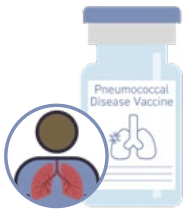


(See infographic by Australian Department of Health and Aged Care)

Pneumococcal disease vaccination is also recommended for all non-Indigenous adults aged 70 years and older and Indigenous adults aged 50 years and older.



Adults with medical conditions associated with an increased risk of invasive pneumococcal disease should also be vaccinated against pneumococcal disease.



The type and number of doses of pneumococcal disease vaccination vary across age groups and risk categories. This can be quite complicated to follow, but it is summarised in the NIP Schedule and Australian Immunisation Handbook (AIH).

The Immunisation Coalition has developed the PneumoSmart Vaccination Tool (PTV), a digital tool which identifies the vaccine type and dosage based on patient criteria. The PVT is based on the AIH and is intended for use by practitioners and nurse immunisers.

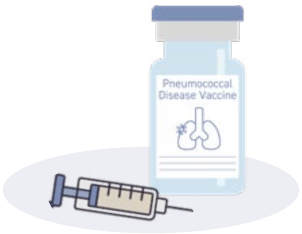
DIAGNOSIS

Diagnosis of pneumococcal disease should be based on the following:

- **Clinical evaluation**: Based on symptoms and physical examination.
- **Laboratory tests**: Blood tests, sputum cultures, and urine tests to identify S. pneumoniae.
- **Imaging**: Chest X-rays for pneumonia and CT scans for sinusitis or suspected meningitis.

DOSAGE AND ADMINISTRATION

The dose of **13-valent** pneumococcal conjugate vaccine (13vPCV) is 0.5 mL, to be given by IM injection in the opposite limb to other injectable vaccines, if possible. 13vPCV (Prevenar 13) is registered for use in people aged ›6 weeks.[22]



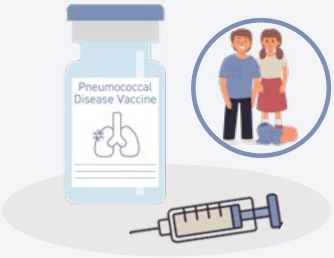
The dose of **15-valent** pneumococcal conjugate vaccine (15vPCV) is 0.5 mL, to be given by IM injection in the opposite limb to other injectable vaccines, if possible. 15vPCV (Vaxneuvance) is registered for use in people aged ›6 weeks.[23]

The dose of **20-valent** pneumococcal conjugate vaccine (20vPCV) is 0.5 mL, to be given by IM injection in the opposite limb to other injectable vaccines, if possible. 20vPCV (Prevenar 20) is registered for use in people aged ›6 weeks.[24]

The dose of **pneumococcal polysaccharide vaccine** (23vPPV) is 0.5 mL, to be given by either IM or SC injection in the opposite limb to other injectable vaccines, if possible:

- The IM route is preferred, as a 3-fold greater rate of injection site reactions is found following administration of 23vPPV by the SC route.
- A vaccine dose administered subcutaneously does not need to be repeated. 23vPPV (Pneumovax 23) is registered for use in children aged ›2 years and in adults.[25]

CHILDHOOD VACCINATION RECOMMENDATIONS



UNIVERSAL CHILDHOOD SCHEDULE

All non-Indigenous children, and Aboriginal and/or Torres Strait Islander children living in ACT, NSW, Tas, and Vic, should receive 3 doses of 13vPCV*:

DOSE 1	DOSE 2	DOSE 3
age **2** months	age **4** months	age **12** months

At-risk children 12 months or under, all children with risk conditions, and **Aboriginal and/or Torres Strait Islander children** living in NT, Qld, SA, and WA, should receive 4 doses of 13vPCV and 2 doses of 23vPPV.

For 13vPCV:*

DOSE 1	DOSE 2	DOSE 3	DOSE 4
age **2** months	age **4** months	age **6** months	age **12** months

For 23vPPV:

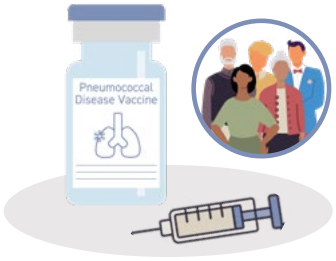
DOSE 1	DOSE 2
age **4 years**	at least **5 years later**

Children over 12 months, adolescents, and adults of any age diagnosed with a risk condition should receive a single dose of 13vPCV* at diagnosis, and 2 doses of 23vPPV (dose 1 at 12 months after 13vPCV or at age 4 years, whichever is later, and dose 2 at least 5 years later).

single dose of **13vPCV** → after 12 months or at age 4 years → 1st dose of 23vPPV → at least 5 years → 2nd dose of 23vPPV

**15vPCV and 20vPCV are available as alternatives to 13vPCV, but are not currently NIP-funded. There are no pneumococcal vaccines subsidised on the Pharmaceutical Benefits Scheme (PBS).*

ADULT VACCINATION RECOMMENDATIONS



Aboriginal and /or Torres Strait Islander adults aged 50 years or over should receive a single dose of 13vPCV*, and 2 doses of 23vPPV (dose 1 at 12 months after 13vPCV, and dose 2 at least 5 years later).

single dose of **13vPCV*** → 12 months → 1st dose of 23vPPV → at least 5 years → 2nd dose of 23vPPV

Non-Indigenous adults aged 70 years or over should receive:

a single dose of 13vPCV*

These vaccines are funded under the National Immunisation Programme.

**15vPCV and 20vPCV are available as alternatives to 13vPCV, but are not currently NIP-funded.*

There are no pneumococcal vaccines subsidised on the Pharmaceutical Benefits Scheme (PBS).

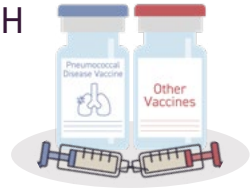
PREGNANCY AND BREASTFEEDING

23vPPV is not routinely recommended during pregnancy or breastfeeding.

Deferral of vaccination with 23vPPV until after delivery is recommended unless there is an increased risk of IPD. 23vPPV may be given to those who are breastfeeding.

Those who are breastfeeding can receive 13vPCV, 15vPCV, or 20vPCV; however, data during pregnancy or breastfeeding is limited.

CO-ADMINISTRATION WITH OTHER VACCINES



Infants can receive pneumococcal vaccines at the same time as other vaccines given in childhood.

In **adults,** pneumococcal vaccines (any conjugate vaccine or 23vPPV) can be concurrently administered with herpes zoster vaccines, influenza vaccines, RSV vaccines, and COVID-19 vaccines using separate syringes and injection sites.
(Refer to the Australian Immunisation Handbook)

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