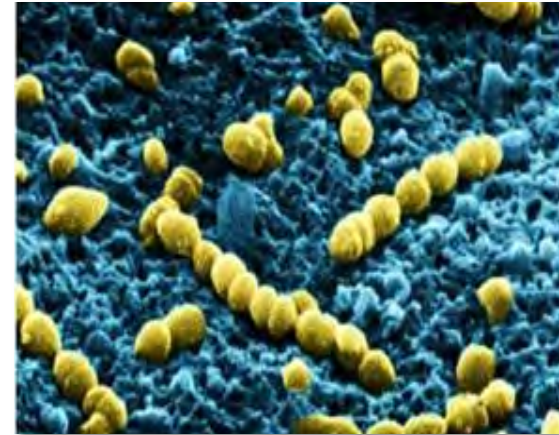




Adult Pneumococcal Disease

S. pneumoniae and pneumococcal disease

- The bacterium *Streptococcus pneumoniae* causes pneumococcal disease
- *S. pneumoniae* is commonly found in human nasopharynx (nose and throat) of many people without disease
- Generally, the presence of *S. pneumoniae* in the nasopharynx does not cause illness. However, vulnerable individuals (e.g. *asplenic*, *HIV*, *malignancy*) may develop pneumococcal disease
- *S pneumoniae* spreads from person to person through contaminated respiratory droplets (i.e. droplets containing the bacteria)



Streptococcus pneumoniae

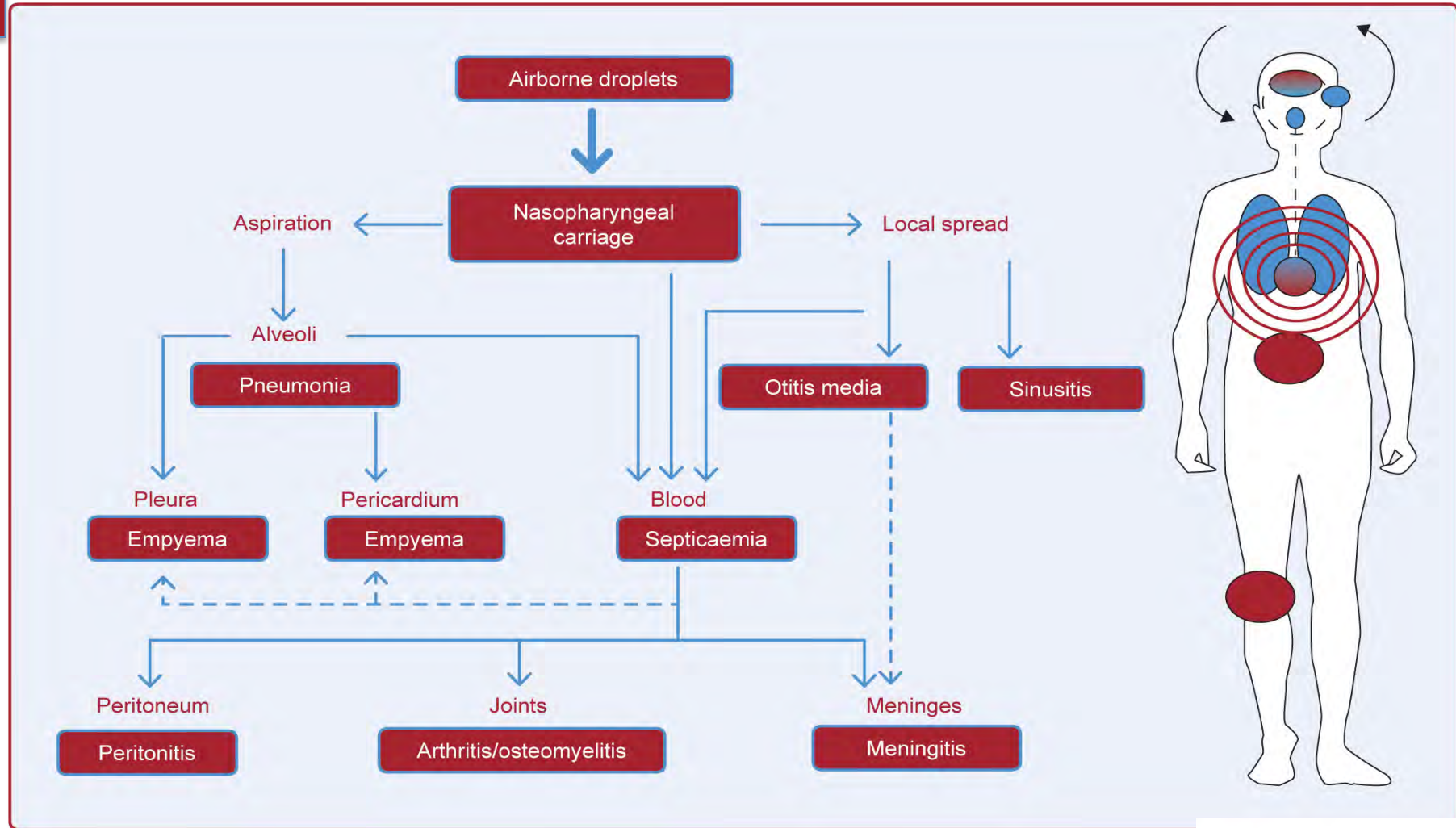


What is pneumococcal disease?

Pneumococcal disease covers a wide spectrum of illnesses ranging from mild to life-threatening

- Sinusitis
- Otitis media
- Bacteraemia
- Pneumonia
- Meningitis
- Peritonitis
- Septic arthritis
- Osteomyelitis

Possible progression pathway of disease





Treating pneumococcal disease

- Pneumococcal disease is treated with antibiotics
- Antibiotic-resistance has become an increasing challenge
- Therefore, prevention of pneumococcal disease, especially in vulnerable individuals, is a priority

What is invasive pneumococcal disease?

- Invasive pneumococcal disease (IPD) is defined as the isolation of a *S. pneumoniae* from a normally sterile site (generally blood, and also pleural, joint and cerebrospinal fluid)
- Major clinical presentations of IPD include:
 - Pneumococcal pneumonia (most common in adults)
 - Bacteraemia without focus (most common in children)
 - Meningitis
- IPD is used as an overall indicator of pneumococcal disease burden
- In children + adults the morbidity associated with IPD can be substantial.
- IPD may be life-threatening
 - resulting in hospitalisations and death





Invasive Pneumococcal Disease in Australia

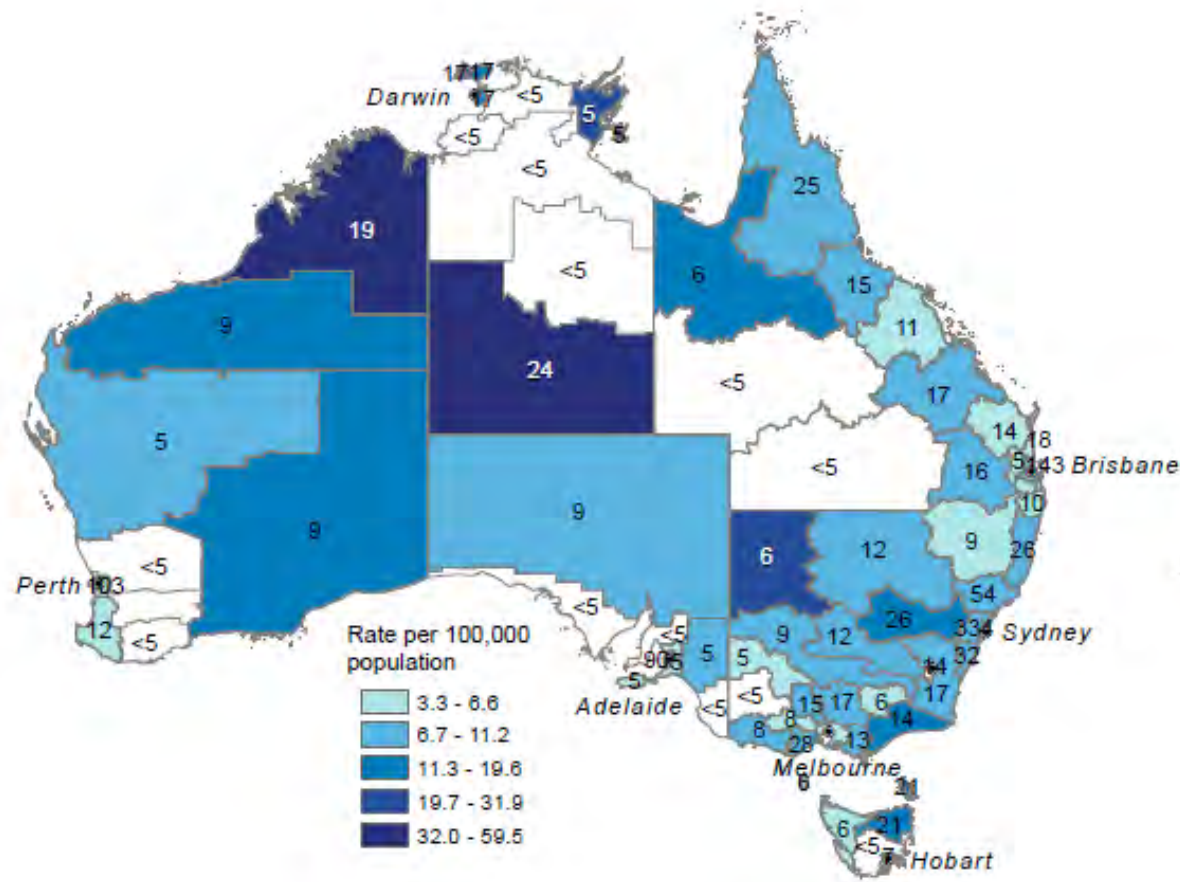
Highest incidence is seen at extremes of age: young children and elderly

In 2008:

- 1,628 cases of IPD were reported to the National Notifiable Diseases Surveillance System (NNDSS)
- Notification rate of 7.6 cases per 100,000 population
- There were 113 deaths known to be associated with IPD
- The case fatality rate was higher in patients aged ≥ 65 years (14.3%) than in children aged < 5 years (1.5%)
- The overall rate of IPD in Indigenous Australians was almost 5 times that in non-Indigenous Australians

Invasive pneumococcal disease in Australia

Rates of IPD reported in 2008, varied across states



Notification rates of IPD, 2008, by Statistical Division of residence.
Source: Barry C, et al 2012.

Who is at risk of IPD?

- Children < 2 years and the elderly
- Aboriginal and Torres Strait Islanders
- Individuals with risk factors or medical condition(s) placing them at risk of IPD including:

Category A: Conditions associated with the highest increased risk of invasive pneumococcal disease

- Functional or anatomical asplenia (e.g. sickle cell disease)
- Immunocompromising conditions (e.g. congenital or acquired immune deficiency, immunosuppressive therapy, solid organ transplant, HIV infection, chronic renal failure and other malignancies)
- Proven or presumptive cerebrospinal fluid leak
- Cochlear implants
- Intracranial shunts

Category B: Conditions associated with an increased risk of invasive pneumococcal disease

- Chronic cardiac disease (e.g. cyanotic heart disease or cardiac disease)
- Chronic lung disease (e.g. cystic fibrosis, severe asthma in adults)
- Diabetes
- Down syndrome
- Alcoholism
- Chronic liver disease
- Pre-term birth at <28 weeks gestation
- Tobacco smoking



Invasive pneumococcal disease risk in people with underlying chronic conditions

- Adults with diabetes, chronic heart disease, or chronic lung disease exhibit a **3 to 6-fold increased risk of IPD**, compared with healthy adults



Pneumococcal disease and diabetes

- Diabetics have impaired pulmonary host defences which may predispose to lower respiratory tract infections
- In people with diabetes, *S. pneumoniae* infections are associated with increased morbidity and mortality
- Diabetes is a risk factor for bacteremia in patients with pneumococcal pneumonia & is associated with increased mortality
- Diabetes is often associated with cardiovascular or renal disease, which increases the risk for severe pneumococcal illness
- *S. pneumoniae* infection can impair blood glucose control





Pneumococcal disease and diabetes

Vaccination recommendations

The following guidelines recommend vaccination against pneumococcal disease for people with diabetes:

- NHMRC The Australian Immunisation Handbook 10th Edition 2013
- The Diabetes Management in General Practice 2012/13 Guidelines for Type 2 Diabetes (Diabetes Australia and the RACGP)

Pneumococcal disease and chronic cardiac disease

Chronic heart failure

- Patients with chronic heart failure are at increased risk of respiratory infections
- Respiratory infections are a major cause of acute cardiac decompensation in heart failure patients, especially in the elderly





Pneumococcal disease and chronic cardiac disease

Vaccination recommendations

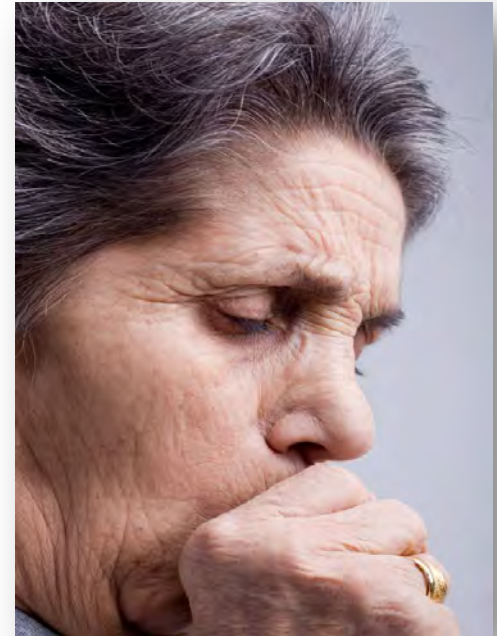
The following guidelines recommend vaccination against pneumococcal disease for people with chronic cardiac disease including chronic heart failure:

- NHMRC The Australian Immunisation Handbook 10th Edition 2013
- Guidelines for the prevention, detection and management of chronic heart failure in Australia Updated 2011
(National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand)

Pneumococcal disease and chronic pulmonary disease

Chronic Obstructive Pulmonary Disease (COPD)

- People with COPD are at increased risk of developing pneumococcal disease
- In patients hospitalised for acute COPD exacerbations and concomitant pneumonia – where infection was the cause of the exacerbation, *S. pneumoniae* is one of commonest bacteria identified in sputum
- Patients on high-dose inhaled corticosteroids may have impaired airway defense mechanisms making them susceptible



Pneumococcal disease and chronic pulmonary disease



Severe Asthma

- Asthma is an independent risk factor for IPD
- People with asthma have at least a two-fold higher risk of developing IPD

Vaccination recommendations

- For people with chronic pulmonary disease, vaccination against pneumococcal disease is recommended by the NHMRC
- The Australian Immunisation Handbook 10th Edition 2013

Invasive pneumococcal disease and tobacco smoking


Cigarette smoking is the strongest independent risk factor for IPD among immunocompetent, non-elderly adults

- Smoking:
 - Damages the mucosal lining of the airways
 - Increases number inflammatory molecules
 - Hinders mucociliary clearance
 - Increases susceptibility to upper respiratory tract colonisation, infection and otitis media
- About half of otherwise healthy adults with IPD are **tobacco smokers**
- Vaccination against pneumococcal disease is recommended by The Australian Immunisation Handbook 10th Edition 2013




23-valent pneumococcal polysaccharide vaccine (23vPPV)

- Contains capsular polysaccharides derived from 23 types of *S. pneumoniae*
- In 2007-2008, these 23 serotypes were identified as the cause of 74% of notified IPD cases in Australia
- Indicated for immunisation against pneumococcal disease due to pneumococcal types contained in the vaccine. **Not recommended for children less than 2 years of age**
- 23-valent pneumococcal polysaccharide vaccine has been available in Australia since 1983
 - For adults ≥ 65 years:
 - Funded in Victoria since 1998
 - Listing on the National Immunisation Program commenced in 2005



23-valent pneumococcal polysaccharide vaccine (23vPPV)

- Administered as a single 0.5mL dose S/C or IM
- Most commonly reported adverse events include fever and injection site reactions
- Duration of immunity: antibody levels decline after 5-10 years
A more rapid decline may occur in some groups (e.g. the elderly)
- The minimum recommended interval between any 2 doses of 23vPPV is 5 years
 - Immune hyporesponsiveness ('blunting' of the antibody response) may occur after repeat doses
 - Not known if this has any significant negative outcome on effectiveness
- A higher rate of self-limited injection site reactions following revaccination (compared with first vaccination) has been observed and is described in the Product Information



23-valent pneumococcal polysaccharide vaccine (23vPPV) NIP and PBS information

National Immunisation Program

23vPPV is listed on the NIP for:

- People aged ≥ 65 years
- Aboriginal and Torres Strait Islanders
 - ≥ 50 years of age
 - 15–49 years of age who have underlying condition(s) placing them at risk of IPD.
- Children aged 4 years with a condition(s) associated increased risk of IPD

Pharmaceutical Benefits Scheme (PBS)

23vPPV is listed on the PBS (restricted benefit) for:

- Persons at high risk of pneumococcal infections
- Splenectomised persons over 2 years of age
- Persons with Hodgkin's disease

13-valent pneumococcal conjugate vaccine (13vPCV)

- Contains capsular polysaccharides derived from 13 types of *S. pneumoniae* - linked to a protein (non-toxic CRM₁₉₇ protein)
- In 2007-2008, these 13 serotypes were identified as the cause of 65% of notified IPD cases in Australia across all age groups
- Indicated in adults and children from 6 weeks of age for active immunisation for the prevention of pneumococcal disease due to pneumococcal types contained in the vaccine.
- 13-valent pneumococcal conjugate vaccine has been available in Australia since 2010
 - The 7-valent pneumococcal conjugate had been available previously since 2000



13-valent pneumococcal conjugate vaccine (13vPCV)

Dosage in Adults:

- **One single dose**, including those previously vaccinated with pneumococcal polysaccharide vaccine*
- The need for revaccination with a subsequent dose has not been established
- If sequential administration of 13vPCV and 23vPPV is considered, 13vPCV should be given first for maximal efficacy and to avoid blunting of the immune response by 23vPPV
- Most commonly reported adverse events include fever and injection site reactions, see full product information

13-valent pneumococcal conjugate vaccine (13vPCV)

- NIP funded as part of the infant program
 - Given 2, 4 and 6 months (can be as early as 6 weeks)
 - Additional 4th booster dose NIP funded for:
 - Indigenous children in QLD, SA, NT, WA given 12-18 months of age
 - Children medically at risk (Category A and B), given at 12 months of age
 - 13vPCV replaced 7vPCV in 2011 on the NIP
 - Adults not currently NIP funded
- AIH recommendations:
 - Include adults >18 years of age with Category A 'Highest increased risk' of IPD

Adult Pneumococcal Vaccination Recommendations

Risk of IPD		Age		13vPCV* (2)	23vPPV** (1)
		Non-indigenous	Indigenous		
Healthy		≥ 65yrs		-	1 dose
			≥ 50yrs‡	-	2 doses
Increased risk category (B) <ul style="list-style-type: none"> Diabetes mellitus Chronic lung disease Chronic cardiac disease Chronic liver disease Down syndrome Alcoholism Tobacco smoking 	18 – 64yrs‡∞	18 – 49yrs#	-	3 doses	
	≥ 65yrs‡	≥ 50yrs‡	-	2 doses	
Highest risk category (A) <ul style="list-style-type: none"> Functional or anatomical asplenia Immunocompromised persons (eg chronic renal failure) Cerebrospinal fluid leaks Cochlear implants Intracranial shunts 	18 – 64yrs‡∞*	18 – 49yrs*#	1 dose	3 doses	
	≥ 65yrs‡∞*	≥ 50yrs*#	1 dose	3 doses	

(1) 23vPPV is funded under the NIP, except for non-indigenous category A & B 19-64 yrs, which is subsidised on the PBS for eligible adults.

(2) 13vPCV is not funded under the NIP

*1 dose of 13vPCV is recommended for those with Highest risk for invasive disease (Category A) who have never received prior dose of 13vPCV. This dose should precede the 1st dose of the recommended 23vPPV by 2 months. For those who have had prior doses of 23vPPV, the 13vPCV dose should be given at least 12 months later.

** The minimum interval between any 2 doses of 23vPPV is 5 years with a maximum of 3 lifetime adult doses.

‡ The 2nd dose should be given 5 years after the 1st dose.

The 2nd dose of 23vPPV should be given 5-10 years after the 1st dose. The 3rd dose should be given at 50 years for indigenous people or 5 years after the 2nd dose, whichever is later.

∞ The 3rd dose of 23vPPV should be given at 65 years or 5 years after the 2nd dose, whichever is later.



Vaccination coverage


	Pneumococcal pneumonia immunisation coverage
65 years and over	54% ¹
'At risk' patients (≥18 to 64 years)	<10% ^{2-5*}

* Based on CSL estimates, may not reflect actual coverage

Conclusions

- Pneumococcal disease can cause considerable morbidity and mortality in those most at risk of pneumococcal infection
- Those most at-risk include very young children, the elderly, Aboriginal and Torres Strait islander individuals, and those with certain risk factors or medical condition(s) placing them at risk of invasive pneumococcal disease
- For those at-risk, Australian guidelines recommended:
 - Vaccination with pneumococcal vaccine*
- Potentially ‘at-risk’ individuals should have their pneumococcal vaccination status checked

*Refer to NHMRC Australian Immunisation Handbook 10th edition for official recommendations



Please review full Product Information before prescribing.

Pneumovax23 PBS Information: This product is listed on the National Immunisation Program (NIP) Schedule and the PBS. Refer to the NIP and PBS Schedule.

Product Information is available from bioCSL (Australia) Pty Limited ABN 66 120 398 067, 63 Poplar Road, Parkville, 3052. ® Pneumovax 23 is a registered trademark of Merck & Co. Inc. Whitehouse Station, NJ, USA Date of preparation: March 2014.

Prevenar 13 PBS Information: This product is listed on the National Immunisation Program (NIP) for children only and is not listed on the PBS. Refer to the NIP Schedule.

Prevenar 13 Product Information is available from Pfizer Australia on request on 1800 675 229 or at www.pfizer.com.au
® Registered trademark. Pfizer Australia Pty Limited 38-42 Wharf Road, West Ryde, NSW 2114.