



IMMUNISATION
COALITION

2024 WEBINAR

PNEUMOCOCCAL DISEASE UPDATE

WEDNESDAY 10 JULY | 6pm–7pm AEDT

Presenter: Angela Newbound
Moderator: Andrew Minton, PhD



Presenter

Angela Newbound

Immunisation Education Consultant and an Immunisation Coalition Member

Angela Newbound is a nurse and is based in South Australia. She is an Immunisation Education Consultant, also a member of the Immunisation Coalition and has been involved in immunisation program delivery in South Australia for over 20 years.

Angela provides clinical advice, support and education to a wide range of immunisation providers and contributes to the development of immunisation resources to assist providers with challenging aspects of the immunisation program.

Angela is passionate about the role that nurses play in vaccinating against infectious diseases and presents regularly at IC events to mixed HCP audiences.



Please indicate the profession or expertise area that most closely represents your background:

1. GP / Medical Practitioner
2. Nurse / Midwife / Immunisation Practitioner
3. Researcher / Educator
4. Pharmacist
5. Other healthcare worker
6. Other

Learning Objectives

- Demonstrate an understanding of the burden of Pneumococcal disease
- Outline the benefits of pneumococcal vaccination and identify the people who would benefit most from vaccination
- Demonstrate an understanding of the higher valency pneumococcal vaccines and recommendations for use
- Be aware of new pneumococcal conjugate vaccines, PVC15 and PVC20
- Describe the safety profile of the pneumococcal vaccines

Poll 1

What causes pneumococcal disease?

- A. *Streptococcus pneumoniae*
- B. *Staphylococcus pneumoniae*
- C. *Staphylococcus aureus*
- D. *Streptococcus agalactiae*



S. pneumoniae & 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)

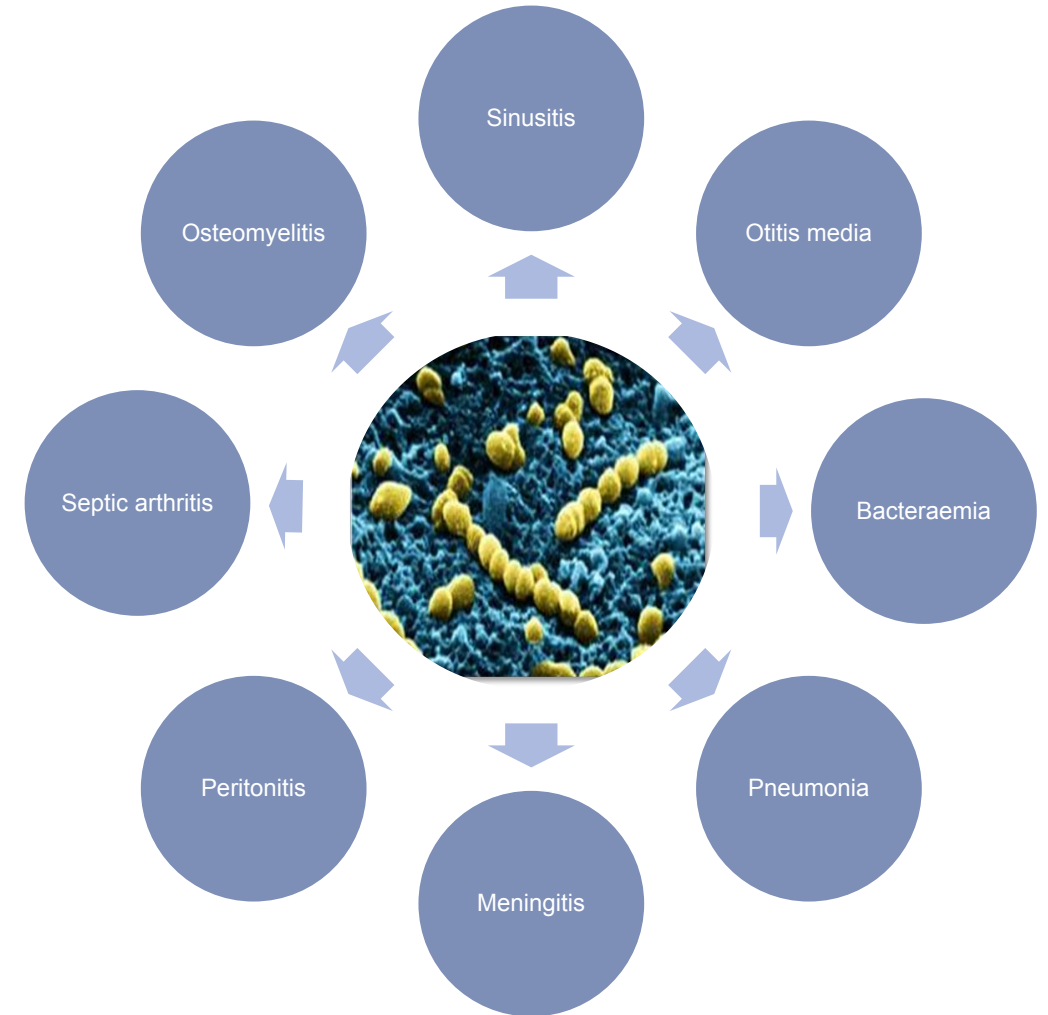




What is pneumococcal disease?

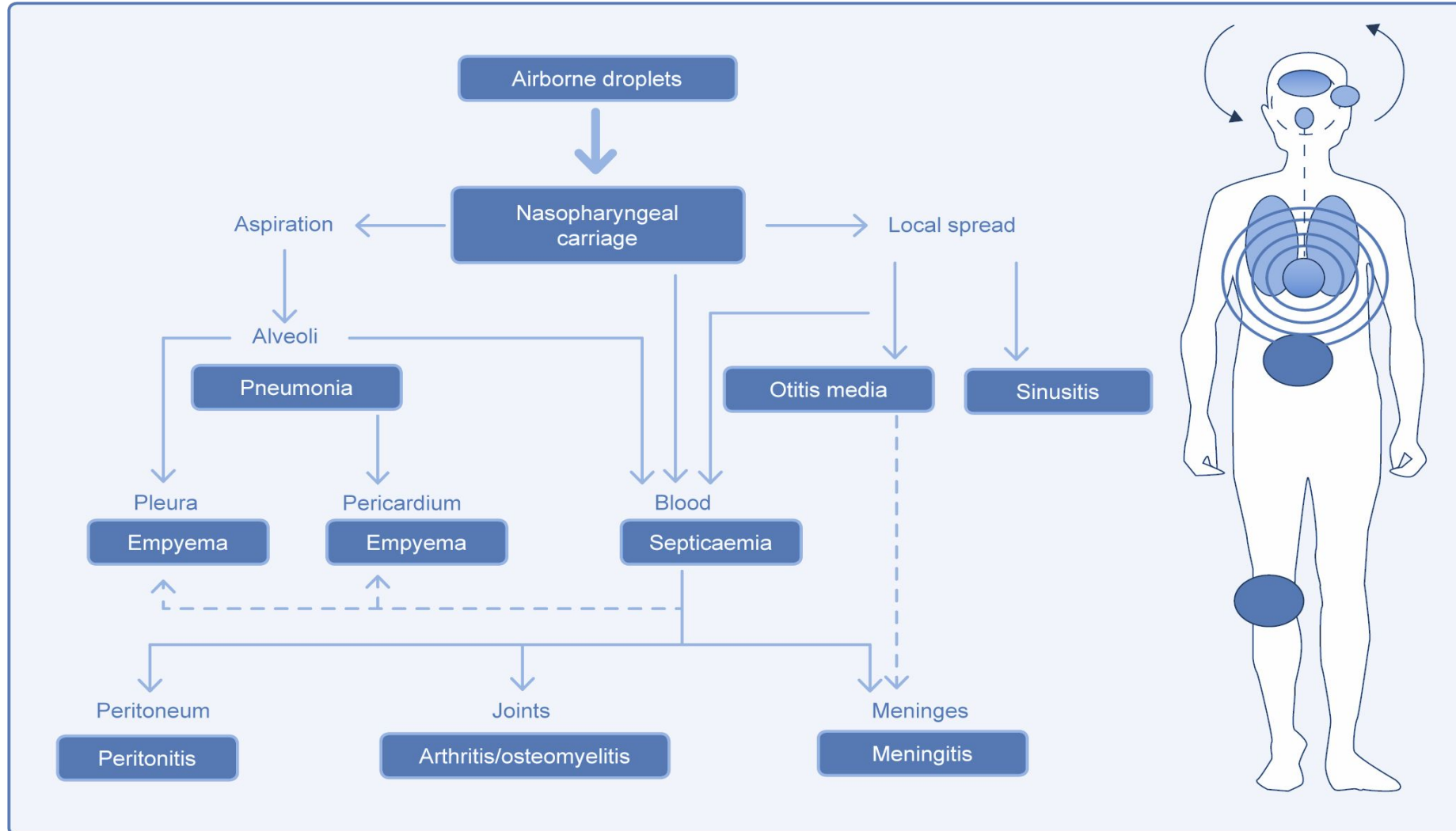
Pneumococcal disease covers a wide spectrum of illnesses ranging from mild to life-threatening

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





Possible progression pathway of disease



Adapted from Musher DM, Principles and Practice of Infectious Diseases, 2005

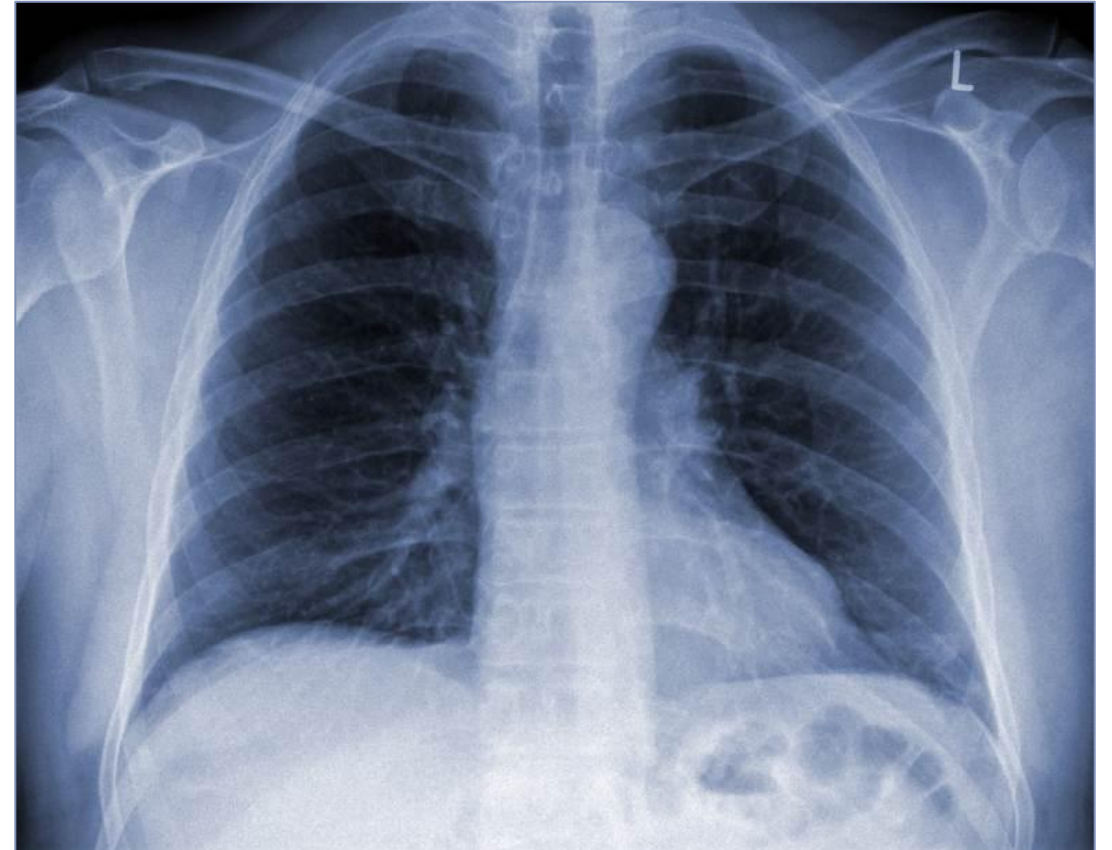
Treating pneumococcal disease

- 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 people**

In 2023, **2,265** cases of IPD were reported to the National Notifiable Diseases Surveillance System (NNDSS)

In 2022, **1,869** cases of IPD were reported to the National Notifiable Diseases Surveillance System (NNDSS)

In 2021, **1,335** cases of IPD were reported to the National Notifiable Diseases Surveillance System (NNDSS), versus 1,115 cases reported in 2020

In 2020,

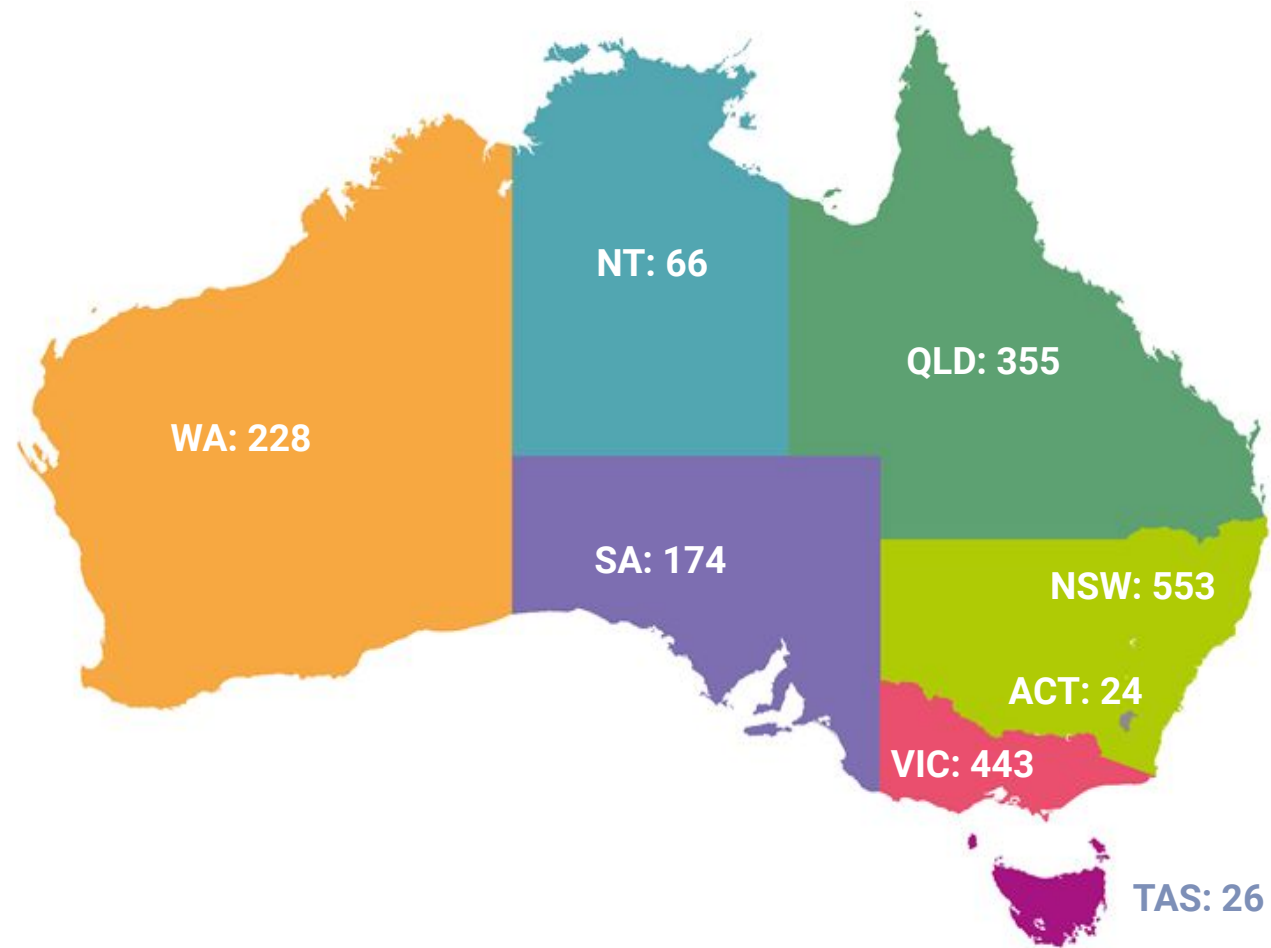
- **169** cases IPD in children under 5 and 449 cases in people ≥ 60 years of age



Dept of Health, Communicable Diseases Intelligence Report, 2020
Dept of Health, National Notifiable Diseases Surveillance System Accessed 22nd May 2023

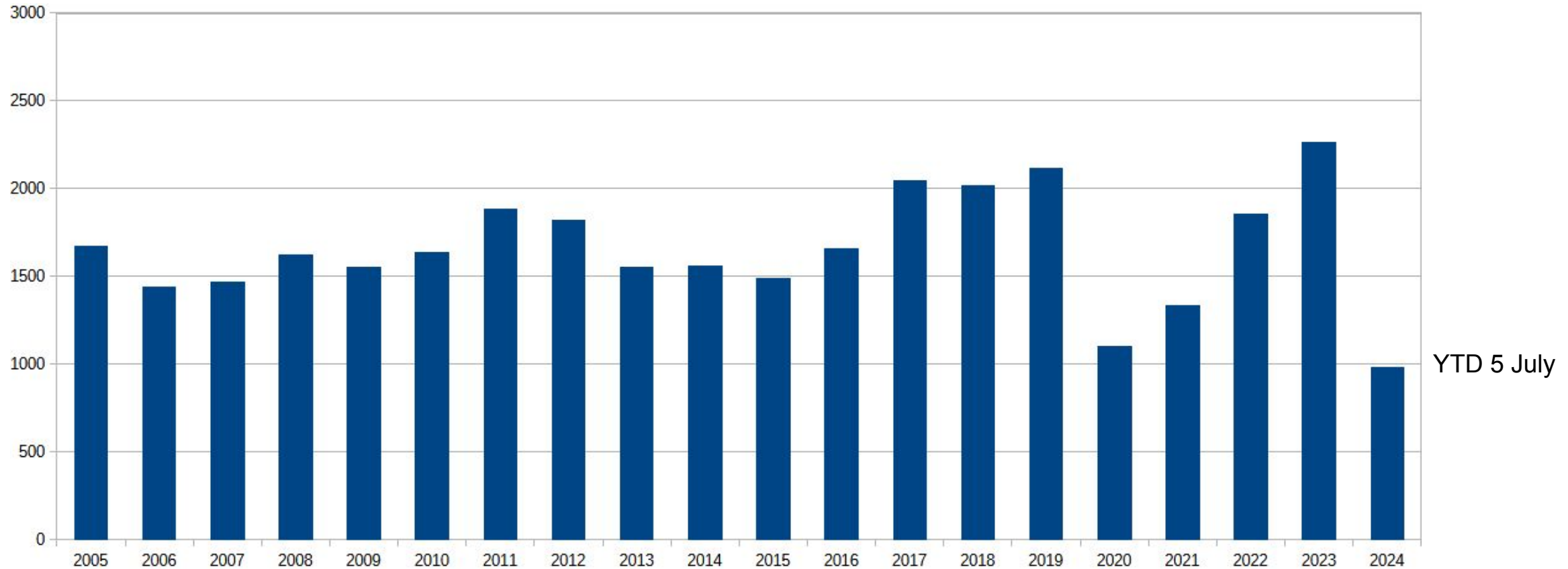
Notification rate of **4.4 cases per 100,000 population**

Invasive pneumococcal disease in Australia

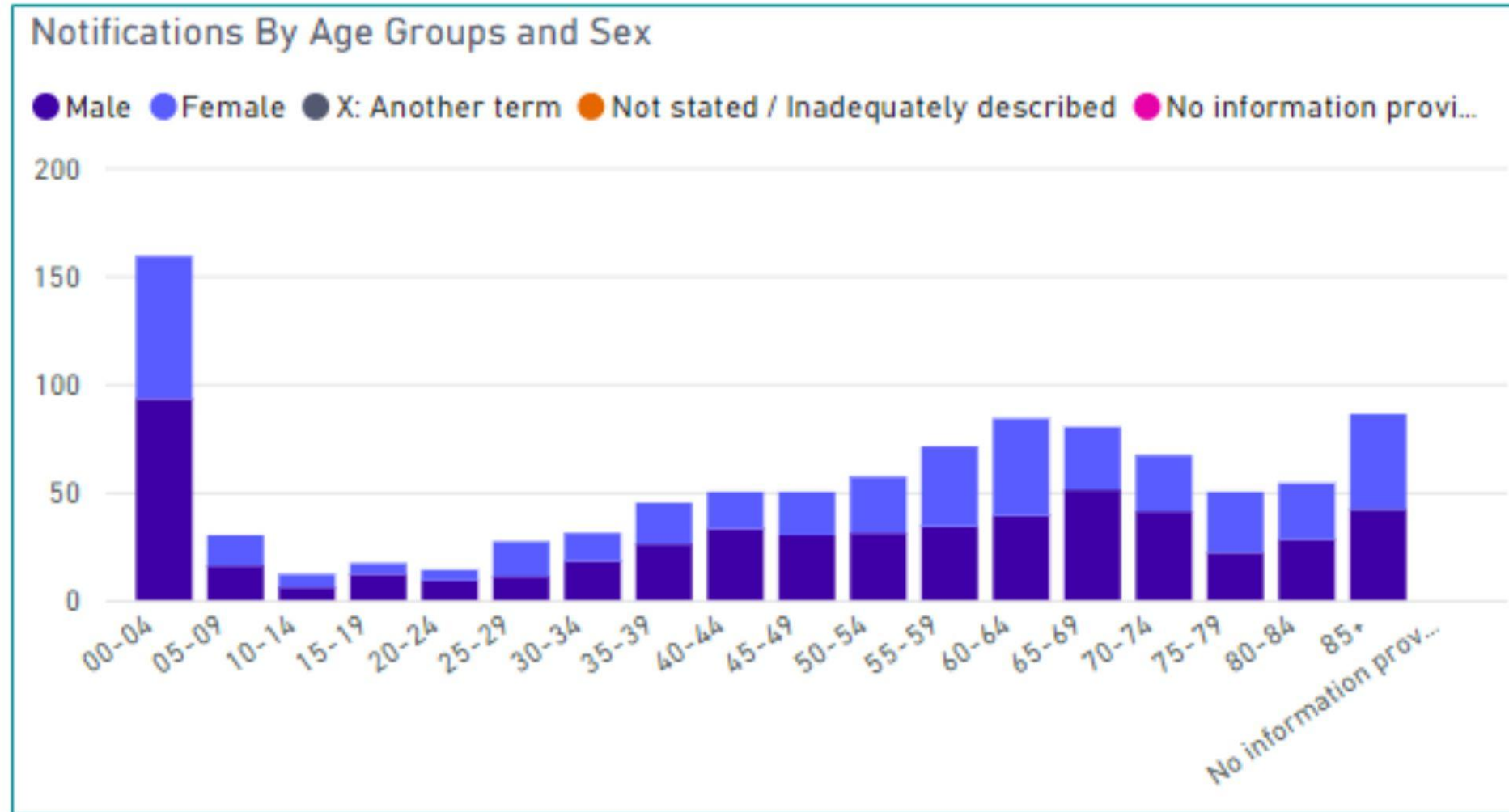




Number of notifications of Invasive Pneumococcal Disease 2005-2024



Notifications by Age Groups and Sex - 2024



Who is at risk of IPD?



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- **Children < 2 years and the elderly**
- **Aboriginal and Torres Strait Islanders**
- Previous episode of invasive pneumococcal disease
- Functional or anatomical asplenia, including:
 - sickle cell disease or other haemoglobinopathies
 - congenital or acquired asplenia e.g. splenectomy or hyposplenia
- Immunocompromising conditions, including:
 - congenital or acquired immune deficiency, including symptomatic IgG subclass or isolated IgA deficiency
 - haematological malignancies
 - solid organ transplant
 - haematopoietic stem cell transplant
 - HIV infection
 - immunosuppressive therapy, where sufficient immune reconstitution for vaccine response is expected; this includes those with underlying conditions requiring but not yet receiving immunosuppressive therapy
 - non-haematological malignancies receiving chemotherapy or radiotherapy (currently or anticipated)
- Proven or presumptive cerebrospinal fluid (CSF) leak, including:
 - cochlear implants
 - intracranial shunts
- Cardiac disease, including:
 - congenital heart disease
 - coronary artery disease
 - heart failure
- Chronic respiratory disease, including:
 - suppurative lung disease, bronchiectasis and cystic fibrosis
 - chronic lung disease in preterm infants
 - chronic obstructive pulmonary disease (COPD) and chronic emphysema
 - severe asthma (defined as requiring frequent hospital visits or the use of multiple medications)
 - interstitial and fibrotic lung disease
- Chronic renal disease:
 - relapsing or persistent nephrotic syndrome
 - chronic renal impairment – eGFR <30 mL/min (stage 4 or 5 disease)
- Children born less than 28 weeks gestation
- Trisomy 21
- Chronic liver disease, including:
 - chronic hepatitis
 - cirrhosis
 - biliary atresia
- Diabetes
- Smoking (current or in the immediate past)
- Harmful use of alcohol (Defined as consuming on average ≥ 60 g of alcohol (6 Australian standard drinks) per day for males and ≥ 40 g of alcohol (4 Australian standard drinks) per day for females)

Invasive pneumococcal disease risk in people with underlying chronic conditions



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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

- People with diabetes 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 bacteraemia 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:

- The Australian Immunisation Handbook , Australian Government Department of Health, Canberra 2018 immunisationhandbook.health.gov.au
- The Royal Australian College of General Practitioners. Management of type 2 diabetes: A handbook for general practice. East Melbourne, Vic: RACGP, 2020

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

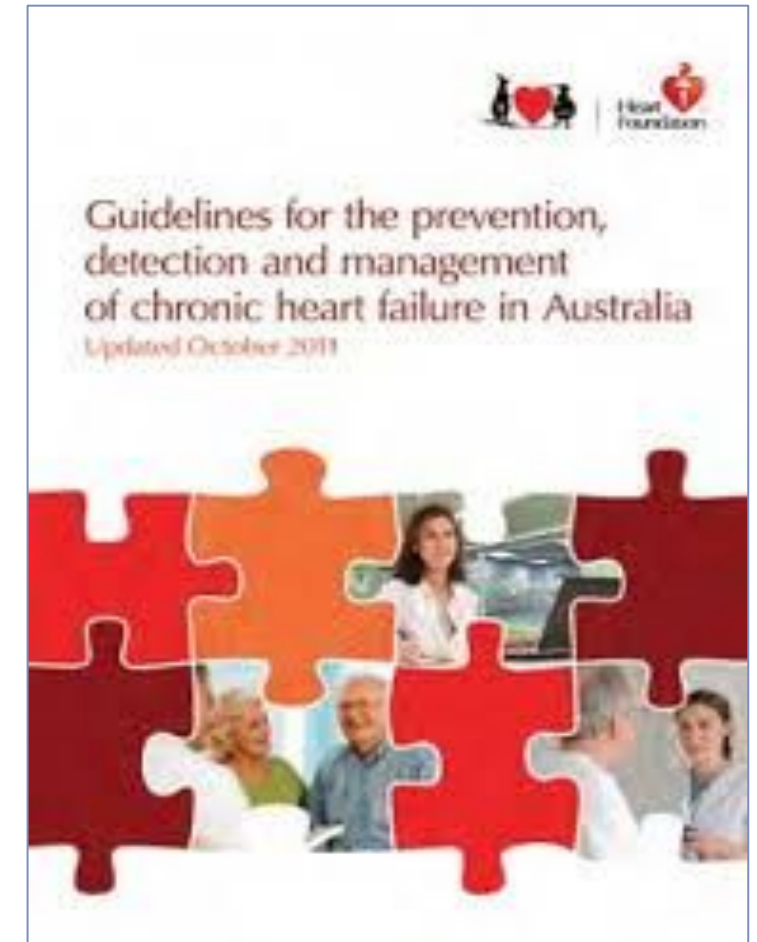


Pneumococcal disease and chronic cardiac disease

VACCINATION RECOMMENDATIONS

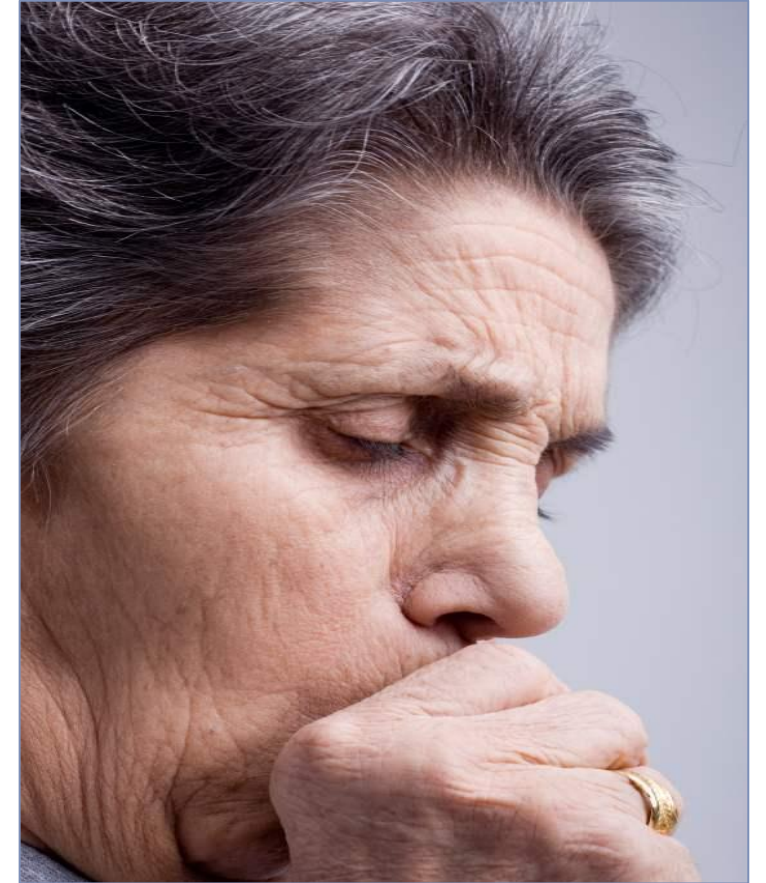
The following guidelines recommend vaccination against pneumococcal disease for people with chronic cardiac disease including chronic heart failure:

- The Australian Immunisation Handbook , Australian Government Department of Health, Canberra 2018 immunisationhandbook.health.gov.au
- 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 Australian Immunisation Handbook



Invasive pneumococcal disease and tobacco smoking

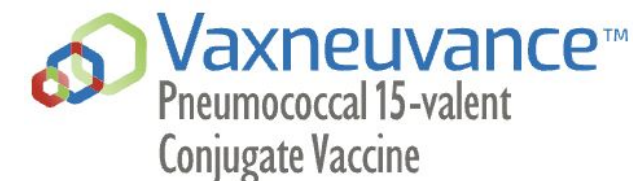
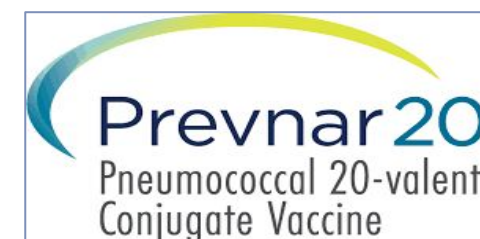
- Cigarette smoking is the strongest independent risk factor for IPD among immunocompetent, non-elderly adults
- Smoking:
 - Damages the mucosal lining of the airways
 - Increases number inflammatory molecules
 - Hinders mucociliary clearance
 - Increases susceptibility to upper respiratory tract colonisation, 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



Pneumococcal vaccine NIP recommendations – history

1986	23vPPV first recommended for high risk populations
1997	23vPPV recommended for all adults > 65 years and Indigenous adults 50-64 years
1998	23vPPV funded for adults ≥ 65 years and Indigenous adults 50-64 years in Victoria
1999	23vPPV funded for all Indigenous adults >50 years and high risk Indigenous 15-50 years
2001	7vPCV NIP for high risk infants
2005	23vPPV NIP for all adults ≥ 65 years 7vPCV NIP for all infants
2011	23vPPV revaccination restricted to at-risk population 13vPCV NIP for all infants
2018	13vPCV NIP 12 months instead of 6 months
2020	13vPCV NIP (in addition to current infant schedules) for: <ul style="list-style-type: none"> - all individuals with certain medical conditions - Aboriginal and Torres Strait Islander people without risk factors at ≥ 50 years of age - non-Aboriginal people without risk factors at ≥ 70 years of age

**NEW PNEUMOCOCCAL
VACCINES NOW TGA
REGISTERED PENDING ATAGI
REVIEW FOR POSSIBLE NIP
LISTING**



Poll 2

What is the difference between Prevenar 13 and Pneumovax 23?

- A. Prevenar 13 is a 13-strain polysaccharide vaccine and Pneumovax 23 is a 23-strain conjugated vaccine
- B. Prevenar 13 is a 13-strain conjugate vaccine and Pneumovax 23 is a 23-strain polysaccharide vaccine
- C. They are both conjugate vaccines but contain a different number of strains
- D. They are both polysaccharide vaccines but contain a different number of strains

13-valent pneumococcal conjugate vaccine (13vpcv)

- Contains capsular polysaccharides derived from 13 types of *S. pneumoniae* - linked to a protein (non-toxic CRM₁₉₇ protein)
- 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

13-valent pneumococcal conjugate vaccine (13vpcv) for routine infant vaccination

NIP funded as part of the infant program

- Given 2, 4 and 12 months (can be as early as 6 weeks)
- Additional dose at 6 months on NIP funded for:
 - Indigenous children in QLD, SA, NT, WA
 - Children with certain medical conditions

13-valent pneumococcal polysaccharide vaccine (13vpcv) nip

NATIONAL IMMUNISATION PROGRAM

A single dose of 13vPCV is listed on the NIP for:

- Aboriginal and Torres Strait Islander people ≥ 50 years of age with no risk conditions
- Non-Aboriginal and Torres Strait Islander people ≥ 70 years of age with no risk conditions
- All individuals with certain (not all) risk conditions

3 doses of 13vPCV is listed on the NIP for

- individuals who have received a haematopoietic stem cell transplant

Poll 3

Can Prevenar 13 be given concurrently with Zostavax and influenza vaccines?

- A. No, the combination should be avoided
- B. Prevenar 13 can be given with Zostavax but not with influenza vaccines
- C. Prevenar 13 can be given with influenza vaccine but not with Zostavax vaccine
- D. Prevenar 13 can be given with influenza and Zostavax vaccines

13-valent pneumococcal conjugate vaccine (13vpcv)

- 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

Pharmaceutical Benefits Scheme (PBS)

13vPCV is not listed on the PBS

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.
- 23-valent pneumococcal polysaccharide vaccine has been available in Australia since 1983
- **The youngest age recommended for receiving the first dose of 23vPPV after the required dose(s) of 13vPCV is 4 years**

23-valent pneumococcal polysaccharide vaccine (23vppv)

- 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 number of recommended lifetime doses of 23vPPV is now **limited to 2 doses** for all people
- 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

Two doses of 23vPPV are listed on the NIP for:

- Aboriginal and Torres Strait Islander peoples ≥ 50 years of age
- All individuals with certain medical conditions
- Children aged 4 years with a condition(s) associated increased risk of IPD
- Aboriginal and Torres Strait Islander children (in SA, WA, Qld and NT) at 4 years of age and another dose 5 years later

Pharmaceutical Benefits Scheme (PBS)

23vPPV is not listed on the PBS

Individuals with risk conditions that do not meet the criteria to receive NIP funded vaccine, will need to purchase the vaccine on prescription.

Poll 4

Your patient is 45 years of age and diagnosed with a Haematological Malignancy.

What is the current recommended pneumococcal vaccination schedule for this patient?

- A. Prevenar 13 first followed by 2 doses of Pneumovax 23
- B. Prevenar 13 first, followed by 1 dose of Pneumovax 23
- C. Pneumovax 23 first, followed by 1 dose of Prevenar 13
- D. Pneumovax 23 first, followed by 2 doses of Prevenar 13

New 15-valent pneumococcal conjugate vaccine (15vpcv)

Product name: Vaxneuvance

- TGA registered for adults and children from 6 weeks of age
- Multi-dose regimen for infants/children and 1 dose for adults 18 years and over
- Contains serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 22F, 23F and 33F
- Immunogenicity data shows equivalent antibody responses compared with those provided by 13vPCV for the shared vaccine serotypes
- Conjugated to non-toxic *Corynebacterium diphtheriae* CRM197 protein
- Interim recommendation in the Immunisation Handbook (18yrs+)
- Pending possible NIP listing

New 20-valent pneumococcal conjugate vaccine (20vpcv)

Product name: Prevenar 20

- TGA registered for adults 18 years of age and older
- Single dose for adults 18 years and over
- Contains serotypes 1, 3, 4, 5, 6A, 6B, 7F, 8, 9V, 10A, 11A, 12F, 14, 15B, 18C, 19A, 19F, 22F, 23F and 33F
- Immunogenicity data shows equivalent antibody responses compared with those provided by 13vPCV for the shared vaccine serotypes
- Conjugated to non-toxic *Corynebacterium diphtheriae* CRM197 protein
- Interim recommendation in the Immunisation Handbook (18yrs+)
- Pending possible NIP listing

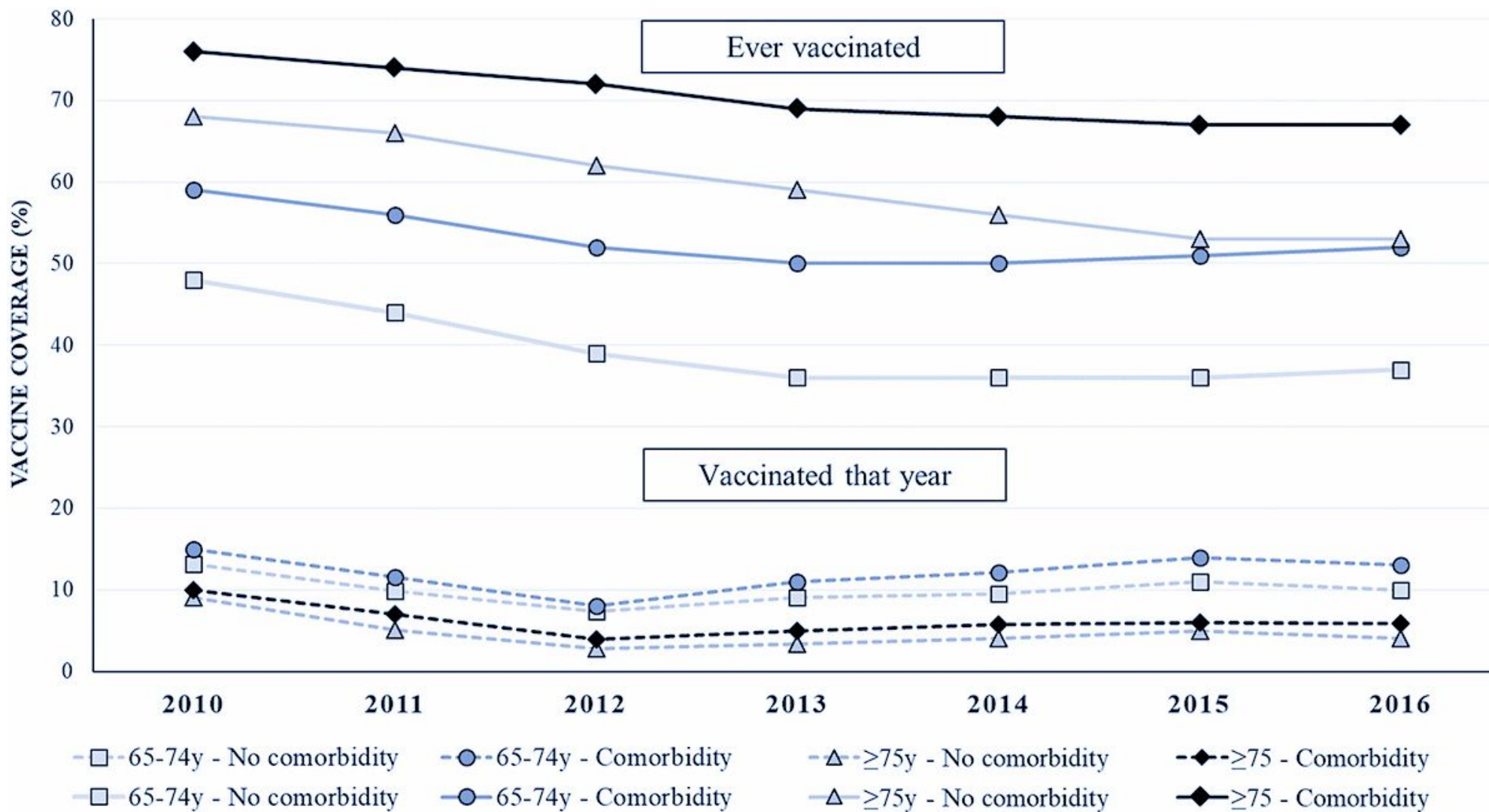
Vaccination coverage

A study undertaken to explore pneumococcal vaccination uptake in older patients attending 550 Australian general practices from 2010–2017 found:

- Vaccination uptake varied between 36% to 76%, depending on the patient's age and presence of comorbidities, and in general decreased over time in all groups.
- The lowest rate was observed among those aged 65–74 years without comorbidity, and the highest among those aged ≥ 75 years with comorbidities.
- Whilst vaccination uptake was adequate among 'every year' patients, interventions are needed to improve pneumococcal vaccination for all older Australians.



Figure 1. Pneumococcal vaccine uptake in each year among 'active' patients aged ≥ 65 years that year. Results from the time series analysis (Study 1). Australia, 2010–2016.




Pneumosmart vaccination tool (PVT)



Created to assist GPs, medical specialists, and other immunisation providers to comply the Australian Immunisation Handbook recommendations

PneumoSmart | The consumer & scientific resource hub for pneumococcal disease



Clinicians

About IPD

Pneumococcal Disease

Pneumococcal disease is caused by the bacterium, *Streptococcus pneumoniae* (pneumococcus). Infection usually starts with a colonising event in the nose and throat, which is asymptomatic, and most infections do not amount to anything beyond colonisation. Some, however, spread locally or invasively to cause disease. Certain pneumococcal diseases are non-invasive, such as middle-ear infections (otitis media), sinusitis or bronchitis.⁴ Others are invasive, involve 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 occurs as more than 90 serotypes, and immunity to the organism is capsule typespecific. Although many serotypes cause disease, only a few cause most infections. The predominant serotypes vary with age, time and geography.

- > ABOUT IPD
- > WHO IS AT RISK
- > VACCINATION
- > EDUCATION
- > VACCINATION TOOL
- > NATIONAL IMMUNISATION PROGRAM

Pneumosmart vaccination tool (PVT)

The tool provides guidance on:

- Catch-up pneumococcal immunisations for children less than 5 years of age (refer to handbook).
Providers can also refer to either:
 - Online Australian Immunisation Handbook
 - Immunisation Calculator
- NIP or self-funded pneumococcal vaccine

If no written records are available to confirm pneumococcal vaccination status, or the type of vaccine (Conjugate or Polysaccharide) that may have been previously administered, the provider should proceed as if the patient has not received previous pneumococcal vaccinations.

Where to find the PTV

THE PNEUMOSMART VACCINATION TOOL

The PneumoSmart Vaccination Tool (herein referred to as "the tool") has been created using the pneumococcal vaccination recommendations in the Australian Immunisation Handbook 10th Edition 2013, and has been developed to assist GPs, medical specialists and other immunisation providers to comply with them. As pneumococcal vaccination recommendations change, the tool will be updated by clinical experts at the Immunisation Coalition.

The tool does not accommodate catch-up pneumococcal immunisations for children less than 5 years of age. Appropriate catch-up vaccines should be offered as recommended:

- in the Australian Immunisation Handbook, 10th Edition 2013 Tables 2.1.9, 2.1.10, 2.1.11 pgs: 56 – 60. ([Handbook link](#))
- as per the Immunisation Calculator ([Calculator link](#))

Important information:

If no written records are available to confirm pneumococcal vaccination status, or the type of vaccine (Conjugate or Polysaccharide) that may have been previously administered, the provider shall proceed as if the patient has not received previous pneumococcal vaccinations.

I have read and agree to the [Terms and Conditions](#) of use for the PneumoSmart Vaccination Tool.

PROCEED

immunisationcoalition.org.au/pvt

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
(Refer to ATAGI Clinical Advice 1 July 2020 and the online Australian Immunisation Handbook Canberra for official recommendations)
- New recommendations for pneumococcal vaccines for certain risk conditions and for older non-Indigenous Australians

Conclusions

- Potentially 'at-risk' individuals should have their pneumococcal vaccination status checked
 - Search your Practice Management Software for eligible patients
 - Use the PneumoSmart Tool to determine vaccination recommendations
- New 15 and 20-valent pneumococcal conjugate vaccines recently TGA approved, pending possible NIP listing
- Use the resources available to you – ATAGI advice, NCIRS fact sheets, online Australian Immunisation Handbook



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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.



Please review full product information before prescribing

AUSTRALIAN PRODUCT INFORMATION – VAXNEUVANCE®
(Pneumococcal 15-valent Conjugate Vaccine [CRM197 Protein], adsorbed)

Product Information is available from <https://www.tga.gov.au/resources/artg>

Sponsor: Merck Sharp & Dohme (Australia) Pty Limited
Level 1, Building A, 26 Talavera Road
Macquarie Park NSW 2113
<http://www.msd-australia.com.au>
Tel (+61) 02 8988 8000

AUSTRALIAN PRODUCT INFORMATION – PREVENAR 20®
(Pneumococcal polysaccharide conjugate, 20-valent adsorbed) Vaccine

Product Information is available from <https://www.tga.gov.au/resources/artg>

Sponsor: Pfizer Australia Pty Ltd
Level 17, 151 Clarence Street
Sydney NSW 2000
Toll Free Number: 1800 675 229
www.pfizermedinfo.com.au



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Questions

www.immunisationcoalition.org.au



Thank you to Angela, and to you for your engagement and questions.

- *Allan Cripps Memorial Tribute: Expert multi-panel discussion. 27 August
Protecting children and older adults from invasive pneumococcal disease:
strategies to reduce morbidity and mortality.*
- *Pertussis update. 17 September*

Register through our website or via our Newsletter (published every Monday).

A very short survey will be sent to your registration address – We appreciate your feedback.