

Invasive pneumococcal disease

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Invasive pneumococcal disease (IPD) is caused by the bacterium *Streptococcus pneumoniae* and is a major cause of illness in children and adults worldwide. The bacterium is transmitted between people via respiratory droplets. Many people carry *S. pneumoniae* harmlessly in their throats but the bacterium occasionally spreads from the upper respiratory tract to other parts of the respiratory tract to cause non-invasive disease (including otitis media) or enters the bloodstream to cause invasive disease (including pneumonia, meningitis or septicaemia).¹ In Australia, only invasive disease is notifiable under public health law.

Age is the most significant predictor of IPD, with children aged 2 years and under and adults aged 65 years and over being most at risk. Other risk factors include asplenia and other immunosuppressive conditions, having an underlying chronic condition such as diabetes, smoking, and environmental factors such as attending childcare. IPD is most common in winter and early spring.¹

The clinical presentation of IPD depends on the particular syndrome but usually includes sudden onset of fever and malaise, with a headache also present with meningitis and breathing difficulties with pneumonia. Laboratory confirmation requires isolation of *S. pneumoniae* from a normally sterile site such as blood by culture or nucleic acid test. The case fatality rate for IPD even after antibiotic treatment is 10%, and is higher among the elderly and patients with underlying illnesses.¹

There are over 90 serotypes of *S. pneumoniae*, each with type-specific immunity.²

Vaccination

From 2005 to 2011, the Australian Government funded a 7-valent pneumococcal conjugate vaccine (7vPCV) for children aged under 2 years. A 13-valent pneumococcal conjugate vaccine (13vPCV) replaced the 7vPCV on the National Immunisation Program in 2011. All children receive three doses, with Aboriginal and Torres Strait Islander children in Queensland, South Australia, Western Australia and the Northern Territory and medically at-risk children receiving a fourth dose. Additionally, a dose

of a 23-valent pneumococcal polysaccharide vaccine (23vPPV) is recommended between the ages of 4 and 5 years for medically at-risk children. The polysaccharide vaccine has also been funded for all Aboriginal adults aged 50 years and over since 1999, and for all adults aged 65 years and over since 2005.² IPD vaccination rates in NSW are over 90% for children aged under 5 years but less than 60% for adults aged 65 years and over.³

Epidemiological trends

The notification rate of IPD in New South Wales (NSW) has decreased from 13.4 per 100 000 population in 2004 to 7.2 per 100 000 population in 2011, with the largest decrease coinciding with the introduction of the childhood vaccination program in 2005. Decreases in notification rates in children aged under 5 years have been the most marked, falling from 62.9 per 100 000 population in 2004 to 14.7 per 100 000 population in 2011.³

IPD notification rates are similar in other Australian jurisdictions except the Northern Territory, where in 2010 the notification rate was 24 per 100 000 population.⁴ This reflects the higher incidence of IPD amongst Aboriginal and Torres Strait Islander people, who are more likely to have multiple risk factors for IPD.

Prior to 2005, almost all invasive disease was caused by serotypes included in the 7vPCV. Since the introduction of the childhood vaccination program, almost no disease is due to these serotypes, though increases have been seen in non-vaccine serotypes. Some cross-protection has occurred for 7vPCV-related serotypes such as 6A but not 19A, which has caused the majority of invasive disease since 2005 and is associated with increased penicillin resistance. The 13-valent pneumococcal conjugate vaccine includes 19A and its introduction has seen a further reduction in invasive disease and reduced penicillin resistance. Serotype and resistance monitoring efforts are ongoing.

References

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