



Australian Government
Department of Health

National Notifiable Diseases Surveillance System

Invasive Pneumococcal Disease Public Data Set

2009 to 2019

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INTRODUCTION

- The Invasive Pneumococcal Disease (IPD) Public Data Set includes notification data collected on IPD caused by *Streptococcus pneumoniae* via National Notifiable Diseases Surveillance System (NNDSS) from 1 January 2009 to 31 December 2019
- See Table 1 for a description of the NNDSS data available in the IPD Public Data Set.

Table 1: NNDSS data available in the IPD Public Data Set

State or Territory	NNDSS Data
Australian Capital Territory	Australian Capital Territory data are not included in this data set. <i>See notes below with regard to how access to these data.</i>
New South Wales	Serotype, State, Age Group, Sex, Indigenous Status, Clinical Category, Other Clinical category and Vaccination History.
Northern Territory	Serotype, State, Age Group, Sex, Indigenous Status, Clinical Category, Other Clinical category and Vaccination History.
Queensland	Serotype, State, Age Group, Sex, Indigenous Status, Clinical Category, Other Clinical category and Vaccination History.
South Australia	Serotype, State, Age Group, Sex, Indigenous Status, Clinical Category, Other Clinical category and Vaccination History.
Victoria and Tasmania	Serotype, State, Age Group, Sex, Indigenous Status, Clinical Category, Other Clinical category and Vaccination History.
Western Australia	State, Age Group, Sex, Indigenous Status, Clinical Category, Other Clinical category and Vaccination History. Serotype data are not included in this data set. <i>See notes below with regard to how to access these data.</i>

- If IPD serotype data for Western Australian (WA) are required, a formal data request should be submitted directly to the Communicable Disease Control Directorate, WA Department of Health. Please contact the Data Manager on (08) 9388 4852. These data will appear as 'not available' in the serotype column.
- If IPD data for Australian Capital Territory (ACT) are required, a formal data request should be submitted directly to the Surveillance & Management, Communicable Disease Control, Health Protection Service. Please contact the Surveillance Officer on (02) 6205 2155 or at cdc@act.gov.au.

DATA CAVEATS AND INTERPRETATION

It should be noted there are several caveats to the National Notifiable Diseases Surveillance System (NNDSS) data for invasive pneumococcal disease (IPD) notifications in this public dataset release:

General

- These IPD notification data are based on data extracted from the NNDSS on the date specified in the downloaded MS Excel IPD public dataset. Due to the dynamic nature of the NNDSS, data on this extract is subject to retrospective revision and may vary from data reported in published NNDSS reports and reports of notification data by states and territories.
- These notification data represent only a proportion of the total cases occurring in the community, that is, only those cases for which health care was sought, a test conducted and a diagnosis made, followed by a notification to health authorities. The degree of under-representation of all cases is unknown and is most likely variable by disease and jurisdiction.
- In interpreting these data it is important to note that changes in notifications over time may not solely reflect changes in disease prevalence or incidence. Changes in testing policies; screening programs including the preferential testing of high risk populations; the use of less invasive and more sensitive

diagnostic tests; and periodic awareness campaigns, may influence the number of notifications that occur annually.

Cross-border NNDSS Notification Protocol

- From 1 January 2009 the Communicable Diseases Network Australia (CDNA) implemented the Cross-border NNDSS Notification Protocol. The Protocol establishes that notifications are reported by the jurisdiction of residence, regardless of the jurisdiction of diagnosis. In the instance that a case is usually resident overseas, the notification is reported to the NNDSS by the jurisdiction of diagnosis.

Case definition and notification to the NNDSS

- The current surveillance case definition for IPD, including any historical edits, are available at: http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-surveil-nndss-casedefs-cd_pnuemo.htm
- In September 2003, new national case definitions for notifications reported to NNDSS were endorsed by the Communicable Diseases Network Australia, with nearly all jurisdictions implementing the new definitions in January 2004 (New South Wales commenced in August 2004). Prior to the adoption of the national definitions, some jurisdictions used the 1994 NHMRC case definitions, some jurisdictions used modified definitions that were based on the NHMRC case definitions, and some others used definitions specific to the state for some diseases. Due to the variability in case definitions used over the period and jurisdictional adherence, please refer to the jurisdictional specific notes in Table 1.
- The case definition for invasive pneumococcal disease (IPD) was last reviewed in 2004.

Completeness of reporting

- The manner in which Indigenous status, Clinical category, Vaccination history fields are collected can vary between jurisdictions.
- Some of the enhanced NNDSS data fields for IPD may not be complete across the entire period for which the data have been sought, especially the earlier years. Additionally, some fields may be under-reported as they require follow up by the jurisdictions to complete. For IPD, some jurisdictions only follow up the collection of data in certain age groups (Table 2).

Table 2: Follow up practices for the collection of enhanced IPD Surveillance data by age group and jurisdiction

Age Group	State or Territory
Under 5 years	New South Wales, Victoria ¹ , Queensland (Metro South and Gold Coast Public Health Units)
50 years and over	New South Wales, Victoria ¹
All Ages	Australian Capital Territory, Northern Territory, Queensland (except Metro South and Gold Coast Public Health Units), Tasmania, South Australia, Victoria ¹ , Western Australia

¹ Prior to 30 June 2012, Victoria followed up the collection of enhanced data on all ages. Since 1 July 2012, Victoria has followed up the collection of enhanced data in the under 5 years and the 50 years and over age groups.

FIELD DEFINITIONS

Diagnosis date (year)

The diagnosis year is taken from the diagnosis date. The diagnosis date is a derived field and represents the onset date or when the date of onset is not known, the earliest of the specimen collection, the notification, or the notification receive dates.

Serotype

Serotype is the specific serotype of *Streptococcus pneumoniae* causing disease in the notified case.

Data domain:

- Multiple serotypes separated by 'AND' represent when two or more serotypes are isolated from the same or separate specimens associated with the one case notification.
- Multiple serotypes separated by 'OR' represent when a culture specific serotyping result is not available and molecular typing was unable to differentiate the specific serotype due to similarity of the target gene.
- 'Non-typable' - when the serotype is reported by the reference laboratory as a non-typable strain.
- 'Typing pending' – awaiting result from reference laboratory.
- 'Untyped' – when no serotype is available, including due to: no isolate available, a sample was not able to be referred to the reference laboratory, isolate was not viable and insufficient genetic material.
- '*Not available*' – *information on IPD serotype for cases from Western Australia are not available in this public dataset. Please contact the Communicable Disease Control Directorate, WA Department of Health.*

State

The State or Territory which sends the notification. Additionally, this field represents the jurisdiction of residence of the notified case. Where the case usually resides overseas, State is the jurisdiction where the diagnosis took place.

Note: information on IPD cases from the Australian Capital Territory are not available in this public dataset. Please contact the Surveillance & Management, Communicable Disease Control, Health Protection Service.

Data domain:

- NSW = New South Wales
- NT = Northern Territory
- Qld = Queensland
- SA = South Australia
- Vic/Tas = Victoria and Tasmania
- WA = Western Australia

Age Group

Age in years of the notified case at onset of disease presented in 5 year age groups. Age is based on the age of the individual as reported to the health authority or the calculated age at onset, using the difference between date of birth and diagnosis date. The age at onset is always rounded down to the age at last birthday, for example a case aged 3 years and 10 months at disease onset is reported as being 3 years. Age groups are presented according to a notified case's age in completed years, for example the 00-04 years age group includes cases from birth to 4 full years of age, but less than 5 years of age.

Specific to IPD notifications, amongst those cases aged less than 5 years, this age group has been split to enable analyses to take into account the current National Immunisation Program pneumococcal vaccination schedule for children aged less than 2 years.

Where age at onset is not reported by the jurisdiction, it is calculated by determining the age at the date of diagnosis.

Data domain:

- Five-year age groups have been provided for cases aged 5 to 84 years.
- For cases outside of this age range, the following groupings have been applied:
 - <2yo: less than two years
 - 02-04: 2 to 4 years
 - Five-year age groups: 5 to 84 years
 - 85+: 85 years and over

Sex

These data represent the sex of the individual at the time of notification.

Data domain:

- Male
- Female
- X
- Unknown.

Notes on interpretation:

- In accordance with the Australian Government Guidelines on Recognition of Sex and Gender 'X' can equal indeterminate, intersex or unspecified.
- 'Unknown' is reserved for where no information on sex is provided.

Indigenous status

The determination of the Indigenous status is by descent, self-identification and community acceptance. Only the Indigenous status text descriptor field has been provided:

Data domain:

- Indigenous (Aboriginal and/or Torres Strait Islander origin)
- Non-Indigenous (Not of Aboriginal or Torres Strait Islander origin)
- Unknown (Not stated, unknown or blank)

Notes on interpretation:

- Indigenous status is usually obtained from medical, rather than laboratory, notification and completeness varies by disease and by state and territory. This reflects differences in notification requirements (i.e. depending on the jurisdiction, some diseases are primarily or completely notified by pathology laboratories rather than clinicians) and the fact that it is not possible to follow-up all cases for diseases with a large volume of notifications and/or not requiring specific case-based public health action. Access by Public Health Units to electronic health record systems has improved the completeness of this field.
- It is recommended that an analyses based on Indigenous status should only be undertaken where there is greater than 50% Indigenous status completeness.
- The percentage of Indigenous status completeness is defined as:
 - $\% \text{ completeness} = ([\text{number of notifications of Indigenous and not Indigenous}] / \text{total notifications}) \times 100$
- Enhanced opportunistic and targeted screening, active contact tracing and in some instances community-wide screening programs, all contribute to the higher notification rates of disease detection observed in remote regions, where a greater proportion of the population are Indigenous, relative to urban regions. However, higher rates in remote regions may also reflect higher underlying incidence of disease. It is not possible to determine the relative contributions of these factors from the data provided to the NNDSS.

Clinical category

Clinical category is the focus of infection for a notified case of IPD. Multiple clinical categories may be reported against one case of IPD, except bacteraemia which can only be used by itself. These data are delimited by a “|” symbol.

Data domain:

- Pneumonia – either positive blood culture or positive PCR from blood or other sterile site plus consistent clinical and/or radiological lung features.
- Meningitis – either positive culture or positive PCR from CSF or other normally sterile site plus supportive findings for meningitis (CSF changes, clinical features or medical imaging consistent with bacterial meningitis).
- Bacteraemia – either positive blood culture or positive PCR from blood, with no other sterile site specimen and no localising signs of pneumonia or meningitis.
- Other - Other type of IPD presentation, from another sterile site (see ‘other clinical category’ for the categories).
- Unknown.

Other clinical category

Provides further information with regard to the reporting of 'other IPD presentations' in the 'clinical category' data field. Only one response can be reported in this field.

Data domain:

- Septic arthritis
- Pleural empyema
- Pleural effusion
- Pericarditis
- Peritonitis
- Ascites
- Cellulitis
- Endophthalmitis
- Other sterile site.

Vaccination history and subsequent fields

These summary data are based on information provided regarding a notified case's reported vaccination history, including the number of doses of a vaccine and the type of vaccine recorded in the NNDSS dataset relevant to the disease, as well as their age in terms of eligibility for vaccination. Please note that any analysis of vaccine protection requires cross-checking between the serotype of the infection with the type vaccine(s) received by the case, the serotypes covered by the vaccine received, as well as the number of doses, interval between doses, age eligibility and other relevant recommendations.

Vaccination history data domain:

- 'No vaccine given' = for cases who are age eligible to receive a pneumococcal vaccine, no vaccine has been provided.
- 'Followed up - information not available' = Vaccination information has attempted to be followed up, however no vaccination information was available.
- 'Not followed up - information not sought' = No vaccination information has been sought for the case.
- 'Vaccination data not provided' = No vaccination information has been reported for the case.
- 'Vaccine/s given' = at least one dose of a pneumococcal vaccine was received.
- 'Vaccine/s given – Not validated' = at least one dose of a pneumococcal vaccine was received, however the dose(s) were not validated with a date or the information was based on patient recall.
- 'Too young for vaccination' = case was noted as being too young (<2 months of age at disease onset) to receive a pneumococcal vaccine.
- 'Serotype unknown' = the serotype for the case was not known. It is recommended that these cases be excluded from analyses of vaccine protection, including cross-protection analyses.
- 'Vaccine not available for serotype' = the serotype for the case was not specifically covered by currently available vaccines (ie. those serotypes in either 13vPCV or 23vPPV). Depending on the analysis objective, further assessment of a case's diagnosis date and what pneumococcal vaccines were available at the time may need to occur.

Vaccinations provided data domain:

Where vaccination information is provided then the number of vaccines, by pneumococcal vaccine type received, are reported in the subsequent columns. These data need to be interpreted in combination with the 'vaccination history', 'serotype', 'age at onset' and 'Indigenous status' fields:

- Total vaccinations
- 23vPPV = 23-valent pneumococcal polysaccharide vaccine
- 7vPCV = 7-valent pneumococcal conjugate vaccine
- 13vPCV = 13-valent pneumococcal conjugate vaccine
- 10VPCV = 10-valent pneumococcal conjugate vaccine
- Vaccine type unknown = Unknown type of pneumococcal vaccine.

For reference, Table 3 provides a summary of the serotypes covered by current and previously available pneumococcal vaccines.

Table 3: Summary of the serotypes covered by current and previously available pneumococcal vaccines

Serotype	Prevenar (7vPCV)	Synflorix (10vPCV)	Prevenar 13 (13vPCV)	Pneumovax 23 (23vPPV)
1		X	X	X
2				X
3			X	X
4	X	X	X	X
5		X	X	X
6A			X	
6B	X	X	X	X
7F		X	X	X
8				X
9N				X
9V	X	X	X	X
10A				X
11A				X
12F				X
14	X	X	X	X
15B				X
17F				X
18C	X	X	X	X
19A			X	X
19F	X	X	X	X
20				X
22F				X
23F	X	X	X	X
33F				X

RESOURCES

- It is recommended that the following resources are used in interpreting the data provided:
 - *Invasive pneumococcal disease in Australia* quarterly report series published in *Communicable Diseases Intelligence*, the most recent reports are available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-surveil-nndss-ipd-reports.htm>
 - *Invasive pneumococcal disease in Australia* Annual report series published in *Communicable Diseases Intelligence*, available at: <http://www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-ipdannrep.htm>
 - *Australia's notifiable diseases status: Annual report of the National Notifiable Diseases Surveillance System* Annual report series published in *Communicable Diseases Intelligence*, available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-annlrpt-nndssar.htm>
 - *National Centre for Immunisation Research and Surveillance vaccination history tables*, available at: <http://www.ncirs.edu.au/immunisation/history/>

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Surveillance of IPD in Australia is overseen by the Enhanced Invasive Pneumococcal Disease Surveillance Working Group (EIPDSWG). The EIPDSWG was established in 2000 by CDNA to assist in developing and implementing a nationally standardised approach to the enhanced surveillance of IPD in Australia. The membership of the EIPDSWG includes representation from states and territories, the Commonwealth, NCIRS and pneumococcal reference laboratories.

The EIPDSWG acknowledges the work of public health officers involved in the collection of surveillance data; State and territory public health communicable disease surveillance managers and data managers; and public and private laboratories that support pneumococcal laboratory surveillance.

The Australian Government's *National IPD Laboratory Surveillance Project* provides funding to four pneumococcal reference laboratories to collect *S. pneumonia* isolates causing IPD across Australia for serotyping analysis. This project ensures that data is available to evaluate the impact of pneumococcal vaccines included in the National Immunisation Program. These reference laboratories are:

- Microbiological Diagnostic Unit Public Health Laboratory, University of Melbourne;
- NSW Health Pathology;
- PathWest Laboratory Medicine; and
- Queensland Health Forensic and Scientific Services, Queensland Health.