PHF Science

INVASIVE PNEUMOCOCCAL DISEASE ANNUAL REPORT 2025

Prepared as part of a Ministry of Health contract for scientific services

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DISCLAIMER

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KEY FINDINGS

This report describes the epidemiology of invasive pneumococcal disease (IPD) in New Zealand for the year 1 January to 31 December 2025. The analyses are based on IPD notifications in the EpiSurv database, as well as information from the national immunisation register (Aotearoa Immunisation Register - AIR).

- There were 720 cases of IPD notified in New Zealand in 2025 (13.5 cases per 100,000), similar to the number in 2024 (718 cases,13.6 per 100,000).
- The incidence of IPD among children aged <2 years increased in 2025 compared to 2024 (31.9 cases and 21.6 cases per 100,000, respectively) but remains lower than the incidence observed from 2021 through to 2023, including the peak seen in 2022 (50.3 cases per 100,000).
- The incidence of IPD among children aged 2-4 years continues to decrease, from the peak of 23.6 cases per 100,000 in 2022 to 11.2 cases per 100,000 in 2025.
- The incidence of IPD among adults aged ≥65 years increased in 2025 to the highest rate observed over the past 10 years (36.2 cases per 100,000).
- Māori and Pacific peoples continue to experience substantially higher rates of IPD than those of European/Other ethnic groups across most age groups, particularly among children aged <2 years and adults aged ≥65 years.
- The overall incidence of IPD due to serotype 19A decreased further in 2025, reaching the lowest levels observed since 2021. This decline was primarily driven by the reduction in disease by serotype 19A in people aged ≥5 years, consistent with indirect protection in older age groups following PCV13 re-introduction in December 2022.
- Incidence of disease caused by serotypes not covered by PCV13 increased in 2025, particularly among children aged <2 years and adults aged ≥65 years. The leading serotypes causing disease were serotype 8 (22.9%), followed by serotype 19A (17.4%) and serotype 22F (13.7%). The incidence of IPD cases caused by serotype 8 has been increasing since 2015, reaching its highest rate in 2025. Serotypes 8 and 22F are not included in PCV13 but are covered by PCV20.
- Serotype 19A continues to cause disease among unvaccinated children and children who received PCV10, partial PCV13, or a mix of both vaccines as part of their routine immunisations. Serotypes included in PCV13 were responsible for 14 (33.3%) cases with serotype results in children aged 6 weeks to 5 years while additional serotypes included in PCV20 were responsible for 13 (30.9%) cases in this age group.
- Antimicrobial susceptibility testing found two-thirds of invasive *S. pneumoniae* isolates were fully susceptible to all antimicrobials tested; 25.2% (76/302) were resistant to penicillin and 20.9% (63/302) were resistant to co-trimoxazole. Penicillin resistance is highest among serotype 19A and is trending down as incidence of 19A disease decreases.
- Given ongoing changes to the vaccine programme, the phenomenon of serotype replacement and the availability and development of new vaccines, it is important to continually monitor trends in IPD epidemiology to inform future vaccine decisions.

INTRODUCTION

Invasive pneumococcal disease (IPD) refers to disease due to *Streptococcus pneumoniae* (*S. pneumoniae*) entering a sterile site, such as blood, pleural fluid, or cerebrospinal fluid. IPD represents the most severe end of the disease spectrum caused by this bacterium. The most common clinical presentations in IPD are bacteraemic pneumonia, non-localised bacteraemia (bacteraemia without focus), and meningitis. Older adults generally have bacteraemic pneumonia, while young children may have any of the three clinical presentations, with meningitis being the most severe.

S. pneumoniae can also cause non-invasive infections such as acute otitis media (predominantly in children) and sinusitis (predominantly in older children and adults). Non-invasive *S. pneumoniae* infections are not notifiable and are not discussed in this report.

IPD is largely a vaccine preventable disease with vaccines available that provide protection against different serotypes of the bacterium. A pneumococcal conjugate vaccine (PCV) has been part of the New Zealand childhood immunisation schedule since 2008. A pneumococcal polysaccharide vaccine (PPV) is available for individuals at higher risk of IPD. The history of the pneumococcal vaccine programme in New Zealand is summarised in Table 1 [1].

Table 1. Pneumococcal conjugate vaccine history in New Zealand

Date	Vaccination schedule change
2006	PCV7 and 23PPV introduced for high-risk individuals.
2008	PCV7 introduced to the Schedule at ages 6 weeks, 3 months, 5 months and 15 months.
2011	PCV10 replaced PCV7 on the Schedule. PCV13 replaced PCV7 for high-risk children.
2014	PCV13 replaced PCV10 on the Schedule.
2015	PCV13 became available for patients of any age with certain high-risk conditions.
2017	PCV10 replaced PCV13 on the Schedule. PCV13 and 23PPV continues for high-risk individuals
2020	PCV10 recommended as a 2-dose primary schedule plus booster dose given at 6 weeks, 5 months and 12 months. PCV13 remained at 3-dose schedule plus booster for high-risk infants (i.e. given at ages 6 weeks, 3, 5 and 12 months)
2022	PCV13 replaced PCV10 in a 2-dose primary schedule plus booster dose on 1 December. PCV13 remained at 3-dose schedule plus booster for high-risk infants (i.e. given at ages 6 weeks, 3, 5 and 12 months)

In 2025, PCV13 is the funded vaccine on the childhood immunisation schedule, given as a two-dose primary course at 6 weeks and 5 months, with a booster at 12 months. Children who started their immunisation course with PCV10 prior to December 2022 were able to complete it with PCV13. PCV13 is not funded for those who have previously been fully vaccinated with PCV10. In addition, PCV13 and 23 PPV are available for vaccination and re-vaccination for people of any age with eligible conditions that affect the immune system [1].

This annual report provides an overview of the epidemiology of IPD for 2025. It also presents trends from 2014. Information about IPD in New Zealand is also available on the PHF Science IPD dashboard (*https://www.phfscience.nz/digital-library/invasive-pneumococcal-disease-dashboard/*).

METHODS

The case data presented in this report are based on the information recorded on EpiSurv, the national notifiable disease surveillance system, as of 20 February 2026. Any updates made to EpiSurv data by public health service staff after this date will not be reflected in this report. EpiSurv data are supplemented with serotype data from the ESR national laboratory-based surveillance of invasive *S. pneumoniae* isolates. Serotype data was derived from genome assemblies using SeroBA v 1.0.2 [2] and replaced the Neufeld test for capsular serotyping from August 2023.The vaccination status of cases aged under 5 years was extracted from the Aotearoa Immunisation Register (AIR).

IPD CASE DEFINITION

IPD has been a notifiable disease since 2008. A confirmed case is one that has a clinically compatible illness that is laboratory confirmed. Most cases present with either meningitis, pneumonia, or septicaemia. Laboratory confirmation requires at least one of the following [3]:

- isolation of *S. pneumoniae* from blood, cerebrospinal fluid (CSF) or another normally sterile site (e.g. joint fluid, pleural fluid)
- detection of *S. pneumoniae* nucleic acid from blood, CSF or another normally sterile site
- a positive *S. pneumoniae* antigen test on CSF or pleural fluid.

CALCULATION OF POPULATION RATES

All rates presented in this report are crude rates.

The 2014–2025 population estimates published by Statistics New Zealand were used to calculate the incidence rates for total population.

All rates are presented as the number of cases per 100,000 population. Rates have not been reported where there were fewer than five cases in any category as this produces unstable rates.

ETHNICITY

Prioritised ethnicity is used in this report. Ethnicity is prioritised in the following order: Māori, Pacific peoples, Asian, and European/Other. The European/Other group includes people identifying as Middle Eastern, Latin American or African (MELAA) as case numbers for this group were very small. For more detail on classification refer to the Ministry of Health ethnicity data protocols [4].

SOCIO-ECONOMIC DEPRIVATION

The New Zealand index of deprivation 2023 (NZDep2023) is used to measure socioeconomic deprivation. NZDep2023 is derived from a weighted combination of nine variables from the 2023 census, each reflecting a different aspect of material and socioeconomic deprivation [5]. The deprivation score is calculated for each geographical mesh block in New Zealand.

This report presents NZDep2023 by quintiles, where 1 represents the least socioeconomically deprived areas and 5 the most socioeconomically deprived areas.

The denominator data used to determine disease rates for NZDep2023 categories is based on the proportion of people in each NZDep2023 category from the usually resident 2023 census population.

ANTIMICROBIAL SUSCEPTIBILITY

A subset of isolates undergo antimicrobial susceptibility testing (AST) at PHF Science. In 2025, isolates collected from March to December, inclusive, were tested.

Penicillin and cefotaxime susceptibilities were determined by Etest (bioMerieux, France) with European Committee on Antimicrobial Susceptibility Testing (EUCAST) Mueller-Hinton Fastidious agar and incubation for 20–24 hours at 35ºC with 5% CO2. Data were interpreted using both meningitis and endocarditis breakpoints as well as non-meningitis and non-endocarditis breakpoints. Chloramphenicol, clindamycin, co-trimoxazole, erythromycin, moxifloxacin, rifampicin, tetracycline and vancomycin susceptibilities were determined by EUCAST disc susceptibility testing methods [6]. Inducible clindamycin resistance was detected by the D-zone test [6]. All minimum inhibitory concentrations (MICs) and zone of inhibition diameters were interpreted according to 2025 EUCAST clinical breakpoints [7]. EUCAST epidemiological cut-off (ECOFF) values were used if breakpoints were not available.

In this report, multidrug resistance (MDR) was defined as resistance to three antibiotics, in addition to penicillin. When defining MDR, the meningitis and endocarditis breakpoints for penicillin were used.

INVASIVE PNEUMOCOCCAL DISEASE IN NEW ZEALAND

There were 720 cases of IPD notified in New Zealand in 2025 (13.5 cases per 100,000). The number of cases by age group and ethnicity is presented in Table 2.

Table 2. IPD cases by age group (years) and ethnicity

Age group (years)	Māori	Pacific	Asian	European/ Other	Unknown	Total
<2	22	6	6	4	0	38
2–4	5	4	7	4	0	20
5-14	4	4	4	9	0	21
15-29	21	9	3	16	0	49
30-49	39	17	7	41	0	104
50–64	62	29	3	67	1	162
65+	65	38	14	207	2	326
Total	**218**	**107**	**44**	**348**	**3**	**720**

Figure 1 shows the incidence of IPD from 2014 to 2025 for the total population. The incidence of IPD increased steadily from 2020 to 2023, reaching its highest level in more than 10 years. The rate decreased to 13.6 per 100,000 in 2024 and remained stable in 2025 (13.5 per 100,000) but is high compared to earlier years.

Figure 1. Incidence of invasive pneumococcal disease in New Zealand, rate per 100,000, 2014 – 2025

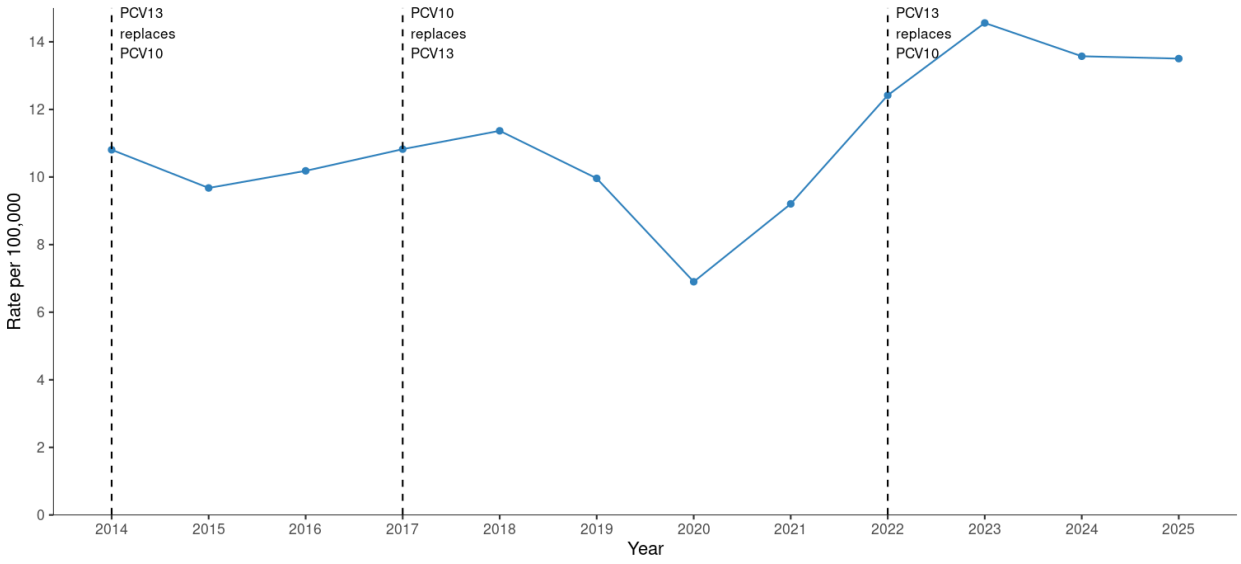


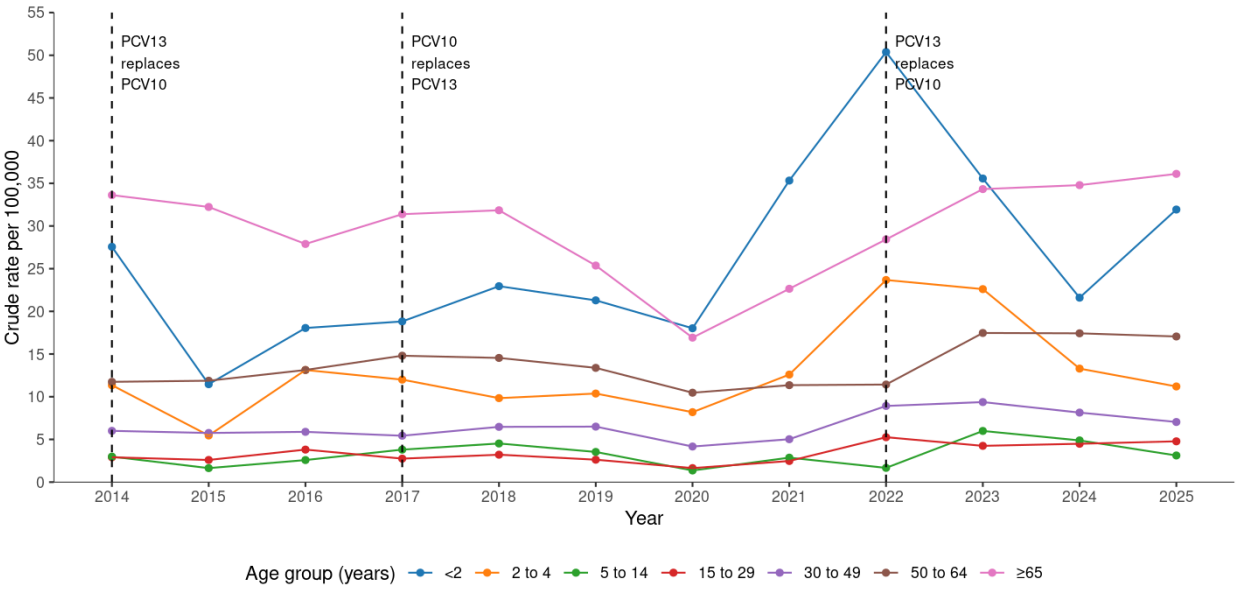
Figure 2 shows IPD trends over time by age group. After a declining trend from 2022, incidence for those aged <2 years increased from 21.6 cases per 100,000 in 2024 to 31.9 cases per 100,000 in 2025. This incidence rate remains below those observed from 2021 through to 2023.

Incidence among children 2 to 4 years old declined in 2025 to 11.2 cases per 100,000. Incidence in this age groups has more than halved since its highest level of 23.7 cases per 100,000 in 2022.

Those aged ≥65 years had the highest incidence of any age group in 2025 (36.2 cases per 100,000). The rate for the ≥65 years age group has been increasing since 2020. Incidence for adults aged 50 to 64 years has remained relatively stable over 2023–2025, and this age group had the third highest rates in 2024 and 2025.

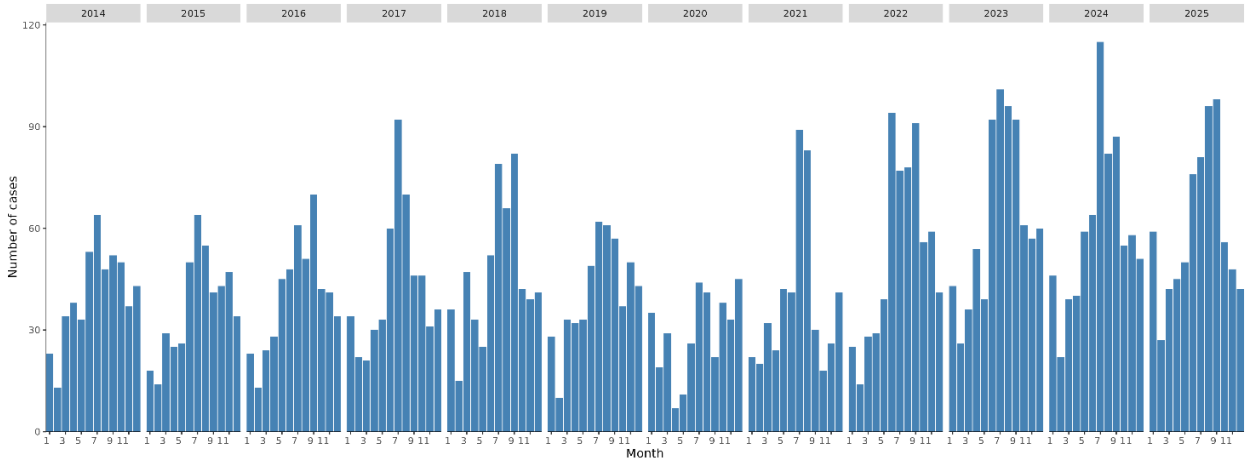
Incidence among children aged 5 to 14 and adults aged 30 to 49 remains low.

Figure 2. Incidence of invasive pneumococcal by age group, rate per 100,000, 2014 – 2025



IPD follows a seasonal pattern with the highest number of cases seen in the winter and early spring months each year (Figure 3).

Figure 3. Number of cases of invasive pneumococcal disease by month and year, 2014 – 2025

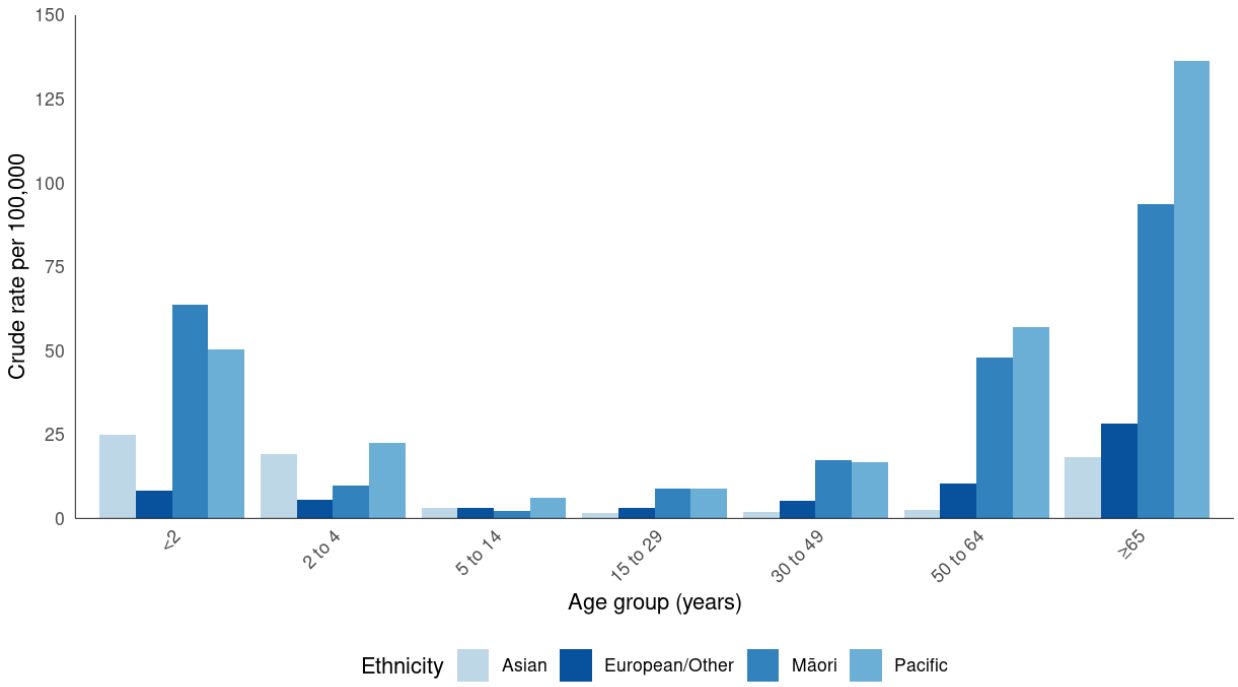


INVASIVE PNEUMOCOCCAL DISEASE BY ETHNIC GROUP

Māori and Pacific peoples experience significantly higher rates of IPD than European/Other ethnic groups across most age groups. Pacific peoples aged ≥65 years, followed by Māori aged ≥65 years, had the highest rates by age group in 2025 (Figure 4).

Māori and Pacific children aged <2 years had 7.7 and 6.1 times the incidence seen in European/Other children <2 years, respectively. Asian children had 3.0 times the incidence seen in European/Other children <2 years.

Figure 4. Incidence of invasive pneumococcal rates by ethnicity, rate per 100,000, 2025



Note: Three cases identified as both Māori and Pacific peoples ethnicity, and two cases identified as both Māori and Asian. These cases were not included in the Pacific peoples and Asian groups rates as these were derived using prioritised ethnicity.

Pacific peoples and Māori have the highest crude rates of IPD, despite the younger age structure of these populations. Rates of IPD for Pacific peoples decreased in 2025 from 2024, increased for Māori, and remained relatively stable for European/other and Asian ethnic groups (Figure 5).

Figure 5. Incidence of invasive pneumococcal disease by prioritised ethnicity, rate per 100,000, 2014 – 2025

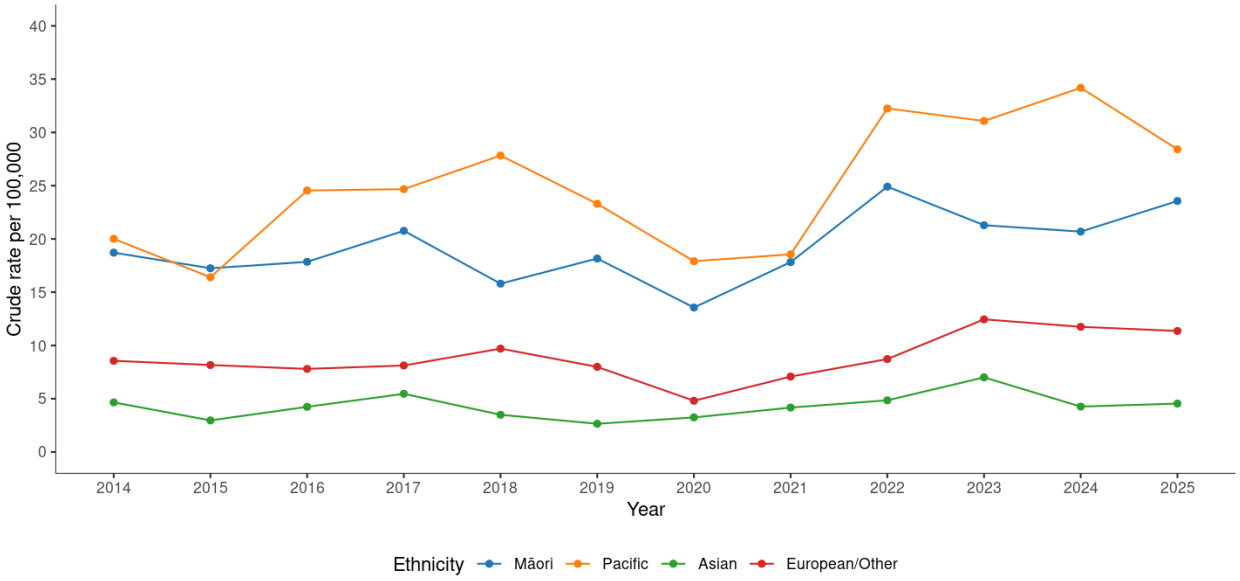
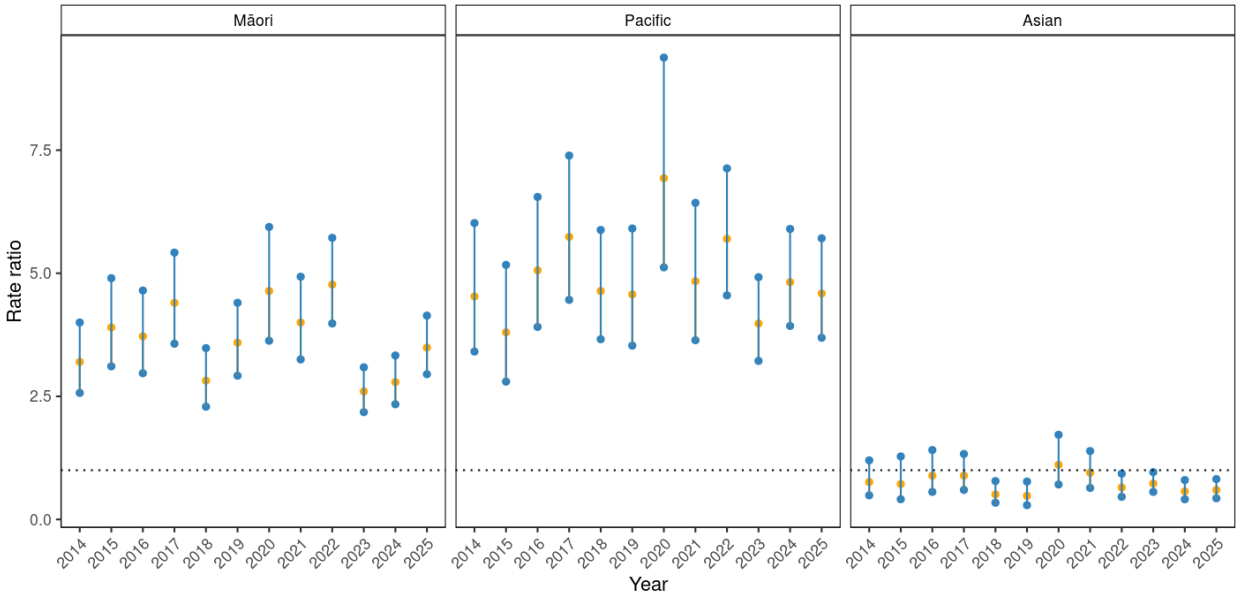


Figure 6 presents age-adjusted incident rate ratios with the European/Other rate as the reference for 2014 to 2025. In 2025, Māori and Pacific people had 3.5 (CI: 2.9 – 4.1) and 4.6 (CI: 3.7 – 5.7) times, respectively, the incidence rate of IPD compared to European/Other after adjusting for age (Figure 6). The age-adjusted incidence rate was lower for people of Asian ethnicity in 2025 (rate ratio: 0.6; CI: 0.4-0.8).

Figure 6. Invasive pneumococcal disease - rate ratios and 95% confidence intervals by ethnicity and year, adjusted by age (reference group European/Other)[a]



[a]. The age-standardised rates are direct-standardised to the age distribution of the total New Zealand population.

INVASIVE PNEUMOCOCCAL DISEASE BY REGION

The Central region had the highest overall IPD incidence in 2025, followed by Te Manawa Taki, then Northern and Te Waipounamu (Table 3).

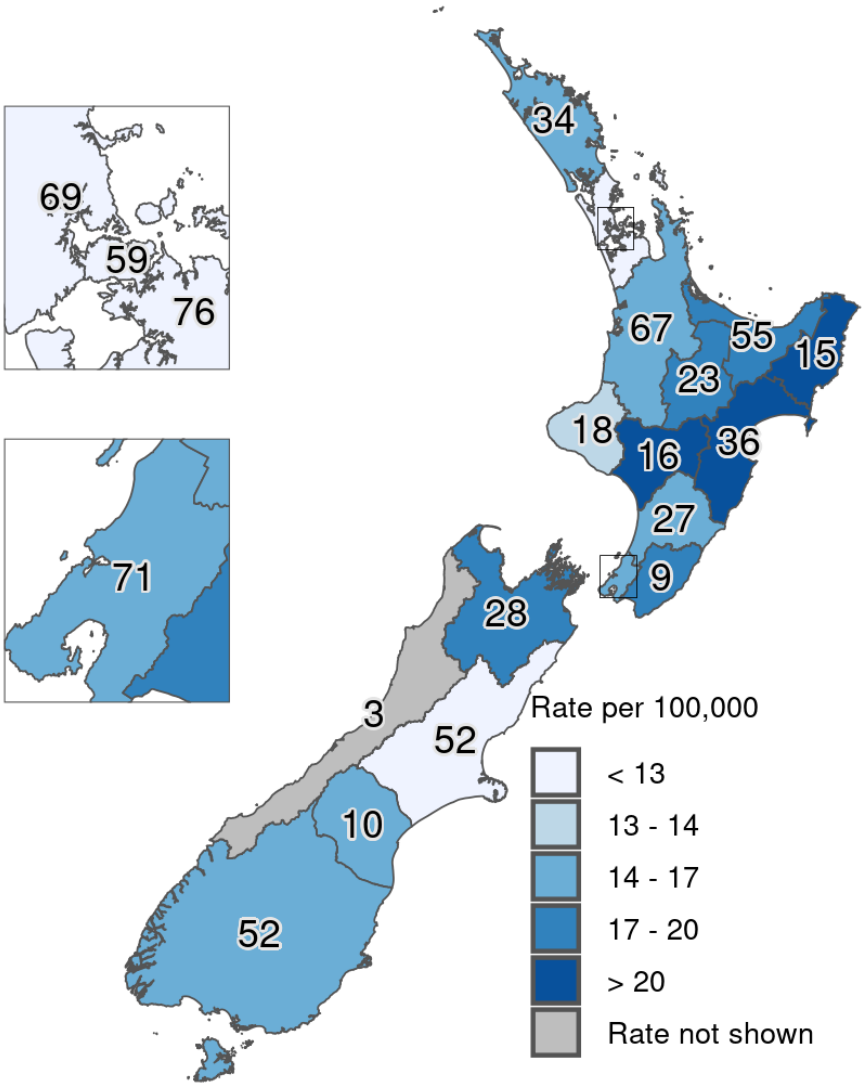
Table 3. Invasive pneumococcal disease by region and age group, case numbers and rate per 100,000, 2025

Region	<2 years		2–4 years		5–64 years		≥65 years		Total	
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate
Northern	15	31.8	5	7.1	120	7.3	98	33.4	238	11.6
Te Manawa Taki	14	55.1	3	--	82	10.4	79	40.5	178	17.0
Central	7	33.4	4	--	78	10.4	70	40.2	159	16.3
Te Waipounamu	2	--	8	21.0	56	5.9	79	33.3	145	11.5
Total	**38**	**31.9**	**20**	**11.2**	**336**	**8.1**	**326**	**36.2**	**720**	**13.5**

--: Rate not shown due to counts less than 5.

Figure 7 provides further detail on the incidence of IPD in 2025 across New Zealand by district. The districts with the highest incidence of IPD in 2025 were Tairawhiti (28.4 per 100,000), Whanganui (22.9 per 100,000), Hawke's Bay (20.0 per 100,000), Bay of Plenty (19.8 per 100,000), and Lakes (19.1 per 100,000).

Figure 7. Geographic distribution of invasive pneumococcal disease cases, rates per 100,000, 2025



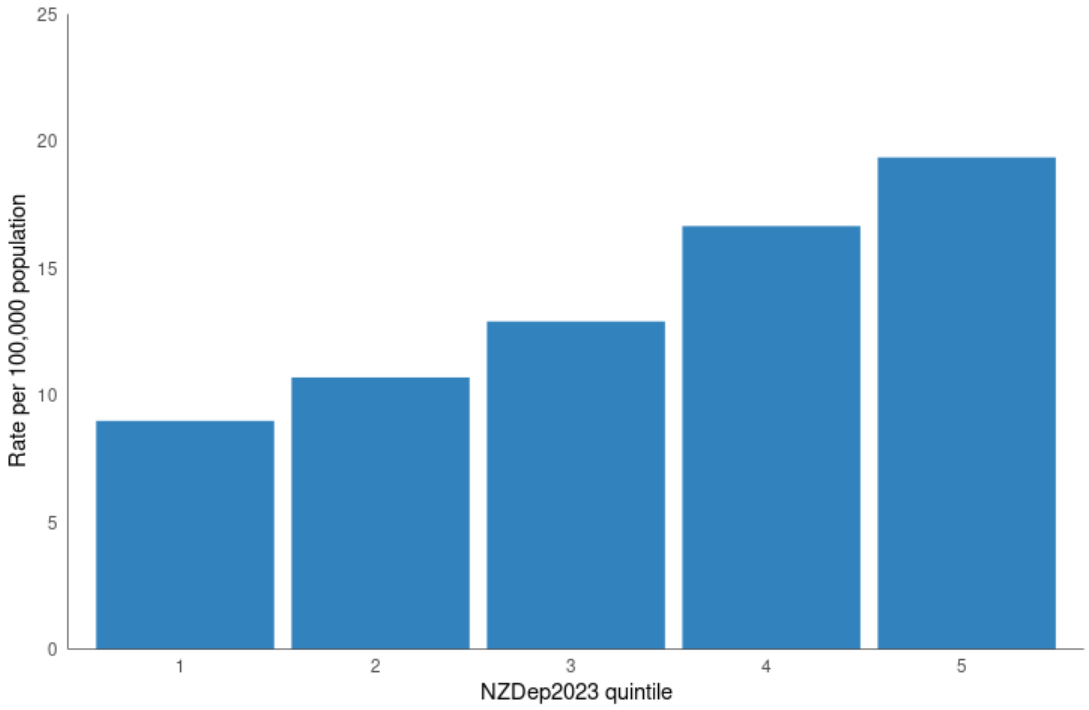
Numbers represent notification count in district.
Where fewer than five cases rates are not shown.

INVASIVE PNEUMOCOCCAL DISEASE BY DEPRIVATION

The NZDep 2023 quintile could be assigned for 715 of 720 cases (99.3%) in 2025.

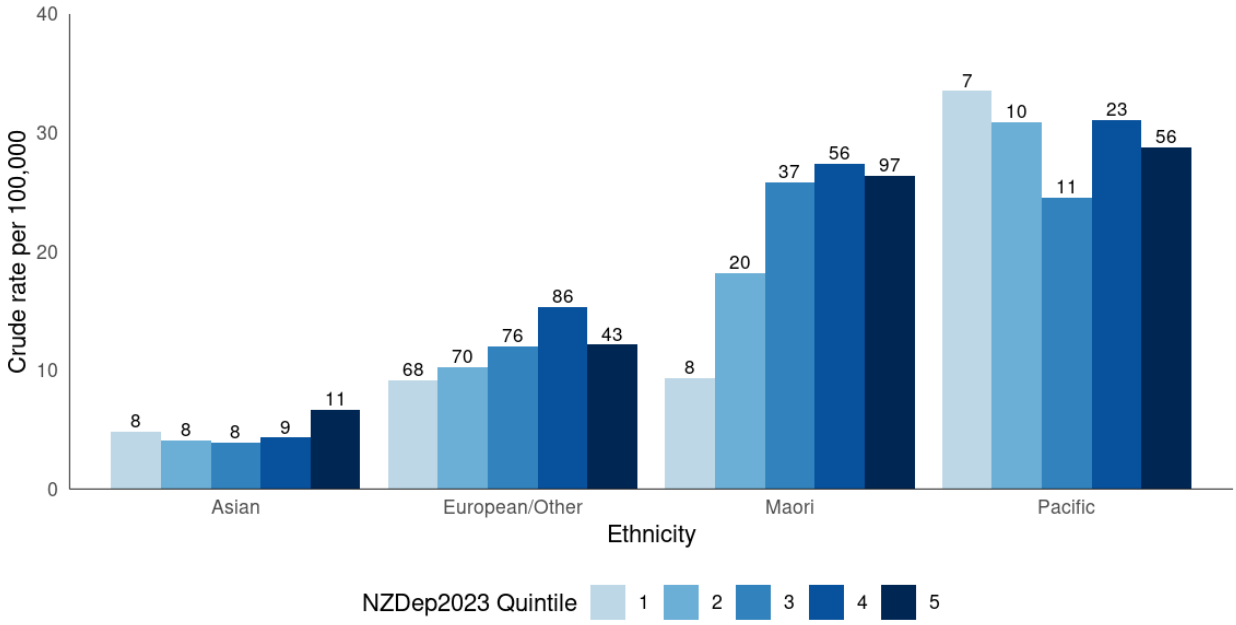
The total population rate for 2025 shows a clear trend by NZDep2023 quintiles, with quintile 5 experiencing the highest rate (19.3 per 100,000) and quintile 1 experiencing the lowest (8.9 per 100,000) (Figure 8). Of cases with a known quintile, 53.6% (383/715) were in the most deprived quintiles 4 and 5.

Figure 8. Incidence of invasive pneumococcal disease cases by NZDep2023 quintile, rate per 100,000, 2025



In 2025, the highest rate of IPD by ethnicity and NZDep2023 quintile was seen for Pacific peoples residing in areas with the lowest deprivation (quintile 1), followed by Pacific peoples in quintiles 4, 2, and 5 (Figure 9).

Figure 9. IPD case numbers and rates by ethnicity and NZDep2023 (quintiles), 2025*



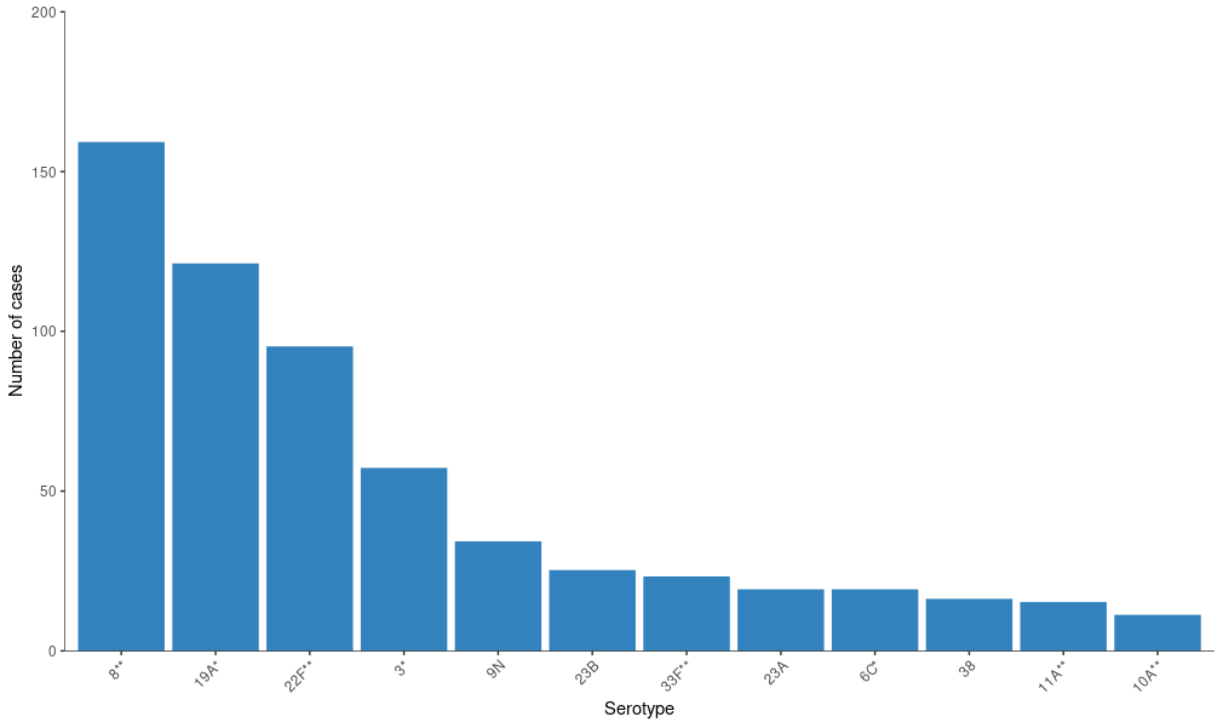
*Numbers represent absolute number of cases in each NZDep Quintile by ethnicity.

INVASIVE PNEUMOCOCCAL DISEASE BY SEROTYPE

There are over 90 serotypes of *S. pneumoniae* that cause invasive disease.

A serotype was identified in 694 (96.4%) of IPD cases in 2025. Figure 10 shows the most common serotypes causing IPD in New Zealand over this time. More information on the serotypes identified is available on Appendix Tables 1 and 2. In 2025, serotype 8 was the most common serotype (22.9%), followed by 19A (17.4%), and 22F (13.7%).

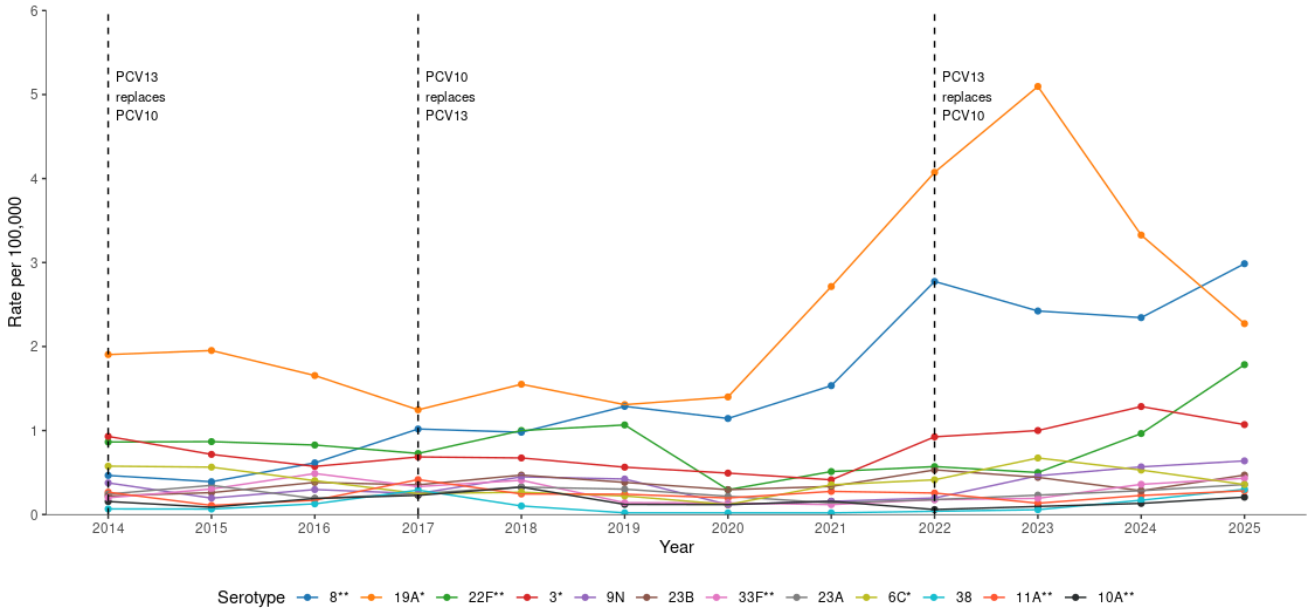
Figure 10. Invasive pneumococcal serotypes, 2025[1]



[1] Only serotypes where there were more than 10 IPD cases are shown.
*PCV13 specific serotype; **PCV20 specific serotype

Figure 11 shows the trend in the incidence of IPD serotypes in New Zealand from 2014 to 2025. Serotype 8 was the most commonly detected serotype in 2025, overtaking 19A for the first time. The incidence of disease caused by serotype 8 has been increasing since 2015. Serotype 8 is not covered by PCV13 but is included in PCV20. Serotype 22F was the third most prevalent serotype in 2025; it is also not covered by PCV13 but is included in PCV20.

Figure 11. Invasive pneumococcal serotypes, 2014 – 2025



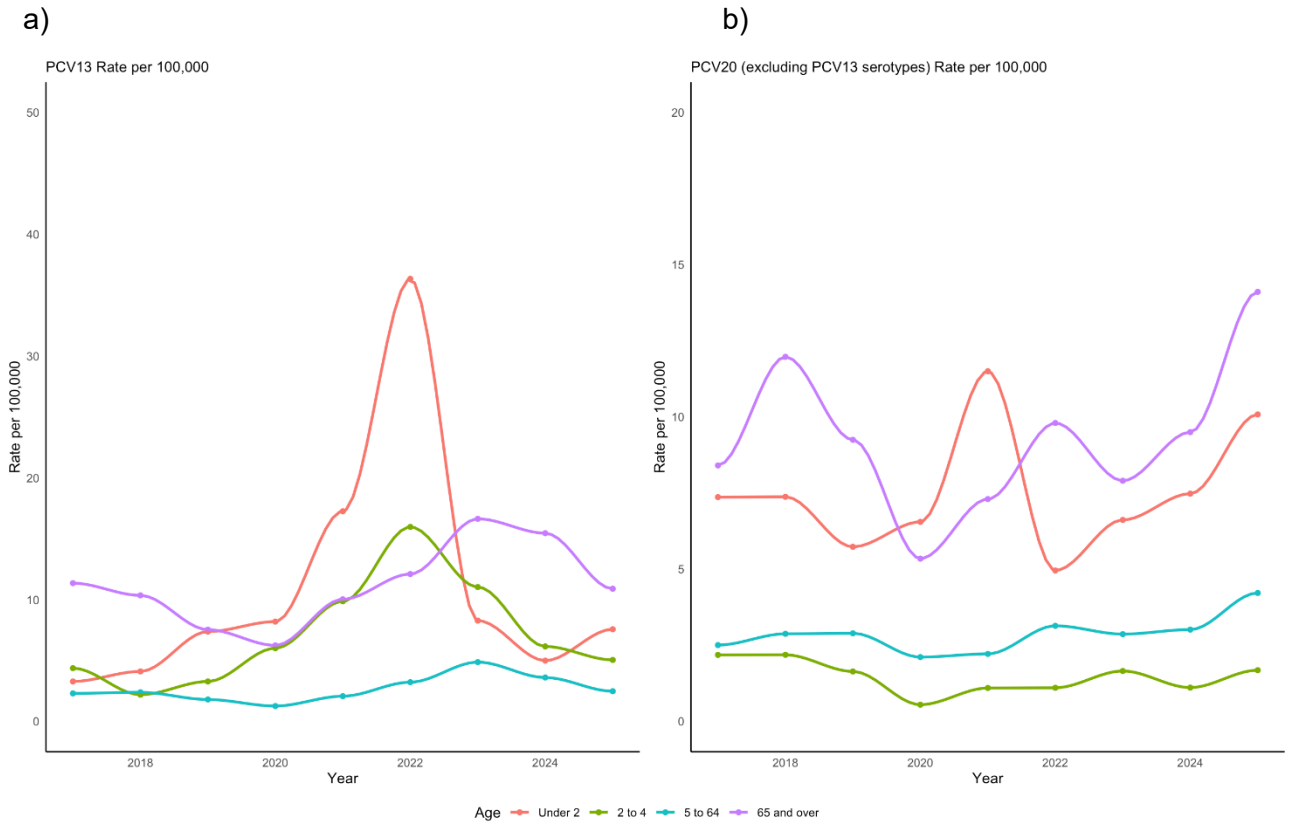
*PCV13 specific serotype; **PCV20 specific serotype

Trends in IPD Incidence Caused by Serotypes Covered by PCV13 and PCV20

In 2025, incidence of disease caused by serotypes contained within PCV13 (driven primarily by 19A) remained lower than 10 cases per 100,000 for most age groups, while the rate among adults 65 and older continued to decline from its peak in 2023 to 10.8 cases per 100,000 (Figure 12a).

The incidence of IPD caused by the additional 7 serotypes covered by PCV20 is increasing, particularly for children under 2 years and adults 65 years and over (Figure 12b). The increasing incidence is driven primarily by serotypes 8 and 22F.

Figure 12a and b. IPD due to serotypes covered by PCV13 (a) and IPD due to serotypes additionally included in PCV20 (b), by age group, rate per 100,000, 2017 – 2025



Note: Serotypes covered by PCV13 include 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F; Additional serotypes covered by PCV20 include 8, 10A, 11A, 12F, 15B, 22F, 33F.

Trends in IPD Incidence Caused by Serotype 19A

Serotype 19A has been the primary driver of IPD incidence attributed to serotypes covered by PCV13 in recent years. Table 4 shows the number of 19A cases by age group and year as well as the proportions of total typed cases for each age group. From 2021 to 2022 the absolute number of 19A cases increased for all age groups. While the number of 19A cases had decreased in children aged <2 years and 2-4 years in 2023 and again in 2024, the relative proportion of 19A cases increased for children aged 2-4 in 2025 and remained the same for children <2. Among people aged ≥5 years, the number of serotype 19A cases increased further in 2023 but has decreased in 2024 and 2025, reaching the lowest numbers since 2021.

Table 4. Serotype 19A cases and proportions of total typed cases by age group (years) and year, 2021 – 2025

Age group (years)	2021	2022	2023	2024	2025
	n (%)	n (%)	n (%)	n (%)	n (%)
<2	16/40 (40%)	37/53 (70%)	15/33 (45%)	4/21 (19%)	6/31 (19%)
2–4	16/21 (76%)	25/34 (74%)	18/30 (60%)	8/20 (40%)	8/15 (53%)
5–64	56/209 (27%)	79/282 (28%)	140/362 (39%)	86/334 (26%)	57/326 (17%)
≥65	50/180 (28%)	66/230 (29%)	92/280 (33%)	78/295 (26%)	50/322 (16%)

Note: All percentages are among cases with a known serotype.

CLINICAL PRESENTATION AND DEATHS

A clinical presentation was recorded for 719/720 (99.9%) cases in 2025 (Table 5). If more than one clinical presentation has been recorded, clinical presentations have been prioritised as: meningitis, empyema, pneumonia, bacteraemia, or other. Pneumonia was the most common presentation among all age groups. Meningitis was the second most common presentation in children <2 years, and empyema in children aged 2–4 years. Bacteraemia without focus was the second most common presentation in age groups 5-64 years and ≥65 years.

Table 5. Invasive pneumococcal disease, clinical presentation by age group, 2025[1]

Age group (years)	Meningitis		Empyema		Pneumonia		Bacteraemia		Other		Total
	n	%	n	%	n	%	n	%	n	%	n
<2	9	23.7%	4	10.5%	14	36.8%	7	18.4%	3	7.9%	38
2–4	2	10.0%	5	25.0%	10	50.0%	2	10.0%	0	0.0%	20
<5	11	19.0%	9	15.5%	24	41.4%	9	15.5%	3	5.2%	58
5–64	25	7.4%	11	3.3%	254	75.6%	32	9.5%	14	4.2%	336
≥65	10	3.1%	4	1.2%	249	76.6%	52	16.0%	10	3.1%	325
Total	**46**	**6.4%**	**24**	**3.3%**	**527**	**73.3%**	**93**	**12.9%**	**27**	**3.8%**	**719**

[1] N: number of cases with 'yes' recorded for the clinical presentation. Any cases for which *S. pneumoniae* was identified in CSF were considered to be cases of pneumococcal meningitis. If more than one clinical presentation has been recorded, clinical presentations have been prioritised as: meningitis, empyema, pneumonia, bacteraemia, other. %: percentage of cases within the age group with the clinical presentation. 'Other' includes septic arthritis. At least one clinical presentation was recorded for 716 (99.6%) of cases notified in 2025.

Based on the information in EpiSurv, there were 61 deaths due to IPD in 2025, 77.0% (n=47) of whom were 65 or older. Three deaths were in children aged <5 years. The mortality data available in EpiSurv is provisional and may differ from the mortality collection.

IMMUNISATION STATUS

A pneumococcal vaccine was introduced to the childhood schedule in 2008 and there have been numerous changes to the schedule since this time (Table 1). Most recently, PCV13 replaced PCV10 on the childhood immunisation schedule in December 2022.

In 2025, there were 54 IPD cases in children aged 6 weeks to <5 years. Table 6 summarises the vaccination status and serotype causing disease for these cases. There were also four cases of IPD in children <6 weeks of age and thus not yet eligible for PCV13. Of the 54 cases, 44 children had at least one dose of vaccine more than 14 days prior to onset of IPD, six children were unvaccinated, and the vaccination status was unknown for four children.

A serotype was identified in 42 of the 54 cases; 14 (33.3%) of these cases were due to serotypes covered by PCV13 (all cases of 19A) and 13 (30.9%) due to additional serotypes included in PCV20 (three cases of 22F, three cases of 33F, three cases of 8, one case of 10A, one case of 11A and two cases of 15B). There were 15 cases (35.7%) due to serotypes not included in a pneumococcal conjugate vaccine.

Most PCV13-serotype cases occurred in children who either had no vaccination history, received PCV10, or had fewer then 3 doses of PCV13 (nine cases). There were five serotype 19A cases in children <5 years that had received three or more PCV-13 doses.

Table 6. Number of cases aged 6 weeks to 5 years by vaccination status and serotype, 2025

Vaccine serotype	PCV7[a]	PCV10[b]	PCV13			PCV20							Non-PCV[c]	Un-known[d]	Total cases
Vaccine received/dose			19A	3	6A	22F	33F	8	10A	11A	12F	15B			
Unvaccinated			3			1								2	6
Unknown Vaccination Status			1										3		4
PCV10															
1			1											1	2
2															
3+			2									1	4	2	9
PCV13															
1			1					2					3		6
2						1						1	2	1	5
3+			5				2		1	1			2	6	17
Mixed PCV															
PCV10/13			1			1	1	1					1		5
Total			**14**			**3**	**3**	**3**	**1**	**1**		**2**	**15**	**12**	**54**

Note: blank cells represent 0 observations. Children diagnosed before they were PCV eligible (6 weeks) are not included.
[a]PCV7 serotypes: 4, 6B, 9V, 14, 18C, 19F, 23F.
[b]Additional PCV10 serotypes: 1, 5, 7F.
[c]A serotype not covered by any PCV in production in 2025.
[d]Serotype is not known either because the case was identified from an antigen test, the isolate was not typed, or the typing did not yield a result.

ANTIMICROBIAL SUSCEPTIBILITY

Antimicrobial susceptibility testing (AST) was undertaken at PHF Science for 302 (41.9%) notified IPD cases in 2025. Using EUCAST meningitis and endocarditis breakpoints, 67.2% (203/302) of tested isolates were fully susceptible to all antimicrobials tested, 25.2% (76/302) of the isolates were resistant to penicillin and 20.9% (63/302) were resistant to co-trimoxazole (Table 7). Resistance to other antimicrobials was generally low.

Among the penicillin-resistant isolates (meningitis and endocarditis breakpoints), 80.3% (61/76) were also resistant to co-trimoxazole. This was most frequently observed in serotype 19A isolates (46/61). Among the penicillin-resistant isolates, 7.9% (6/76) were resistant to at least three additional antimicrobials, most commonly co-trimoxazole, erythromycin, and tetracycline or clindamycin.

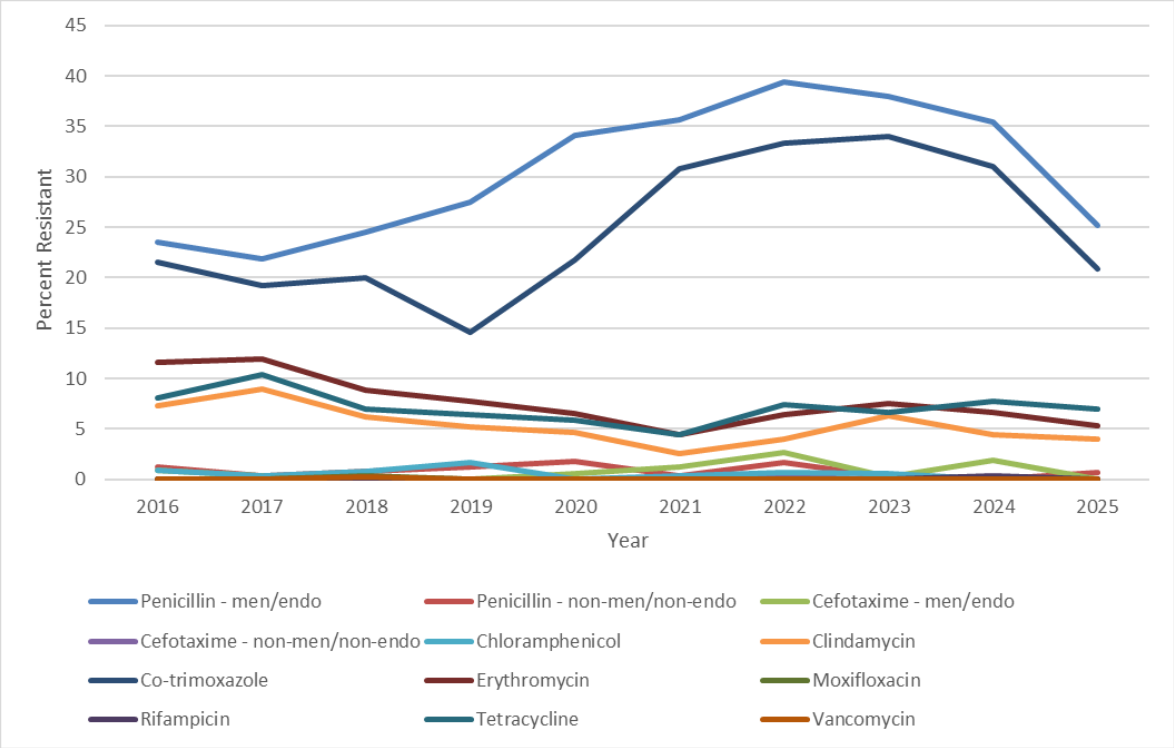
Table 7. Antimicrobial susceptibility among isolates from invasive pneumococcal disease cases, 2025

Antimicrobial	EUCAST clinical breakpoints			Susceptibility (%)		
	S[a]	I[a]	R[a]	S[a]	I[a]	R[a]
MIC, mg/L						
Penicillin						
Meningitis and endocarditis breakpoints	≤0.06	-	>0.06	74.8 (226)	-	25.2 (76)
Non-meningitis and non-endocarditis breakpoints	≤0.06	0.12–1	>1	74.8 (226)	24.5 (74)	0.7 (2)
Cefotaxime						
Meningitis and endocarditis breakpoints	≤0.5	-	>0.5	100.0 (302)	-	0.0 (0)
Non-meningitis and non-endocarditis breakpoints	≤0.5	1–2	>2	100.0 (302)	0.0 (0)	0.0 (0)
Zone diameter (mm)						
Chloramphenicol[b]	≥21	-	<21	100.0 (302)	-	0.0 (0)
Clindamycin[c]	≥19	-	<19	96 (290)	-	4.0 (12)
Co-trimoxazole	≥13	10–12	<10	77.5 (234)	1.7 (5)	20.9 (63)
Erythromycin	≥22	-	<22	94.7 (286)	-	5.3 (16)
Moxifloxacin	≥22	-	<22	100.0 (302)	-	0.0 (0)
Rifampicin	≥22	-	<22	100.0 (302)	-	0.0 (0)
Tetracycline	≥25	-	<25	93.1 (281)	-	7.0 (21)
Vancomycin	≥16	-	<16	100.0 (302)	-	0.0 (0)

[a] S: susceptible, standard dosing regimen, I: susceptible, increased exposure, and R: resistant
[b] EUCAST epidemiological cut off value (ECOFF) applied, with isolates with a zone diameter above the ECOFF categorised as resistant.
[c] The percentage resistant given is for constitutive clindamycin resistance. One isolate had inducible clindamycin resistance.

Penicillin resistance among *S. pneumoniae* from invasive disease increased from 2017 to 2022 and has declined since, with 25.2% of isolates resistant to penicillin in 2025 (Figure 13). Co-trimoxazole showed a similar pattern.

Figure 13. Antimicrobial resistance among isolates from invasive pneumococcal disease cases, 2016 – 2025



Note: non-men: non-meningitis; non-endo: non-endocarditis

Table 8 summarises antimicrobial resistance by age group among isolates with AST data. A higher proportion of penicillin resistance was seen in younger age groups, ranging between 41 and 43% in children <5 years, compared with 20.8% in those aged 5–64 years and 27.1% in those aged ≥65 years.

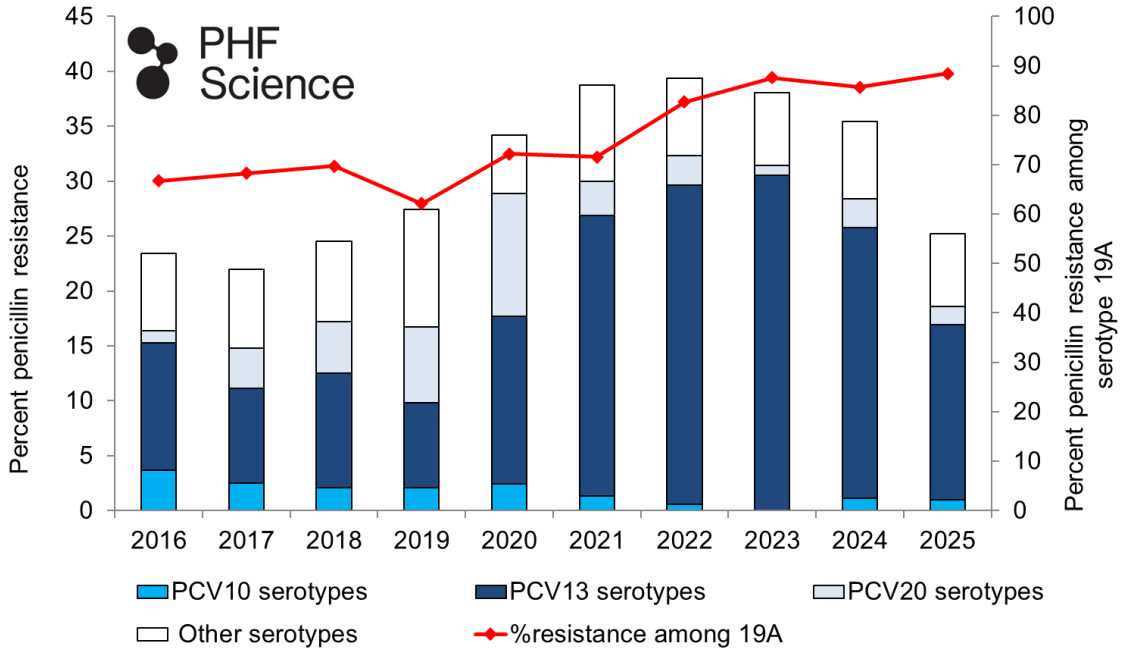
Table 8. Penicillin and cefotaxime resistance among isolates from invasive pneumococcal disease cases, 2025

Age group (years)	Penicillin		Cefotaxime	
	Resistant[a] MIC >0.06 mg/L		Resistant[a,b] MIC >0.5 mg/L	
	Number	%[c]	Number	%[c]
<2 (n=17)	7	41.1	0	0.0
2−4 (n=7)	3	42.9	0	0.0
5−64 (n=149)	31	20.8	0	0.0
³65 (n=129)	35	27.1	0	0.0
All ages (n=302)	**76**	**25.2**	**0**	**0.0**

[a] EUCAST meningitis and endocarditis breakpoints
[b] EUCAST non-meningitis and endocarditis breakpoints
[c] Percentage of the isolates from the cases within the age group.

A high proportion of serotype 19A isolates are resistant to penicillin (Figure 14. Penicillin resistance among isolates from invasive pneumococcal disease cases, 2016 – 2025). In 2025, the overall proportion of isolates with penicillin resistance decreased, related to the decrease in incidence of disease caused by serotype 19A. Other serotypes that were associated with penicillin resistance were serotype 11A (5/5, 100%) and serotype 23B (10/13. 76.9%). Serotype 8 was the most common serotype in 2025, and all tested isolates of this serotype were susceptible to penicillin.

Figure 14. Penicillin resistance among isolates from invasive pneumococcal disease cases, 2016 – 2025



Note: Serotypes covered by PCV10 include 1, 4, 5, 6B, 7F, 9V, 14, 18C, 19F, 23F. Additional serotypes covered by PCV13 include 3, 6A, 19A; Additional serotypes covered by PCV20 (excluding PCV13 serotypes) 8, 10A, 11A, 12F, 15B, 22F, 33F.

DISCUSSION

The incidence of IPD remained stable in 2025 in New Zealand, following the decrease observed in 2024. Though lower than the high observed in 2023, incidence is higher than any other year in the past decade, reflecting a continued high burden of disease.

The number of IPD cases in children <2 years has increased from 26 in 2024, to 38 cases in 2025. This represents a 47.7% increase in the incidence in this age group, however, the incidence remains considerably lower than the peak observed in 2022, when PCV13 was re-introduced to the immunisation schedule. The increase observed in 2025 was largely due to serotypes not covered by PCV13 but also due to a small increase in the number of cases due to serotype 19A (Table 4, Appendix Tables 1 and 2).

For the 2- to 4-year-olds age group, the overall incidence of IPD continued to decline in 2025, reaching its lowest level since 2020. While many children in this age group will have received one or more doses of PCV13 as part of their immunisation schedule, indirect protection may also be a contributing factor due to the reduced pneumococcal carriage among younger children vaccinated with PCV13.

Of the (PCV13) vaccine preventable IPD cases in PCV13-eligible children <5 years, all (n=14) were attributed to serotype 19A. However, most cases (64.2%; 9/14) were among children who were unvaccinated, had an unknown vaccination history, received only PCV10, received a mix of PCV10/13, or were under-vaccinated with PCV13. There were also five cases of IPD due to 19A in children <5 years who had received 3 doses of PCV13; cases with a vaccination history are not uncommon in higher-valency pneumococcal vaccines, and serotype 19A has shown to be one of the main serotypes involved in such cases [8]. It is important to continue to monitor the impact that higher valency vaccines have on IPD incidence and serotype prevalence, as well as to continue to monitor changes in the incidence of IPD due to serotypes covered by these vaccines in New Zealand.

In 2025, incidence among adults aged ≥65 years increased from 2024 to the highest level seen in the past 10 years and was higher than any other age group. However, incidence of disease caused by PCV13 serotypes (mostly 19A) decreased further from its 2023 peak, likely as a result of indirect protection due to vaccination of younger children with PCV13. Further reductions in IPD incidence due to PCV13 serotypes from indirect protection can be expected in this age group, as international experience suggests it can take at least 3 to 4 years to achieve a 50% reduction in incidence in non-vaccine eligible age groups [9]. Additionally, to further reduce burden of disease some countries have also introduced vaccination in older age groups [10].

Only a small proportion of cases in 2025 was due to serotypes included in PCV10 (2.7%). This compares to more than half of typed IPD cases in 2011, the year prior to the introduction of PCV10 to the childhood schedule, highlighting the change in circulating serotypes over time.

The incidence of IPD cases caused by serotypes not included in PCV13 but included in the higher valency vaccine PCV20 has increased for all age groups in 2025, in particular among older adults aged ≥65 years. The major drive for this is serotype 8. The incidence of IPD cases attributed to serotype 8 has been increasing since 2015, reaching its highest rate in 2025. Serotype 8 has surpassed the incidence of IPD due to serotype 19A for the first time since 2014, becoming the

most identified serotype in 2025, followed by serotype 19A and serotype 22F; all three serotypes are included in PCV20 (not currently funded in New Zealand). The increase in serotype 8 incidence observed following the re-introduction of PCV13 in childhood immunisation schedules has been documented in European countries, reflecting serotype replacement dynamics [11,12,13,14].

Though PCV20 holds potential for reducing the incidence of vaccine preventable IPD in New Zealand, careful consideration should be made with regards to the dose schedule. Immunogenicity for some serotypes (e.g., 19A) has been shown to be reduced in PCV20 when compared to PCV13 [15], particularly with a 2+1 dosing schedule. However, PCV20 response against 19A is improved with a 3+1 dosing schedule [15]. While some countries have recently introduced PCV20 with a 2+1 schedule (e.g., Australia) [16], New Zealand's recent experience with serotype 19A highlights considerations that may differ from those in other settings.

Māori and Pacific peoples continue to experience substantially higher rates of IPD than those of European/Other across all age groups, but particularly among children aged <2 years and adults aged ≥65 years. While the overall incidence of IPD in Pacific peoples has slightly reduced in 2025, it has increased in Māori, particularly in children aged <2 years, with the number of cases increasing nearly 70% from 2024 to 2025 (from 13 to 22 cases, respectively). Inequities in vaccine coverage for these groups is likely a contributing factor to disease burden [17]. To further reduce the incidence of IPD in New Zealand and the inequities in incidence, it is important that immunisation coverage is increased with a focus on improving equity.

Antimicrobial resistance analysis showed that in 2025 about 25% of IPD cases were penicillin resistant, and around 8% were multi-drug resistant. This is a decrease from the proportion observed between 2022 and 2024, when 40% of IPD cases were resistant to penicillin. The re-introduction of PCV13, and overall reduction of 19A cases, a serotype usually associated with high antimicrobial resistance, has likely contributed to this decrease [18]. No antimicrobial resistance was detected among serotype 8 isolates. Surveillance of antimicrobial resistance in IPD cases continues to be a public health priority in New Zealand.

Overall, IPD incidence in 2025 continues to affect mostly older adults and children <2 years, with an increasing proportion of non-PCV13 serotypes, particularly serotype 8, causing disease. Given the relatively recent changes to the vaccine programme and the time required for both direct and indirect effects to be fully realised, ongoing changes in serotype distribution are expected. Continued monitoring of IPD epidemiology remains important to inform future immunisation policy decisions.

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APPENDIX

Appendix Table 1. Number and percentage of invasive pneumococcal disease cases by serotype, serotypes covered by PCV7, PCV10, PCV13, PCV20, and age group, 2025

Serotype	<2 years		2–4 years		<5 years[a]		5–64 years		≥65 years		Total	
	Cases	%[b]	Cases	%[b]	Cases	%[b]	Cases	%[b]	Cases	%[b]	Cases	%[b]
4	0	0.0	0	0.0	0	0.0	3	<1.0	1	<1.0	4	<1.0
6B	0	0.0	0	0.0	0	0.0	0	0.0	1	<1.0	1	<1.0
9V	0	0.0	0	0.0	0	0.0	1	<1.0	1	<1.0	2	<1.0
14	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
18C	1	3.2	0	0.0	1	2.1	1	<1.0	2	<1.0	4	<1.0
19F	0	0.0	0	0.0	0	0.0	1	<1.0	2	<1.0	3	<1.0
23F	0	0.0	0	0.0	0	0.0	1	<1.0	1	<1.0	2	<1.0
PCV7	**1**	**3.2**	**0**	**0.0**	**1**	**2.2**	**7**	**2.1**	**8**	**2.5**	**16**	**2.3**
1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
7F**	0	0.0	0	0.0	0	0.0	3	<1.0	0	0.0	3	<1.0
PCV10	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**3**	**<1.0**	**0**	**0.0**	**3**	**<1.0**
19A**	6	19.4	8	53.3	14	30.4	57	17.5	50	15.5	121	17.4
3**	1	3.2	0	0.0	1	2.2	25	7.7	31	9.6	57	8.2
6A**	0	0.0	0	0.0	0	0.0	1	<1.0	1	<1.0	2	<1.0
PCV13	**7**	**22.6**	**8**	**53.3**	**15**	**32.6**	**83**	**24.7**	**82**	**25.5**	**180**	**25.9**
22F**	3	9.7	0	0.0	3	6.5	40	12.3	52	16.1	95	13.7
33F**	3	9.7	0	0.0	3	6.5	7	2.1	13	4.0	23	3.3
8**	4	12.9	1	6.7	5	10.9	113	34.7	41	12.7	159	22.9
10A**	0	0.0	1	6.7	1	2.2	4	1.2	6	1.9	11	1.6
11A**	1	3.2	0	0.0	1	2.2	4	1.2	10	3.1	15	2.2
12F**	0	0.0	0	0.0	0	0.0	4	1.2	0	0.0	4	<1.0
15B**	1	3.2	1	6.7	2	4.3	2	<1.0	5	1.6	9	1.3
PCV20	**12**	**38.7**	**3**	**20.0**	**15**	**32.6**	**174**	**53.8**	**127**	**39.4**	**316**	**45.5**
6C	1	3.2	1	6.7	2	4.3	9	2.8	8	2.5	19	2.7
7C	1	3.2	0	0.0	1	2.2	2	<1.0	4	1.2	7	1.0
9N**	2	6.5	0	0.0	2	4.3	14	4.3	18	5.6	34	4.9
11E	0	0.0	0	0.0	0	0.0	0	0.0	2	<1.0	2	<1.0
13	0	0.0	0	0.0	0	0.0	1	<1.0	0	0.0	1	<1.0
15A**	0	0.0	0	0.0	0	0.0	0	0.0	4	1.2	4	<1.0
15BC**	0	0.0	0	0.0	0	0.0	1	<1.0	0	0.0	1	<1.0
15C**	0	0.0	1	6.7	1	2.2	1	<1.0	6	1.9	8	1.2
16F**	1	3.2	0	0.0	1	2.2	3	<1.0	6	1.9	10	1.4

Serotype	<2 years		2–4 years		<5 years[a]		5–64 years		≥65 years		Total	
	Cases	%[b]	Cases	%[b]	Cases	%[b]	Cases	%[b]	Cases	%[b]	Cases	%[b]
17F**	0	0.0	0	0.0	0	0.0	3	<1.0	3	<1.0	6	<1.0
18F	0	0.0	0	0.0	0	0.0	0	0.0	1	<1.0	1	<1.0
21	1	3.2	0	0.0	1	2.2	2	<1.0	0	0.0	3	<1.0
23A**	1	3.2	0	0.0	1	2.2	4	1.2	14	4.3	19	2.7
23B**	2	6.5	0	0.0	2	4.3	10	3.1	13	4.0	25	3.6
28A	0	0.0	0	0.0	0	0.0	0	0.0	1	<1.0	1	<1.0
31**	0	0.0	0	0.0	0	0.0	0	0.0	3	<1.0	3	<1.0
34	0	0.0	0	0.0	0	0.0	2	<1.0	0	0.0	2	<1.0
35B**	0	0.0	0	0.0	0	0.0	1	<1.0	9	2.8	10	1.4
35F	0	0.0	0	0.0	0	0.0	1	<1.0	5	1.6	6	<1.0
38	2	6.5	2	13.3	4	8.7	4	1.2	8	2.5	16	2.3
Other[c]	0	0.0	0	0.0	0	0.0	1	<1.0	0	0.0	1	<1.0
Unknown	7		5		12		10		4		26	
Total[d]	**38**		**20**		**58**		**336**		**326**		**720**	

[a] Aggregated age group.
[b] Percentage of cases within the age group with the serotype. Percentage among cases with known serotypes only
[c] Includes non-typeable serotypes.
[d] Total number of isolates from culture-positive cases referred to PHF Science for serotyping for each age group.
Note: PCV21 serotypes are denoted with **

Appendix Table 2. Number and percentage of invasive pneumococcal disease cases by PCV type and age group, 2025

Serotype	<2 years (n=38)		2–4 years (n=20)		<5 years[a] (n=58)		5–64 years (n=336)		≥65 years (n=326)		Total (n=720)	
	Cases	%[b]	Cases	%[b]	Cases	%[b]	Cases	%[b]	Cases	%[b]	Cases	%[b]
PCV7	1	3.2	0	0.0	1	2.2	7	2.1	8	2.5	16	2.3
PCV10	1	3.2	0	0.0	1	2.2	10	3.1	8	2.5	19	2.7
PCV13	8	25.8	8	53.3	16	34.8	93	28.5	90	28.0	199	28.7
PCV20	20	64.5	11	73.3	31	67.4	267	81.9	217	67.4	515	74.2
PCV20 Exclusive	12	38.7	3	20.0	15	32.6	174	53.8	127	39.4	316	45.5
PCV21	25	80.6	12	80.0	37	80.4	297	88.4	285	88.5	619	89.2
Unknown	7		5		12		10		4		26	

[a] Aggregated age group.
[b] Percentage of cases within the age group with a serotype contained in that PCV. Percentages among cases with known serotypes only.
Note: Serotypes covered by PCV7: 4. 6B, 9V, 14, 18C, 19F, 23F; additional serotypes covered by PCV10: 1, 5, 7F; additional serotypes covered by PCV13: 3, 6A, 19A; additional serotypes covered by PCV20/PCV20 exclusive serotypes: 8, 10A, 11A, 12F, 15B, 22F, 33F. Serotype covered by PCV21: 3, 6A, 7F, 8, 9N, 10A, 11A, 12F, 15A, 15B, 15C, 16F, 17F, 19A, 20A, 22F, 23A, 23B, 24F, 31, 33F, 35B

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