

Invasive Pneumococcal Disease Quarterly Report January–March 2023

Background

Since 17 October 2008, invasive pneumococcal disease (IPD) has been notifiable to the local Medical Officer of Health under the Health Act 1956. The pneumococcal conjugate vaccine (PCV) was added to the New Zealand childhood immunisation schedule on 1 June 2008. The vaccine used on the schedule has changed several times: • Prevenar[®] (PCV7) was used from June 2008 to June 2011, • Synflorix[®] (PCV10) was used from July 2011 to June 2014, • Prevenar13[®] (PCV13) was used from July 2014 to June 2017, • Synflorix[®] (PCV10) had been used since July 2017 to 30 November 2022. Prevenar13[®] (PCV13) was re-introduced from 1 December 2022. The current PCV childhood immunisation schedule is a 2 plus 1 regime and includes doses at 6 weeks, 5 months, and 12 months of age. This regime has been in place since July 2020, when it changed from a 3 plus 1 schedule with the 3-month dose of PCV removed from the schedule.

PCV10 includes the seven serotypes in PCV7 (4, 6B, 9V, 14, 18C, 19F and 23F) as well as serotypes 1, 5 and 7F. PCV13 includes the 10 serotypes in PCV10 as well as serotypes 3, 6A and 19A. In addition, PCV13 and the 23-valent pneumococcal polysaccharide vaccine (23PPV, Pneumovax 23) were recommended for individuals with medical conditions that increase the risk of IPD. PCV13 is now recommended for all PCV-unvaccinated children. 23PPV includes the 13 serotypes of PCV13 as well as serotypes 2, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F and 33F.

The data presented in this report (except for immunisation status) is based on the information recorded on EpiSurv, the national notifiable disease surveillance system, as of 19 April 2023. Any updates made to EpiSurv data by public health unit staff after this date will not be reflected in this report. The immunisation status of cases that were eligible for PCV vaccination was extracted from the National Immunisation Register (NIR).

These quarterly and threshold reports are part of an enhanced surveillance programme to monitor the impact of PCV vaccination, including the changes in vaccine valency, on the epidemiology of IPD in New Zealand.

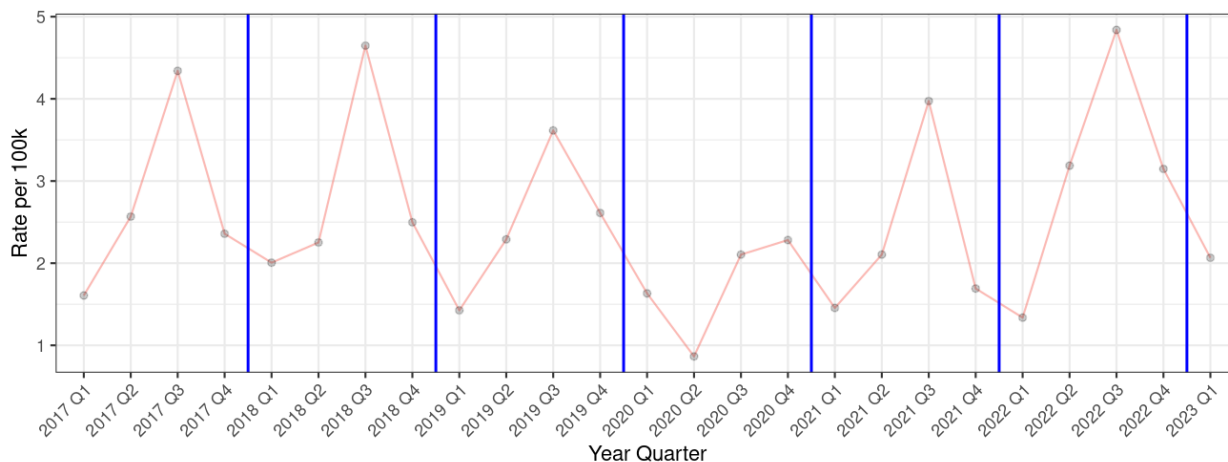
PCV13 was re-introduced on 1 December 2022 for newly vaccine eligible children. We will continue to closely monitor and analyse the impact of the reintroduction of PCV13 on IPD trends and distribution of serotypes in children in comparison with periods in which PCV10 alone (July 2017 – 30 November 2022) was used. However, it will take time for any changes

resulting from the reintroduction of PCV13 to be observed, given the cohorts of children vaccinated with PCV10. As such, beginning in 2023, the threshold analyses will be superseded by a 12-month rolling rate of 19A for children under 2 years of age as part of routine IPD surveillance.

Quarterly rates of IPD

There were 105 IPD cases notified between January and March 2023 (Q1 2023). This is the highest number of cases reported in Q1 of any year since IPD became notifiable (n=121 cases in Q1 2009) (Figure 1).

Figure 1: Quarterly IPD rates (2017-2023)



12-Month Rolling Rate of 19A and PCV-13 Specific Serotypes (IPD cases in children less than 2 years of age, 12 months ending March 2023)

The rates we report are based on cumulative cases over a four-quarter time-period. For reference, for the 12 months ending in December 2020 (Q4 2020), the rate of 19A was 7.5 cases per 100,000 (data not shown). In the 12 months ending in December 2022 (Q4 2022), the rate of 19A cases reached a record high of 29.9 cases per 100,000.

In the 12 months ending in March 2023 (Q1 2023), the rate of 19A cases is still near record high, with 28.3 cases per 100,000.

The rate for the combined serotypes of interest (3, 6A, and 19A) has steadily increased in the previous four quarters. The rate for the combined serotypes of interest has reached a record high of 33.2 per 100,000 in the 12 months ending in December 2022, before decreasing slightly to 31.6 in the 12 months ending March 2023. These increases are largely explained by the increase in 19A.

Figure 2: Quarterly IPD incidence rate per 100,000 children less than 2 years of age for the previous 12 months ending 31 March 2023

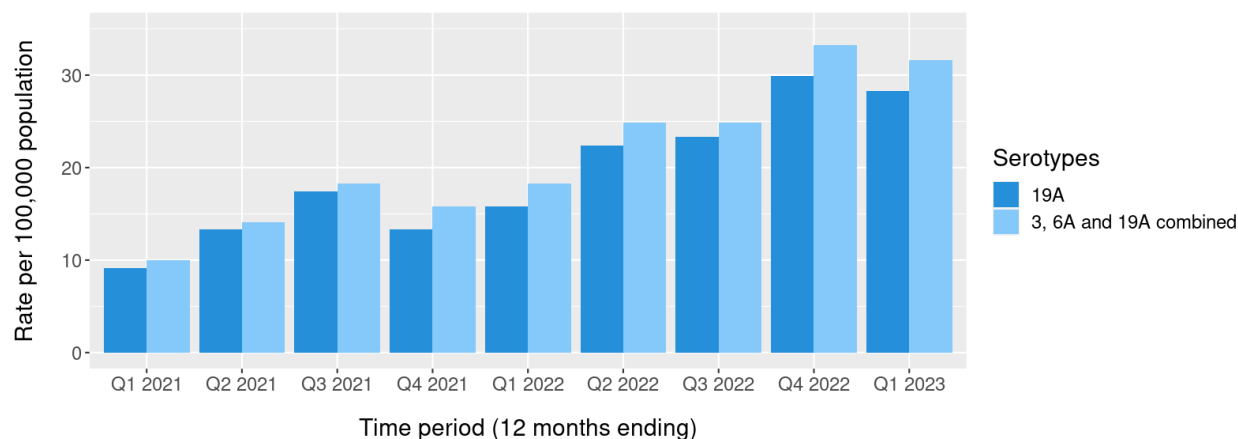


Table 1: Table of IPD incidence rate per 100,000 children (rolling 4 quarter rate) less than 2 years of age

Serotypes	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023
3, 6A and 19A combined	10	14.1	18.3	15.8	18.3	24.9	24.9	33.2	31.6
19A	9.1	13.3	17.4	13.3	15.8	22.4	23.3	29.9	28.3

Vaccine preventable incident cases

Among children under 5 years of age, the number of IPD cases that are PCV10-vaccine preventable has remained low since 2017. However, the proportion of PCV13-vaccine preventable cases that are 19A has increased since 2017.

The number of cases with PCV13 preventable serotypes among children under 5 years of age has steadily increased since 2018 (Table 2). In 2017, 36.4% of all vaccine preventable cases (PCV13-specific serotypes) were 19A. In 2022, the proportion reached 89.6% of all vaccine preventable cases (PCV13-specific serotypes). Since 2019, 94% of all PCV13-vaccine preventable cases in children under 5 years have been serotype 19A (134/142).

The proportion of cases due to a PCV13 serotype that are 19A among all ages has also steadily increased since 2017. In 2019, 49.2% of all cases due to a PCV13 serotype were 19A, this increased to 75% in 2021 and 2022.

Table 2: Distribution of vaccine preventable serotypes (2017-2023)

Year	No. IPD cases	No. IPD cases with known serotypes*	No. with Vaccine Preventable Serotypes (PCV10)	No. with PCV13 Serotypes	No. 19A Cases (% of PCV13 cases)	No. IPD cases in Children Under 5 Years of Age**	No. with Vaccine Preventable Serotypes (PCV10) for Children Under 5 Years of Age	No. with PCV13 Serotypes for Children Under 5 Years of Age	No. 19A Cases (% of cases with PCV13 serotypes in children under 5 years of age)
2017	521	482	74	169	60(35.5%)	45	3	11	4(36.4%)
2018	557	523	52	163	75(46.0%)	46	1	7	4(57.1%)
2019	495	461	38	132	65(49.2%)	45	1	13	10(76.9%)
2020	350	335	18	114	71(62.3%)	37	0	20	18(90.0%)
2021	469	451	25	184	138(75.0%)	66	1	36	32(88.9%)
2022	636	593	22	268	200(74.6%)	107	1	67	60(89.6%)
2023***	105	100	5	40	27(67.5%)	18	0	6	6(100.0%)

*Not all cases reported in 2023 have serotype results available at this time

**Includes cases with unknown serotype.

*** January to March 2023.

Deaths

Based on the information in EpiSurv, the total number of people who have died with a diagnosis of IPD at the time of death in Q1 2023 to date is six. The number of deaths with serotype 19A is one. Importantly, the main causes of death are not yet final for most cases.

Immunisation status

Of all PCV eligible children born after 1 January 2008, 23 children were diagnosed with IPD in 2023 through Q1. Of these 23 children, 21 had NIR data available and 2 had no NIR data and were assumed to be unvaccinated. Of the 21 children where NIR data is available, 38.1% (n=8) were serotype 19A and 61.9% (n=13) were non-PCV serotypes or the serotype is still unknown (Table 3).

The only observed vaccine preventable serotype was 19A (covered by PCV13). None of the 8 cases with 19A serotype who were eligible for vaccination had been vaccinated with PCV13 alone. None were unvaccinated, one received 2 PCV10 doses and 2 PCV13 doses, and the remainder received only PCV10 (2 had 2 doses, 3 had 3 doses, 2 had 4 doses). It is unknown whether these children were eligible to receive PCV13 due to having a high-risk condition.

Table 3: Immunisation status of all PCV eligible IPD cases born after 1 January 2008 (n=23)

Vaccine received and number of doses	PCV7 Serotypes							PCV10 Serotypes			PCV13 Serotypes			Non-PCV Serotypes or UNK	Total cases by vaccine and by number of doses
	4	6B	9V	14	18C	19F	23F	1	5	7F	19A	3	6A		
PCV7															
1															
2															
3															
4+															
PCV10															
1															
2											2			1	3
3											3			4	7
4+											2			5	7
PCV13															
1														2	2
2															
3															
4+															
PCV10/PCV13											1 ¹			1 ²	2
PCV7/PCV10															
Unvaccinated														2	2
Total											8			15	23

1. 2 PCV10 doses/2 PCV13 doses; 2. 1 PCV10 dose/1 PCV13 dose Note: blank cells represent 0 observations.

The year-to-date totals for all serotypes by year are shown in Table 4. In 2023, the total number of IPD cases reported year-to-date through March (n=105) is the most reported year-to-date since IPD became notifiable (2009 n=121).

Of the PCV13 serotypes reported since 2019, serotype 19A is the most reported vaccine serotype and has been steadily increasing in incidence (4-fold higher since 2019). Serotype 3 has also increased since 2019 (60% higher since 2019), though not as rapidly as 19A. In Q1 2023, 27 19A cases have been reported – 69% higher than Q1 2022. There were 200 19A cases reported through December 2022. It is important to note that serotype data are often delayed, therefore, the most recent IPD isolates will likely have a much higher proportion of missing serotype information.

Table 4: Year-to-date cumulative totals by year and serotype

	2019	2020	2021	2022	2023
Serotypes	March Year-To-Date Cumulative Totals				
PCV10	8	5	2	4	5
1					
4		2			1
5					
6B				1	
7F	5	1	2	2	1
9V	1				
14					1
18C					1
19F	1	2		1	1
23F	1				
PCV13 only	11	20	22	20	35
3	5	8	3	4	8
6A					
19A	6	12	19	16	27
Other	49	56	46	40	58
Unknown	3	2	4	4	7
Total	71	83	74	68	105

The year-to-date 19A totals for age groups by year are shown in Table 5. There is an increase in the incidence of cases aged under 5 years over time, however, this has decreased to 22% in the year-to-date 2023 compared to 38% in the same period in 2022.

Table 5: Year-to-date 19A cumulative totals by year and age group

	2019	2020	2021	2022	2023
Age group (years)	March Year-To-Date Cumulative Totals (percent of total)				
<2	0 (0.0)	0 (0.0)	2 (10.5)	5 (31.3)	3 (11.1)
2-4	1 (16.7)	1 (8.3)	3 (15.8)	1 (6.3)	3 (11.1)
5 or older	5 (83.3)	11 (91.7)	14 (73.7)	10 (62.5)	21 (77.8)
Total 19A	6	12	19	16	27

The year-to-date 19A totals for prioritised ethnicity groups by year are shown in Table 6. In 2022, 8 of the 16 19A cases reported were European/Other (50.0%) and 8 were Māori (50.0%). In 2023, 10 of the 27 19A cases reported through March were Māori (37.0%), 9 were European or Other (33.3%), 4 were Asian (14.8%), and 2 were Pacific Peoples (7.4%); the ethnicity of 2 is still unknown (7.4%).

Although the number of 19A cases have increased across all ethnic groups, Māori and Pacific peoples are overrepresented in the number of cases - with 44% of cases in these ethnic groups in 2023.

Table 6: Year-to-date 19A cumulative totals by year and ethnicity

	2019	2020	2021	2022	2023
Ethnicity	March Year-To-Date Cumulative Totals				
European or Other	4 (66.7)	4 (33.3)	6 (31.6)	8 (50.0)	9 (33.3)
Māori	1 (16.7)	4 (33.3)	6 (31.6)	8 (50.0)	10 (37.0)
Pacific Peoples	1 (16.7)	3 (25.0)	5 (26.3)	0 (0.0)	2 (7.4)
Asian	0 (0.0)	1 (8.3)	2 (10.5)	0 (0.0)	4 (14.8)
Unknown	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (7.4)
Total 19A	6	12	19	16	27

The year-to-date cumulative totals for all serotypes by year and district are shown in Table 7. The Northern North Island has consistently had the highest number of IPD cases (n=38 in 2023). The number of children under 5 years diagnosed with IPD in the Northern North Island (n=10) has increased by 233% since 2022 and is a record number reported since IPD became notifiable.

Table 7: Total IPD cases by age group (all ages and <5) by district and region (2019-23)

Districts	2019		2020		2021		2022		2023	
	<5	All ages	<5	All ages	<5	All ages	<5	All ages	<5	All ages
Te Tai Tokerau (Northland)	1	5		8		6		6	3	7
Waitematā		8		11	3	9	1	5	4	7
Te Toka Tumai Auckland	3	8	1	7		1		1	1	7
Counties Manukau	1	12	1	16		8	2	18	2	17
Northern North Island	5	33	2	42	3	24	3	30	10	38
Waikato	1	4	1	15	1	9		1	2	13
Lakes		1		2		2		1		1
Hauora a Toi Bay of Plenty	1	7		1		6		1	1	4
Tairāwhiti						2		1	1	4
Taranaki		2		1		2		1		2
Te Manawa Taki	2	14	1	19	1	21	0	5	4	24
Te Matau a Māui Hawke's Bay		3		2	1	4	2	6		4
Whanganui				2		1		2	1	4
Te Pae Hauora o Ruahine o Tararua MidCentral		1		3		1		1		5
Capital, Coast, and Hutt Valley		6	1	1	5	9	1	8	3	6
Wairarapa		1		1				2		2
Central North Island		11	1	9	6	15	3	19	4	21
Nelson Marlborough		3			1	1	1	1		3
Te Tai o Poutini West Coast		1								

Waitaha Canterbury		8	1	7	2	9	1	6		9
South Canterbury				3				1		1
Southern		1		3	1	4	1	6	1	9
Te Waipounamu	0	13	1	13	4	14	3	14	1	22
Total	7	71	5	83	14	74	9	68	19	105

1. Note: blank cells represent 0 observations.

The year-to-date cumulative 19A cases by year and district are shown in Table 8. 19A cases are geographically dispersed. The number of 19A cases has increased by 4 cases in the Northern North Island, 7 cases in Te Manawa Taki, 2 cases in Central North Island and has decreased by 2 cases in Te Waipounamu in 2023 compared to 2022. The number of 19A cases in children under 5 years in 2023 is similar to the number of cases in the same period in 2022 across all regions.

Table 8: 19A cases by age group (all ages and <5) by district and region (2019-23)

Districts	2019		2020		2021		2022		2023	
	<5	All ages	<5	All ages	<5	All ages	<5	All ages	<5	All ages
Te Tai Tokerau (Northland)		1		2		1		2		1
Waitematā		1		1	1	2	1	1		
Te Toka Tumai Auckland		1							1	2
Counties Manukau			1	5		3	1	3	1	7
Northern North Island	0	3	1	8	1	6	2	6	2	10
Waikato				2		4				3
Lakes						1				1
Hauora a Toi Bay of Plenty	1	1				1			1	2
Tairāwhiti						1				1
Taranaki										
Te Manawa Taki	1	1	0	2	0	7	0	0	1	7

Te Matau a Māui Hawke's Bay							1	1		
Whanganui						1			1	2
Te Pae Hauora o Ruahine o Tararua MidCentral										1
Capital, Coast, and Hutt Valley		1			1	2	1	2	2	3
Wairarapa								2		1
Central North Island	0	1	0	0	1	3	2	5	3	7
Nelson Marlborough										
Te Tai o Poutini West Coast										
Waitaha Canterbury				2	2	2	1	3		2
South Canterbury										
Southern		1			1	1	1	2		1
Te Waipounamu	0	1	0	2	3	3	2	5	0	3
Total	1	6	1	12	5	19	6	16	6	27