

# Vaccine preventable and invasive diseases in Queensland

1 Jan – 31 Dec 2019

## Quarterly surveillance report

This report provides additional data on vaccine preventable diseases notified in Queensland. This report covers the period 1 January to 31 December 2019. Data for this report were extracted from the Queensland Health notifiable conditions register on 20 January 2020 by onset date.

For current year to date totals, please refer to the Queensland Health Weekly Notifiable Conditions Report available [here](#). The current [Queensland immunisation schedule](#) is available online.

## Summary

Table 1: Notifications of vaccine preventable diseases in Queensland by quarter, 2019 and 2018-2019

Disease	2019					2018
	Q1	Q2	Q3	Q4	Total	Total
Diphtheria	1	1	2	1	5	6
Group A Streptococcal infection (invasive)	75	79	103	83	340	354
<i>Haemophilus influenzae</i> type b (invasive)	2	1	0	1	4	7
Measles	10	6	12	46	74	14
Meningococcal (invasive)	11	8	20	7	46	58
Mumps	17	11	7	14	49	475
Pertussis	409	327	511	512	1,759	1,763
Pneumococcal (invasive)	48	96	127	87	358	370
Rotavirus	174	215	951	959	2,299	1,039
Rubella	2	1	1	0	4	5
Tetanus	0	0	0	1	1	1
Varicella	2,328	2,302	2,606	2,583	9,819	9,551

(Q1: 1 January – 31 March, Q2: 1 April – 30 June, Q3: 1 July – 30 September, Q4: 1 October – 31 December)

**Diphtheria** – There was one notification of cutaneous toxigenic *C. diphtheriae* from the Wide Bay HHS areas in quarter 4 2019 (Q4 2019) in a fully vaccinated 6-year-old with recent travel to Sri Lanka. In 2019, there were five cases of cutaneous toxigenic *C. diphtheriae* notified in Queensland. All cases were acquired their infection overseas (two cases in Vanuatu, one in Papua New Guinea, one in Solomon Islands, and one in Sri Lanka). Of the five cases, three cases were vaccinated, and two cases had no documentation of diphtheria vaccination.

**Invasive *Haemophilus influenzae* type b (Hib) disease** – There was one notification of invasive Hib disease from the Townsville HHS in Q4 2019 in a fully vaccinated (three doses) 6 month old baby. The four notifications of Hib in 2019 were aged 6 months, 5, 11, and 58 years. All three children were fully vaccinated for age.

**Measles** – There were 46 notifications in Q4 2019, with cases aged from 6 months to 52 years.

In 2019, there were 74 measles cases notified in Queensland. This is the highest number of notifications in Queensland since 1997. Counts by age group of the 74 notified cases were 20–29 years (25 cases), 10–19 years (16 cases), 30–39 years (12 cases), under 5 years (11 cases), 40–49 years (9 cases), and 50+ years (1 case).

Of these 74 cases, 22 cases acquired their infection overseas (nine cases in New Zealand, three in Vietnam, three in Samoa, two in Philippines, one case in Myanmar, one case in Thailand, and three cases visited multiple measles endemic countries) resulting in a further 26 cases in Queensland. A further three cases were infected interstate, one case was linked with an overseas visitor to Victoria, the second case was acquired in the Northern Territory, and the third case was acquired infection in New South Wales. On return to Queensland, the Northern Territory acquired case infected one other person in Queensland. The source of infection was not known for five cases, and two of these cases infected 17 other people in Queensland.

Of the 74 cases, three cases were too young for vaccination, 13 were partially vaccinated, 11 were fully vaccinated, 11 had no documentation of measles vaccination, and 36 cases were unvaccinated.

**Mumps** – There were 14 notifications of mumps received in Q4 2019, with cases aged from 5 years to 79 years.

In 2019, there were 49 mumps cases notified in Queensland, with cases aged from 3 years to 79 years. Of these 49 notifications, 27% of the cases had been partially or fully vaccinated with mumps containing vaccines. Indigenous status was available for 41 (84%) cases; of these 7 (14%) were Aboriginal and/or Torres Strait Islander people.

**Rubella** – There were no notifications in Q4 2019.

In 2019, there were four (3 confirmed and 1 probable) notifications of rubella in Queensland, with cases aged from 20 to 41 years. One case was partially vaccinated, two cases were unvaccinated, and one case had no documentation of rubella vaccination. Of the four cases, three cases acquired infection in China and one case in New Zealand. Two cases were identified through the PCR testing and serology results (IgM) and other two cases identified through serology results (IgM) only.

**Tetanus** – There was one notification of tetanus from the Wide Bay HHS in Q4 2019 in an unvaccinated 84 year old.

## Invasive group A streptococcal infection

There were 83 notifications of invasive group A streptococcal (iGAS) infection in Q4 2019, with no deaths reported. From 1 January to 31 December 2019, there were 340 notifications of iGAS infection in Queensland, including 10 reported deaths. The majority of cases (87%) were adults aged 20 years or older. Of the 10 deaths, 8 deaths occurred in adults aged 50 years or older and two deaths in children younger than 5 years of age. Indigenous status was available for all reported 340 (100%) cases, of these 83 (24%) were Aboriginal and/or Torres Strait Islander people.

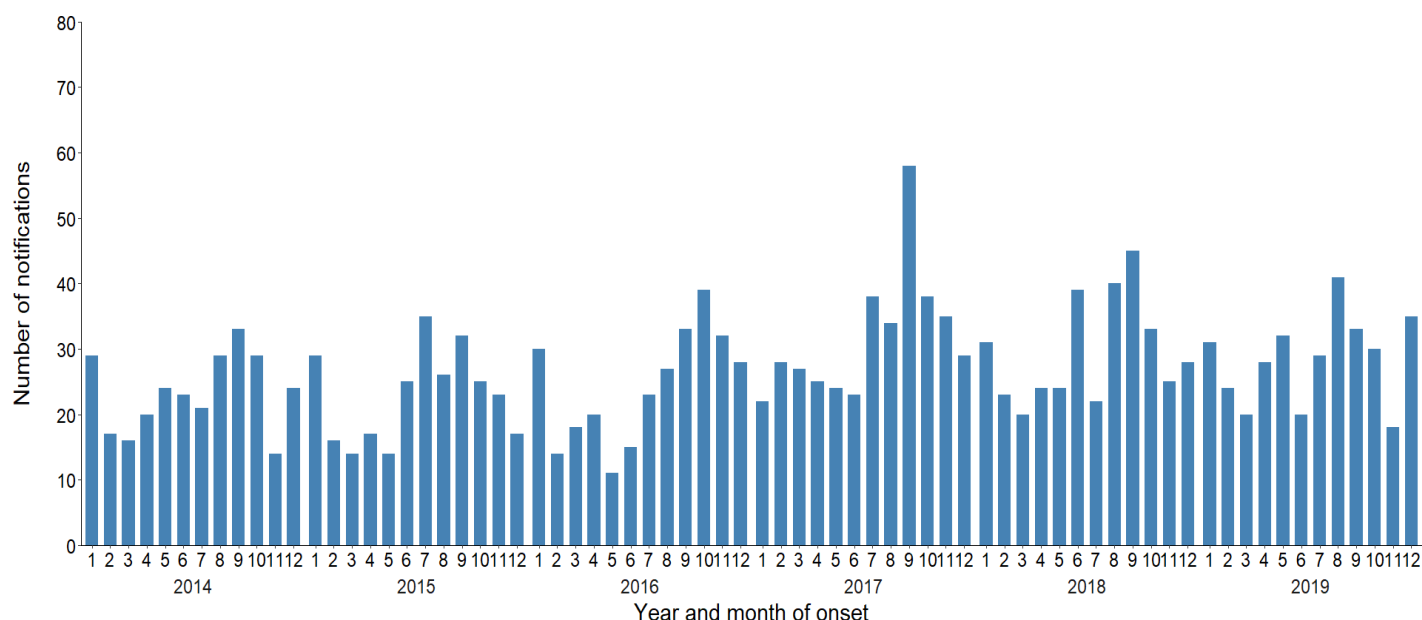


Figure 1: Notifications of invasive group A streptococcal infection in Queensland by year and month of onset, 1 January 2014 to 31 December 2019

Table 2: Notifications of invasive group A streptococcal infection in Queensland by age group and quarter, 2019 and 2018-2019

Age Group (years)	2019					2018
	Q1	Q2	Q3	Q4	Total	Total
0-4	4	5	7	9	25	32
5-9	0	1	4	1	6	17
10-14	2	1	3	0	6	7
15-19	0	3	3	3	9	4
20-24	4	2	4	2	12	13
25-44	20	18	21	16	75	70
45-64	19	27	31	24	101	91
65+	26	22	30	28	106	120
<b>Total</b>	<b>75</b>	<b>79</b>	<b>103</b>	<b>83</b>	<b>340</b>	<b>354</b>

## Invasive meningococcal disease

There were 7 notifications of invasive meningococcal disease (IMD) in Q4 2019, with two deaths reported in adults aged 29 and 64 years. Of these, four cases were serogroup W, 1 case was serogroup Y, 1 case was serogroup B, and 1 case was a clinical notification. During 2019, there were a total of 46 notifications of IMD, with 4 deaths reported. Of the 46 notifications, 18 cases were serogroup B, 18 cases were serogroup Y, 9 cases were serogroup W, 1 case was a clinical notification. Serogroups W and Y are still occurring in Queensland following their emergence in 2016 (Figure 2).

### Vaccination History

In Queensland:

- Vaccines for serogroup C disease were introduced for children 12 months of age in 2003, with an initial catch-up period covering older ages to <20 years.
- In response to the rise in serogroup W and serogroup Y disease in 2016, a meningococcal ACWY vaccination program was introduced in July 2017 to provide vaccination to year 10 students through the school immunisation program, and for young people aged 15–19 years of age through their immunisation provider.
- From 1 July 2018, meningococcal ACWY vaccine replaced Menitorix (Hib-Meningococcal Serogroup C vaccine) at the 12-month time point on the national immunisation program schedule.
- Vaccines for serogroup B are available on the private market but are not currently part of the national immunisation program.

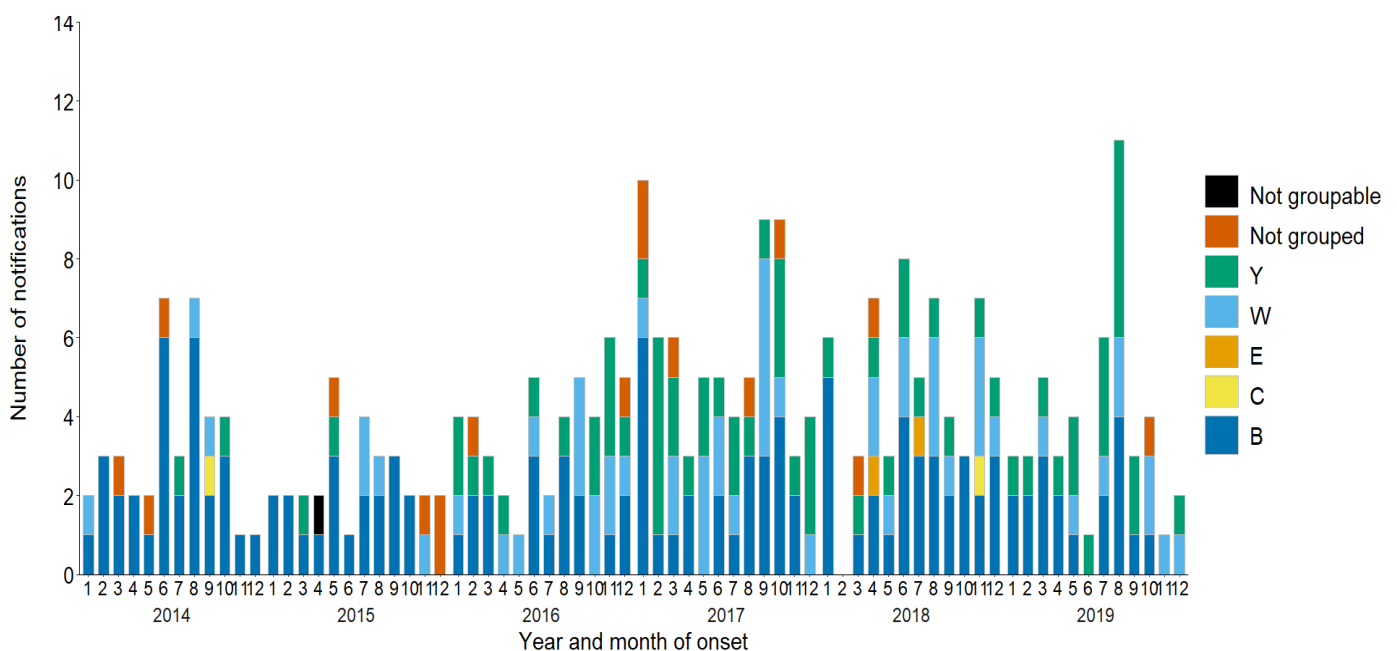


Figure 2: Notifications of invasive meningococcal disease in Queensland by year and month of onset, 1 January 2014 to 31 December 2019

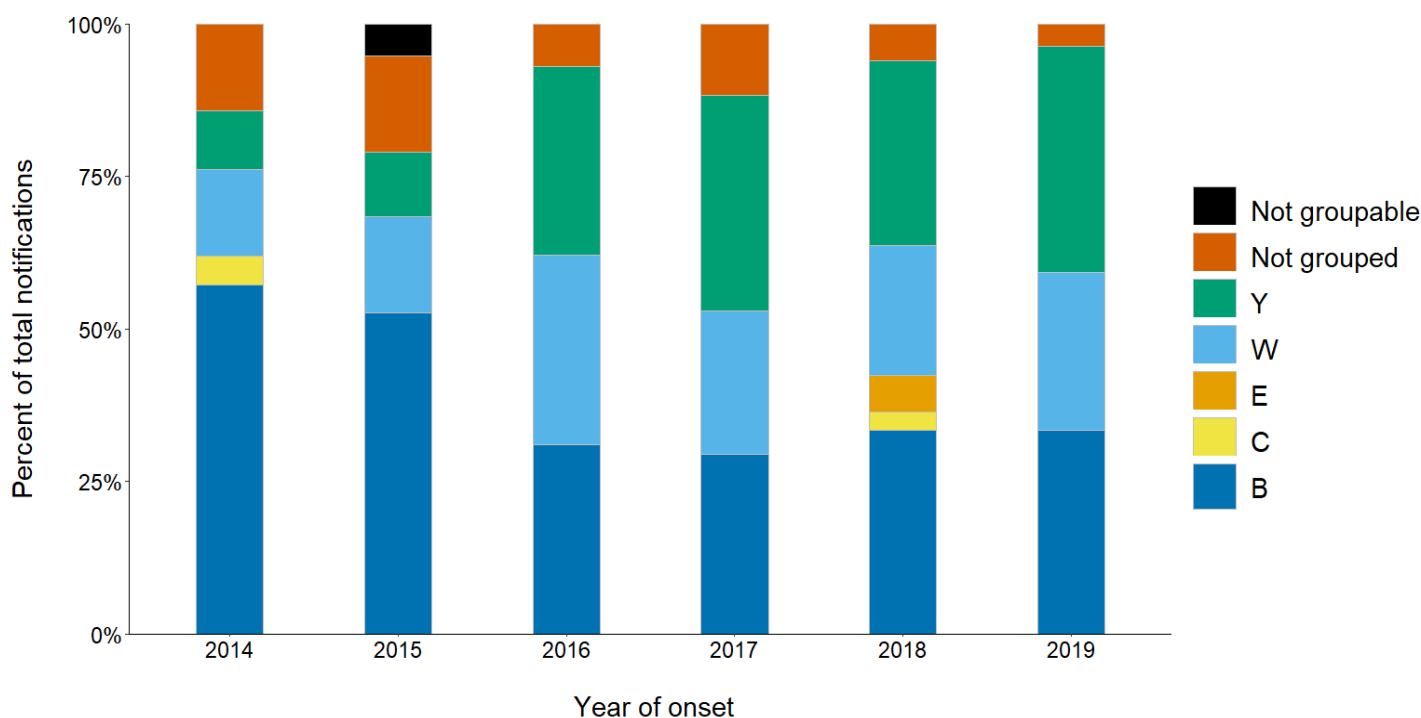


Figure 3: Notifications of invasive meningococcal disease in Queensland by year and serogroup, 1 January 2014 to 31 December 2019

Table 3: Notifications of invasive meningococcal infection in Queensland by serogroup and age group, 1 January to 31 December 2019, and age group, 2018-2019

Age Group (years)	2019							2018	
	Group B	Group C	Group E	Group W	Group Y	Not groupable	Not grouped	Total	
0-4	6	0	0	3	0	0	0	9	11
5-9	1	0	0	1	0	0	0	2	1
10-14	2	0	0	0	0	0	0	2	1
15-19	3	0	0	0	2	0	0	5	11
20-24	1	0	0	1	5	0	0	7	7
25+	5	0	0	4	11	0	1	21	27
<b>Total</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>18</b>	<b>0</b>	<b>1</b>	<b>46</b>	<b>58</b>

## Invasive pneumococcal disease

There were 87 invasive pneumococcal disease (IPD) notifications in Q4 2019, with three deaths reported in adults aged between 15 and 77 years. During 2019, there were 358 notifications of IPD, and 20 deaths reported. Of these 20 deaths, 19 were in adults aged 35 years or older and 1 was in child aged 15 years. Figure 4 shows the number of notifications of IPD by year and month of onset. The serotype of each notification is categorised according to vaccine type: serotypes included in the 7-valent vaccine (Prevenar) are categorised as 7v, those included exclusively in the 13-valent vaccine (Prevenar 13) are categorised as 13v-7v.

## Vaccination History

Queensland has been using

- Prevenar 13® (13vPCV) vaccine in a 3-dose primary course schedule for infants not in a high-risk category at 6 weeks, 4, and 6 months of age for since 1 July 2011. From 1 July 2018, a new schedule for 13vPCV was introduced, with doses at 6 weeks, 4 months, and 12 months of age.
- From 1 July 2018, Aboriginal and/or Torres Strait Islander children and medically at-risk children are scheduled to receive Prevenar 13 at 6 weeks, 4 months, 6 months, and 12 months of age.

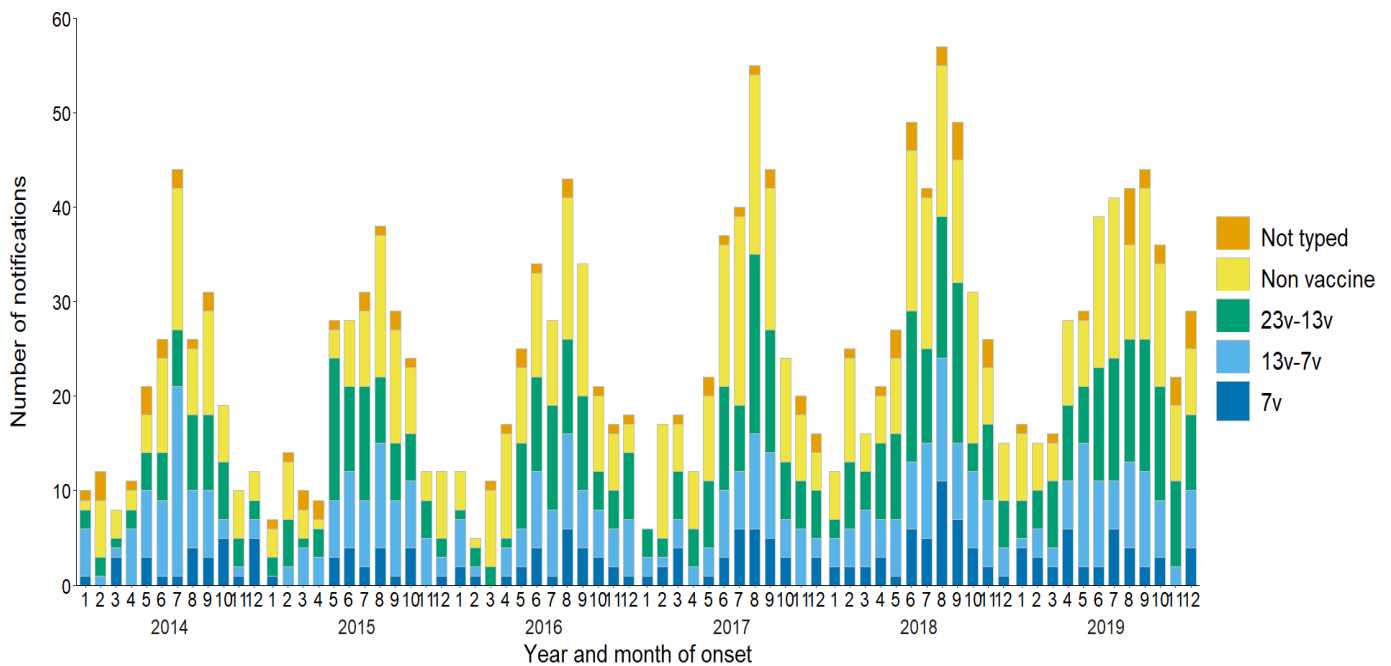


Figure 4: Notifications of invasive pneumococcal disease in Queensland by year and month of onset, 1 January 2014 to 31 December 2019

Figure 5 shows the number of notifications of 7v serotypes of IPD in Queensland by year and quarter of onset, 1 January 2014 to 31 December 2019.

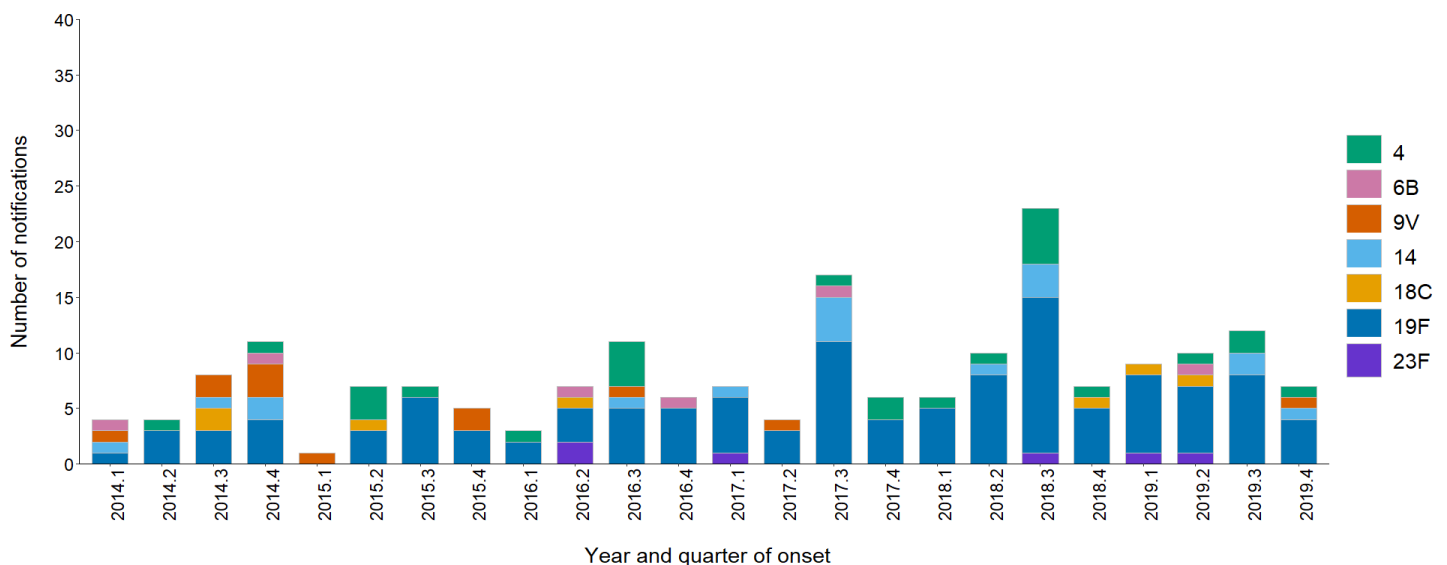


Figure 5: Notifications of 7v serotypes of invasive pneumococcal disease in Queensland by year and quarter of onset, 1 January 2014 to 31 December 2019.

Figure 6 shows the number of notifications of 13v-7v serotypes of IPD in Queensland by year and quarter of onset, 1 January 2014 to 31 December 2019.

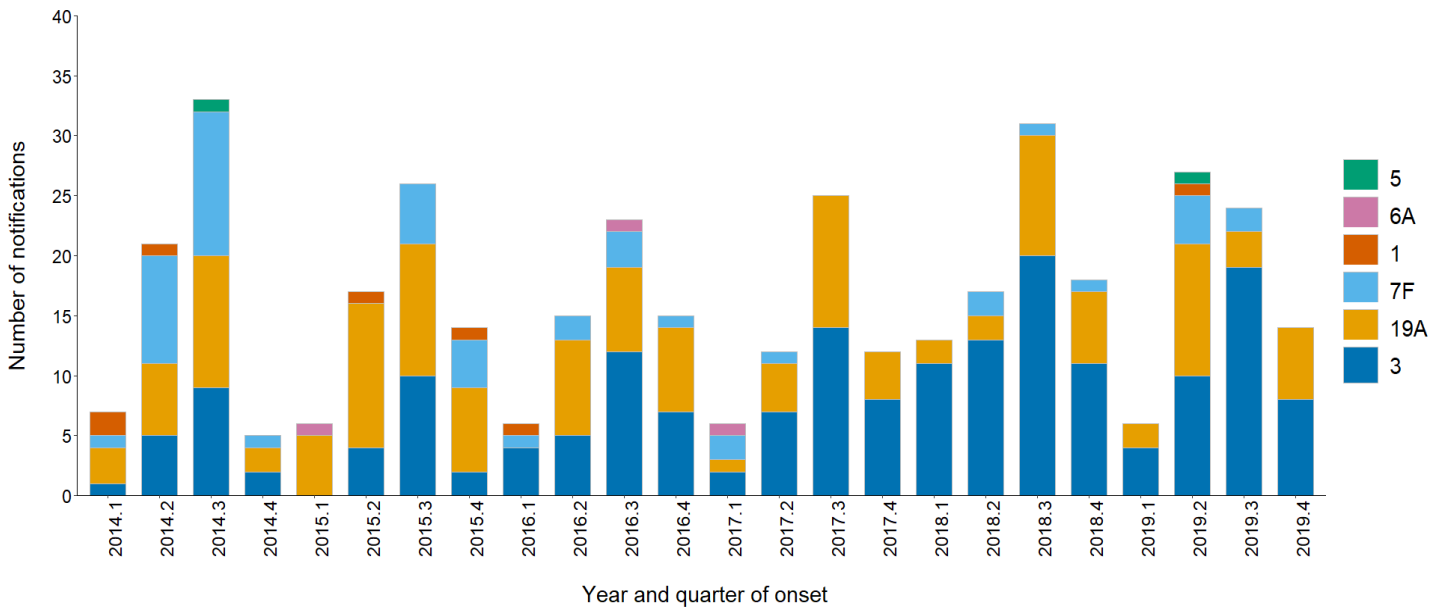


Figure 6: Notifications of 13v-7v serotypes of invasive pneumococcal disease in Queensland by year and quarter of onset, 1 January 2014 to 31 December 2019

Figure 7 shows the number of notifications of 23v-13v serotypes of IPD in Queensland by year and quarter of onset, 1 January 2014 to 31 December 2019.

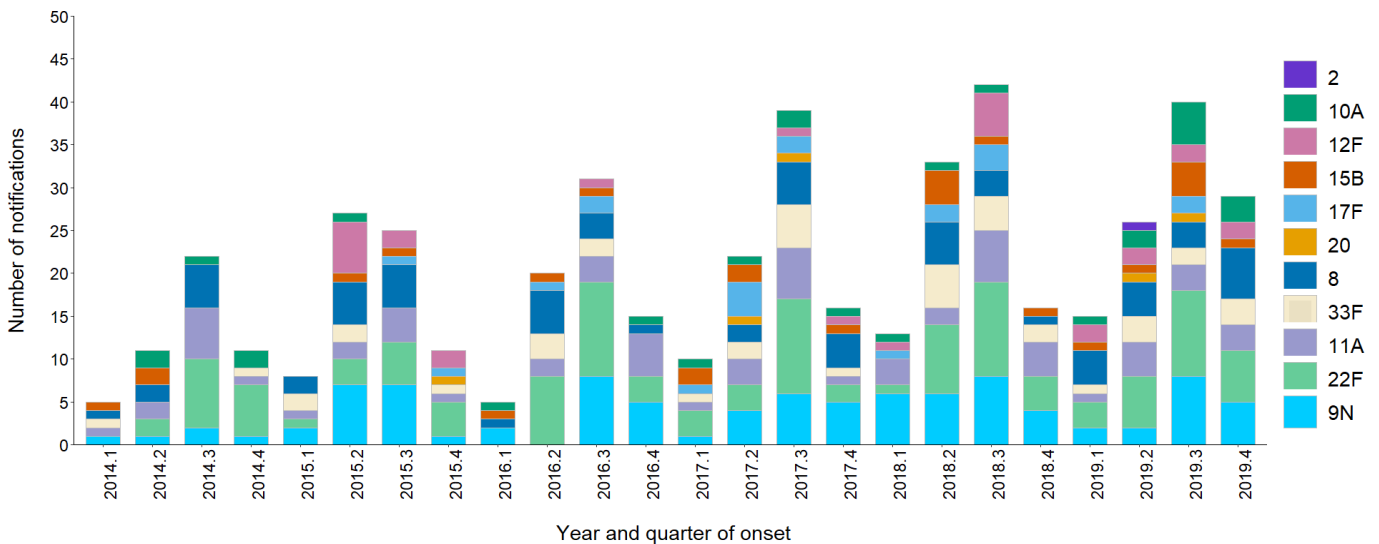


Figure 7: Notifications of 23v-13v serotypes of invasive pneumococcal disease in Queensland by year and quarter of onset, 1 January 2014 to 31 December 2019

In 2019, the most commonly notified IPD serotypes were 3, 19F, 22F, 19A, 23B, 8, 9N, 16F, 6C, 10A, 11A, 15A, 23B, 16F, 10A, 15A, and 38 accounting for 66% of all IPD notifications in the time period.

Table 4: Most common serotypes of invasive pneumococcal disease notified in Queensland by quarter, 2019 and 2018-2019

Serotype	Vaccine inclusion	2019					2018
		Q1	Q2	Q3	Q4	Total	Total
3	13v-7v	4	10	19	8	41	55
19F	7v	7	6	8	4	25	32
22F	23v-13v	3	6	10	6	25	24
19A	13v-7v	2	11	3	6	22	20
23B	Non vaccine	5	4	5	5	19	23
8	23v-13v	4	4	3	6	17	9
9N	23v-13v	2	2	8	5	17	24
16F	Non vaccine	0	7	5	4	16	13
6C	Non vaccine	1	4	6	2	13	11
10A	23v-13v	1	2	5	3	11	3
11A	23v-13v	1	4	3	3	11	15
15A	Non vaccine	2	1	5	2	10	11
38	Non vaccine	1	2	1	6	10	10

Table 5: Notifications and rates of invasive pneumococcal disease in Queensland by age group and quarter, 2019 and 2018-2019

Age Group (years)	2019						2018	
	Q1	Q2	Q3	Q4	Total	Rate#	Total	Rate#
<1	2	4	4	4	14	22.7	20	32.4
1-4	6	9	16	9	40	15.6	47	18.3
5-14	2	1	6	6	15	2.3	15	2.3
15-24	5	4	6	2	17	2.6	18	2.8
25-44	9	21	21	12	63	4.7	55	4.1
45-64	10	25	31	20	86	7.1	102	8.4
65+	14	32	43	34	123	16.6	113	15.2
<b>Total</b>	<b>48</b>	<b>96</b>	<b>127</b>	<b>87</b>	<b>358</b>	<b>7.3</b>	<b>370</b>	<b>7.5</b>

# Annual age specific rate per 100,000 population per year using ERP for 2018 and 2019 (ABS Catalogue no. 3218.0)

## Pertussis

There were 512 notifications of pertussis in Q4 2019 and a total of 1,759 notifications of pertussis for the year with no deaths reported. The highest number and rates of notifications was seen in the 5-9 year age group (Table 6).

## Vaccination History

- Acellular vaccines were first used on the NIP for all Australian children in the late 1990s.
- Queensland has offered children Infanrix hexa in a 3-dose schedule for infants at 6 weeks, 4 months, and 6 months of age since 1 March 2008.



- Booster doses of pertussis-containing vaccine (DTPa) are scheduled for children at 18 months and 4 years of age.
- A pertussis-containing booster (dTpa) is offered in the year 7 school vaccination program.
- A dose of pertussis-containing vaccine (dTpa) is recommended during the third trimester (preferably between 20 and 32 weeks) of every pregnancy.

Table 6: Number and rate of pertussis notifications in Queensland by age group and quarter, 2019 and 2018-2019

Age Group (years)	2019						2018	
	Q1	Q2	Q3	Q4	Total	Rate#	Total	Rate#
<1	23	9	15	11	<b>58</b>	94.1	<b>39</b>	63.3
1–2	19	14	24	18	<b>75</b>	59.2	<b>79</b>	62.4
3–4	25	11	17	17	<b>70</b>	54	<b>88</b>	67.9
5–9	95	92	114	141	<b>442</b>	132.5	<b>558</b>	167.3
10–14	64	58	122	133	<b>377</b>	119.4	<b>355</b>	112.5
15–19	22	27	29	22	<b>100</b>	32.2	<b>92</b>	29.6
20–49	93	71	114	111	<b>389</b>	19.2	<b>350</b>	17.2
50–64	43	26	49	41	<b>159</b>	18.1	<b>128</b>	14.6
65+	25	19	27	18	<b>89</b>	12	<b>74</b>	10
<b>Total</b>	<b>409</b>	<b>327</b>	<b>511</b>	<b>512</b>	<b>1,759</b>	<b>35.7</b>	<b>1,763</b>	<b>35.8</b>

# Annual age specific rate per 100,000 population per year using ERP for 2018 and 2019 (ABS Catalogue no. 3218.0)

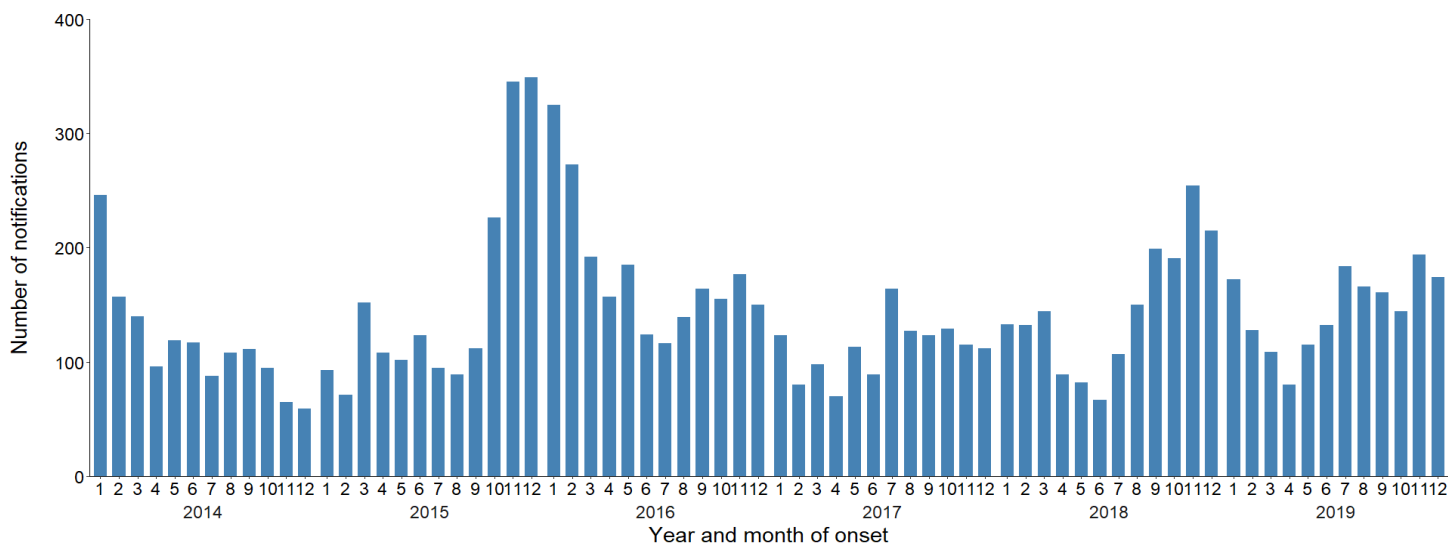


Figure 8: Notifications of pertussis in Queensland by month and year of onset, 1 January 2014 to 31 December 2019

Table 7: Notifications of pertussis in Queensland in children aged younger than one year by quarter, 2019 and year-to-date, 2018–2019

Age Group	2019					2018
	Q1	Q2	Q3	Q4	Total	Total
<1 month	3	0	0	0	3	1
1 month	0	1	0	1	2	4
2 months	2	2	3	3	10	3
3 months	1	0	4	1	6	5
4 months	2	1	2	1	6	4
5 months	0	1	1	1	3	1
6 months	2	0	3	1	6	6
7 months	3	1	2	0	6	3
8 months	2	1	0	2	5	4
9 months	4	1	0	0	5	4
10 months	2	1	0	0	3	3
11 months	2	0	0	1	3	1
<b>Total</b>	<b>23</b>	<b>9</b>	<b>15</b>	<b>11</b>	<b>58</b>	<b>39</b>

Table 8: Maternal vaccination status for mother of pertussis cases reported in Queensland in children aged younger than one year by quarter, 2019 and 2018-2019

Maternal vaccination status	2019					2018
	Q1	Q2	Q3	Q4	Total	Total
Vaccinated	6	5	7	9	27	14
Not Vaccinated	11	4	8	1	24	13
Not asked	1	0	0	0	1	3
Unknown	5	0	0	1	6	9
<b>Total</b>	<b>23</b>	<b>9</b>	<b>15</b>	<b>11</b>	<b>58</b>	<b>39</b>

## Rotavirus

There were 959 notifications of rotavirus in Q4 2019 and a total of 2,299 notifications in 2019. The highest number and rate of notification was seen in children younger than 1 year of age and followed by the 1–2 years age group. The 2019 notifications and rates of rotavirus were 2.2 times higher than the notifications and rates of 2018. Figure 9 shows the notifications of rotavirus in Queensland by age group and quarter and year of onset.

Towards the end of 2015 there was an increase in notifications in children aged younger than one year, which has been sustained. At the end of 2015, two laboratories in Queensland introduced PCR testing for rotavirus infection. PCR is more sensitive for rotavirus detection than antigen detection methods. Further, with current PCR assays, discrimination between wild type rotavirus and the vaccine strains is not possible. Notified cases in this age group may reflect recent vaccination rather than infection.

During 2006–2016, only confirmed rotavirus cases were notified as per the Queensland health guidelines. Queensland introduced a case definition for probable and confirmed cases from the beginning of 2017.

## Vaccination History

Vaccines for rotavirus first became available in Australia in early 2006 and were added to the National Immunisation Program from 1 July 2007. At this time, Queensland began vaccinating children with RotaTeq (Merck/Seqirus) in a 3-dose schedule administered orally at 6 weeks, 4 months, and 6 months of age.

From 1 July 2017, oral rotavirus vaccine Rotarix (GSK) given in a 2-dose schedule (6 weeks, 4 months), replaced RotaTeq in Queensland.

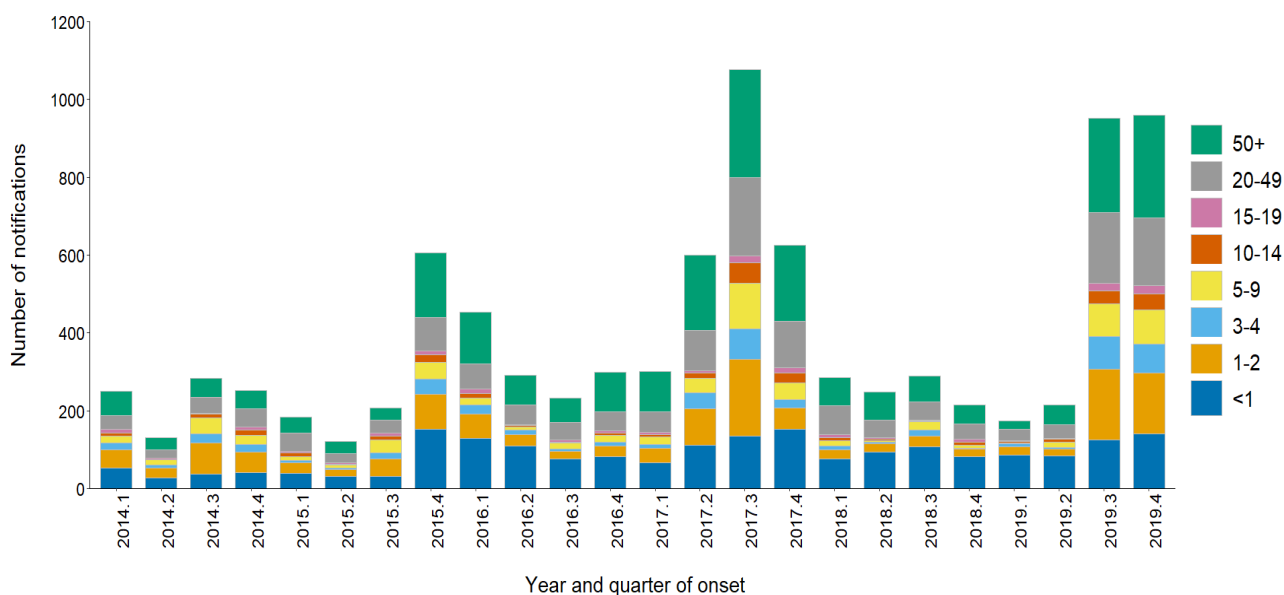


Figure 9: Notifications of rotavirus in Queensland by age group and quarter and year of onset, 1 January 2014 to 31 December 2019

Table 9: Number and rate of rotavirus notifications in Queensland by age group and quarter, 2019 and 2018-2019

Age Group (years)	2019						2018	
	Q1	Q2	Q3	Q4	Total	Rate#	Total	Rate#
<1	87	85	125	141	<b>438</b>	710.3	<b>362</b>	587.1
1-2	21	17	182	156	<b>376</b>	297.0	<b>93</b>	73.5
3-4	8	4	84	75	<b>171</b>	131.9	<b>31</b>	23.9
5-9	2	13	84	88	<b>187</b>	56.1	<b>44</b>	13.2
10-14	3	8	34	41	<b>86</b>	27.2	<b>23</b>	7.3
15-19	2	3	18	21	<b>44</b>	14.2	<b>21</b>	6.8
20-49	29	34	183	173	<b>419</b>	20.6	<b>206</b>	10.1
50+	22	51	241	264	<b>578</b>	35.7	<b>259</b>	16.0
<b>Total</b>	<b>174</b>	<b>215</b>	<b>951</b>	<b>959</b>	<b>2,299</b>	<b>46.6</b>	<b>1,039</b>	<b>21.1</b>

# Annual age specific rate per 100,000 population per year using ERP for 2018 and 2019 (ABS Catalogue no. 3218.0)

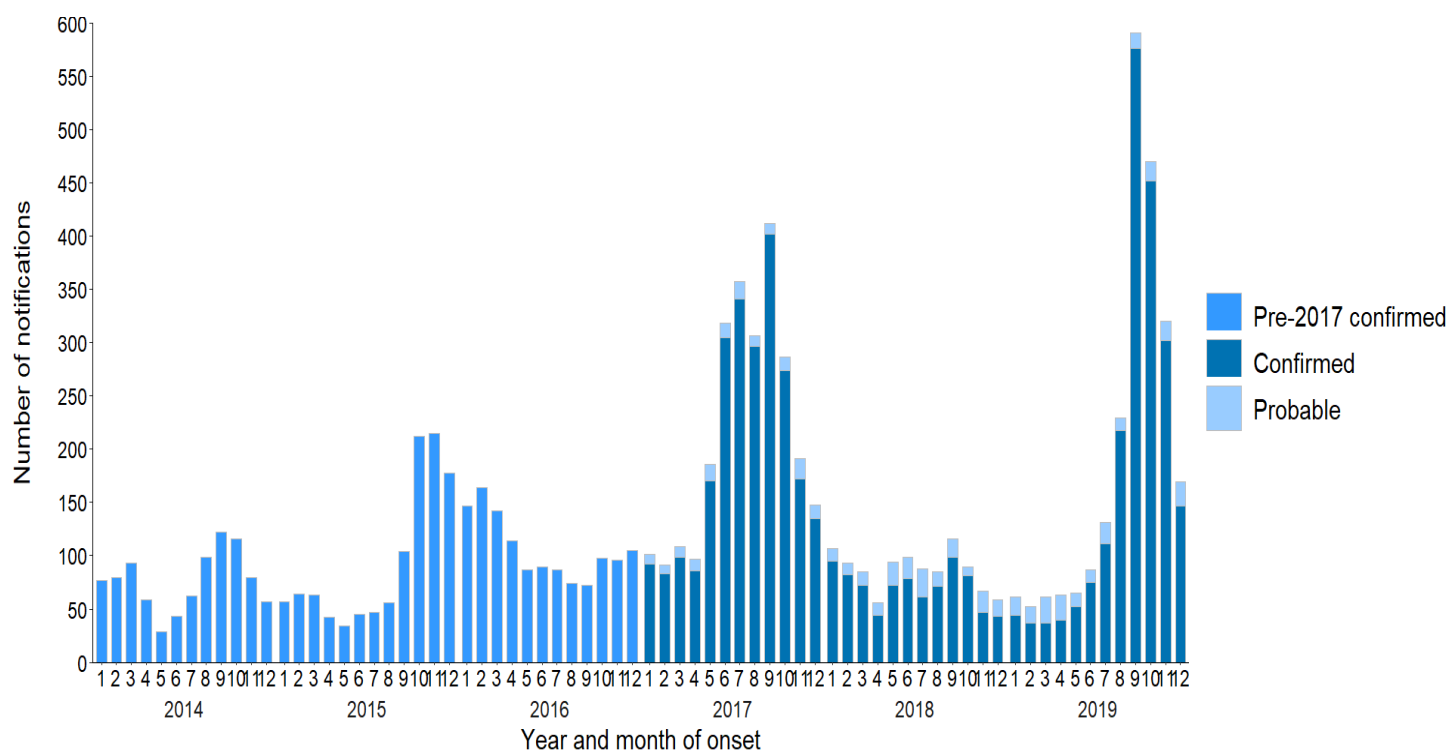


Figure 10: Notifications of rotavirus in Queensland by month and year of onset, 1 January 2014 to 31 December 2019

Table 10: Notifications of rotavirus in Queensland in children aged younger than one year by quarter, 2019 and 2018-2019

Age Group	2019					2018
	Q1	Q2	Q3	Q4	Total	Total
<1 month	0	0	8	5	13	6
1 month	19	19	22	36	96	98
2 months	23	30	22	23	98	101
3 months	7	12	19	22	60	42
4 months	17	10	15	10	52	44
5 months	10	6	7	5	28	21
6 months	3	2	5	4	14	7
7 months	3	1	5	7	16	11
8 months	0	0	7	11	18	10
9 months	2	2	4	9	17	10
10 months	1	2	6	5	14	7
11 months	2	1	5	4	12	5
<b>Total</b>	<b>87</b>	<b>85</b>	<b>125</b>	<b>141</b>	<b>438</b>	<b>362</b>

## **Varicella-zoster virus infection**

There were 2,583 notifications of varicella-zoster infection in Q4 2019. From 1 January 2018, all notifications of varicella-zoster virus infection in children aged younger than 10 years, and adults aged 60 years or older have been followed up to determine if the clinical presentation is consistent with chickenpox or shingles. Prior to this time, only children younger than eight years of age were followed up. A time limited (1 Dec 2017–30 Sep 2018) intermittent enhanced surveillance (all notifications followed up for one month in each quarter) of all varicella notifications also commenced in December 2017. From 1 August 2019, all notifications of varicella-zoster virus infection have been followed up to determine the clinical presentation is consistent with chickenpox or shingles.

### **Vaccination History**

The National Shingles Vaccination Program commenced in November 2016 for adults 70 years of age, with a single catch-up dose funded for adults aged 71 to 79 years until 2021. The National Immunisation Program Schedule provides a combined measles, mumps, rubella, and varicella (MMRV) vaccine for children aged 18 months.

Table 11: Notifications of varicella in Queensland by age group and clinical presentation and quarter, 2019

Age Group (years)	Q1 2019				Q2 2019				Q3 2019				Q4 2019			
	Chickenpox	Shingles	Unspecified	Total	Chickenpox	Shingles	Unspecified	Total	Chickenpox	Shingles	Unspecified	Total	Chickenpox	Shingles	Unspecified	Total
<1	4	0	0	<b>4</b>	13	0	1	<b>14</b>	18	0	1	<b>19</b>	14	1	5	<b>20</b>
1–2	12	1	2	<b>15</b>	14	4	2	<b>20</b>	29	7	2	<b>38</b>	17	7	3	<b>27</b>
3–4	11	6	1	<b>18</b>	10	4	0	<b>14</b>	21	7	0	<b>28</b>	14	9	1	<b>24</b>
5–7	33	11	3	<b>47</b>	58	5	2	<b>65</b>	109	5	2	<b>116</b>	68	11	2	<b>81</b>
8–9	32	11	1	<b>44</b>	38	6	3	<b>47</b>	88	4	7	<b>99</b>	56	8	8	<b>72</b>
10–59	7	26	1,330	<b>1,363</b>	48	127	1,116	<b>1,291</b>	272	1,070	66	<b>1,408</b>	240	1,125	133	<b>1,498</b>
60–69	12	419	14	<b>445</b>	8	420	19	<b>447</b>	13	389	21	<b>423</b>	9	365	54	<b>428</b>
70+	2	373	17	<b>392</b>	9	365	30	<b>404</b>	12	438	25	<b>475</b>	7	375	51	<b>433</b>
<b>Total</b>	<b>113</b>	<b>847</b>	<b>1,368</b>	<b>2,328</b>	<b>198</b>	<b>931</b>	<b>1,173</b>	<b>2,302</b>	<b>562</b>	<b>1,920</b>	<b>124</b>	<b>2,606</b>	<b>425</b>	<b>1,901</b>	<b>257</b>	<b>2,583</b>

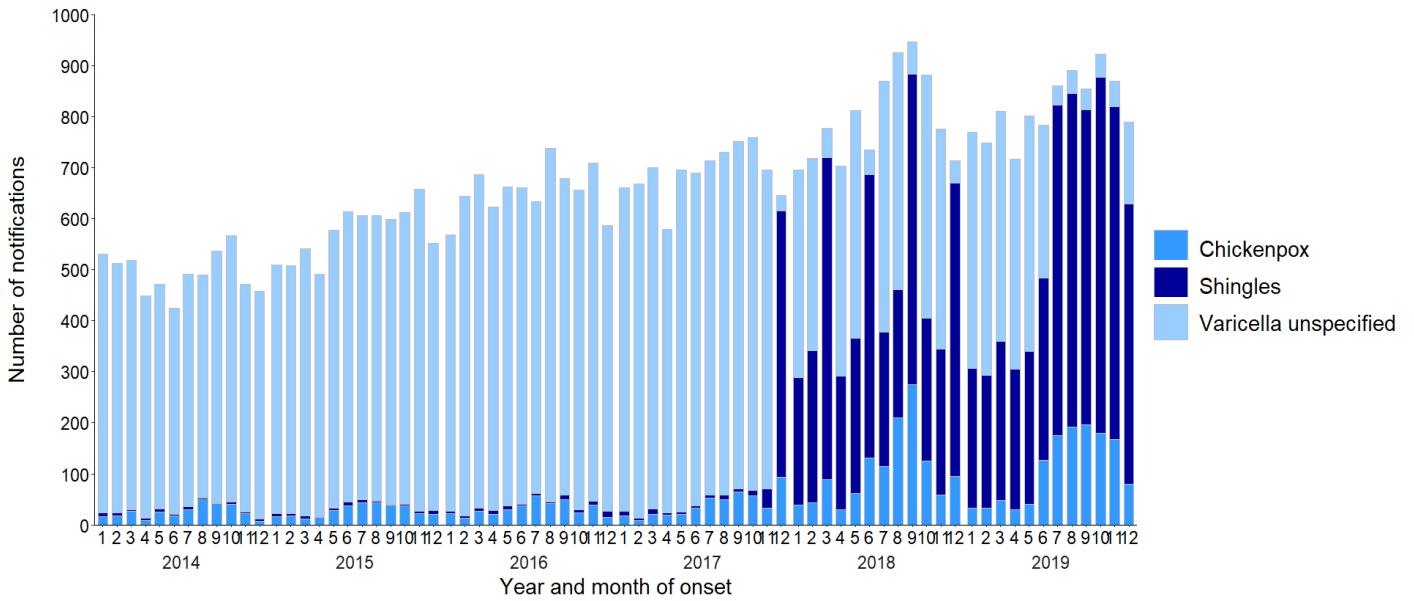


Figure 11: Notifications of varicella in Queensland by clinical presentation, 1 January 2014 to 31 December 2019

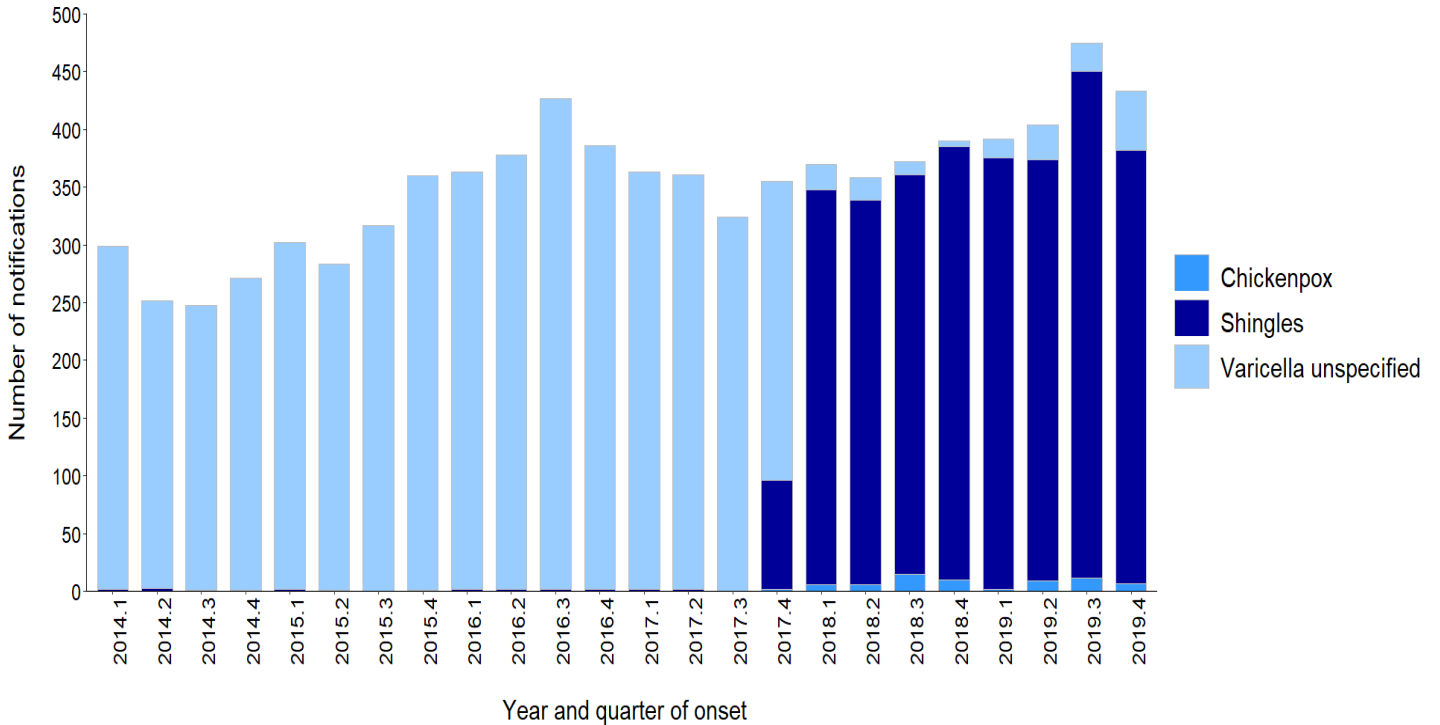


Figure 12: Notifications of varicella in Queensland by clinical presentation for people 70 years of age or older, 1 January 2014 to 31 December 2019

## Technical notes

1. Notifications recorded in NOCS may change over time as it is a live database.
2. Case definitions for the reported diseases are available at: <http://disease-control.health.qld.gov.au/>
3. Historical vaccination data and immunisation policies are available from the National Centre for Immunisation Research and Surveillance (NCIRS) at: <http://www.ncirs.edu.au/provider-resources/vaccination-history/>