



6SSN 2324-4097

Community and Hospital Surveillance

ILI, SARI, Influenza and Respiratory Pathogens

2017 Influenza Season, Week 33, ending 20 August 2017

SUMMARY

- Influenza-like illness (ILI) consultation rates decreased compared to the previous week, while remaining above the seasonal threshold level. The overall influenza positivity rate of tested samples has dropped again.
- Severe acute respiratory illness (SARI) hospitalisation rates decreased, with a lower influenza positive rate in tested samples.
- Influenza A(H3N2) are the predominant viruses in New Zealand this year.
- Influenza B/Victoria lineage viruses also co-circulated with B/Yamagata lineage viruses with more B/Yamagata viruses.
- Rhinovirus and respiratory syncytial virus (RSV) are the most commonly detected non-influenza viruses this week.

The surveillance for community-based influenza-like illness (ILI) and hospital-based severe acute respiratory illness (SARI) provides evidence to inform public health and clinical practice to reduce the impact of influenza virus infection and other important respiratory pathogens. This weekly report summarises data obtained from the ILI and SARI surveillance platforms. The report includes incidence, demographic characteristics, clinical outcomes and aetiologies for community ILI cases as well as hospital SARI cases including ICU admissions and deaths for the past week as well as the cumulative period since 2 January 2017.

Note: Data in this report are provisional and may change as more cases are assessed and information is updated. Data were extracted on 23 August 2017.

INFLUENZA-LIKE ILLNESS and SEVERE ACUTE RESPIRATORY ILLNESS

Influenza-like illness (ILI)

During week 33, ending 20 August 2017, 182 patients with influenza-like illness consulted sentinel general practices in 20 DHBs. The weekly ILI incidence was 44.3 per 100 000 patient population (Figures 1 and 2). Of the 136 tested ILI cases, 37 were positive for influenza viruses. This gives an ILI related influenza incidence (adjusted) of 12.0 per 100 000 patient population.

Figure 1. Weekly resident ILI and influenza incidence since 2 January 2017

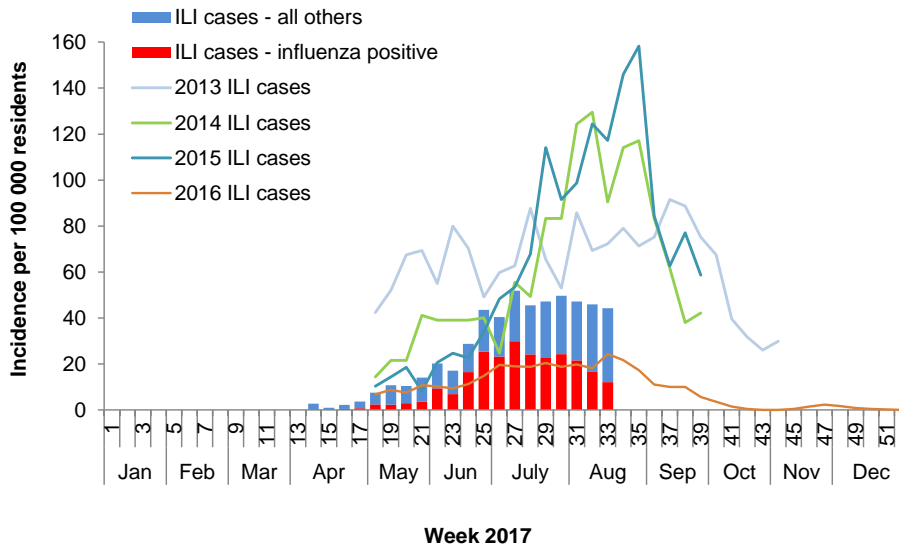
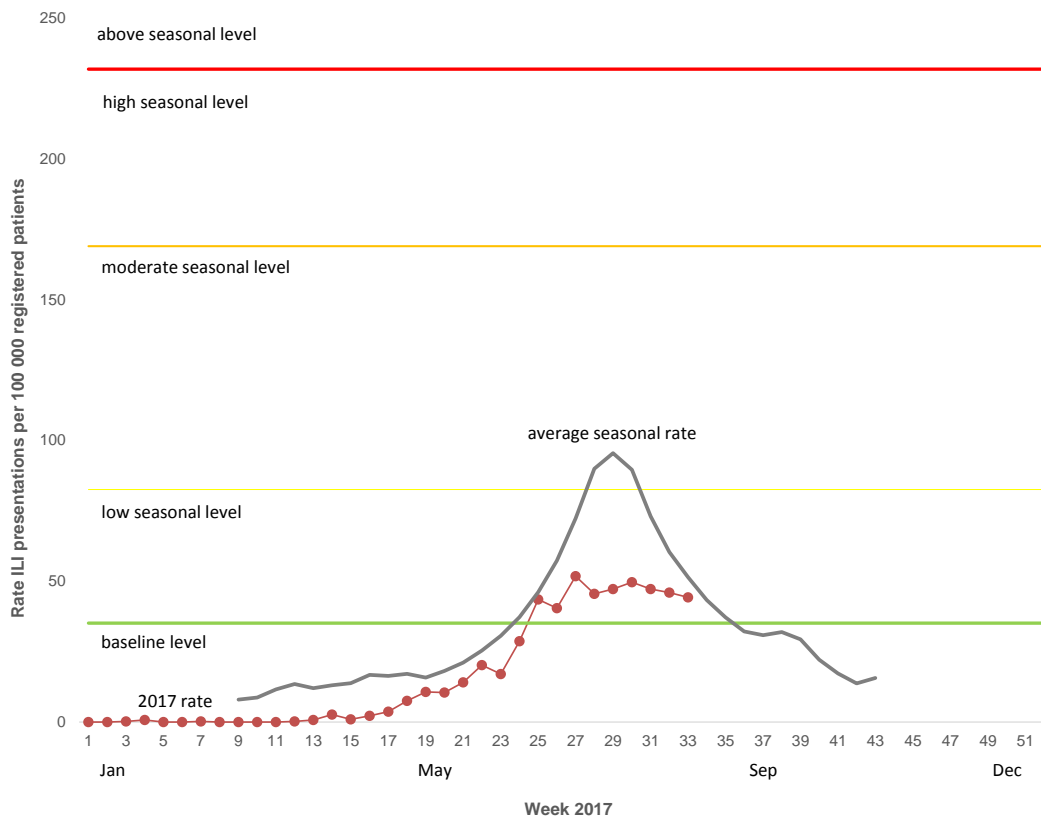


Figure 2. Comparison of 2017 rate with average seasonal rate, and historical thresholds



The weekly consultation rates for influenza-like illness by different age groups and ethnicities are shown in Figures 3 and 4.

Figure 3. Weekly ILI incidence by age group since 2 January 2017

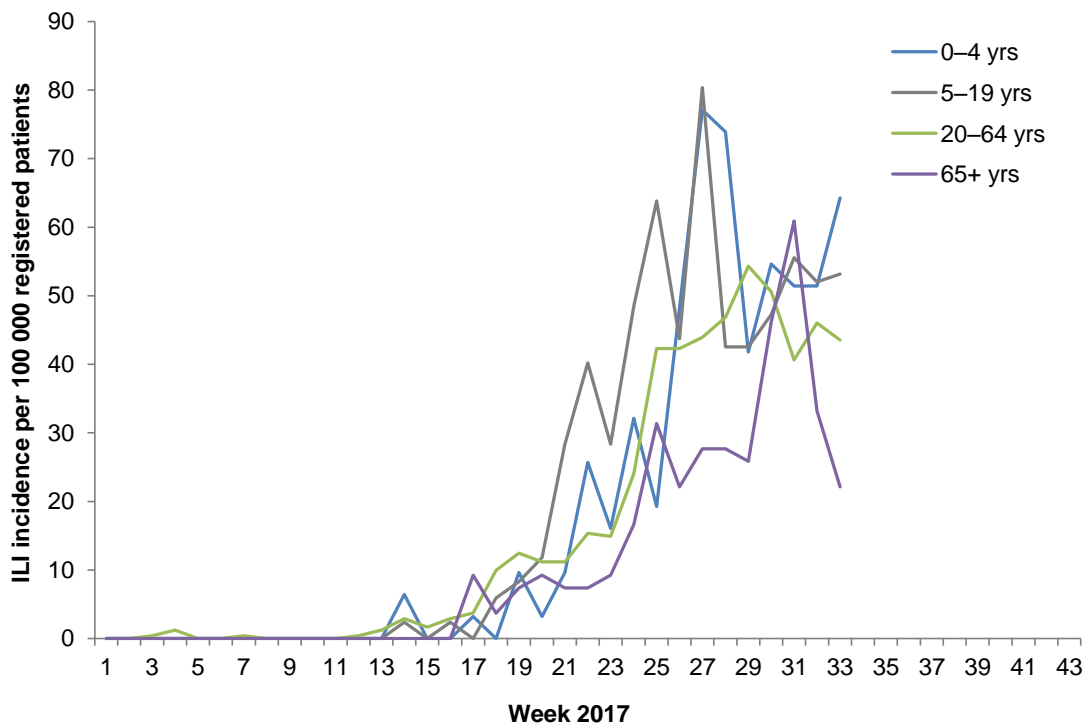


Figure 4. Weekly ILI incidence by ethnicity since 2 January 2017

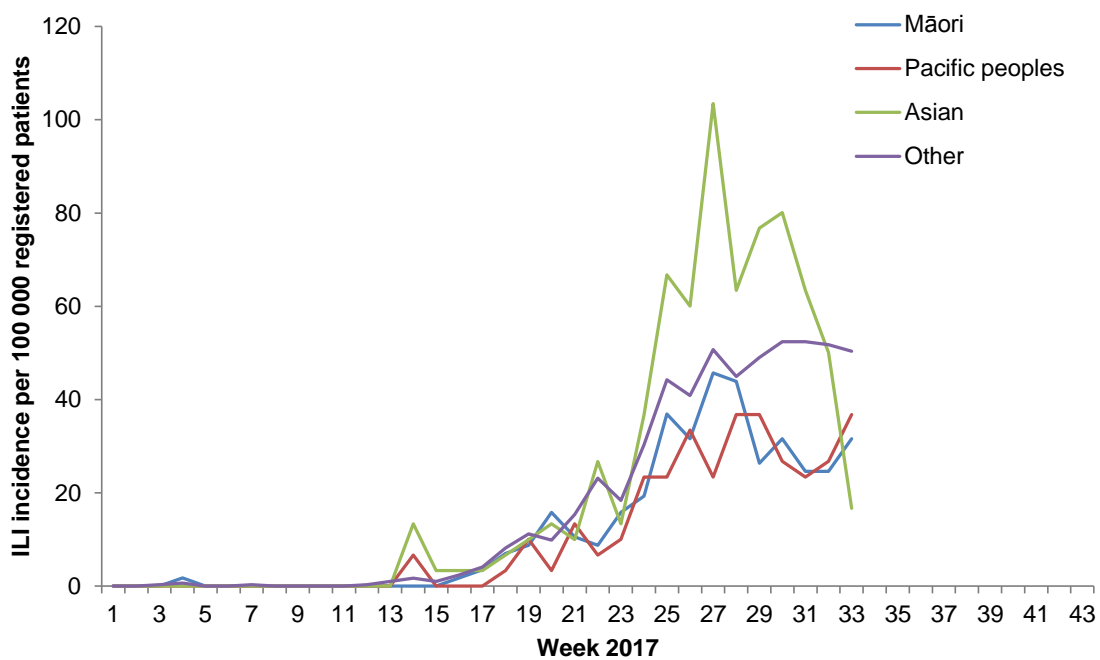
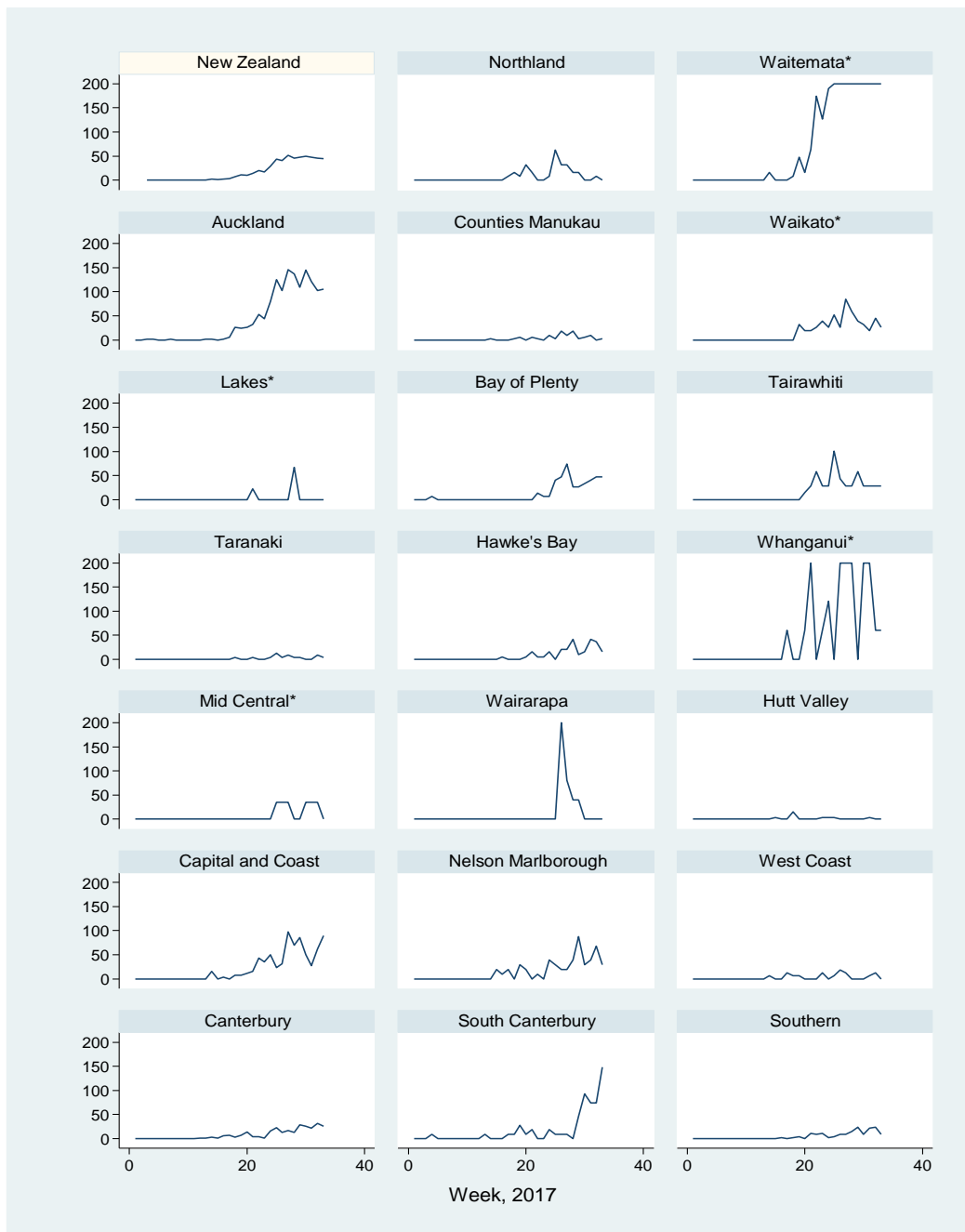


Figure 5 compares the consultation rates for influenza-like illness for each DHB over the past week. Waitemata (308.5 per 100 000, 39 cases), South Canterbury (148.5 per 100 000, 16 cases), and Auckland (105.7 per 100 000, 60 cases) DHBs had the highest consultation rates.

Figure 5. Rate of ILI consultations per 100 000 registered by DHB per week since 2 January 2017



*Results that have some uncertainty, with less than 5% of the DHB population covered (see Notes on Interpretation).
Note: Outliers have been omitted from this graph.

ILI consultation rates for any particular DHB should be treated with caution as they may not be representative of the real situation for a particular community or setting, especially if the surveillance system has a small number of participating General Practices in the DHB, or the GP enrolled patient population is small, the calculated ILI rates are subject to greater fluctuation.

Since 2 January 2017, a total of 2203 ILI cases were identified. This gives a cumulative ILI incidence of 535.8 per 100 000 patient population (Table 1). Among the 1776 tested ILI cases, 827 (46.6%) were positive for influenza viruses. This gives an ILI related (adjusted) influenza incidence of 249.5 per 100 000 patient population.

Table 1. Demographic characteristics of ILI and influenza cases, since 2 January 2017

Characteristics	ILI & influenza cases among sentinel practices				
	ILI cases	Influenza cases	Prop Influenza positive ¹ (%)	ILI incidence (per 100 000)	Influenza incidence ² (per 100 000)
Overall	2203	827	46.6 (100.0)	535.8	249.5
Age group (years)					
<1	26	3	13.6 (0.4)	393.3	53.6
1–4	157	34	27.2 (4.1)	640.6	174.2
5–19	556	267	59.5 (32.3)	657.1	390.8
20–34	363	124	40.8 (15.0)	422.5	172.3
35–49	525	199	48.0 (24.1)	640.5	307.1
50–64	377	132	43.4 (16.0)	514.1	223.2
65–79	168	53	41.1 (6.4)	411.4	169.0
>80	31	15	53.6 (1.8)	232.1	124.3
Unknown	0	0	0.0		
Ethnicity					
Māori	222	78	44.1 (9.4)	390.1	171.9
Pacific peoples	103	39	49.4 (4.7)	344.5	170.1
Asian	216	111	56.3 (13.4)	720.9	406.2
European and Other	1660	599	45.3 (72.4)	565.3	256.1
Unknown	2	0	0.0	0.0	
Sex					
Female	1242	456	45.9 (55.1)	581.9	267.0
Male	957	371	47.4 (44.9)	484.0	229.6
Unknown	4	0	0.0		

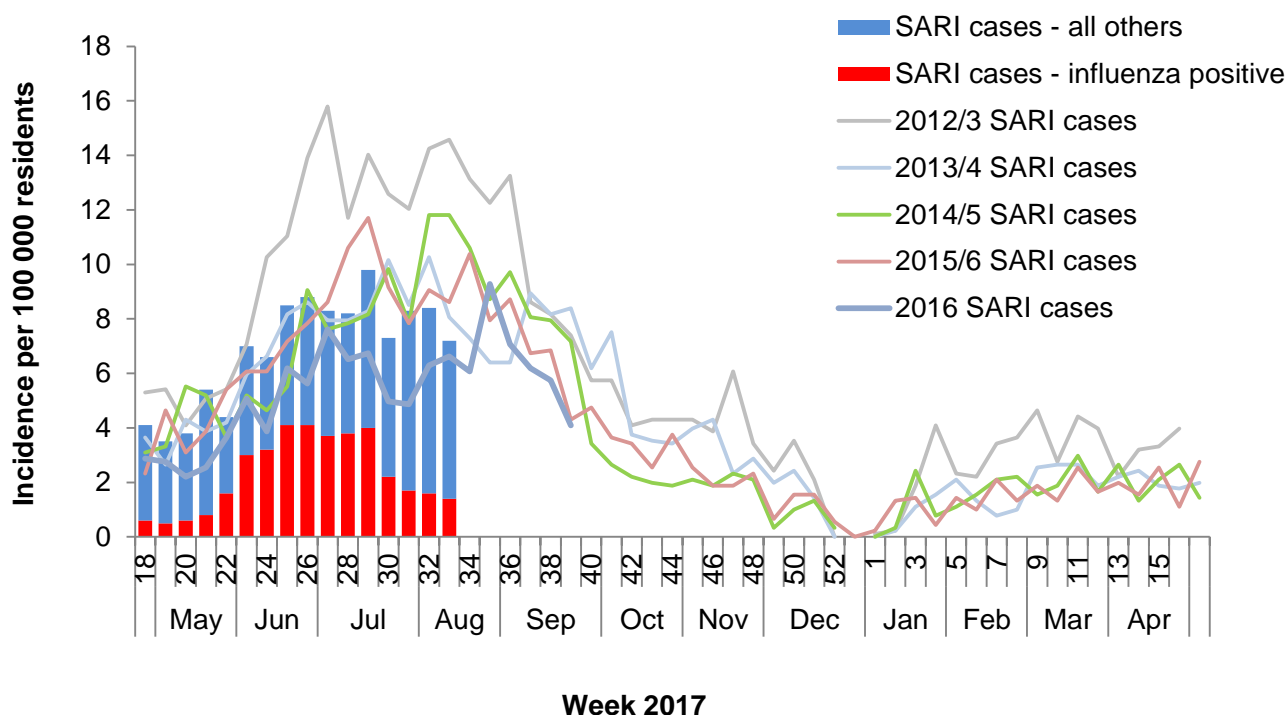
¹Proportion of cases tested which were positive for influenza viruses

²Adjusted to positivity of tested cases

Severe acute respiratory illness (SARI)

There were 2916 acute admissions to ADHB and CMDHB hospitals during week 33, ending 20 August 2017. A total of 114 patients with acute respiratory illness were assessed in these hospitals. Of these, 82 (71.9%) patients met the SARI case definition. Three cases were admitted to ICU and no SARI related deaths were reported this week. Of the 50 tested residents with SARI, 10 were positive for influenza viruses, giving a SARI related influenza incidence of 1.4 per 100 000 population this week.

Figure 6. Weekly resident SARI and influenza incidence since 2 May 2016 and previous seasons SARI incidence



Since 1 May 2017, a total of 1286 SARI cases were identified. This gives a SARI proportion of 28.3 per 1000 acute hospitalisations (Table 2). Eighty-seven SARI cases have been admitted to ICU and 18 SARI related deaths were reported during this period.

Of the 1286 SARI cases, 992 were ADHB and CMDHB residents, giving a SARI incidence of 109.5 per 100 000 population (Table 2). Among the 901 tested SARI cases who were ADHB and CMDHB residents, 306 (34.0%) had positive influenza virus results. This gives a SARI (adjusted) related influenza incidence of 37.2 per 100 000 population.

Table 2. Demographic characteristics of SARI cases and related influenza cases, since 1 May 2017

Characteristics	Admissions	Assessed	SARI & influenza cases among all hospital patients			SARI & influenza cases among ADHB & CMDHB residents			
			SARI Cases (%)	Cases per 1000 hospitalisations	Influenza positive ¹ (%)	SARI cases	SARI incidence (per 100 000)	Influenza Cases	Influenza incidence (per 100 000)
Overall	45374	2419	1286 (53.2)	28.3	326 (33.9)	992	109.5	306	37.2
Age group (years)									
<1	1735		210	121.0	17 (9.5)	194	1436.4	16	136.8
1–4	3195		147	46.0	28 (23.1)	135	255.3	27	62.1
5–19	5375		73	13.6	17 (27.9)	59	30.6	11	6.7
20–34	8484		64	7.5	28 (45.2)	62	29.7	27	13.4
35–49	6616		75	11.3	28 (40.0)	70	36.6	27	15.2
50–64	7725		157	20.3	72 (49.3)	154	102.3	70	50.1
65–79	7340		192	26.2	71 (38.8)	181	247.7	65	93.6
>80	4904		140	28.5	65 (48.1)	136	580.5	63	279.1
Unknown	0		228			1		0	
Ethnicity									
Māori	6196		208	33.6	40 (22.1)	185	186.0	37	42.7
Pacific peoples	9724		368	37.8	105 (31.3)	359	260.2	99	79.0
Asian	7519		91	12.1	33 (42.3)	87	41.4	32	17.2
European and Other	21636		392	18.1	148 (40.7)	361	89.9	138	36.8
Unknown	257		227	883.3		0		0	
Hospitals									
ADHB	26495	925	634 (68.5)	23.9	164 (40.4)	398	91.2	147	37.3
CMDHB	18879	1494	652 (43.6)	34.5	162 (29.2)	594	126.6	159	37.1
Sex									
Female	24014		550	22.9	170 (34.1)	510	109.6	160	37.7
Male	21357		506	23.7	155 (33.9)	480	109.0	145	36.4
Unknown	3		230			2		1	

¹Proportion of cases tested which were positive for influenza viruses

Note. A specimen may be positive for more than one virus; a patient may have more than one specimen tested.

RESPIRATORY PATHOGEN SURVEILLANCE

Influenza virus

During week 33, 136 ILI specimens were tested; 37 were positive for influenza viruses. In addition, 58 SARI specimens were tested; 12 were positive for influenza viruses.

Since 1 May 2017, 1761 ILI specimens were tested, 826 (46.9%) were positive for influenza with the following viruses. In addition, 1081 SARI specimens were tested, 361 (33.4%) were positive for influenza viruses (see Table 3).

Table 3. Influenza viruses among ILI and SARI cases since 1 May 2017

Influenza viruses	ILI	SARI	SARI and non-SARI	
	Cases (%)	Cases (%)	ICU (%)	Deaths (%)
No. of specimens tested	1761	1081	191	21
No. of positive specimens (%) ¹	826 (46.9)	361 (33.4)	21 (11.0)	11 (52.4)
Influenza A	488	271	12	6
A (not subtyped)	12	106	5	1
A(H1N1)pdm09	54	29	1	0
A(H1N1)pdm09 by PCR	37	25	0	0
A/Michigan/45/2015 (H1N1)pdm09 - like	13	4	1	0
A/California/7/2009 (H1N1)pdm09 - like	4	0	0	0
A(H3N2)	422	136	6	5
A(H3N2) by PCR	374	134	6	5
A/Hong Kong/4801/2014 (H3N2) - like	48	2	0	0
Influenza B	338	90	9	5
B (lineage not determined)	19	53	7	4
B/Yamagata lineage	304	37	2	1
B/Yamagata lineage by PCR	159	22	2	1
B/Phuket/3073/2013 - like	145	15	0	0
B/Victoria lineage	15	0	0	0
B/Victoria lineage by PCR	15	0	0	0
B/Brisbane/60/2008 - like	0	0	0	0
Influenza and non-influenza co-detection (% +ve)	44 (5.3)	20 (5.5)	2 (9.5)	1 (9.1)

¹Number of specimens positive for at least one of the listed viruses

Note. A specimen may be positive for more than one virus; a patient may have more than one specimen tested.

The recommended influenza vaccine formulation for trivalent vaccine for New Zealand in 2017 is:

- A(H1N1) an A/Michigan/45/2015 (H1N1)pdm09-like virus
- A(H3N2) an A/Hong Kong/4801/2014 (H3N2)-like virus
- B a B/Brisbane/60/2008-like virus (belonging to B/Victoria lineage)

Quadrivalent vaccines contain the above three viruses plus one more vaccine component: B/Phuket/3073/2013-like virus (belonging to B/Yamagata lineage)

Note: Antigenic characterization of the current A(H3N2) viruses have been technically challenging because many viruses had low or undetectable haemagglutination activity. This phenomenon has been well recognized globally and documented in WHO's Weekly Epidemiological Record:

<http://apps.who.int/iris/bitstream/10665/254756/1/WER9211.pdf?ua=1>

Non-influenza respiratory pathogens

Since 1 May 2017, 1691 ILI specimens were tested for non-influenza viruses, 326 (19.3%) were positive with the following viruses. Eight hundred and seventy-seven SARI specimens were tested for non-influenza viruses, 275 (31.4%) were positive with the following viruses (see Table 4).

Table 4. Non-influenza viruses among ILI and SARI cases since 1 May 2017¹

<i>Non-influenza respiratory viruses</i>	ILI	SARI	SARI and non-SARI	
	Cases (%)	Cases (%)	ICU (%)	Deaths (%)
No. of specimens tested	1691	877	142	21
No. of positive specimens (%) ¹	326 (19.3)	275 (31.4)	86 (60.6)	1 (4.8)
Respiratory syncytial virus (RSV)	91	148	43	1
Parainfluenza 1 (PIV1)	3	1	0	0
Parainfluenza 2 (PIV2)	23	11	4	0
Parainfluenza 3 (PIV3)	39	21	6	0
Rhinovirus (RV)	112	92	41	0
Adenovirus (AdV)	37	27	8	0
Human metapneumovirus (hMPV)	19	16	3	0
Enterovirus	21	13	6	0
Single virus detection (% of positives)	310 (95.1)	228 (82.9)	64 (74.4)	0 (-)
Multiple virus detection (% of positives)	16 (4.9)	47 (17.1)	22 (25.6)	0 (-)

¹Number of specimens positive for at least one of the listed viruses; note a specimen may be positive for more than one virus

Figure 7. Temporal distribution of the number and proportion of influenza viruses from ILI specimens by type and week¹

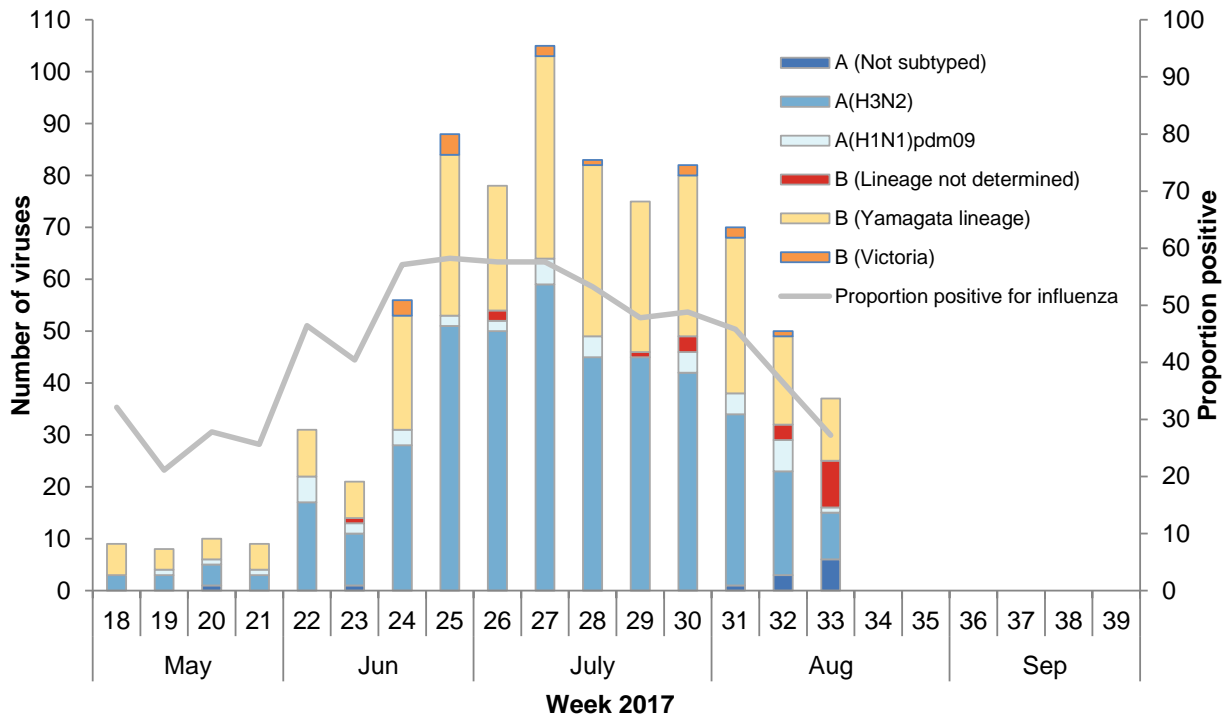


Figure 8. Temporal distribution of the number and proportion of influenza viruses from SARI specimens by type and week¹

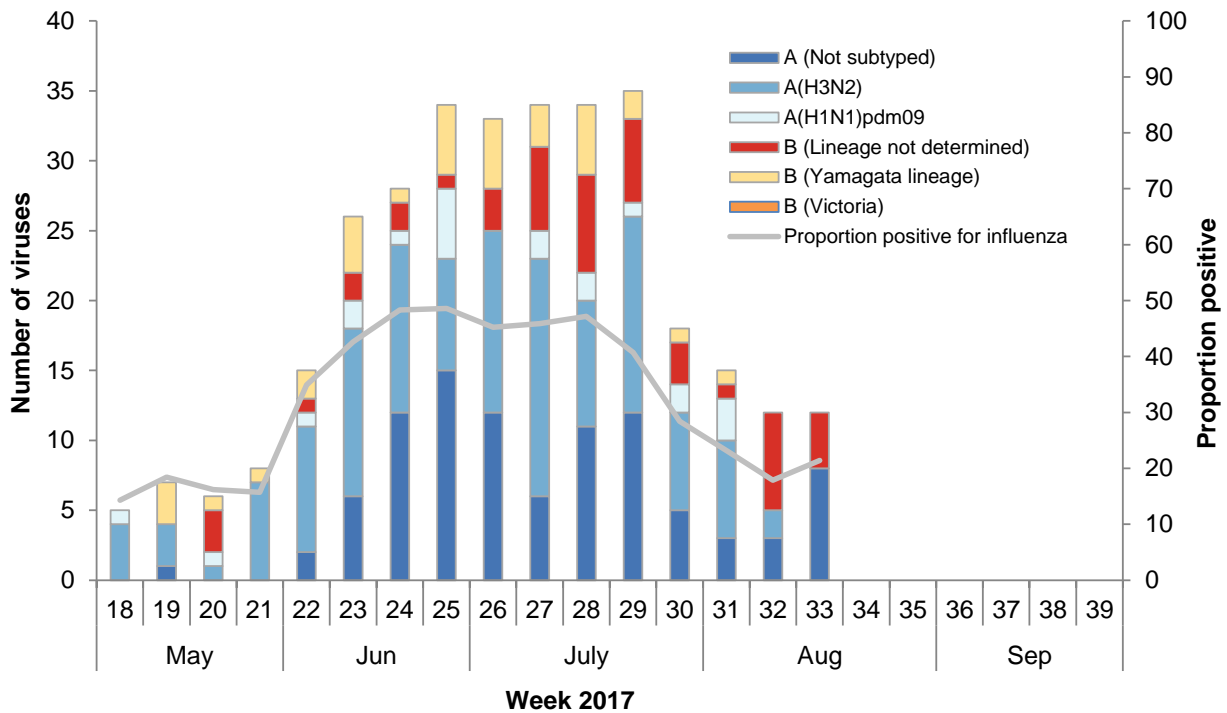


Figure 9. Temporal distribution of the number and proportion of non-influenza viruses from ILI specimens by type and week¹

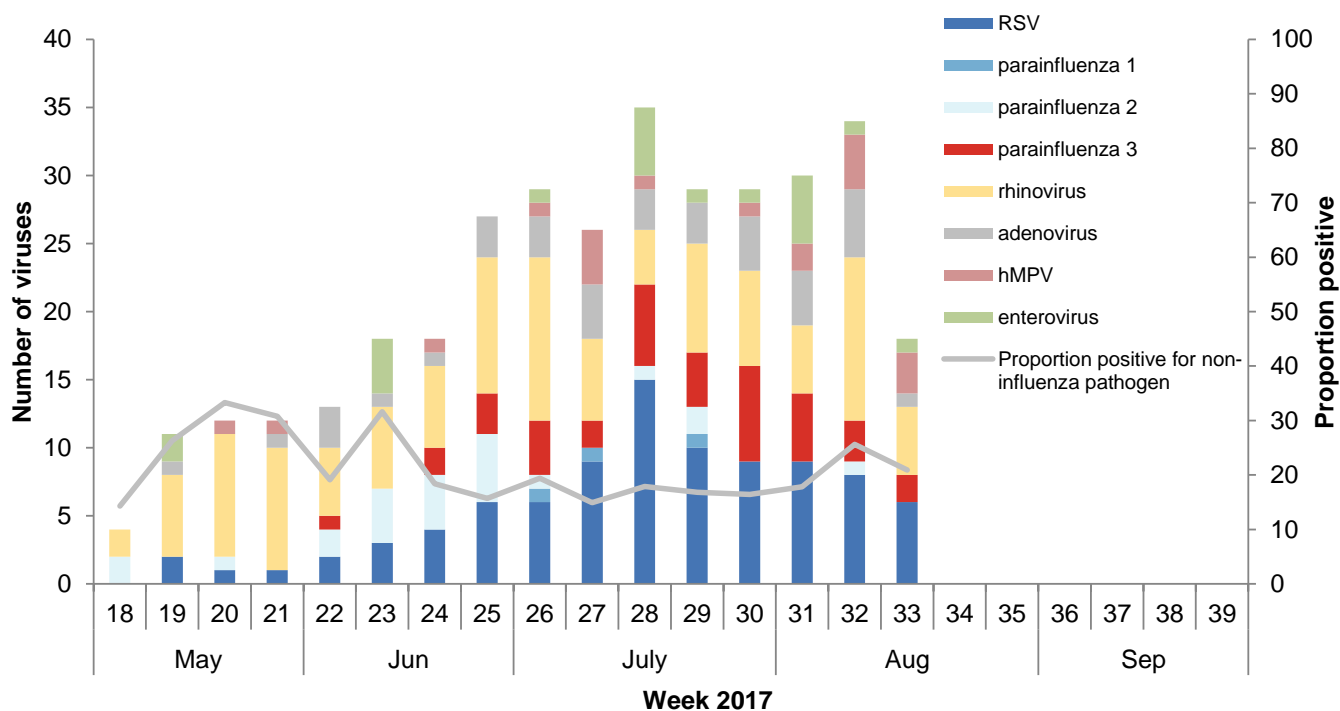
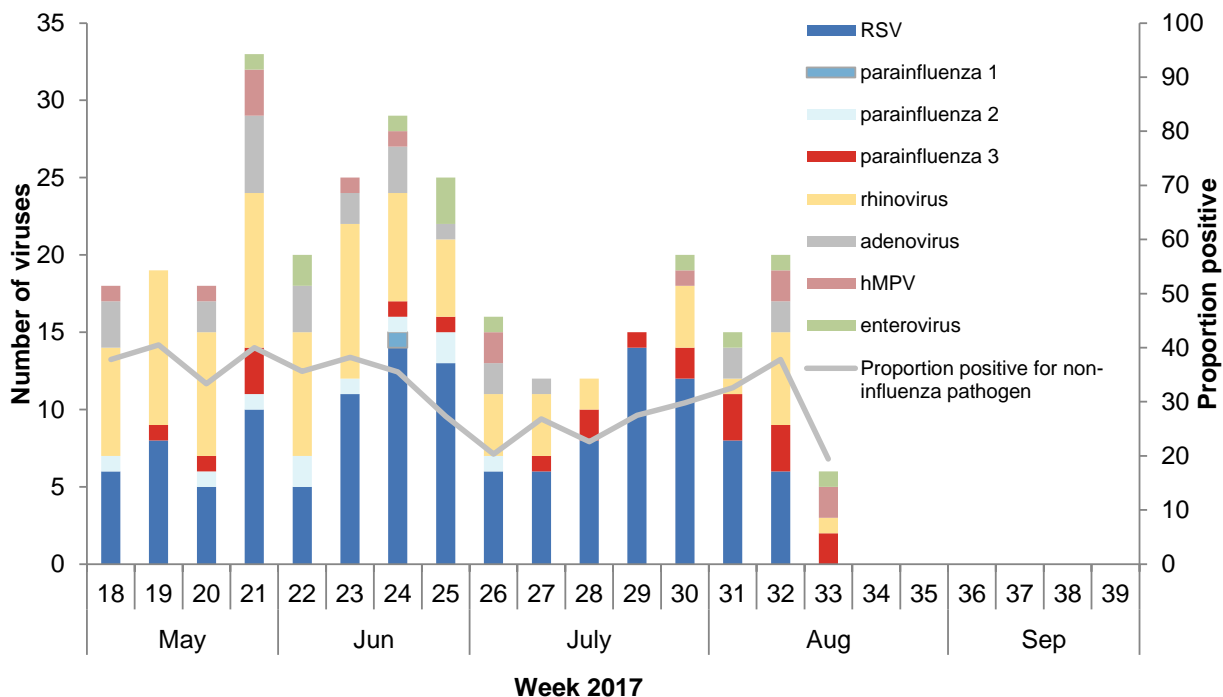


Figure 10. Temporal distribution of the number and proportion of non-influenza viruses from SARI specimens by type and week¹



¹Figures for recent weeks will be underestimates due to time lag in receiving laboratory test results.



APPENDIX

Table 5. Influenza-like illness count by DHB by week 18–33, 2017

DHB	Week															
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Auckland	15	14	15	18	30	25	45	71	58	83	78	62	82	69	58	60
Bay of Plenty	0	0	0	0	2	1	1	6	7	11	4	4	5	6	7	7
Canterbury	2	5	10	3	3	1	11	16	9	12	9	20	18	15	22	18
Capital and Coast	2	2	3	4	11	9	13	6	8	25	18	22	13	7	16	23
Counties Manukau	1	2	0	2	1	0	3	1	6	3	6	1	2	3	0	1
Hawke's Bay	0	0	1	3	1	1	3	0	4	4	8	2	3	8	7	3
Hutt Valley	4	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0
Lakes	0	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0
MidCentral	0	0	0	0	0	0	0	1	1	1	0	0	1	1	1	0
Nelson Marlborough	0	3	2	0	1	0	4	3	2	2	4	9	3	4	7	3
Northland	2	1	4	2	0	0	1	8	4	4	2	2	0	0	1	0
South Canterbury	1	3	1	2	0	0	2	1	1	1	0	5	10	8	8	16
Southern	1	2	0	5	4	5	1	2	4	4	7	11	4	10	11	4
Tairāwhiti	0	0	1	2	4	2	2	7	3	2	2	4	2	2	2	2
Taranaki	1	0	0	1	0	0	1	3	1	2	1	1	0	0	2	1
Waikato	0	5	3	3	4	6	4	8	4	13	9	6	5	3	7	4
Wairarapa	0	0	0	0	0	0	0	0	5	2	1	1	0	0	0	0
Waitemata	1	6	2	8	22	16	24	44	41	37	30	44	50	52	37	39
West Coast	1	1	0	0	0	2	0	1	3	2	0	0	0	1	2	0
Whanganui	0	0	1	4	0	1	2	0	5	5	5	0	6	4	1	1
New Zealand	31	44	43	58	83	70	118	179	166	213	187	194	204	194	189	182

Table 6. Influenza-like illness rate by DHB by week 18–33, 2017

DHB	Rate per 100 000															
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Auckland	26.4	24.7	26.4	31.7	52.8	44.0	79.2	125.0	102.1	146.2	137.4	109.2	144.4	121.5	102.1	105.7
Bay of Plenty	0.0	0.0	0.0	0.0	13.5	6.7	6.7	40.4	47.1	74.1	26.9	26.9	33.7	40.4	47.1	47.1
Canterbury	2.8	7.1	14.2	4.3	4.3	1.4	15.6	22.8	12.8	17.1	12.8	28.4	25.6	21.3	31.3	25.6
Capital and Coast	7.8	7.8	11.7	15.6	42.8	35.0	50.6	23.4	31.2	97.3	70.1	85.7	50.6	27.3	62.3	89.6
Counties Manukau	3.0	6.0	0.0	6.0	3.0	0.0	9.0	3.0	18.0	9.0	18.0	3.0	6.0	9.0	0.0	3.0
Hawke's Bay	0.0	0.0	5.2	15.7	5.2	5.2	15.7	0.0	20.9	20.9	41.7	10.4	15.7	41.7	36.5	15.7
Hutt Valley	15.2	0.0	0.0	0.0	0.0	3.8	3.8	3.8	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0
Lakes*	0.0	0.0	0.0	22.3	0.0	0.0	0.0	0.0	0.0	0.0	66.8	0.0	0.0	0.0	0.0	0.0
MidCentral*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.5	35.5	35.5	0.0	0.0	35.5	35.5	35.5	0.0
Nelson Marlborough	0.0	29.2	19.5	0.0	9.7	0.0	39.0	29.2	19.5	19.5	39.0	87.7	29.2	39.0	68.2	29.2
Northland	15.7	7.9	31.5	15.7	0.0	0.0	7.9	62.9	31.5	31.5	15.7	15.7	0.0	0.0	7.9	0.0
South Canterbury	9.3	27.8	9.3	18.6	0.0	0.0	18.6	9.3	9.3	9.3	0.0	46.4	92.8	74.2	74.2	148.5
Southern	2.2	4.4	0.0	10.9	8.7	10.9	2.2	4.4	8.7	8.7	15.3	24.0	8.7	21.8	24.0	8.7
Tairāwhiti	0.0	0.0	14.4	28.9	57.7	28.9	28.9	101.0	43.3	28.9	28.9	57.7	28.9	28.9	28.9	28.9
Taranaki	4.4	0.0	0.0	4.4	0.0	0.0	4.4	13.1	4.4	8.7	4.4	4.4	0.0	0.0	8.7	4.4
Waikato*	0.0	32.5	19.5	19.5	26.0	39.0	26.0	52.1	26.0	84.6	58.6	39.0	32.5	19.5	45.5	26.0
Wairarapa	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	200.0	80.0	40.0	40.0	0.0	0.0	0.0	0.0
Waitematā*	7.9	47.5	15.8	63.3	174.0	126.6	189.8	348.0	324.3	292.7	237.3	348.0	395.5	411.3	292.7	308.5
West Coast	6.3	6.3	0.0	0.0	0.0	12.7	0.0	6.3	19.0	12.7	0.0	0.0	0.0	6.3	12.7	0.0
Whanganui*	0.0	0.0	60.2	241.0	0.0	60.2	120.5	0.0	301.2	301.2	301.2	0.0	361.4	241.0	60.2	60.2
New Zealand	7.5	10.7	10.5	14.1	20.2	17.0	28.7	43.5	40.4	51.8	45.5	47.2	49.6	47.2	46.0	44.3

*Results that have some uncertainty, with less than 5% of the DHB population covered (see Notes on Interpretation).



Recent global experience with pandemic influenza A(H1N1)pdm09 highlights the importance of monitoring severe and mild respiratory disease to support pandemic preparedness as well as seasonal influenza prevention and control. Two active, prospective, population-based surveillance systems were used to monitor influenza and other respiratory pathogens: 1) among those registered patients seeking consultations with influenza-like illness (ILI) at sentinel general practices nation-wide; 2) among those hospitalized patients with severe acute respiratory illness (SARI) in Auckland and Counties Manukau District Health Boards (ADHB and CMDHB).

The aims of ILI and SARI surveillance are: 1) to measure the burden of severe and moderate disease caused by influenza and other respiratory pathogens; 2) to monitor trends in severe and moderate disease caused by influenza and other respiratory pathogens; 3) to identify high risk groups that should be prioritized for prevention and treatment; 4) to monitor antigenic, genetic and antiviral characteristics of influenza viruses associated with severe and mild disease. 5) to provide a study base to estimate the effectiveness of influenza vaccine.

ACKNOWLEDGEMENT

We acknowledge the support of the New Zealand Ministry of Health. SARI surveillance was established and funded by the US CDC, and continues to operate through funding from the New Zealand Ministry of Health.

DESCRIPTION OF ILI ACTIVITY THRESHOLDS

The values for the different intensity levels for 2017 are listed in the table below. This is based on New Zealand’s consultation rates from 2000–2015 (excluding the pandemic year, 2009) and WHO’s interim guidance severity assessment

Below seasonal level (baseline, per 100,000)	Seasonal level (per 100,000)			Above seasonal level (per 100,000)
	low	moderate	high	
<35.1	35.1-82.5	82.5-168.9	168.9-231.8	>231.8

- The baseline threshold indicates the level of influenza activity that signals the start and end of the annual influenza season and it is based on the Moving Epidemic Method (MEM) (*Vega et al. Influenza and other respiratory viruses 2013;7(4):546-558*).
- Seasonal levels (low, moderate and high) are estimated as the upper limits of the 40%, 90% and 97.5% one-sided confidence intervals of the geometric mean of 30 highest epidemic weekly rates using the MEM method. As many other countries use this method, it allows the NZ data to be interpreted not just at the country level but also comparable with other countries.
- The average seasonal curve indicates the usual seasonal activity that may occur during a typical year using the method described in “*Global epidemiological surveillance standards for influenza*” (http://www.who.int/influenza/resources/documents/WHO_Epidemiological_Influenza_Surveillance_Standards_2014.pdf).

NOTES ON INTERPRETATION

- SARI case definition: “An acute respiratory illness with a history of fever or measured fever of $\geq 38^{\circ}\text{C}$, AND cough, AND onset within the past 10 days, AND requiring inpatient hospitalisation (defined as a patient who is admitted under a medical team and to a hospital ward or assessment unit)”. A non-SARI case is a hospitalised respiratory patient who does not meet the SARI case definition.
- ILI case definition: “An acute respiratory illness with a history of fever or measured fever of $\geq 38^{\circ}\text{C}$, AND cough, AND onset within the past 10 days, AND requiring GP consultation”.
- ILI sentinel general practices: a total of 74 sentinel general practices have agreed to participate in community ILI surveillance. These practices have ~400 000 registered patients, covering roughly 9% of the NZ population.
- SARI sentinel hospitals serving a population of 906 000 people: Auckland City Hospital and the associated Starship Children’s Hospital (ADHB), and Middlemore Hospital and the associated Kidz First Children’s Hospital (CMDHB).
- The real-time PCR assay for influenza virus uses CDC’s protocol (http://www.accessdata.fda.gov/cdrh_docs/pdf8/k080570.pdf);
- The real-time PCR assay for non-influenza respiratory viruses (respiratory syncytial virus, parainfluenza virus types 1-3, human metapneumovirus, rhinovirus and adenovirus) uses CDC’s protocol. Note: The rhinovirus PCR detects mostly rhinovirus with slight cross-reactivity against enterovirus.
- The surveillance week is Monday to Sunday inclusive, and data are extracted on the subsequent Tuesday. Results from previous weeks will be revised as data are updated (laboratory test results in particular may be delayed).
- ILI consultation rates for any particular DHB should be treated with caution. If the surveillance system has a small number of participating General Practices in the DHB, or the GP enrolled patient population is small, the calculated ILI rates are subject to greater fluctuation.

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