

Community and Hospital Surveillance

ILI, SARI, Influenza and Respiratory Pathogens

2016 Influenza Season, Week 37, ending 18 September 2016

SUMMARY

During week 37 (12–18 September 2016), influenza activity was very low among consultation-seeking patients nationwide. Influenza activity was also low among those hospitalised patients in Auckland and Counties Manukau District Health Boards.

- **Influenza-like illness (ILI) and severe acute respiratory illness (SARI) surveillance**

ILI surveillance: Forty-eight patients with influenza-like illness consulted sentinel general practices in 20 DHBs. The weekly ILI incidence was 9.1 per 100 000 patient population (Figure 1), below the seasonal threshold of ILI consultations. The ILI related influenza incidence (adjusted) was 4.9 per 100 000 patient population.

SARI surveillance: There were 2934 acute admissions to ADHB and CMDHB hospitals this week. Of the 170 patients with suspected respiratory infections, 71 (41.8%) patients met the SARI case definition. No SARI cases were admitted to ICU and no SARI related deaths were reported. The weekly SARI incidence was 5.6 per 100 000 population. The SARI related influenza incidence was 0.4 per 100 000 population.

- **Respiratory pathogen surveillance**

Influenza virus: During this week, 30 ILI specimens were tested, 16 were positive for influenza viruses. In addition, 24 SARI specimens were tested, four were positive for influenza viruses. For details, see Table 3 and Figures 5 and 6.

Non-influenza respiratory viruses: For cumulative totals, see Table 4 and Figures 7 and 8.

ILI counts and rates by DHB by week are available in the Appendix.

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 May 2016.

Note: Data in this report are provisional and may change as more cases are assessed and information is updated. Data were extracted on 21 September 2016.

INFLUENZA-LIKE ILLNESS and SEVERE ACUTE RESPIRATORY ILLNESS

Influenza-like illness (ILI)

During week 37, ending 18 September 2016, 48 patients with influenza-like illness consulted sentinel general practices in 20 DHBs. The weekly ILI incidence was 9.1 per 100 000 patient population. Of the 30 tested ILI cases, 16 were positive for influenza viruses. This gives an ILI related influenza incidence (adjusted) of 4.9 per 100 000 patient population.

Figure 1. Weekly resident ILI and influenza incidence since 2 May 2016

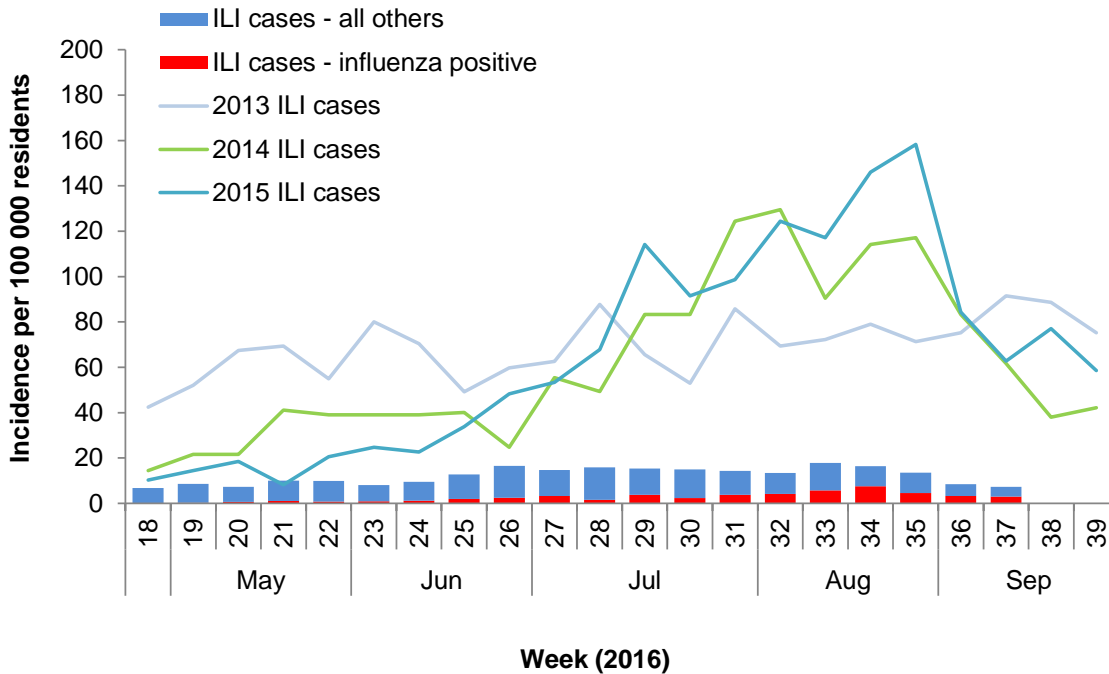


Figure 2. Comparison of 2016 rate with average seasonal rate, and historical thresholds

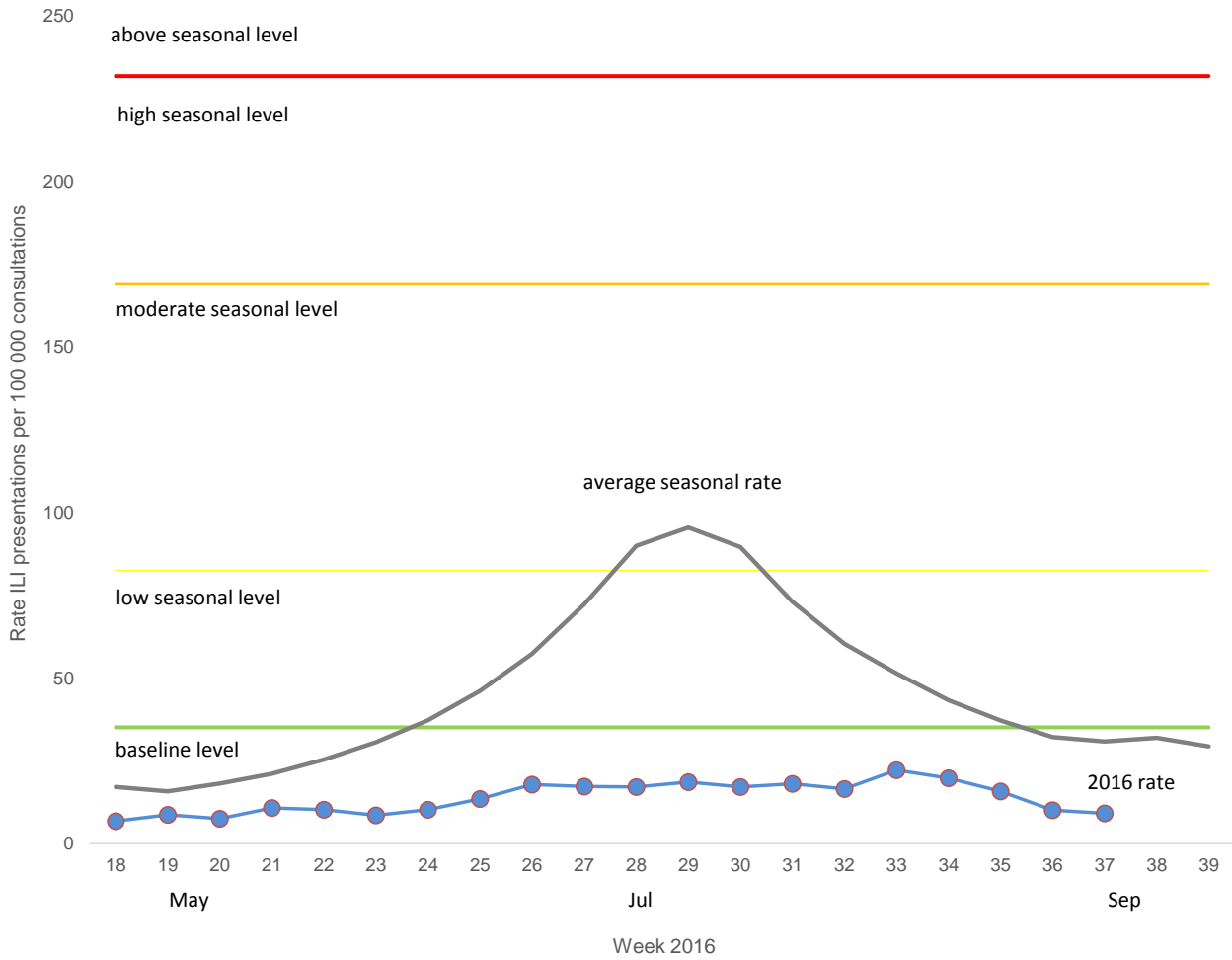
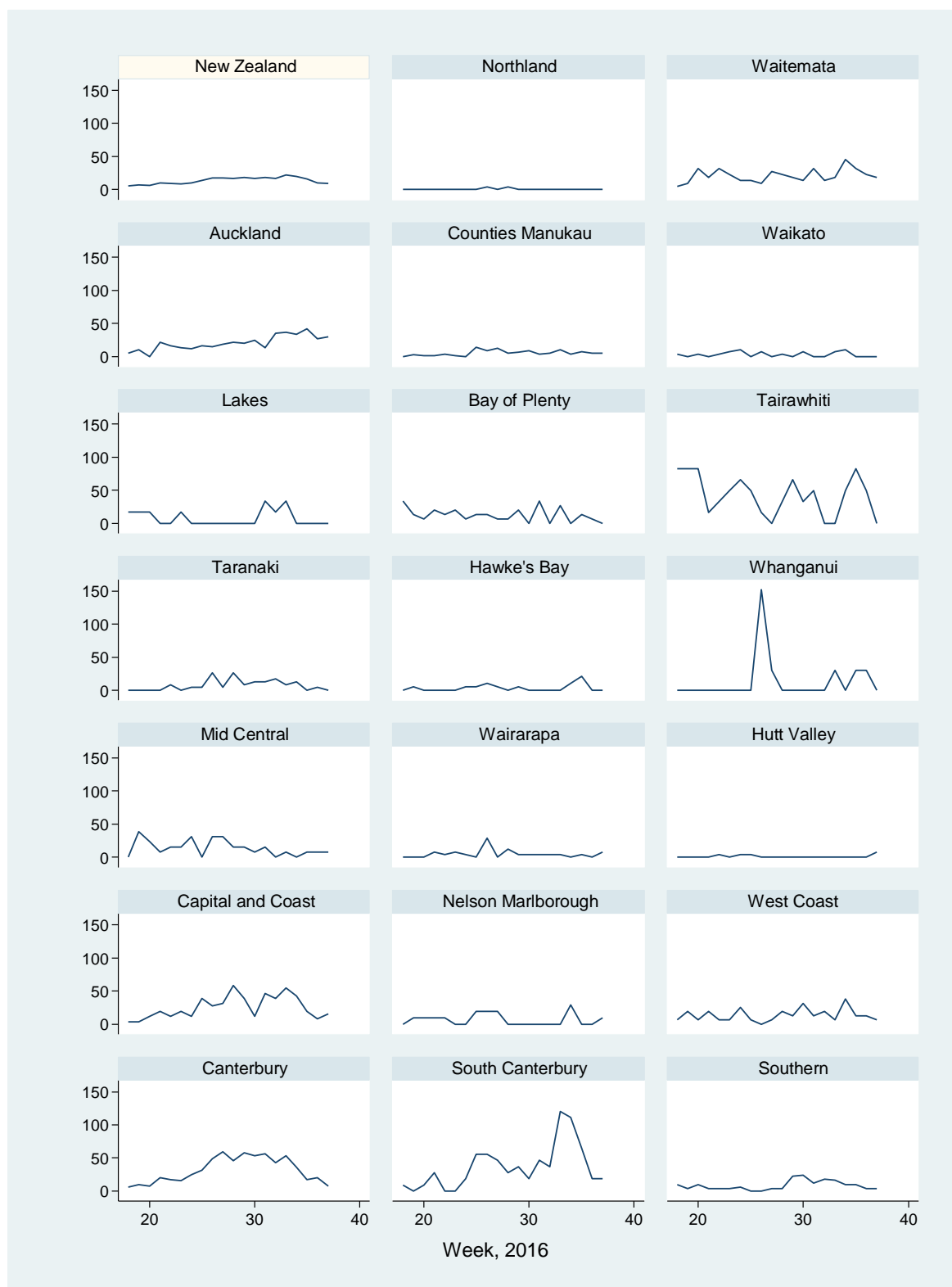


Figure 3 compares the consultation rates for influenza-like illness for each DHB over the past week. Auckland (29.9 per 100 000, 18 cases), South Canterbury (18.6 per 100 000, 2 cases) and Waitemata (18.3 per 100 000, 4 cases) DHBs had the highest consultation rates.

Figure 3. Rate of ILI consultations per 100 000 registered by DHB per week since 2 May 2016



Since 2 May 2016, a total of 1421 ILI cases were identified. This gives a cumulative ILI incidence of 269.8 per 100 000 patient population (Table 1). Among the 871 tested ILI cases, 273 (31.3%) were positive for influenza viruses. This gives an ILI related influenza incidence of 84.6 per 100 000 patient population.

Table 1. Demographic characteristics of ILI and influenza cases, since 2 May 2016

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	1421	273	31.3 (100.0)	269.8	84.6
Age group (years)					
<1	12	2	25.0 (0.7)	534.3	133.6
1–4	86	8	17.0 (2.9)	281.6	47.9
5–19	320	76	38.2 (27.8)	300.1	114.6
20–34	427	76	32.5 (27.8)	380.5	123.6
35–49	272	61	33.5 (22.3)	262.3	87.9
50–64	199	38	29.9 (13.9)	205.9	61.6
65–79	85	8	13.6 (2.9)	152.2	20.6
>80	20	4	26.7 (1.5)	105.6	28.2
Unknown	0	0	0.0		
Ethnicity					
Māori	170	24	22.4 (8.8)	251.9	56.5
Pacific peoples	102	34	40.0 (12.5)	286.3	114.5
Asian	124	13	0.0	332.2	56.1
European and Other	1025	202	33.6 (74.0)	266.0	89.3
Unknown	0	0	0.0	0.0	
Sex					
Female	799	157	32.0 (57.5)	292.4	93.5
Male	621	116	30.5 (42.5)	245.0	74.8
Unknown	1	0	0.0		

¹Proportion of cases tested which were positive for influenza viruses

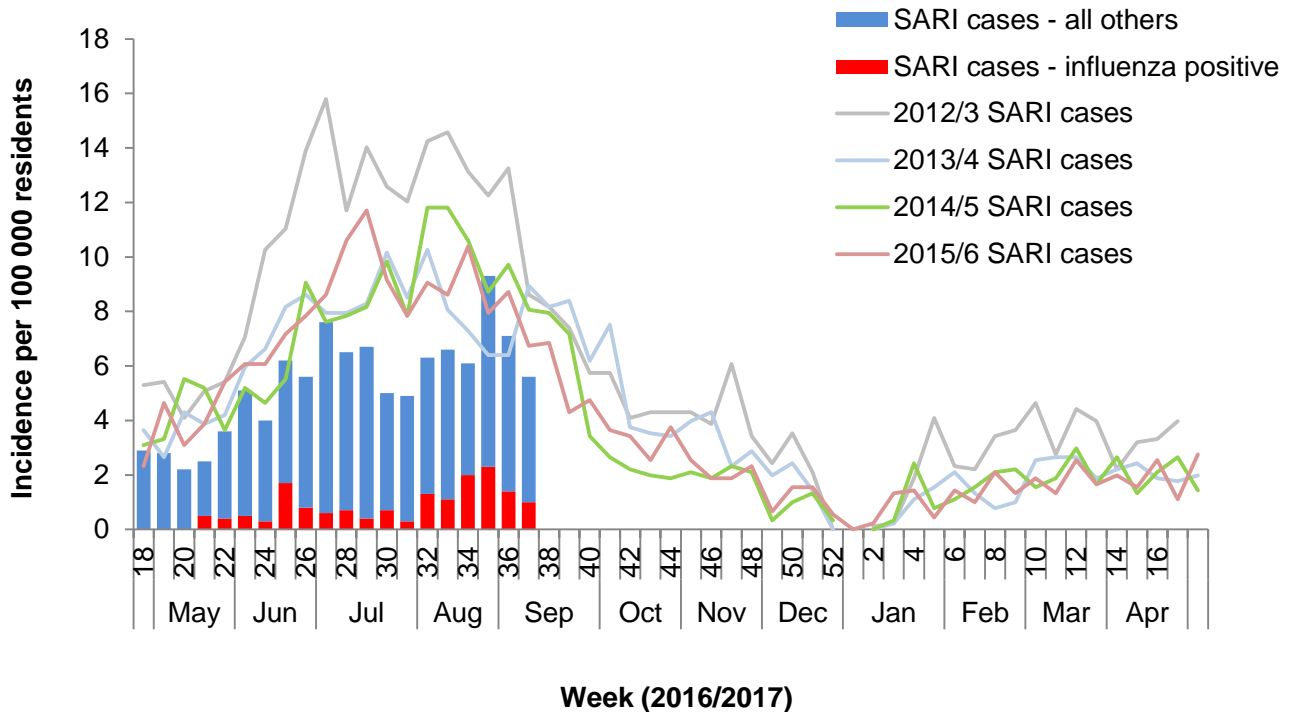
²Adjusted to positivity of tested cases

Severe acute respiratory illness (SARI)

There were 2934 acute admissions to ADHB and CMDHB hospitals during week 37, ending 18 September 2016. A total of 170 patients with suspected respiratory infections were assessed in these hospitals. Of these, 71 (41.8%) patients met the SARI case definition. No cases were admitted to ICU and no SARI related deaths were reported this week.

Of the 71 SARI cases this week, 51 were residents of ADHB and CMDHB. This gives a weekly SARI incidence of 5.6 per 100 000 population (Figure 4). Twenty-three SARI residents had specimens tested for influenza viruses, four were positive for influenza viruses. This gives a SARI related influenza incidence of 0.4 per 100 000 patient population.

Figure 4. Weekly resident SARI and influenza incidence since 2 May 2016 and previous seasons SARI incidence



Since 2 May 2016, a total of 1303 SARI cases were identified. This gives a SARI proportion of 23.8 per 1000 acute hospitalisations (Table 2). Eighty-six SARI cases have been admitted to ICU and five SARI related deaths were reported during this period.

Of the 1303 SARI cases, 965 were ADHB and CMDHB residents, giving a SARI incidence of 106.6 per 100 000 population (Table 2). Among the 732 tested SARI cases who were ADHB and CMDHB residents, 109 (14.9%) had positive influenza virus results. This gives a SARI related influenza incidence of 12.0 per 100 000 population.

Table 2. Demographic characteristics of SARI cases and related influenza cases, since 2 May 2016

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	54811	3286	1303 (39.7)	23.8	119 (14.4)	965	106.6	109	12.0
Age group (years)									
<1	2243		275	122.6	10 (4.9)	246	1821.4	7	51.8
1–4	3774		230	60.9	21 (13.5)	195	368.8	21	39.7
5–19	6325		66	10.4	5 (11.4)	57	29.6	5	2.6
20–34	10871		61	5.6	15 (26.3)	57	27.3	12	5.8
35–49	8036		77	9.6	13 (22.0)	76	39.8	13	6.8
50–64	9290		130	14.0	24 (21.4)	120	79.7	21	14.0
65–79	8679		146	16.8	17 (14.3)	137	187.5	17	23.3
>80	5593		77	13.8	13 (20.3)	75	320.1	13	55.5
Unknown	0		239			0		0	
Ethnicity									
Māori	7341		214	29.2	20 (13.2)	190	191.0	16	16.1
Pacific peoples	11557		412	35.6	42 (13.4)	386	279.7	41	29.7
Asian	9021		102	11.3	9 (11.1)	93	44.2	8	3.8
European and Other	26554		336	12.7	47 (17.4)	296	73.7	44	11.0
Unknown	322		239	742.2		0		0	
Hospitals									
ADHB	32276	1752	678 (38.7)	21.0	79 (17.4)	421	96.5	70	16.0
CMDHB	22535	1533	625 (40.8)	27.7	40 (10.7)	544	115.9	39	8.3
Sex									
Female	29008		521	18.0	59 (14.8)	478	102.8	55	11.8
Male	25800		538	20.9	58 (14.0)	482	109.4	53	12.0
Unknown	3		244			5		1	

¹Proportion of cases tested which were positive for influenza viruses

RESPIRATORY PATHOGEN SURVEILLANCE

Influenza virus

During week 37, 30 ILI specimens were tested; 16 were positive for influenza viruses. In addition, 24 SARI specimens were tested; four were positive for influenza viruses.

Since 2 May 2016, 871 ILI specimens were tested, 273 (31.3%) were positive for influenza with the following viruses. In addition, 875 SARI specimens were tested, 123 (14.1%) were positive for influenza viruses (see Table 3).

Table 3. Influenza viruses among ILI and SARI cases since 2 May 2016

<i>Influenza viruses</i>	ILI	SARI		
	Cases (%)	Cases (%)	ICU (%)	Deaths (%)
No. of specimens tested	871	875	85	2
No. of positive specimens (%) ¹	273 (31.3)	123 (14.1)	9 (10.6)	1 (50.0)
Influenza A	252	115	9	0
A (not subtyped)	80	62	7	0
A(H1N1)pdm09	43	28	1	0
A(H1N1)pdm09 by PCR	38	21	0	0
A/California/7/2009 (H1N1)pdm09 - like	5	7	1	0
A(H3N2)	129	25	1	0
A(H3N2) by PCR	129	25	1	0
A/Hong Kong/4801/2014 (H3N2) - like	0	0	0	0
Influenza B	21	8	0	1
B (lineage not determined)	6	5	0	0
B/Yamagata lineage	7	2	0	1
B/Yamagata lineage by PCR	7	1	0	1
B/Phuket/3073/2013 - like	0	1	0	0
B/Victoria lineage	8	1	0	0
B/Victoria lineage by PCR	5	0	0	0
B/Brisbane/60/2008 - like	3	1	0	0
Influenza and non-influenza co-detection (% +ve)	16 (5.9)	9 (7.3)	1 (11.1)	0 (0.0)

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

The recommended influenza vaccine formulation for trivalent vaccine for New Zealand in 2016 is:

- A(H1N1) an A/California/7/2009 (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 and plus one more vaccine component:

- B a B/Phuket/3073/2013 - like virus (belonging to B/Yamagata lineage)

Non-influenza respiratory pathogens

Since 2 May 2016, 848 ILI cases were tested for non-influenza viruses, 268 (31.6%) were positive with the following viruses. Three hundred and sixty-six SARI specimens were tested for non-influenza viruses, 218 (59.6%) were positive with the following viruses (see Table 4).

Table 4. Non-influenza viruses among ILI and SARI cases since 2 May 2016¹

<i>Non-influenza respiratory viruses</i>	ILI	SARI		
	Cases (%)	Cases (%)	ICU (%)	Deaths (%)
No. of specimens tested	848	366	15	2
No. of positive specimens (%) ¹	268 (31.6)	218 (59.6)	10 (66.7)	1 (50.0)
Respiratory syncytial virus (RSV)	68	117	4	0
Parainfluenza 1 (PIV1)	28	14	1	0
Parainfluenza 2 (PIV2)	2	1	0	0
Parainfluenza 3 (PIV3)	7	2	0	0
Rhinovirus (RV)	98	61	5	1
Adenovirus (AdV)	30	26	4	0
Human metapneumovirus (hMPV)	40	24	1	0
Enterovirus	11	4	0	0
Single virus detection (% of positives)	253 (94.4)	192 (88.1)	6 (60.0)	1 (100.0)
Multiple virus detection (% of positives)	15 (5.6)	26 (11.9)	4 (40.0)	0 (0.0)

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

Figure 5. Temporal distribution of the number and proportion of influenza viruses from ILI specimens by type and week¹

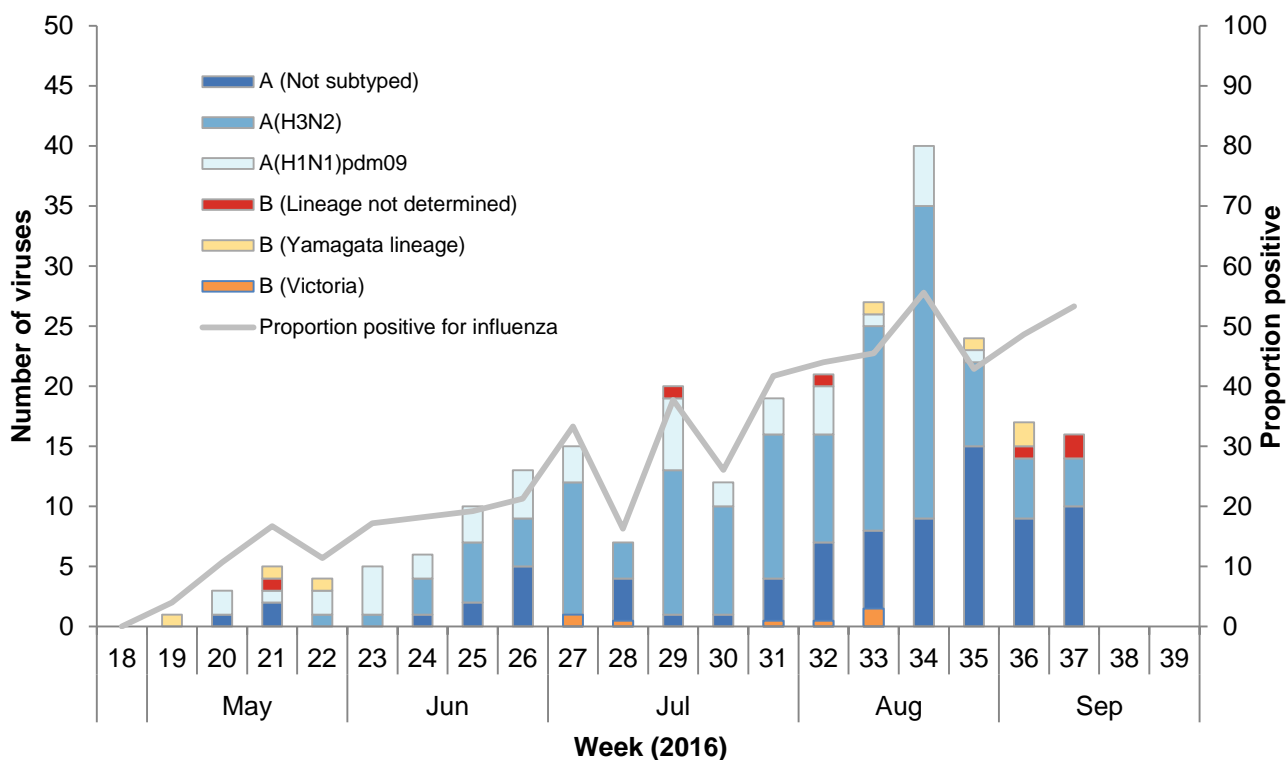


Figure 6. Temporal distribution of the number and proportion of influenza viruses from SARI specimens by type and week¹

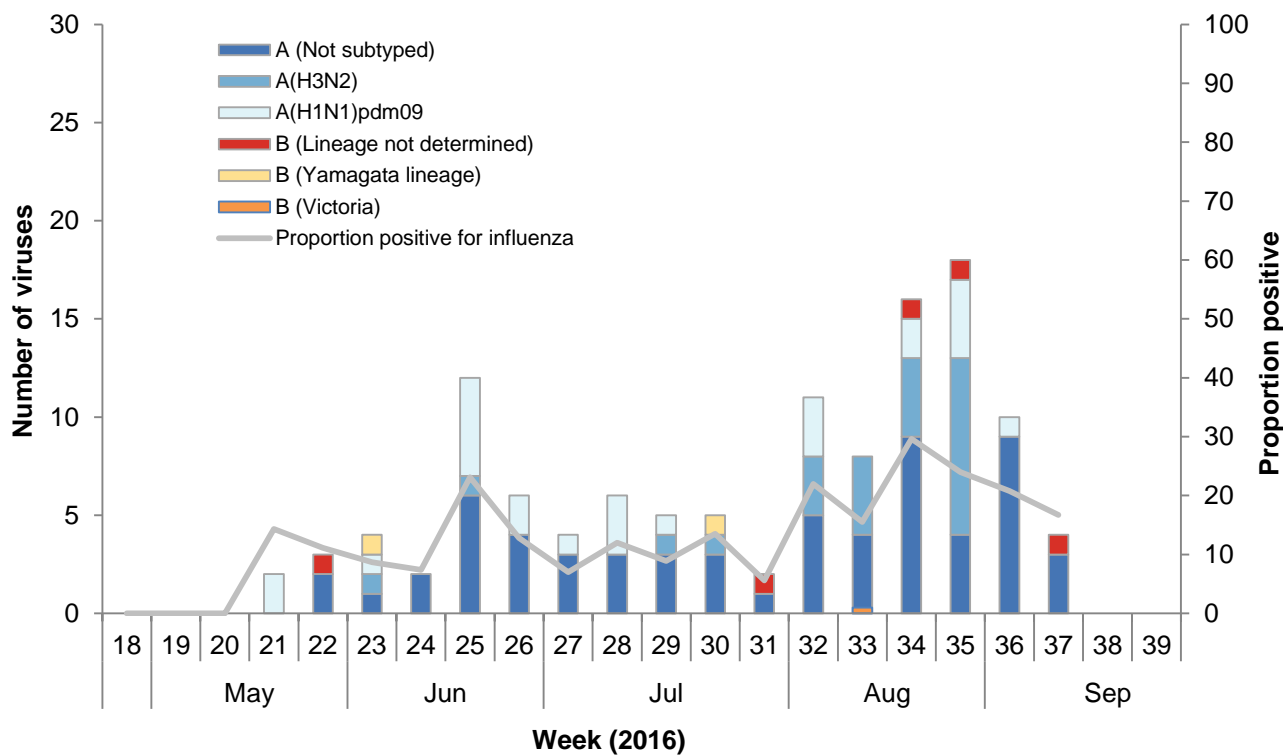


Figure 7. Temporal distribution of the number and proportion of non-influenza viruses from ILI specimens by type and week¹

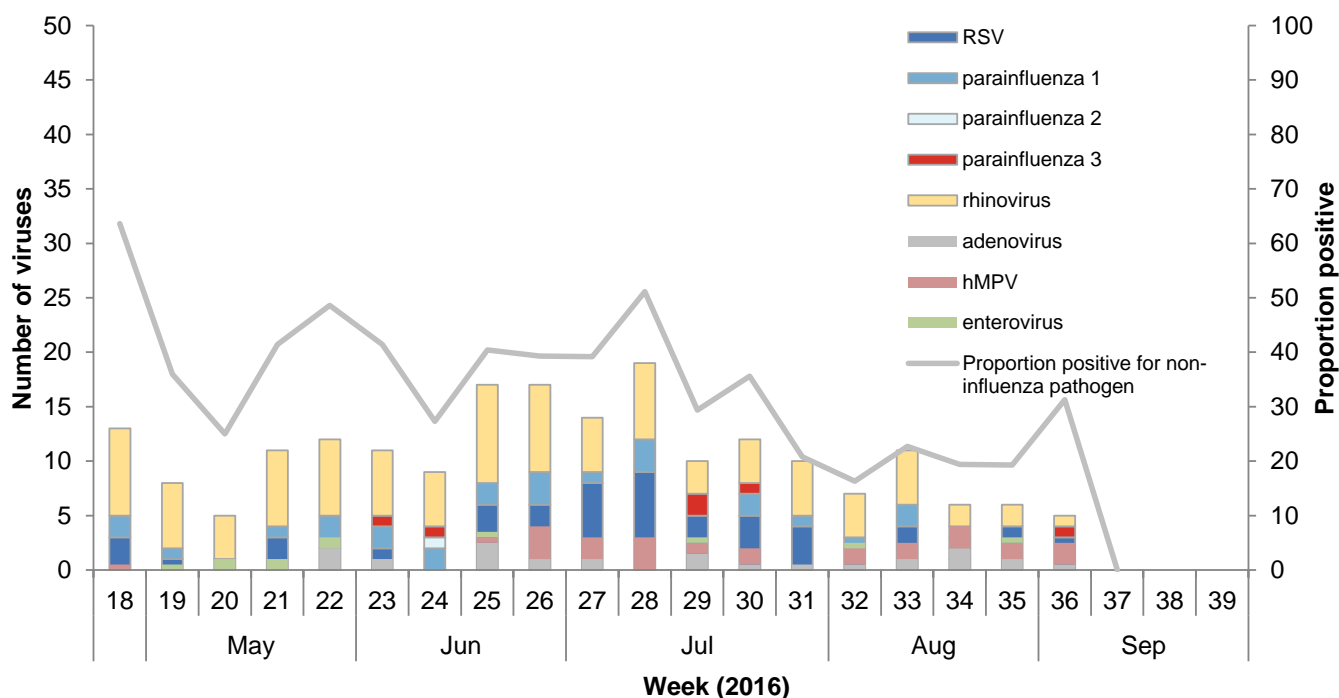
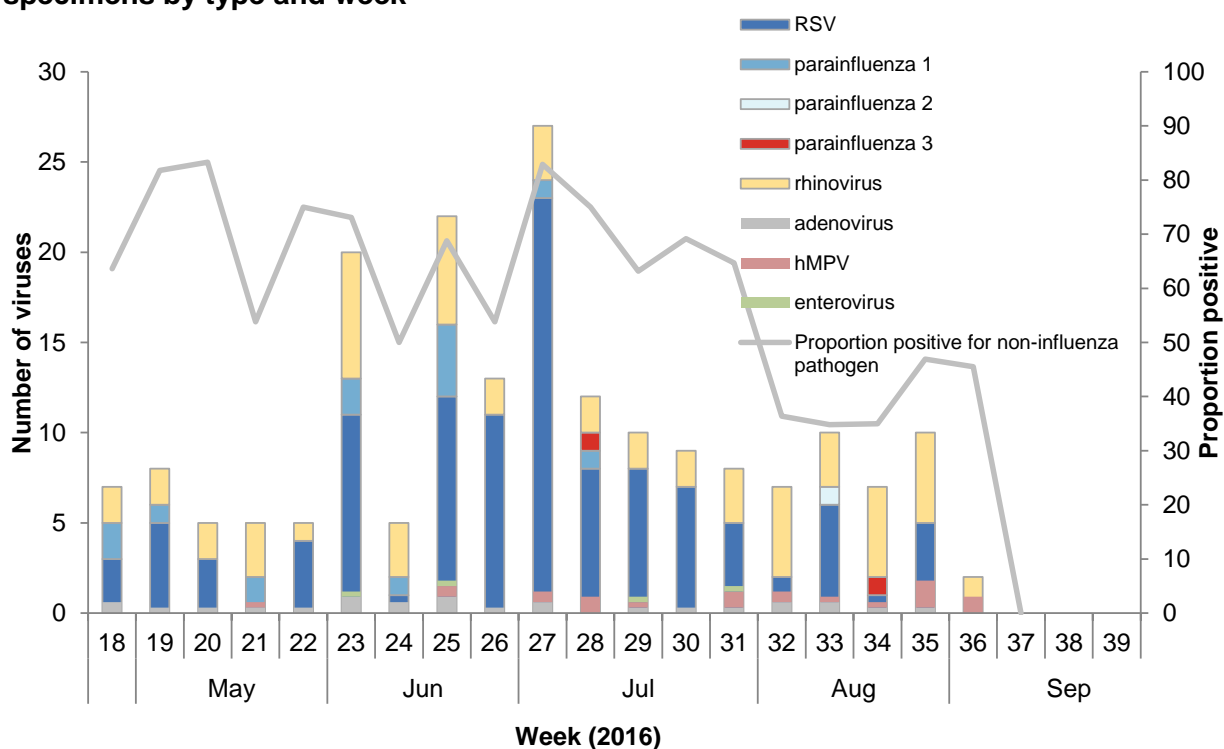


Figure 8. Temporal distribution of the number and proportion of non-influenza viruses from SARI specimens by type and week¹



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 18–37, 2016

DHB	Week																			
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Auckland	3	6	0	13	10	8	7	10	9	11	13	12	15	8	21	22	20	25	16	18
Bay of Plenty	5	2	1	3	2	3	1	2	2	1	1	3	0	5	0	4	0	2	1	0
Canterbury	4	6	5	13	11	10	16	20	31	38	29	37	34	36	27	34	23	11	13	5
Capital and Coast	1	1	3	5	3	5	3	10	7	8	15	10	3	12	10	14	11	5	2	4
Counties Manukau	0	2	1	1	3	1	0	11	7	10	4	5	7	3	4	8	3	6	4	4
Hawke's Bay	0	1	0	0	0	0	1	1	2	1	0	1	0	0	0	0	2	4	0	0
Hutt Valley	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
Lakes	1	1	1	0	0	1	0	0	0	0	0	0	0	2	1	2	0	0	0	0
MidCentral	0	5	3	1	2	2	4	0	4	4	2	2	1	2	0	1	0	1	1	1
Nelson Marlborough	0	1	1	1	1	0	0	2	2	2	0	0	0	0	0	0	3	0	0	1
Northland	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
South Canterbury	1	0	1	3	0	0	2	6	6	5	3	4	2	5	4	13	12	7	2	2
Southern	5	2	5	2	2	2	3	0	0	2	2	11	12	6	9	8	5	5	2	2
Tairāwhiti	5	5	5	1	2	3	4	3	1	0	2	4	2	3	0	0	3	5	3	0
Taranaki	0	0	0	0	2	0	1	1	6	1	6	2	3	3	4	2	3	0	1	0
Waikato	1	0	1	0	1	2	3	0	2	0	1	0	2	0	0	2	3	0	0	0
Wairarapa	0	0	0	2	1	2	1	0	7	0	3	1	1	1	1	1	0	1	0	2
Waitematā	1	2	7	4	7	5	3	3	2	6	5	4	3	7	3	4	10	7	5	4
West Coast	1	3	1	3	1	1	4	1	0	1	3	2	5	2	3	1	6	2	2	1
Whanganui	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	1	0	1	1	0
New Zealand	28	37	35	52	49	45	54	71	94	91	90	98	90	95	87	117	104	83	53	48

Table 6. Influenza-like illness rate by DHB by week 18–37, 2016

DHB	Rate (per 100 000)																			
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Auckland	5.0	10.0	0.0	21.6	16.6	13.3	11.6	16.6	15.0	18.3	21.6	19.9	24.9	13.3	34.9	36.6	33.2	41.5	26.6	29.9
Bay of Plenty	33.7	13.5	6.7	20.2	13.5	20.2	6.7	13.5	13.5	6.7	6.7	20.2	0.0	33.7	0.0	26.9	0.0	13.5	6.7	0.0
Canterbury	6.3	9.4	7.9	20.5	17.3	15.7	25.2	31.5	48.8	59.8	45.6	58.2	53.5	56.7	42.5	53.5	36.2	17.3	20.5	7.9
Capital and Coast	3.9	3.9	11.7	19.5	11.7	19.5	11.7	38.9	27.3	31.2	58.4	38.9	11.7	46.7	38.9	54.5	42.8	19.5	7.8	15.6
Counties Manukau	0.0	2.5	1.2	1.2	3.7	1.2	0.0	13.7	8.7	12.4	5.0	6.2	8.7	3.7	5.0	10.0	3.7	7.5	5.0	5.0
Hawke's Bay	0.0	5.2	0.0	0.0	0.0	0.0	5.2	5.2	10.4	5.2	0.0	5.2	0.0	0.0	0.0	0.0	10.4	20.9	0.0	0.0
Hutt Valley	0.0	0.0	0.0	0.0	3.8	0.0	3.8	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6
Lakes	17.0	17.0	17.0	0.0	0.0	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.0	17.0	34.0	0.0	0.0	0.0	0.0
MidCentral	0.0	38.9	23.3	7.8	15.5	15.5	31.1	0.0	31.1	31.1	15.5	15.5	7.8	15.5	0.0	7.8	0.0	7.8	7.8	7.8
Nelson Marlborough	0.0	9.7	9.7	9.7	9.7	0.0	0.0	19.5	19.5	19.5	0.0	0.0	0.0	0.0	0.0	0.0	29.2	0.0	0.0	9.7
Northland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Canterbury	9.3	0.0	9.3	27.8	0.0	0.0	18.6	55.7	55.7	46.4	27.8	37.1	18.6	46.4	37.1	120.6	111.4	65.0	18.6	18.6
Southern	10.1	4.0	10.1	4.0	4.0	4.0	6.1	0.0	0.0	4.0	4.0	22.2	24.3	12.1	18.2	16.2	10.1	10.1	4.0	4.0
Tairāwhiti	82.9	82.9	82.9	16.6	33.2	49.8	66.4	49.8	16.6	0.0	33.2	66.4	33.2	49.8	0.0	0.0	49.8	82.9	49.8	0.0
Taranaki	0.0	0.0	0.0	0.0	8.7	0.0	4.4	4.4	26.1	4.4	26.1	8.7	13.1	13.1	17.4	8.7	13.1	0.0	4.4	0.0
Waikato	3.5	0.0	3.5	0.0	3.5	7.0	10.6	0.0	7.0	0.0	3.5	0.0	7.0	0.0	0.0	7.0	10.6	0.0	0.0	0.0
Wairarapa	0.0	0.0	0.0	8.2	4.1	8.2	4.1	0.0	28.8	0.0	12.4	4.1	4.1	4.1	4.1	4.1	0.0	4.1	0.0	8.2
Waitemata	4.6	9.1	32.0	18.3	32.0	22.8	13.7	13.7	9.1	27.4	22.8	18.3	13.7	32.0	13.7	18.3	45.7	32.0	22.8	18.3
West Coast	6.3	19.0	6.3	19.0	6.3	6.3	25.4	6.3	0.0	6.3	19.0	12.7	31.7	12.7	19.0	6.3	38.1	12.7	12.7	6.3
Whanganui	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	152.3	30.5	0.0	0.0	0.0	0.0	0.0	30.5	0.0	30.5	30.5	0.0
New Zealand	5.3	7.0	6.6	9.9	9.3	8.5	10.3	13.5	17.8	17.3	17.1	18.6	17.1	18.0	16.5	22.2	19.7	15.8	10.1	9.1

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 and the US Department of Health and Human Services, Centers for Disease Control and Prevention (CDC). SARI surveillance was established and funded by the US CDC under award number 5U01IP000480, a five year research cooperative agreement between the Institute of Environmental Science and Research and US CDC’s National Center for Immunization and Respiratory Diseases Influenza Division, 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 2016 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).
- 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 84 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).

This weekly report is compiled by ESR. For more information please contact:

Tim Wood: T:+64 4 529 0611; E: Tim.Wood@esr.cri.nz
Liza Lopez: T:+64 4 914 0647; E: Liza.Lopez@esr.cri.nz
Sue Huang: T:+64 4 529 0606; E: Sue.Huang@esr.cri.nz