

Community and Hospital Surveillance

ILI, SARI, Influenza and Respiratory Pathogens

2016 Influenza Season, Week 31, ending 7 August 2016

SUMMARY

During week 31 (1–7 August 2016), influenza activity was very low among consultation-seeking patients nationwide. Influenza activity was also very 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: Ninety-five patients with influenza-like illness consulted sentinel general practices in 20 DHBs. The weekly ILI incidence was 18.0 per 100 000 patient population (Figure 1), below the seasonal threshold of ILI consultations. The ILI related influenza incidence (adjusted) was 8.1 per 100 000 patient population.

SARI surveillance: There were 2672 acute admissions to ADHB and CMDHB hospitals this week. Of the 155 patients with suspected respiratory infections, 57 (36.8%) patients met the SARI case definition. Three SARI cases were admitted to ICU and no SARI related deaths were reported. The weekly SARI incidence was 4.7 per 100 000 population. The SARI related influenza incidence was 0.1 per 100 000 population.

- **Respiratory pathogen surveillance**

Influenza virus: During this week, 29 ILI specimens were tested, 13 were positive for influenza viruses. In addition, 26 SARI specimens were tested, one was 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 10 August 2016.

INFLUENZA-LIKE ILLNESS and SEVERE ACUTE RESPIRATORY ILLNESS

Influenza-like illness (ILI)

During week 31, ending 7 August 2016, 95 patients with influenza-like illness consulted sentinel general practices in 20 DHBs. The weekly ILI incidence was 18.0 per 100 000 patient population. Of the 29 tested ILI cases, 13 were positive for influenza viruses. This gives an ILI related influenza incidence (adjusted) of 8.1 per 100 000 patient population.

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

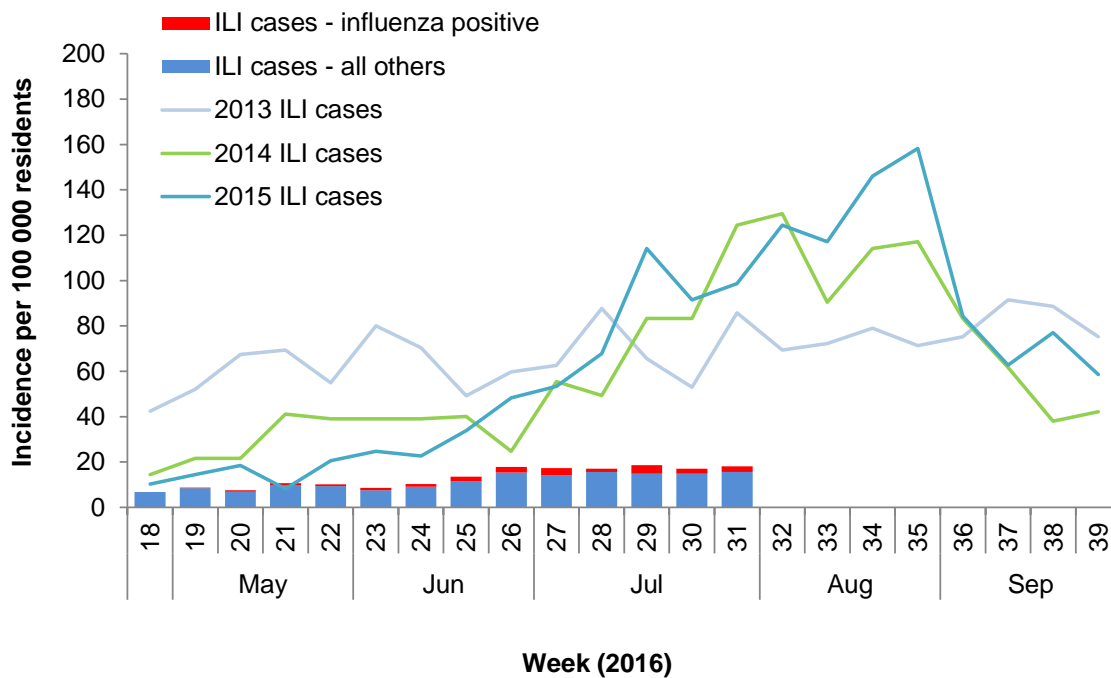


Figure 2. Comparison of 2016 rate with average seasonal rate, and historical thresholds

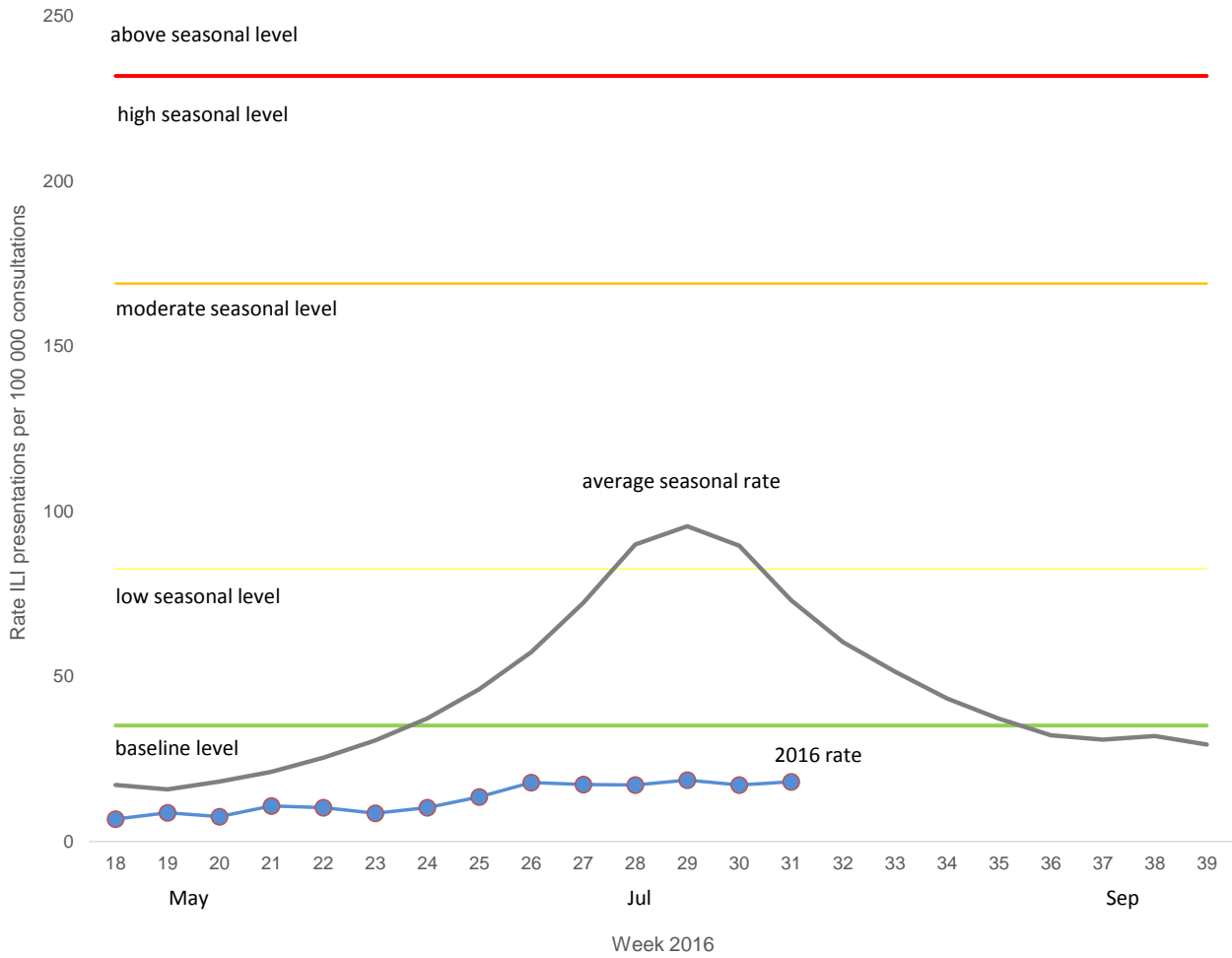
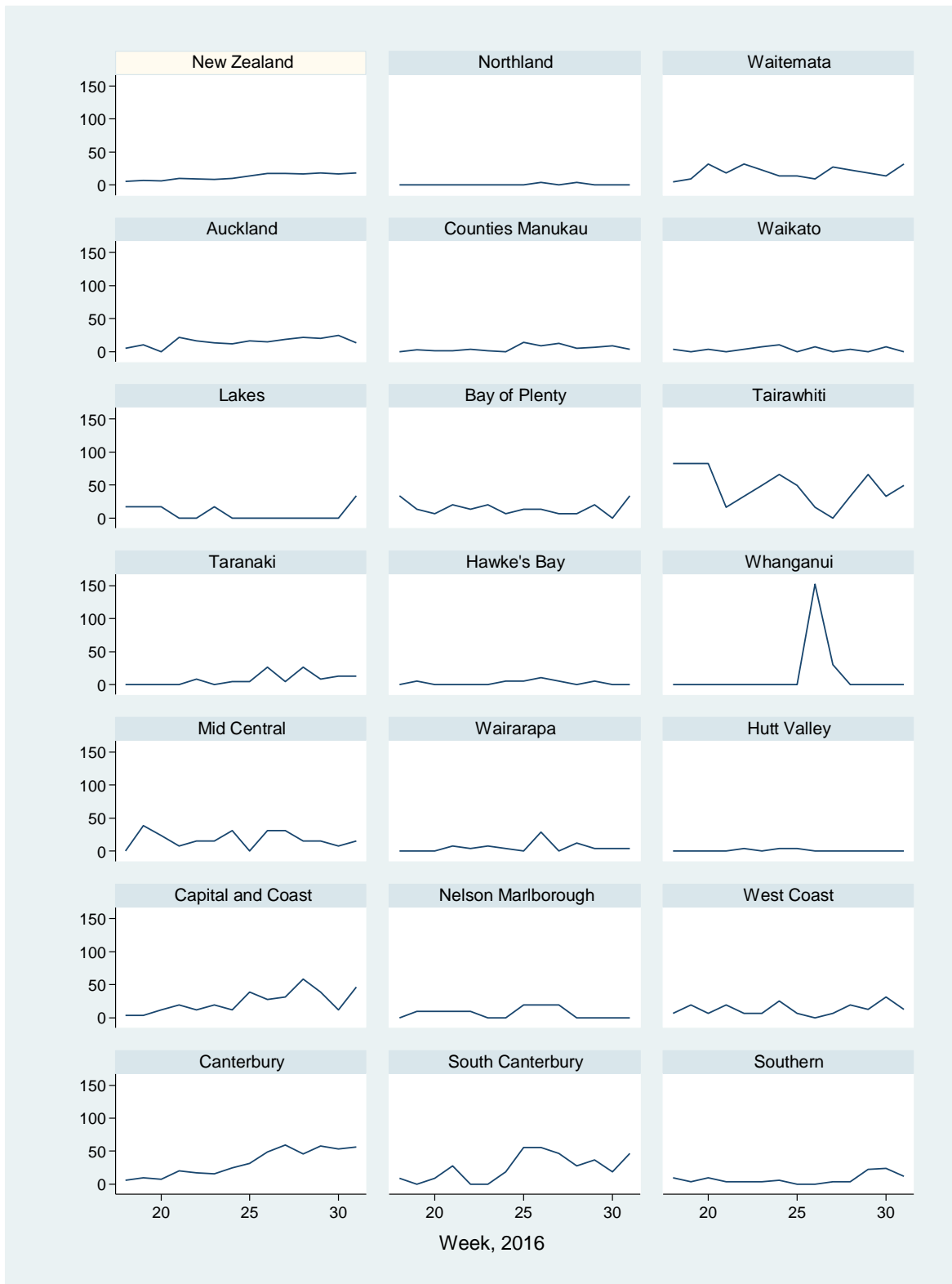


Figure 3 compares the consultation rates for influenza-like illness for each DHB over the past week. Canterbury (56.7 per 100 000, 36 cases), Tairāwhiti (49.8 per 100 000, 3 cases) and Capital & Coast (46.7 per 100 000, 12 cases) DHBs had the highest consultation rates.

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 929 ILI cases were identified. This gives a cumulative ILI incidence of 176.4 per 100 000 patient population (Table 1). Among the 540 tested ILI cases, 117 (21.7%) were positive for influenza viruses. This gives an ILI related influenza incidence of 38.2 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	929	117	21.7 (100.0)	176.4	38.2
Age group (years)					
<1	7	1	20.0 (0.9)	311.7	62.3
1–4	55	2	6.7 (1.7)	180.1	12.0
5–19	186	31	27.9 (26.5)	174.5	48.7
20–34	304	35	22.0 (29.9)	270.9	59.6
35–49	183	25	22.1 (21.4)	176.5	39.0
50–64	133	19	23.2 (16.2)	137.6	31.9
65–79	51	3	8.8 (2.6)	91.3	8.1
>80	10	1	16.7 (0.9)	52.8	8.8
Unknown	0	0	0.0		
Ethnicity					
Māori	122	12	15.2 (10.3)	180.8	27.5
Pacific peoples	66	15	30.6 (12.8)	185.2	56.7
Asian	81	5	0.0	217.0	21.3
European and Other	660	85	23.5 (72.6)	171.3	40.3
Unknown	0	0	0.0	0.0	
Sex					
Female	511	60	20.3 (51.3)	187.0	38.0
Male	417	57	23.3 (48.7)	164.5	38.3
Unknown	1	0	0.0		

¹Proportion of cases tested which were positive for influenza viruses

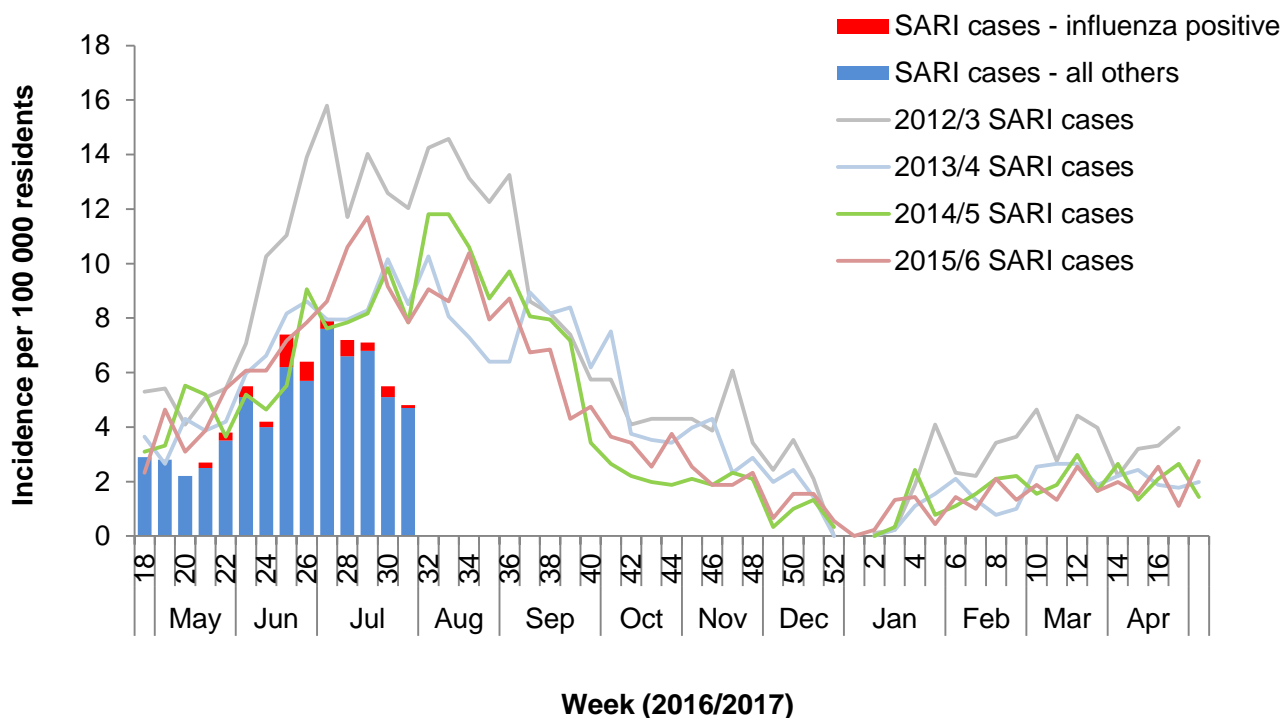
²Adjusted to positivity of tested cases

Severe acute respiratory illness (SARI)

There were 2672 acute admissions to ADHB and CMDHB hospitals during week 31, ending 7 August 2016. A total of 155 patients with suspected respiratory infections were assessed in these hospitals. Of these, 57 (36.8%) patients met the SARI case definition. Three cases were admitted to ICU and no SARI related deaths were reported this week.

Of the 57 SARI cases this week, 43 were residents of ADHB and CMDHB. This gives a weekly SARI incidence of 4.7 per 100 000 population (Figure 4). Twenty-four SARI residents had specimens tested for influenza viruses, one was positive for influenza viruses. This gives a SARI related influenza incidence of 0.1 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 821 SARI cases were identified. This gives a SARI proportion of 21.6 per 1000 acute hospitalisations (Table 2). Fifty-three SARI cases have been admitted to ICU and four SARI related deaths were reported during this period.

Of the 821 SARI cases, 596 were ADHB and CMDHB residents, giving a SARI incidence of 65.8 per 100 000 population (Table 2). Among the 445 tested SARI cases who were ADHB and CMDHB residents, 45 (10.1%) had positive influenza virus results. This gives a SARI related influenza incidence of 5.0 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	37962	2158	821 (38.0)	21.6	48 (9.5)	596	65.8	45	5.0
Age group (years)									
<1	1491		195	130.8	6 (4.1)	178	1317.9	5	37.0
1–4	2727		159	58.3	10 (9.6)	131	247.7	10	18.9
5–19	4259		43	10.1	2 (6.9)	37	19.2	2	1.0
20–34	7542		24	3.2	2 (8.7)	24	11.5	2	1.0
35–49	5537		42	7.6	6 (18.8)	41	21.5	6	3.1
50–64	6494		76	11.7	10 (15.2)	69	45.8	8	5.3
65–79	6024		79	13.1	6 (9.5)	74	101.3	6	8.2
>80	3888		42	10.8	6 (17.1)	41	175.0	6	25.6
Unknown	0		160			0		0	
Ethnicity									
Māori	5116		141	27.6	10 (10.5)	124	124.7	7	7.0
Pacific peoples	7988		250	31.3	14 (7.3)	230	166.7	14	10.1
Asian	6151		64	10.4	4 (8.5)	59	28.1	4	1.9
European and Other	18470		206	11.2	20 (12.1)	183	45.6	20	5.0
Unknown	225		160	711.1		0		0	
Hospitals									
ADHB	22190	1150	418 (36.3)	18.8	35 (13.1)	245	56.1	32	7.3
CMDHB	15772	1008	403 (40.0)	25.6	13 (5.4)	351	74.8	13	2.8
Sex									
Female	19946		310	15.5	18 (7.7)	282	60.6	17	3.7
Male	18013		348	19.3	30 (11.4)	311	70.6	28	6.4
Unknown	3		163			3		0	

¹Proportion of cases tested which were positive for influenza viruses

RESPIRATORY PATHOGEN SURVEILLANCE

Influenza virus

During week 31, 29 ILI specimens were tested; 13 were positive for influenza viruses. In addition, 26 SARI specimens were tested; one was positive for influenza viruses.

Since 2 May 2016, 540 ILI specimens were tested, 117 (21.7%) were positive for influenza with the following viruses. In addition, 543 SARI specimens were tested, 51 (9.4%) 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	540	543	47	2
No. of positive specimens (%) ¹	117 (21.7)	51 (9.4)	4 (8.5)	1 (50.0)
Influenza A	108	48	4	0
A (not subtyped)	25	26	4	0
A(H1N1)pdm09	29	18	0	0
A(H1N1)pdm09 by PCR	26	13	0	0
A/California/7/2009 (H1N1)pdm09 - like	3	5	0	0
A(H3N2)	54	4	0	0
A(H3N2) by PCR	47	4	0	0
A/Hong Kong/4801/2014 (H3N2) - like	7	0	0	0
Influenza B	9	3	0	1
B (lineage not determined)	3	2	0	0
B/Yamagata lineage	3	1	0	1
B/Yamagata lineage by PCR	3	1	0	1
B/Phuket/3073/2013 - like	0	0	0	0
B/Victoria lineage	3	0	0	0
B/Victoria lineage by PCR	3	0	0	0
B/Brisbane/60/2008 - like	0	0	0	0
Influenza and non-influenza co-detection (% +ve)	11 (9.4)	6 (11.8)	1 (25.0)	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, 534 ILI cases were tested for non-influenza viruses, 199 (37.3%) were positive with the following viruses. Two hundred and thirty-six SARI specimens were tested for non-influenza viruses, 161 (68.2%) were positive with the following viruses (see Table 4).

Table 4. Non-influenza viruses among ILI and SARI cases since 2 May 2016

<i>Non-influenza respiratory viruses</i>	ILI	SARI		
	Cases (%)	Cases (%)	ICU (%)	Deaths (%)
No. of specimens tested	534	236	10	2
No. of positive specimens (%) ¹	199 (37.3)	161 (68.2)	8 (80.0)	1 (50.0)
Respiratory syncytial virus (RSV)	50	97	3	0
Parainfluenza 1 (PIV1)	23	14	1	0
Parainfluenza 2 (PIV2)	1	0	0	0
Parainfluenza 3 (PIV3)	5	1	0	0
Rhinovirus (RV)	80	37	5	1
Adenovirus (AdV)	19	19	3	0
Human metapneumovirus (hMPV)	21	9	0	0
Enterovirus	9	2	0	0
Single virus detection (% of positives)	190 (95.5)	144 (89.4)	5 (62.5)	1 (100.0)
Multiple virus detection (% of positives)	9 (4.5)	17 (10.6)	3 (37.5)	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

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

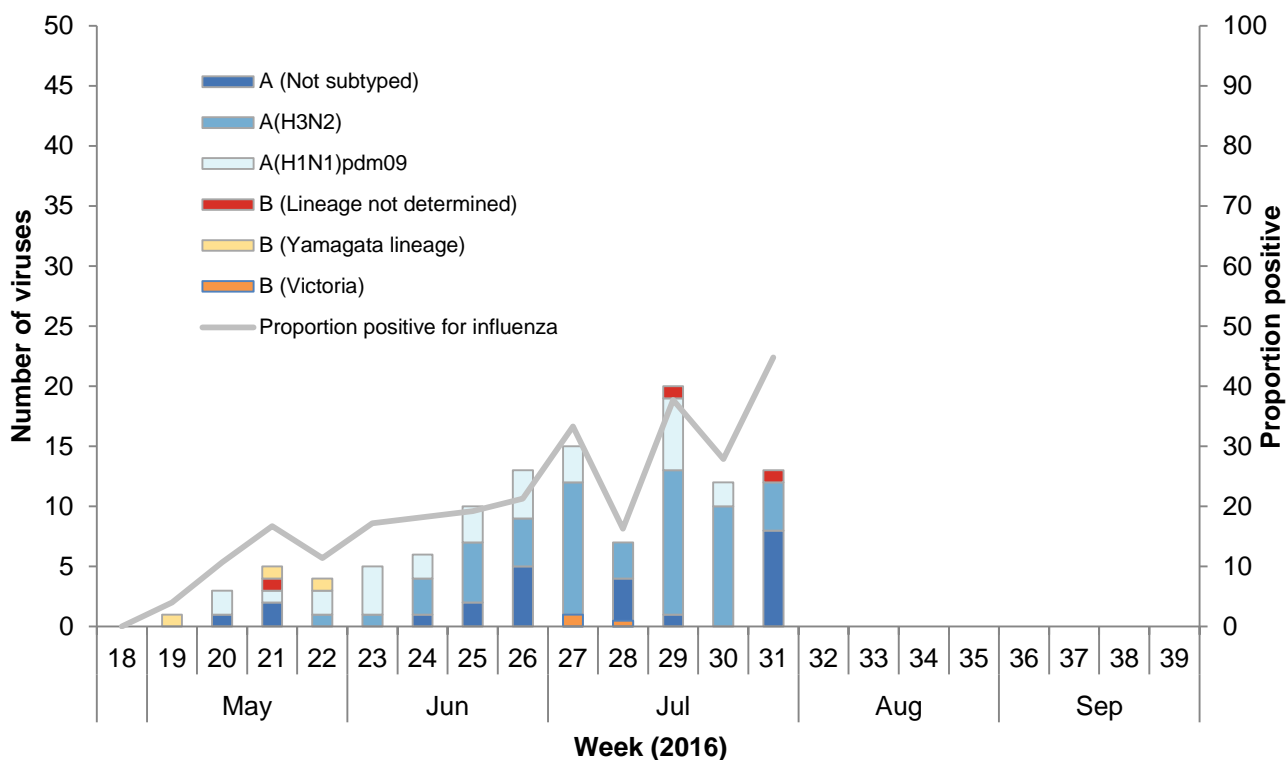


Figure 6. Temporal distribution of the number and proportion of influenza viruses from SARI specimens by type and week¹

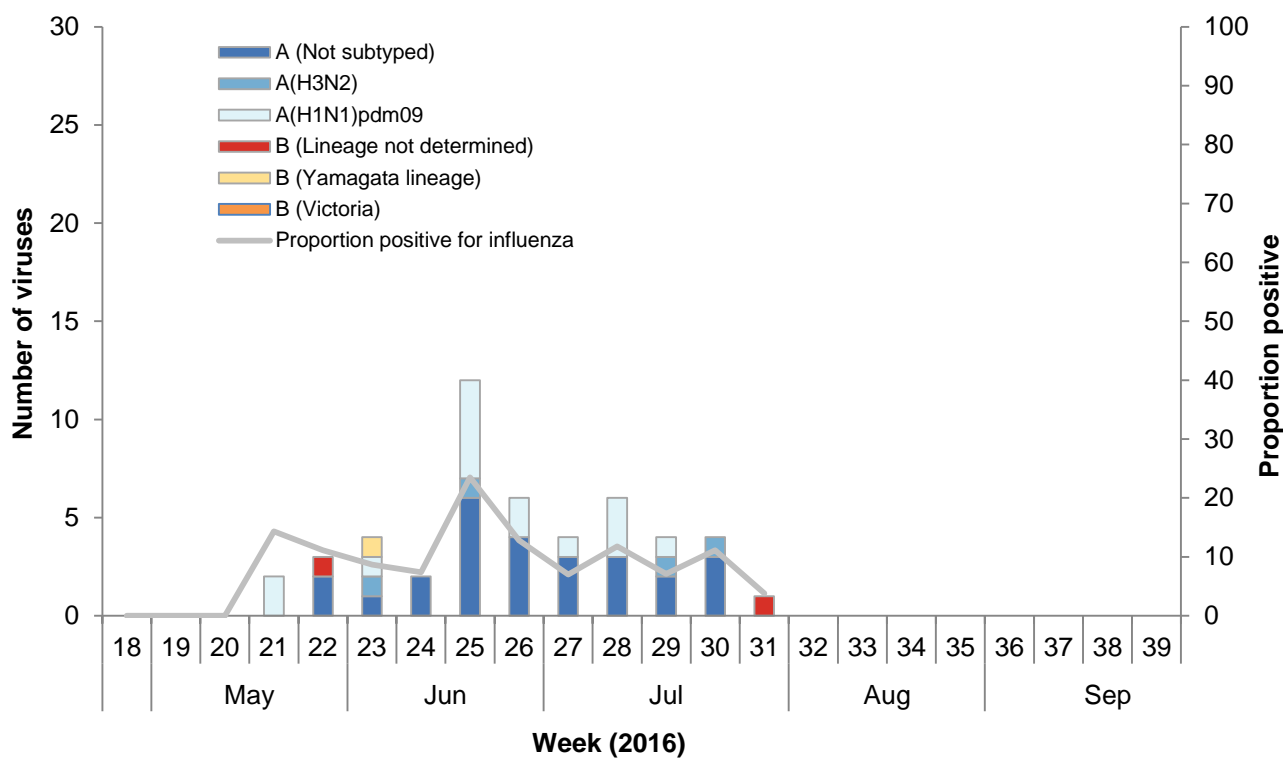


Figure 7. Temporal distribution of the number and proportion of non-influenza viruses from ILI specimens by type and week¹

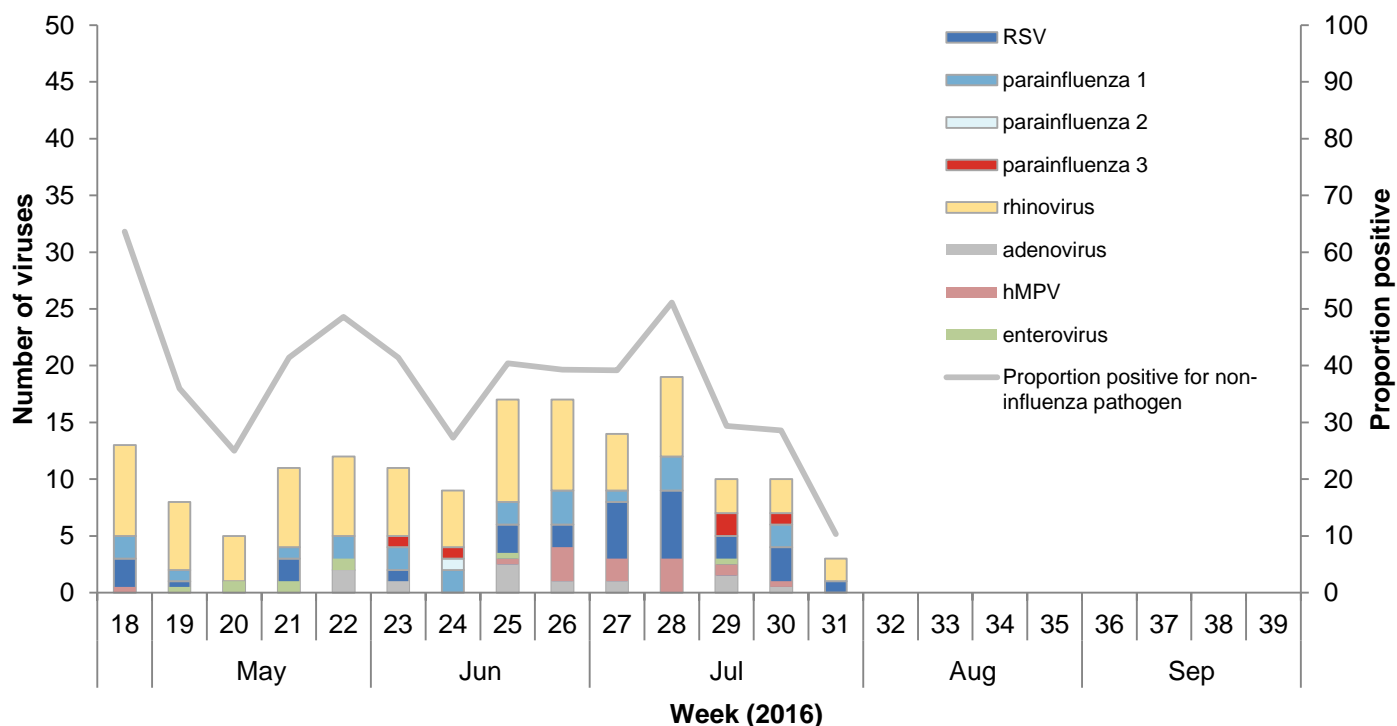
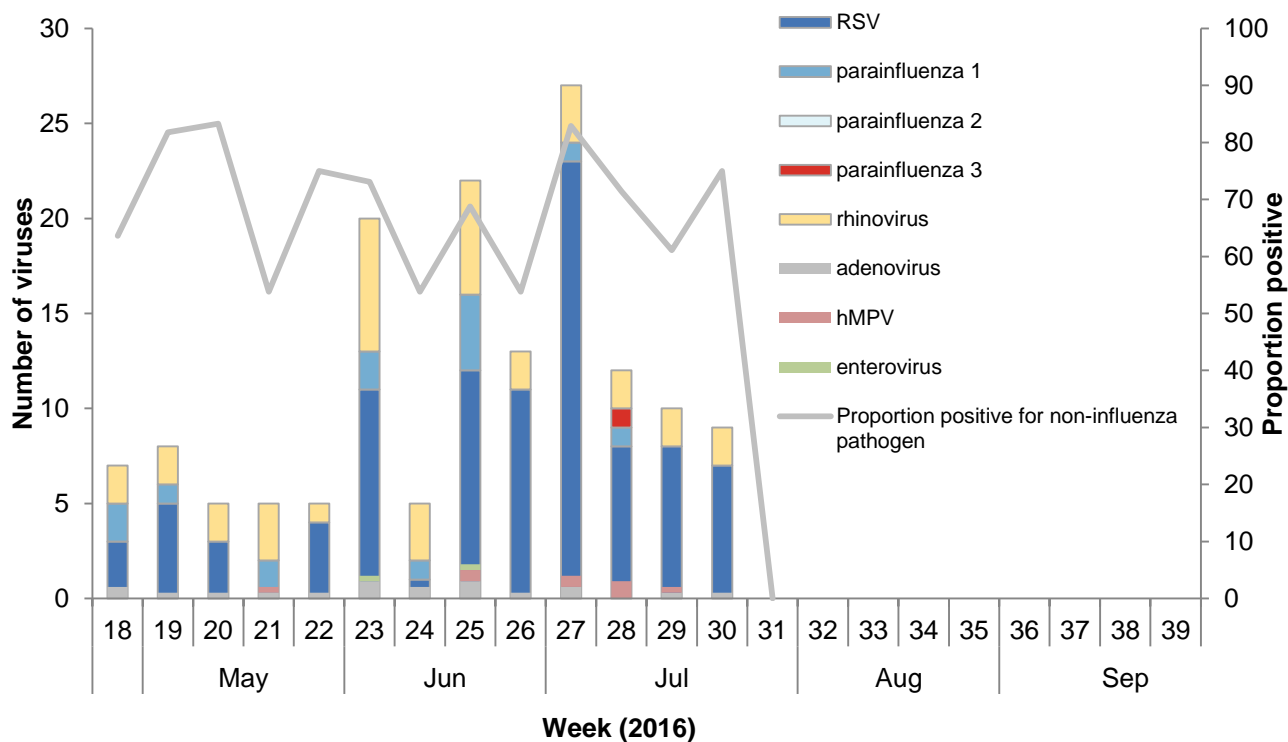


Figure 8. Temporal distribution of the number and proportion of non-influenza viruses from SARI specimens by type and week¹



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 18–31, 2016

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

Table 6. Influenza-like illness rate by DHB by week 18–31, 2016

DHB	Rate (per 100 000)													
	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Auckland	5	10	0	21.6	16.6	13.3	11.6	16.6	15	18.3	21.6	19.9	24.9	13.3
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	33.7
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
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
Counties Manukau	0	2.5	1.2	1.2	3.7	1.2	0	13.7	8.7	12.4	5	6.2	8.7	3.7
Hawke's Bay	0	5.2	0	0	0	0	5.2	5.2	10.4	5.2	0	5.2	0	0
Hutt Valley	0	0	0	0	3.8	0	3.8	3.8	0	0	0	0	0	0
Lakes	17	17	17	0	0	17	0	0	0	0	0	0	0	34
MidCentral	0	38.9	23.3	7.8	15.5	15.5	31.1	0	31.1	31.1	15.5	15.5	7.8	15.5
Nelson Marlborough	0	9.7	9.7	9.7	9.7	0	0	19.5	19.5	19.5	0	0	0	0
Northland	0	0	0	0	0	0	0	0	4	0	4	0	0	0
South Canterbury	9.3	0	9.3	27.8	0	0	18.6	55.7	55.7	46.4	27.8	37.1	18.6	46.4
Southern	10.1	4	10.1	4	4	4	6.1	0	0	4	4	22.2	24.3	12.1
Tairāwhiti	82.9	82.9	82.9	16.6	33.2	49.8	66.4	49.8	16.6	0	33.2	66.4	33.2	49.8
Taranaki	0	0	0	0	8.7	0	4.4	4.4	26.1	4.4	26.1	8.7	13.1	13.1
Waikato	3.5	0	3.5	0	3.5	7	10.6	0	7	0	3.5	0	7	0
Wairarapa	0	0	0	8.2	4.1	8.2	4.1	0	28.8	0	12.4	4.1	4.1	4.1
Waitemata	4.6	9.1	32	18.3	32	22.8	13.7	13.7	9.1	27.4	22.8	18.3	13.7	32
West Coast	6.3	19	6.3	19	6.3	6.3	25.4	6.3	0	6.3	19	12.7	31.7	12.7
Whanganui	0	0	0	0	0	0	0	0	152.3	30.5	0	0	0	0
New Zealand	5.3	7	6.6	9.9	9.3	8.5	10.3	13.5	17.8	17.3	17.1	18.6	17.1	18

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 82 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).

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