6SSN 2324-4097

Community and Hospital Surveillance

ILI, SARI, Influenza and Respiratory Pathogens

2017 Influenza Season, Week 32, ending 13 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 to about 30%.
- Severe acute respiratory illness (SARI) hospitalisation rates decreased slightly, with a lower influenza positive rate.
- Influenza A(H3N2) are the predominant viruses in New Zealand this year. A(H3N2) viruses are known to change more quickly over time than the other human influenza viruses, as illustrated by the frequency of formulation changes of the A(H3N2) component of the vaccine. The A(H3N2) viruses have changed genetically. However, it is too early to predict whether these genetic changes will lead to any antigenic changes that reduce vaccine effectiveness. The data for vaccine effectiveness will be available at the end of this influenza season.
- Influenza B/Victoria lineage viruses also co-circulated with B/Yamagata lineage viruses with more B/Yamagata viruses. Quadrivalent vaccine covered both B lineages whereas trivalent vaccine only covered one lineage (B/Victoria). Cross-protection between the two B lineages has been documented previously in vaccine effectiveness and seroprevalence studies.
- 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 16 August 2017.

INFLUENZA-LIKE ILLNESS and SEVERE ACUTE RESPIRATORY ILLNESS

Influenza-like illness (ILI)

During week 32, ending 13 August 2017, 189 patients with influenza-like illness consulted sentinel general practices in 20 DHBs. The weekly ILI incidence was 46.0 per 100 000 patient population (Figures 1 and 2). Of the 109 tested ILI cases, 38 were positive for influenza viruses. This gives an ILI related influenza incidence (adjusted) of 16.0 per 100 000 patient population.

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

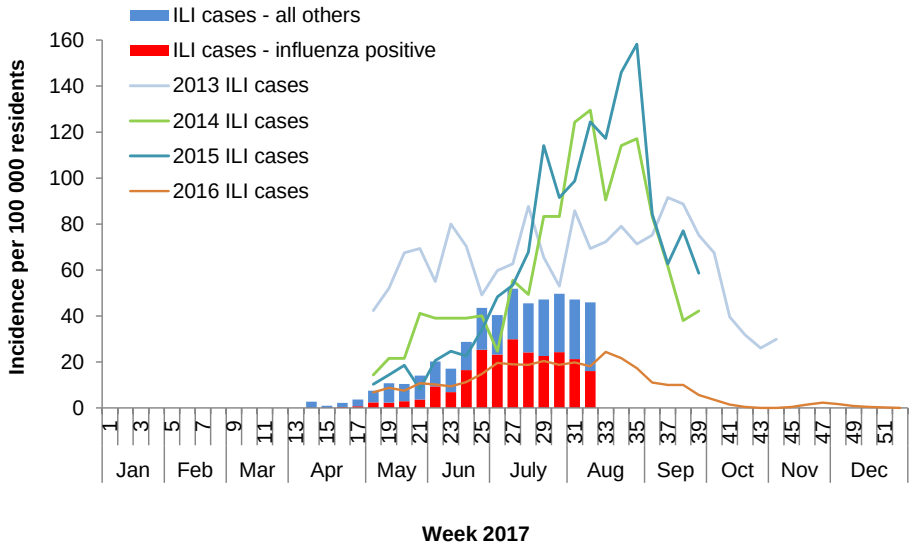
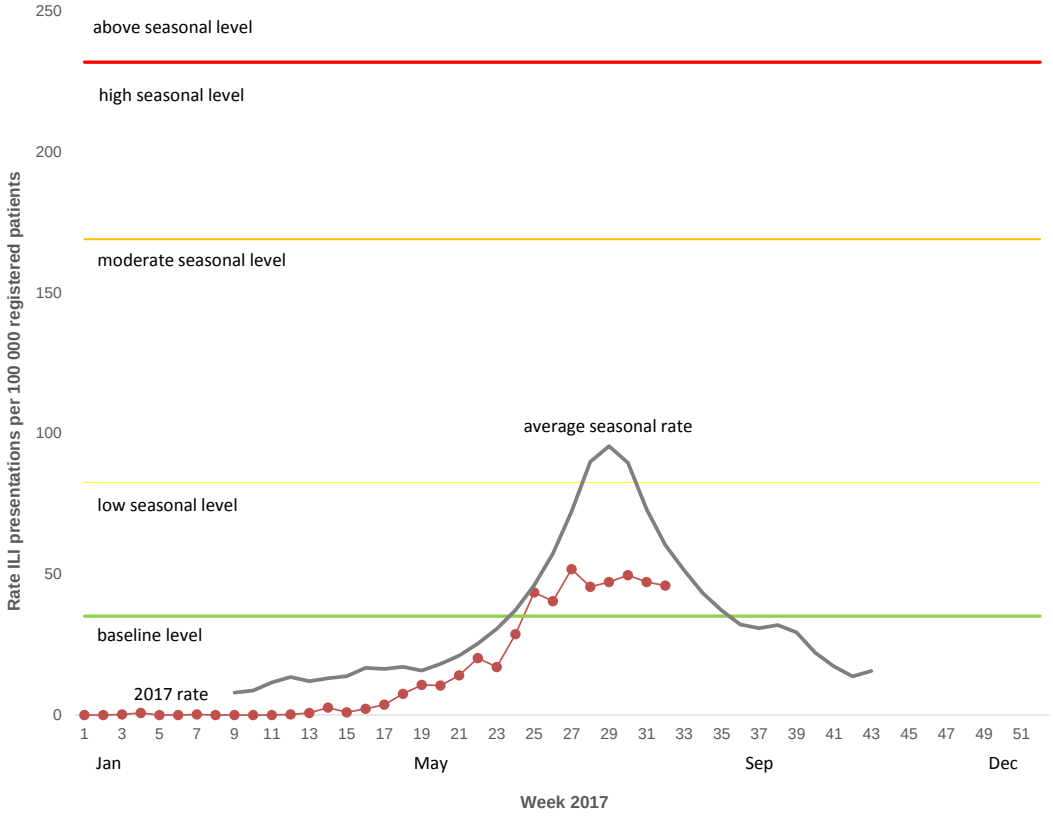


Figure 2. Comparison of 2017 rate with average seasonal rate, and historical thresholds



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

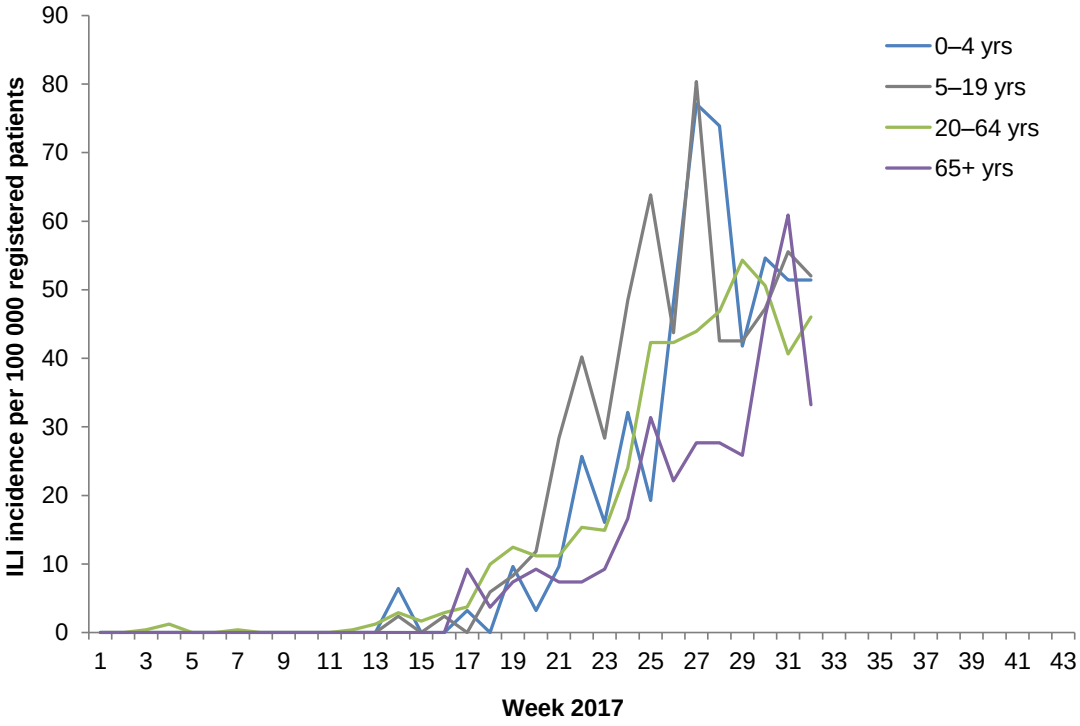


Figure 4. Weekly ILI incidence by ethnicity since 2 January 2017

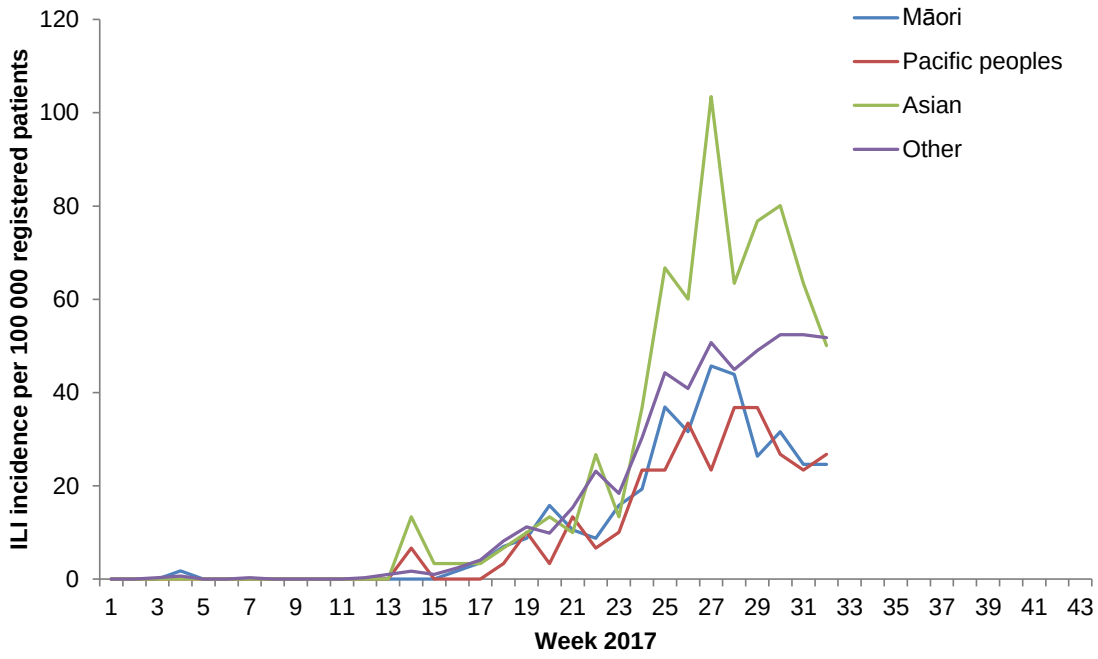
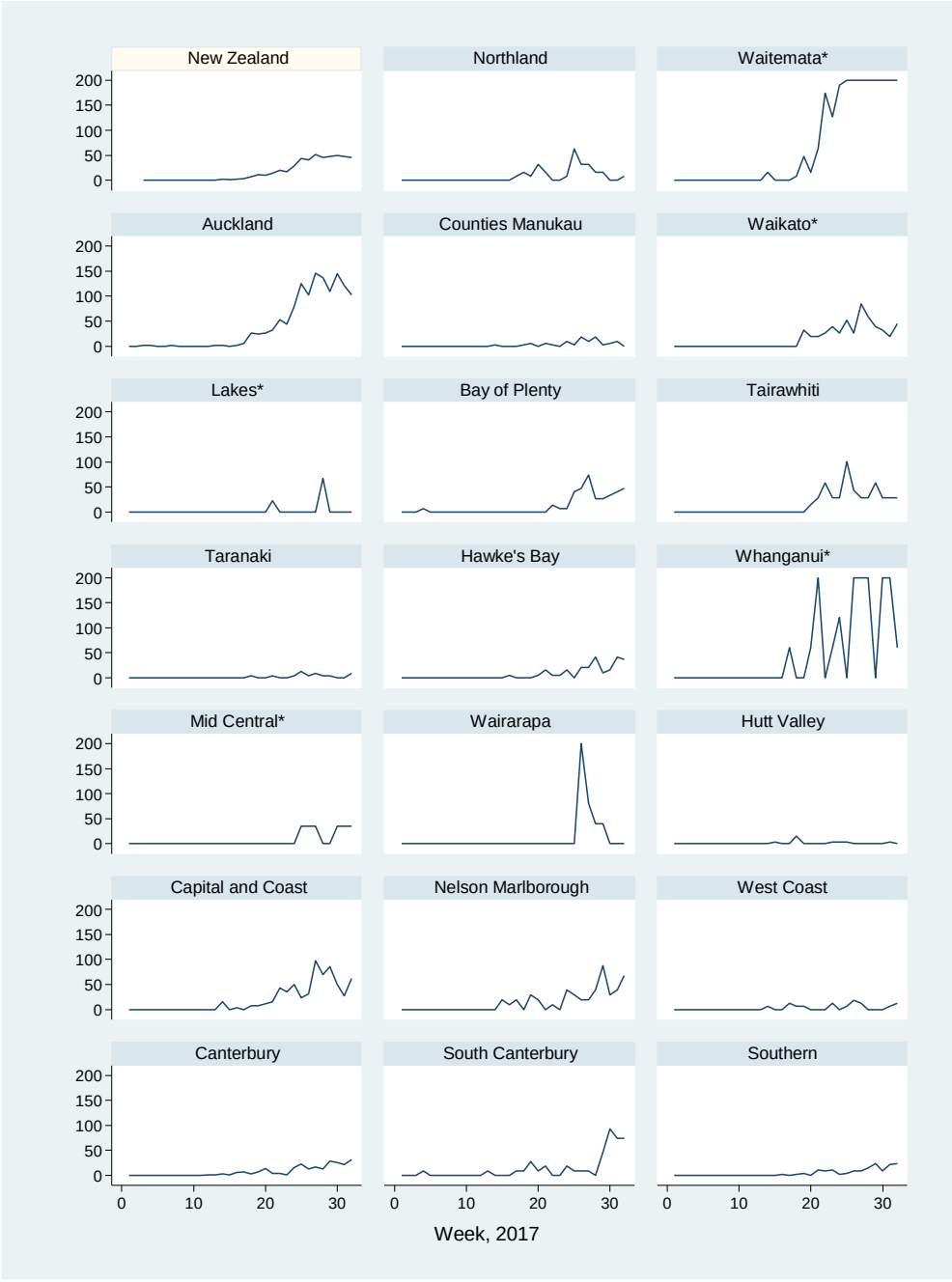


Figure 5 compares the consultation rates for influenza-like illness for each DHB over the past week. Waitemata (292.7 per 100 000, 37 cases), Auckland (102.1 per 100 000, 58 cases), and South Canterbury (74.2 per 100 000, 8 cases) DHBs had the highest consultation rates.

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 2021 ILI cases were identified. This gives a cumulative ILI incidence of 491.6 per 100 000 patient population (Table 1). Among the 1612 tested ILI cases, 777 (48.2%) were positive for influenza viruses. This gives an ILI related (adjusted) influenza incidence of 236.9 per 100 000 patient population.

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

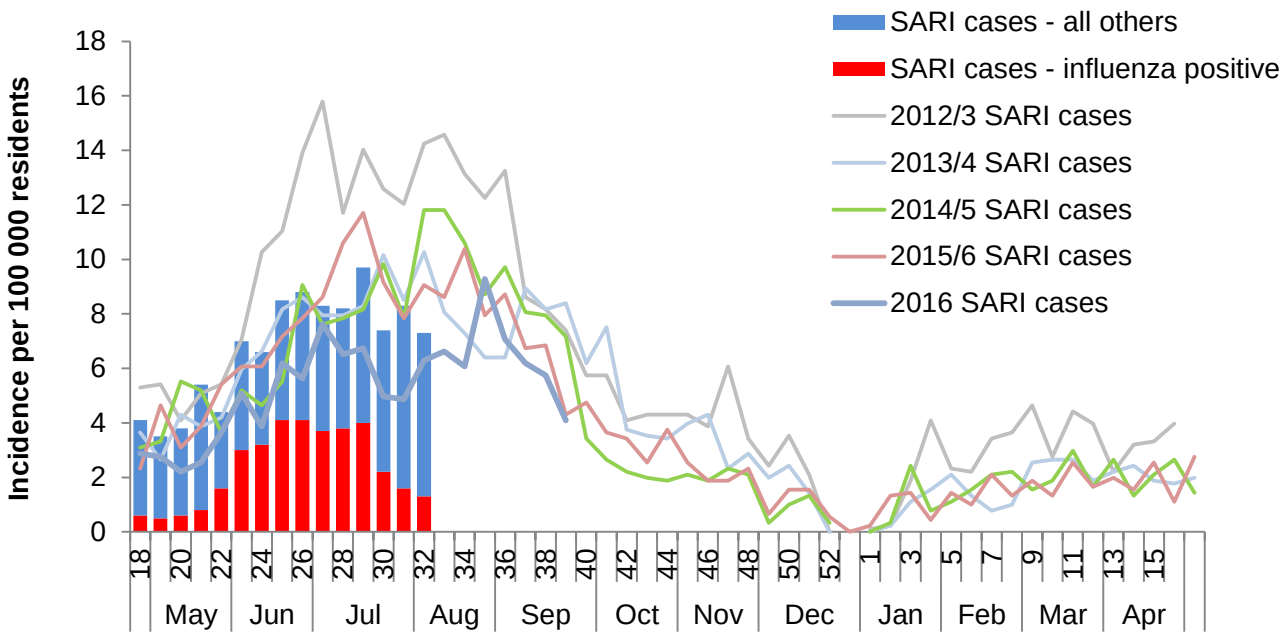
Characteristics	ILI & influenza cases among sentinel practices				
	ILI cases	Influenza cases	Prop Influenza positive[1] (%)	ILI incidence (per 100 000)	Influenza incidence[2] (per 100 000)
Overall	**2021**	**777**	**48.2 (100.0)**	**491.6**	**236.9**
Age group (years)					
<1	21	2	12.5 (0.3)	317.7	39.7
1–4	142	33	28.9 (4.2)	579.4	167.7
5–19	511	249	61.2 (32.0)	604.0	369.5
20–34	328	117	42.9 (15.1)	381.8	163.6
35–49	486	183	48.2 (23.6)	592.9	285.5
50–64	346	127	46.0 (16.3)	471.8	217.1
65–79	160	52	42.6 (6.7)	391.8	167.0
>80	27	14	58.3 (1.8)	202.1	117.9
Unknown	0	0	0.0		
Ethnicity					
Māori	204	73	44.8 (9.4)	358.5	160.5
Pacific peoples	92	39	54.9 (5.0)	307.7	169.0
Asian	211	108	56.8 (13.9)	704.2	400.3
European and Other	1512	557	46.9 (71.7)	514.9	241.6
Unknown	2	0	0.0	0.0	
Sex					
Female	1143	426	47.3 (54.8)	535.5	253.5
Male	877	351	49.3 (45.2)	443.6	218.7
Unknown	1	0	0.0		

[1]Proportion of cases tested which were positive for influenza viruses
[2]Adjusted to positivity of tested cases

Severe acute respiratory illness (SARI)

There were 2811 acute admissions to ADHB and CMDHB hospitals during week 32, ending 13 August 2017. A total of 154 patients with acute respiratory illness were assessed in these hospitals. Of these, 95 (61.7%) patients met the SARI case definition. Seven cases were admitted to ICU and one SARI related death was reported this week. Of the 54 tested residents with SARI, ten were positive for influenza viruses, giving a SARI related influenza incidence of 1.3 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 1194 SARI cases were identified. This gives a SARI proportion of 28.1 per 1000 acute hospitalisations (Table 2). Eighty SARI cases have been admitted to ICU and 17 SARI related deaths were reported during this period.

Of the 1194 SARI cases, 917 were ADHB and CMDHB residents, giving a SARI incidence of 101.3 per 100 000 population (Table 2). Among the 842 tested SARI cases who were ADHB and CMDHB residents, 293 (34.8%) had positive influenza virus results. This gives a SARI (adjusted) related influenza incidence of 35.2 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	**42458**	**2288**	**1194 (52.2)**	**28.1**	**311 (34.8)**	**917**	**101.3**	**293**	**35.2**
Age group (years)									
<1	1612		188	116.6	17 (10.3)	174	1288.3	16	133.9
1–4	3005		137	45.6	26 (23.0)	127	240.2	25	56.6
5–19	5055		64	12.7	15 (28.3)	52	27.0	10	6.1
20–34	7913		63	8.0	28 (45.9)	61	29.3	27	13.4
35–49	6209		69	11.1	26 (40.0)	65	34.0	25	13.9
50–64	7250		143	19.7	70 (51.5)	140	93.0	68	47.6
65–79	6867		178	25.9	67 (39.4)	169	231.2	62	89.0
>80	4547		132	29.0	62 (48.8)	128	546.3	60	266.5
Unknown	0		219			0		0	
Ethnicity									
Māori	5839		193	33.1	37 (21.8)	171	171.9	34	39.0
Pacific peoples	9066		341	37.6	104 (33.1)	333	241.3	98	77.3
Asian	7031		83	11.8	31 (42.5)	80	38.0	30	15.8
European and Other	20247		358	17.7	139 (41.6)	333	82.9	131	34.6
Unknown	257		219	852.1		0		0	
Hospitals									
ADHB	24802	876	591 (67.5)	23.8	152 (40.8)	371	85.0	137	35.0
CMDHB	17656	1412	603 (42.7)	34.2	159 (30.6)	546	116.3	156	35.7
Sex									
Female	22453		514	22.9	164 (34.9)	478	102.8	155	36.2
Male	20002		458	22.9	146 (34.9)	437	99.2	137	34.0
Unknown	3		222			2		1	

[1]Proportion 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 32, 109 ILI specimens were tested; 38 were positive for influenza viruses. In addition, 64 SARI specimens were tested; 10 were positive for influenza viruses.

Since 1 May 2017, 1597 ILI specimens were tested, 776 (48.6%) were positive for influenza with the following viruses. In addition, 1009 SARI specimens were tested, 346 (34.3%) 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	1597	1009	175	19
No. of positive specimens (%)[1]	776 (48.6)	346 (34.3)	19 (10.9)	9 (47.4)
Influenza A	451	261	11	6
A (not subtyped)	12	97	4	1
A(H1N1)pdm09	48	29	1	0
A(H1N1)pdm09 by PCR	32	26	0	0
A/Michigan/45/2015 (H1N1)pdm09 - like	12	3	1	0
A/California/7/2009 (H1N1)pdm09 - like	4	0	0	0
A(H3N2)	403	135	6	5
A(H3N2) by PCR	357	134	6	5
A/Hong Kong/4801/2014 (H3N2) - like	46	1	0	0
Influenza B	313	85	8	3
B (lineage not determined)	17	48	6	2
B/Yamagata lineage	283	37	2	1
B/Yamagata lineage by PCR	147	23	2	1
B/Phuket/3073/2013 - like	136	14	0	0
B/Victoria lineage	13	0	0	0
B/Victoria lineage by PCR	13	0	0	0
B/Brisbane/60/2008 - like	0	0	0	0
Influenza and non-influenza co-detection (% +ve)	43 (5.5)	18 (5.2)	2 (10.5)	1 (11.1)

[1]Number 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, 1555 ILI specimens were tested for non-influenza viruses, 291 (18.7%) were positive with the following viruses. Eight hundred and fourteen SARI specimens were tested for non-influenza viruses, 256 (31.4%) were positive with the following viruses (see Table 4).

Table 4. Non-influenza viruses among ILI and SARI cases since 1 May 2017[1]

Non-influenza respiratory viruses	ILI	SARI	SARI and non-SARI	
	Cases (%)	Cases (%)	ICU (%)	Deaths (%)
No. of specimens tested	1555	814	126	18
No. of positive specimens (%)[1]	291 (18.7)	256 (31.4)	79 (62.7)	1 (5.6)
Respiratory syncytial virus (RSV)	79	142	39	1
Parainfluenza 1 (PIV1)	3	1	0	0
Parainfluenza 2 (PIV2)	22	10	3	0
Parainfluenza 3 (PIV3)	35	15	5	0
Rhinovirus (RV)	102	88	40	0
Adenovirus (AdV)	36	25	7	0
Human metapneumovirus (hMPV)	14	14	3	0
Enterovirus	19	11	6	0
Single virus detection (% of positives)	275 (94.5)	213 (83.2)	58 (73.4)	0 (-)
Multiple virus detection (% of positives)	16 (5.5)	43 (16.8)	21 (26.6)	0 (-)

[1]Number 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 week[1]

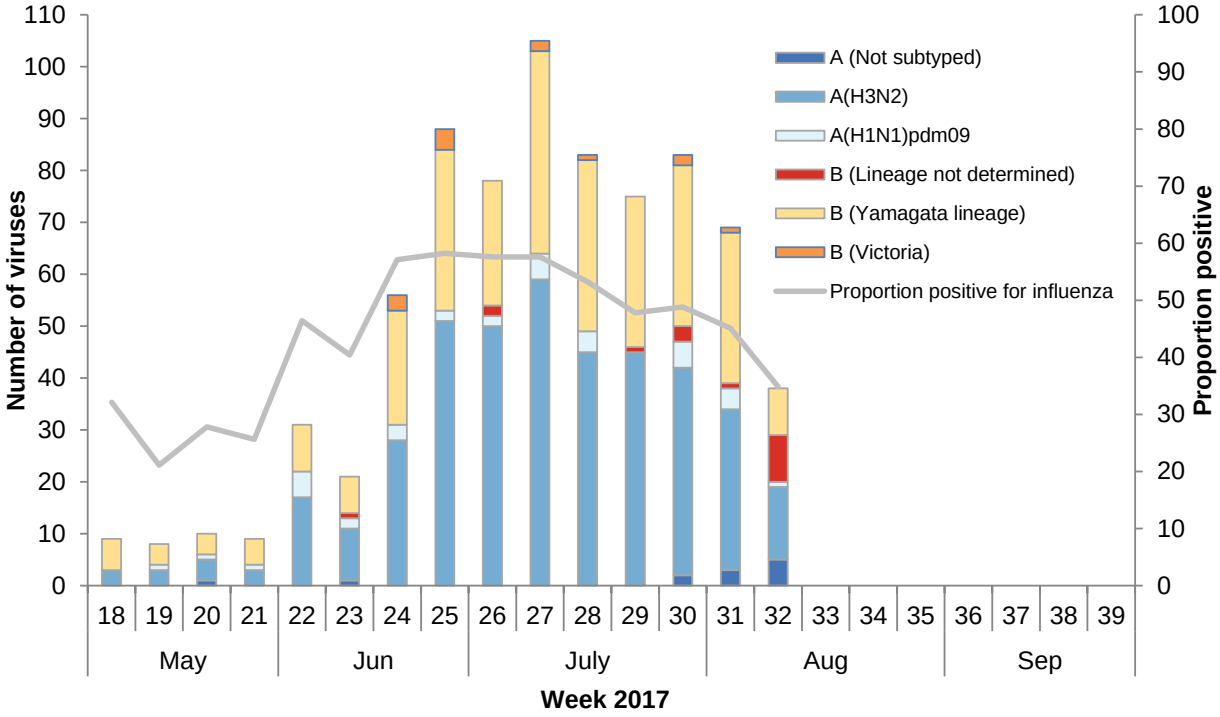


Figure 8. Temporal distribution of the number and proportion of influenza viruses from SARI specimens by type and week[1]

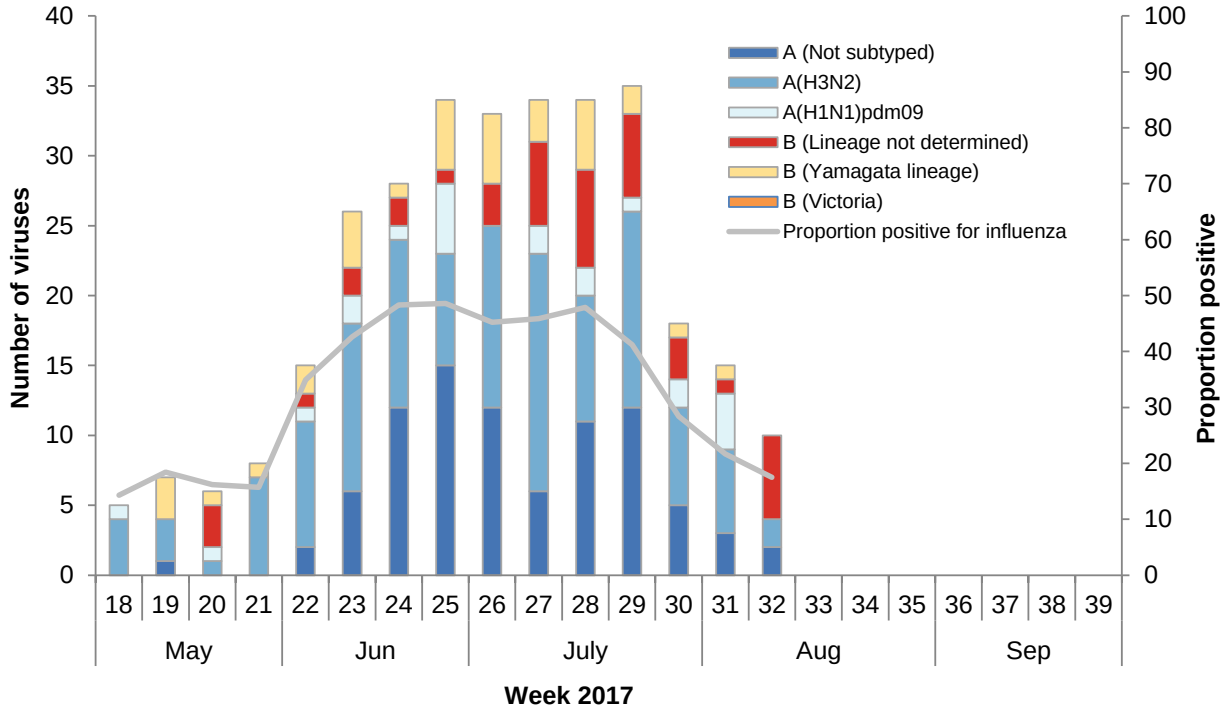


Figure 9. Temporal distribution of the number and proportion of non-influenza viruses from ILI specimens by type and week[1]

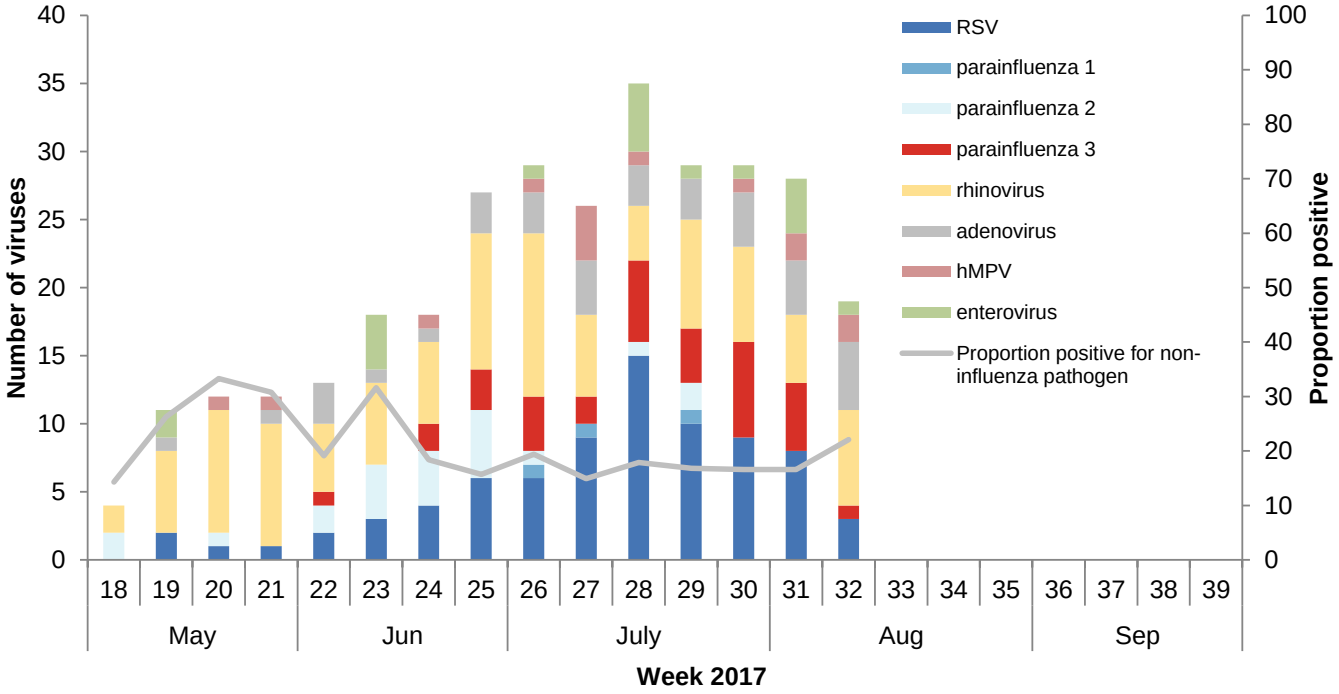
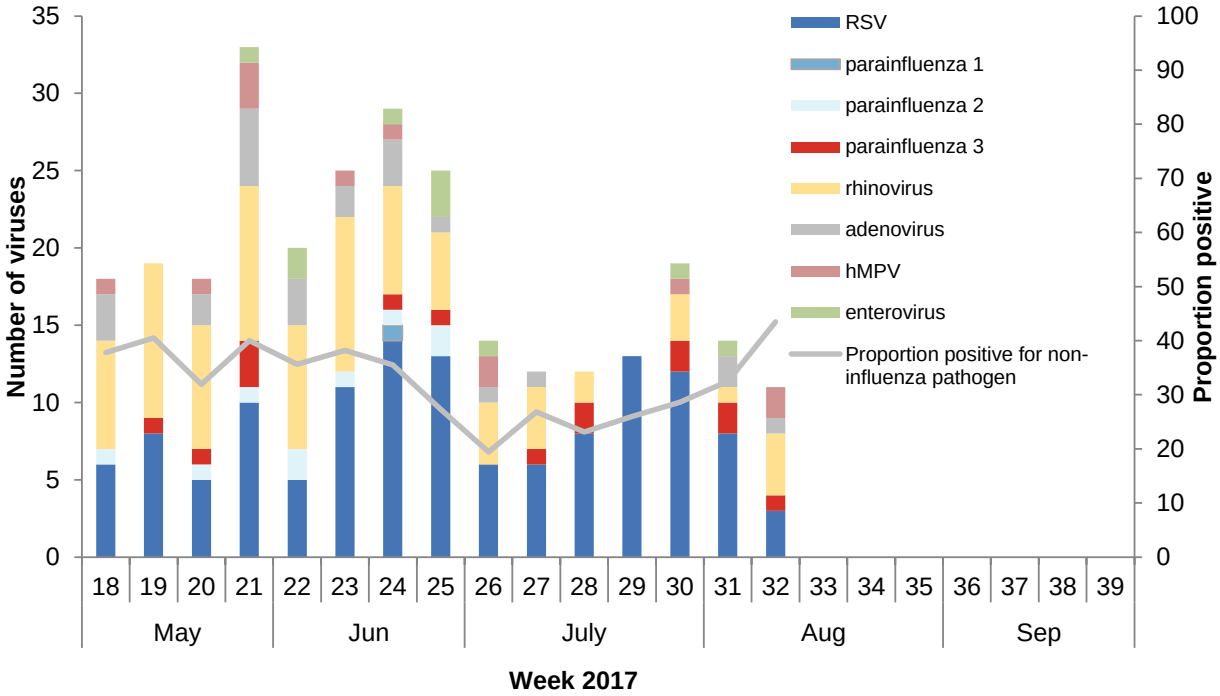


Figure 10. Temporal distribution of the number and proportion of non-influenza viruses from SARI specimens by type and week[1]



[1]Figures 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 18–32, 2017

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

Table 6. Influenza-like illness rate by DHB by week 18–32, 2017

DHB	Rate per 100 000														
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
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
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
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
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
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
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
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
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
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
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
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
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
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
Tairawhiti	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
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
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
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
Waitemata*	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
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
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
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**

*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 ≥38°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 ≥38°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.

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