INFLUENZA WEEKLY UPDATE

2009/51: 14-20 December 2009

The national influenza surveillance system in New Zealand is an essential public health component for assessing and implementing strategies to control influenza. This report summarises the data collected from sentinel general practice (GP) surveillance and non-sentinel surveillance for week 51 (14-20 December 2009). While the primary purpose of the sentinel surveillance system has been to contribute to the deliberations on the composition of the following year's seasonal influenza vaccine, it has provided timely information on the progress of the current pandemic.

IN THIS REPORT:

- There has been a slight decrease in consultations for influenza-like illness through sentinel surveillance in week 51 (14-20 December 2009). The highest weekly ILI rates were reported from Wellington, Otago and Nelson Marlborough health districts. The highest ILI consultation rates have been reported among children and teenagers aged 0 to 19 years.

- Up to 13 December 2009, a total of 4898 influenza viruses have been reported through sentinel (624, 13%) and non-sentinel surveillance (4274, 87%). Five influenza viruses were reported in week 51: A/California/7/2009 (H1N1)v (3) and pandemic (H1N1) 09 (2) from the non-sentinel surveillance. Pandemic (H1N1) 09 has become the predominant strain among all influenza viruses. Seasonal A (H1N1) strain has been the predominant strain among all seasonal influenza viruses.

- Since January 2008, a global emergence and rapid spread of oseltamivir-resistant seasonal influenza A (H1N1) viruses has been observed. Since 2009 in New Zealand, a total of 53 seasonal A (H1N1) viruses have been tested by either a phenotypic assay or a molecular assay and all 53 viruses have been resistant to oseltamivir.

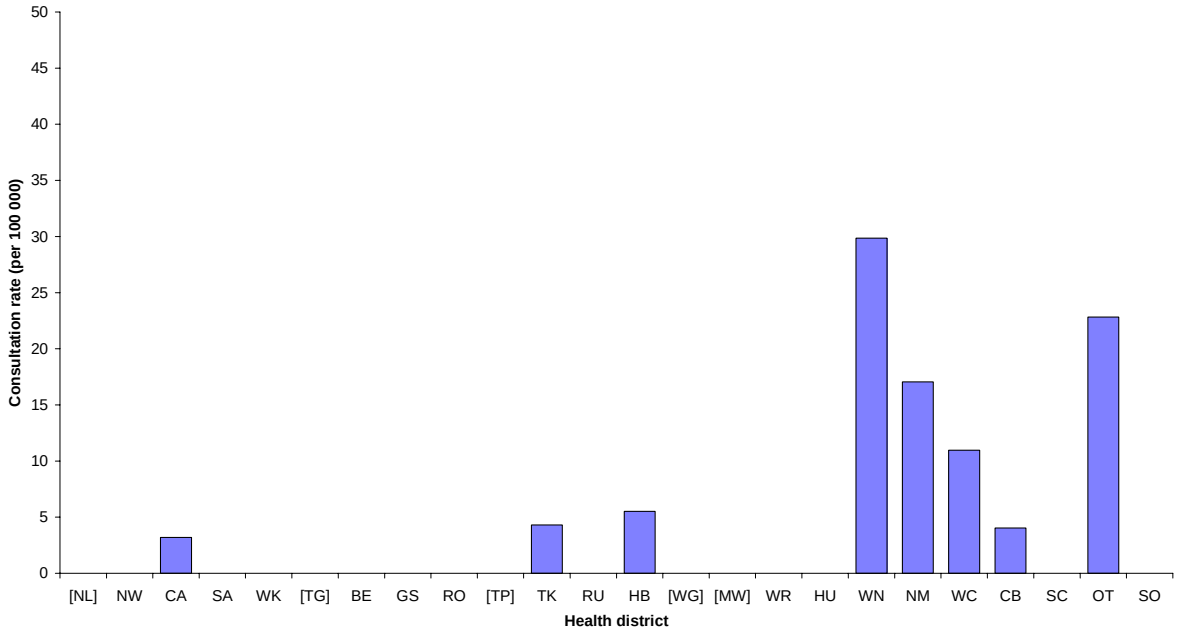
- Most Pandemic influenza (H1N1) 09 viruses reported globally are sensitive to oseltamivir. Forty two viruses have now been described from around the world which are resistant to oseltamivir, all carrying the same mutation (H275Y) that confers resistance to the antiviral oseltamivir but not to the antiviral zanamivir. Over 10 000 viruses have been tested worldwide and have all been shown to be sensitive to oseltamivir. During this winter season in New Zealand, a total of 521 Pandemic influenza (H1N1) 09 viruses were tested by phenotypic assay. All 521 viruses were sensitive to oseltamivir.

SENTINEL GENERAL PRACTICE SURVEILLANCE

In the past week, a total of 19[1] consultations for influenza-like illness were reported from 70 general practices in 19 of the 24 health districts. This gives a weekly consultation rate of 7.09 per 100 000 patient population.

The graph below compares the consultation rates for influenza-like illness for each health district over the past week. Wellington had the highest consultation rate (29.9 per 100 000, 8 cases), followed by Otago (22.8 per 100 000, 5 cases) and Nelson Marlborough (17.1 per 100 000, 1 case).

Figure 1: Weekly consultation rates for influenza-like illness by health district week ending 20 December 2009



[ ] Health districts did not participate for the week.

The weekly national consultation rates are shown in Figure 2 for 2007 and 2008 seasons, and 2009 so far. As seen in the previous years, the rates of influenza-like illness have decreased gradually between week 34 and week 40. However, ILI consultations from the GP sentinel surveillance program are still being reported after week 40 in response to the influenza pandemic this year.

[1] Includes ILI consultations through telephone assessment by sentinel GPs starting from week 29 (13-19 July).

Figure 2: Weekly consultation rates for influenza-like illness in New Zealand, 2007, 2008 and 2009

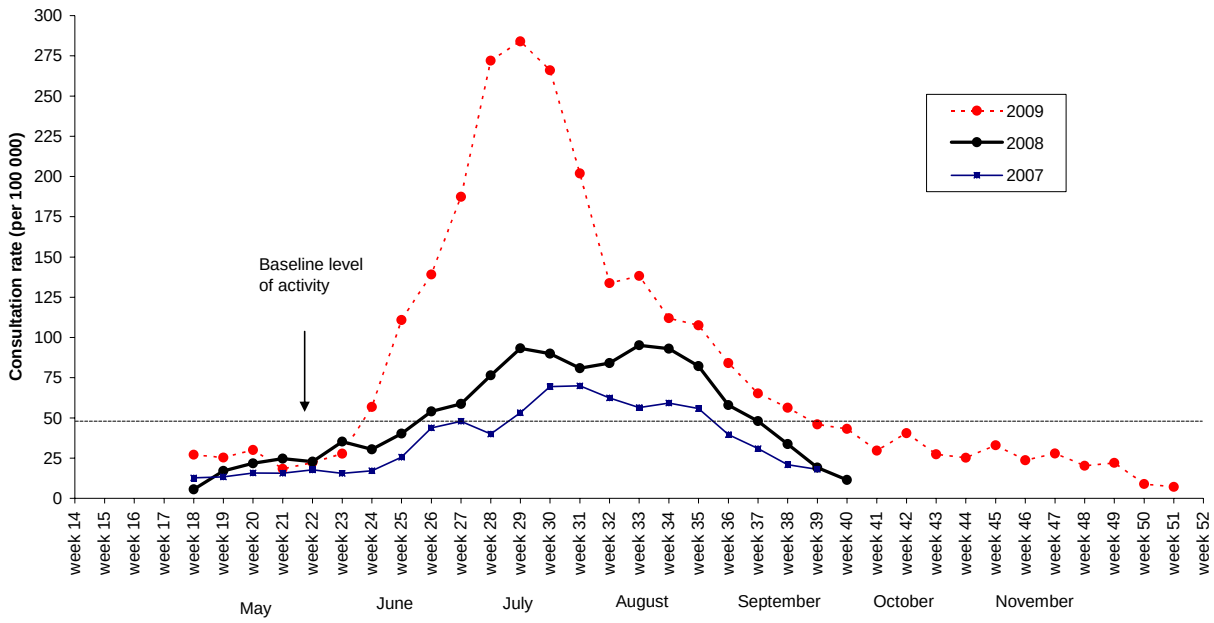
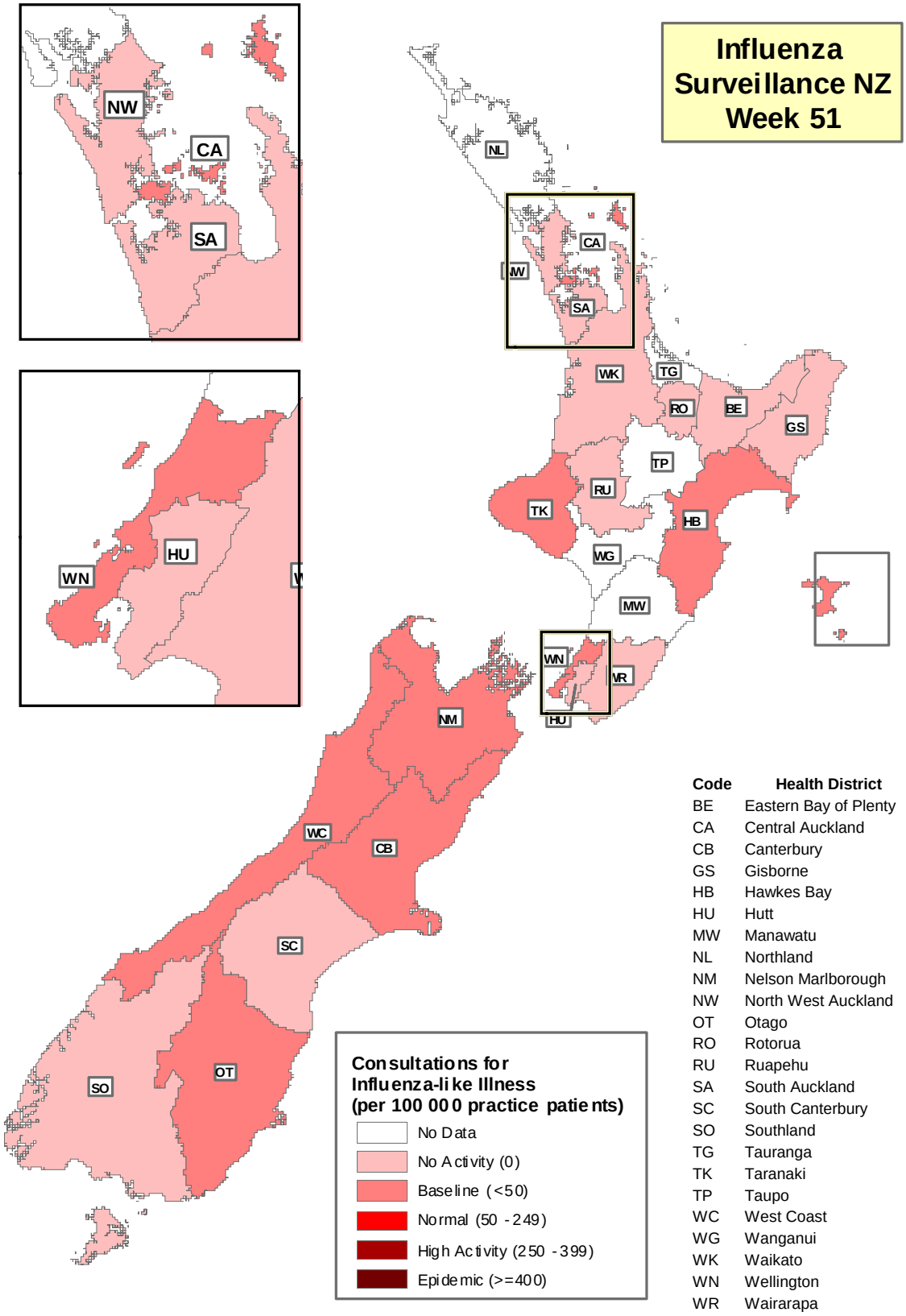


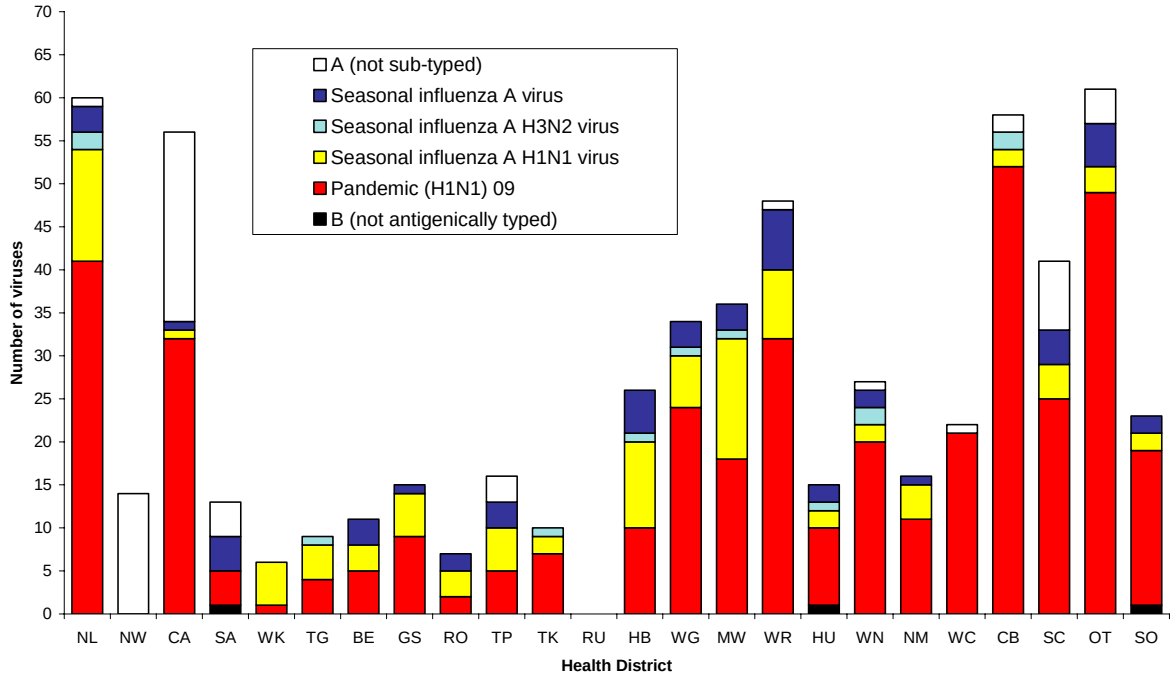
Figure 3 illustrates consultation rates for influenza-like illness mapped by health district for week 51, 2009.



A total of 25 swabs were received by the virology laboratories. No influenza viruses were identified.

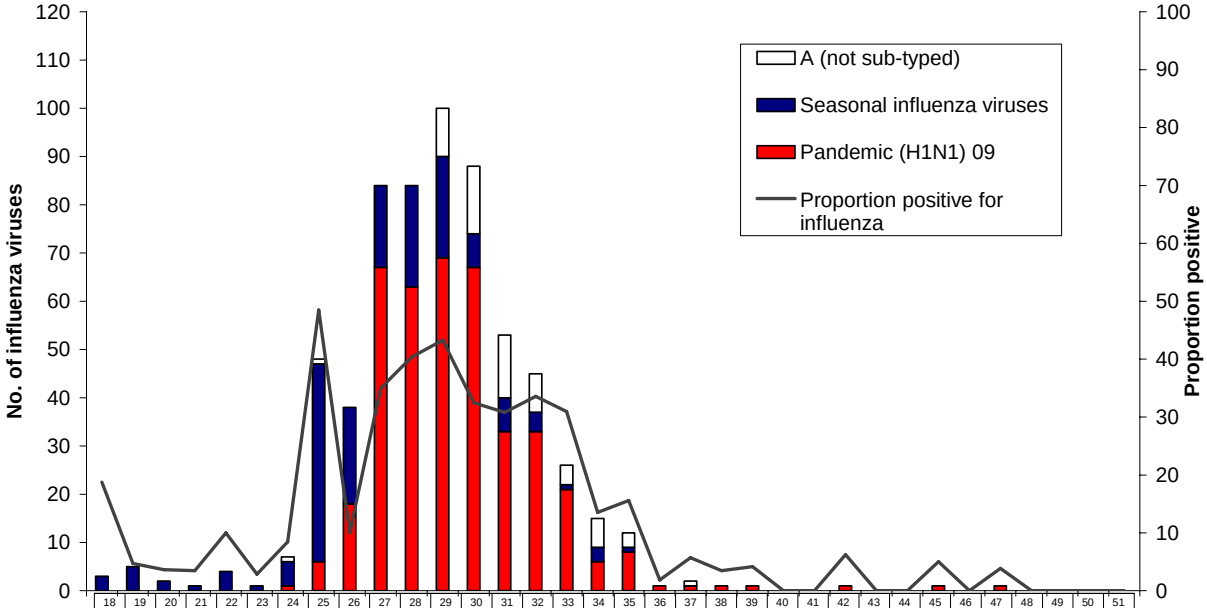
The cumulative figures are shown in Figure 4 for sentinel surveillance by health district from week 18 (27 April-3 May) to week 51 (14-20 December 2009). A total of 624 influenza viruses were identified. The predominant strain was pandemic (H1N1) 2009 (399) including 167 of pandemic influenza A/California/7/2009 (H1N1)v - like strains, followed by seasonal influenza A (H1N1) (98) including 28 of A/Brisbane/59/2007 (H1N1) - like strains, influenza A not subtyped (61), seasonal influenza A (51), seasonal influenza A (H3N2) (12), and influenza B not typed (3). Pandemic influenza (H1N1) 09 has become the predominant strain among all influenza viruses from sentinel surveillance.

Figure 4: Cumulative influenza viruses from sentinel surveillance by health district to 20 December 2009



The temporal distribution of influenza viruses is shown in the graph below for sentinel surveillance from week 18 (27 April-3 May) to week 51 (14-20 December 2009). Pandemic influenza (H1N1) 09 is greater than the number of seasonal influenza viruses.

Figure 5: Total influenza viruses from sentinel surveillance by type and week reported to 20 December 2009 and the total percentage positive from the swabs received

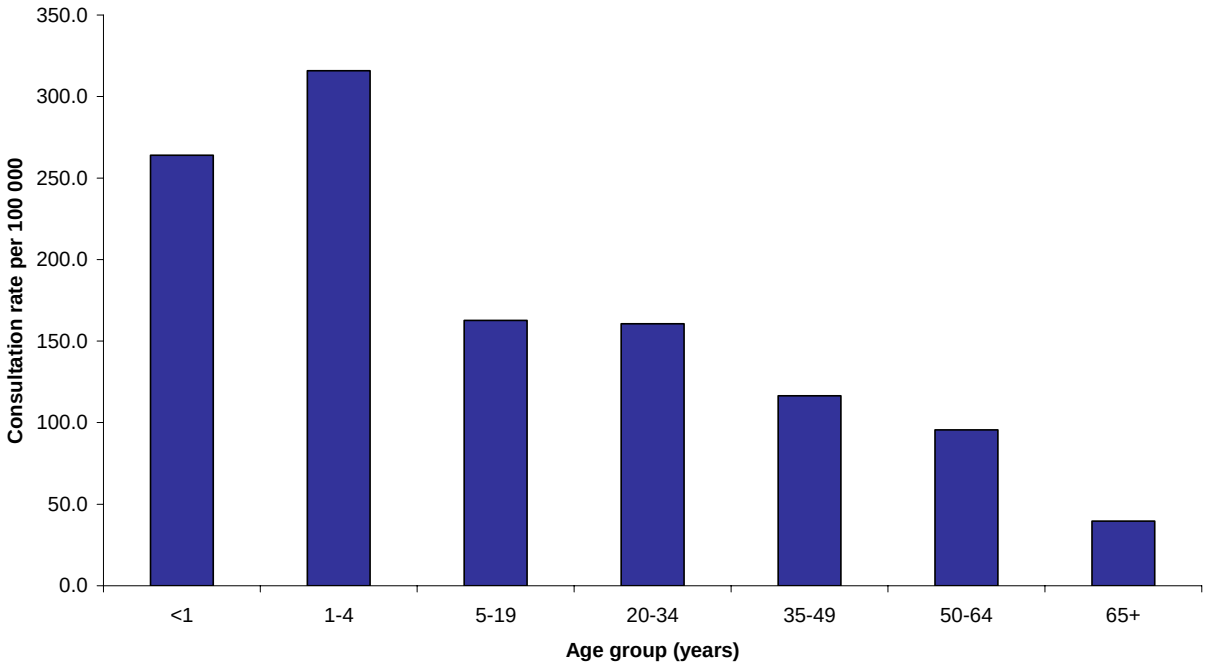


	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
A (not sub-typed)	0%	0%	0%	0%	0%	0%	14%	2%	0%	0%	0%	10%	16%	25%	18%	15%	40%	25%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Seasonal influenza viruses	100%	100%	100%	100%	100%	100%	71%	85%	53%	20%	25%	21%	8%	13%	9%	4%	20%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pandemic (H1N1) 09	0%	0%	0%	0%	0%	0%	14%	13%	47%	80%	75%	69%	76%	62%	73%	81%	40%	67%	100%	50%	100%	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%	0%	0%

Note: All results of sentinel swabs are received by ESR. The line shows the proportion of those swabs that test positive for any type of influenza. A low proportion may be due to the swabs not successfully retrieving the virus, or that ILI presentations to sentinel GPs are due to other viruses.

The age distribution for influenza-like illness (ILI) consultation rates for weeks 18-51 is shown in Figure 6. The highest ILI consultation rate was in 1-4 years (315.9 per 100 000) followed by those less than 1 year (264.1 per 100 000) aged 5-19 years (162.7 per 100 000).

Figure 6: Sentinel consultation rate for influenza-like illness by age group for weeks 18-51, 2009

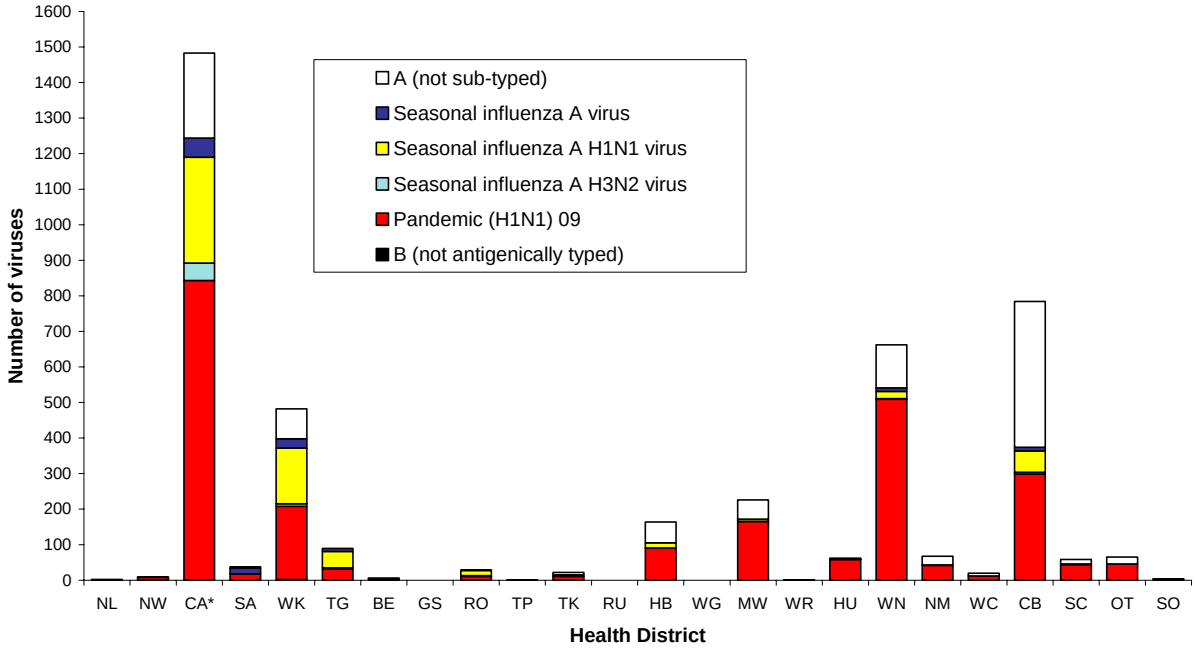


NON-SENTINEL SURVEILLANCE

Five influenza viruses were reported this week from the laboratory-based (non-sentinel) surveillance: A/California/7/2009 (H1N1)v (3) from Wellington and pandemic (H1N1) 09 (2) from Northland and South Auckland.

The cumulative influenza viruses are shown in Figure 7 for non-sentinel surveillance by health district from week 1 (1-4 Jan) to week 51 (14-20 December 2009). A total of 4274 influenza viruses were identified. The predominant strain was pandemic (H1N1) 2009 (2401) including 233 of pandemic influenza A/California/7/2009 (H1N1)v - like strains, followed by seasonal influenza A (H1N1) (625) including 131 of A/Brisbane/59/2007 (H1N1) - like strains, influenza A not subtyped (1049), seasonal influenza A (127), seasonal influenza A (H3N2) (69) including three A/Brisbane/10/2007 (H3N2) - like, and influenza B not typed (3). Pandemic influenza (H1N1) 09 has become the predominant strain among all influenza viruses from non-sentinel surveillance.

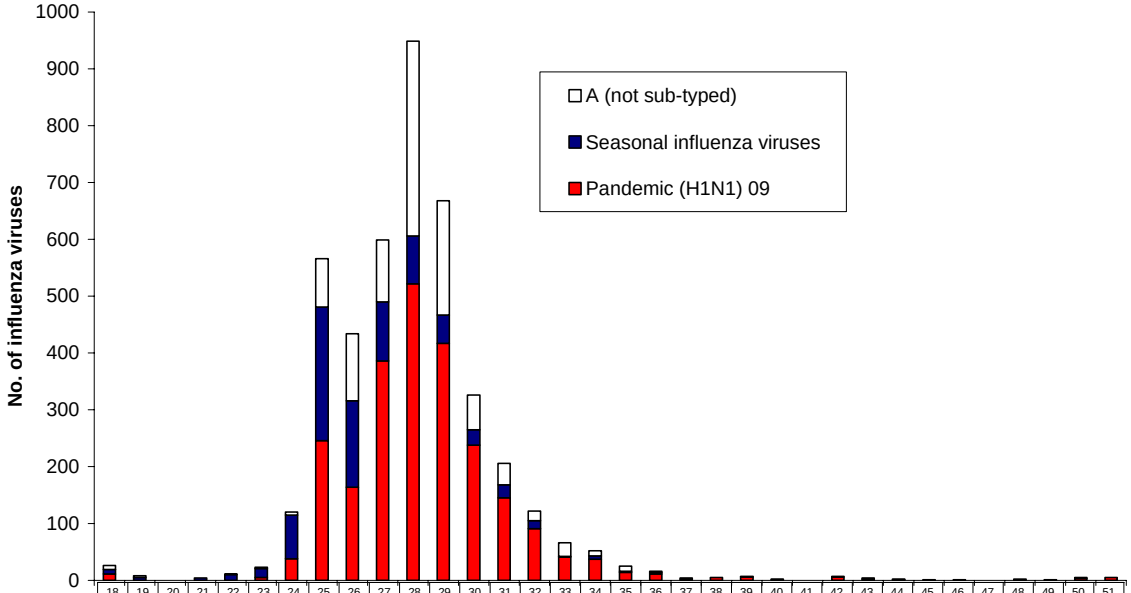
Figure 7: Cumulative influenza viruses from non-sentinel surveillance by health district to 20 December 2009



Note: Viruses from Auckland without health district codes have been temporarily assigned to Central Auckland (CA).

The temporal distribution is shown in Figure 8 for influenza viruses reported by type and subtype for each week from non-sentinel surveillance from week 7 (9-15 February) to week 51 (14-20 December 2009). The number of pandemic influenza (H1N1) 09 is greater than the number of seasonal influenza viruses.

Figure 8: Total influenza viruses from non-sentinel surveillance by type and week reported to 20 December 2009



	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
A (not sub-typed)	27%	38%	0%	0%	9%	9%	4%	15%	27%	18%	36%	30%	19%	18%	14%	36%	17%	36%	13%	50%	0%	14%	50%	0%	14%	50%	50%	0%	0%	0%	0%	0%	40%	0%
Seasonal influenza viruses	31%	63%	0%	100%	91%	70%	64%	42%	35%	17%	9%	7%	8%	11%	11%	2%	12%	8%	19%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%
Pandemic (H1N1) 09	42%	0%	0%	0%	0%	22%	32%	43%	38%	64%	55%	62%	73%	70%	75%	62%	71%	56%	69%	50%	100%	86%	50%	0%	86%	50%	50%	0%	100%	0%	100%	100%	60%	100%

*Data shown from week 18 onwards.

ANTIVIRAL SUSCEPTIBILITY MONITORING

Since January 2008, a global emergence and rapid spread of oseltamivir-resistant seasonal influenza A (H1N1) viruses has been observed. During this winter season in New Zealand, a total of 28 seasonal A (H1N1) viruses have been tested for the H275Y mutation (histidine-to-tyrosine mutation at the codon of 275 in N1 numbering) which is known to confer resistance to oseltamivir. All 28 viruses had the H275Y mutation. In addition, a total of 25 seasonal A (H1N1) viruses were tested using a phenotypic assay called fluorometric neuraminidase inhibition assay. The results of the fluorometric neuraminidase inhibition assay indicated that these viruses had highly reduced sensitivity to oseltamivir with IC50 values in the range of 305-7912 nM, typical of the recently global emerging oseltamivir-resistant A (H1N1) viruses. (Table 1).

Twelve Pandemic influenza (H1N1) 09 viruses were sequenced to see whether they possess the H275Y mutation. All 12 viruses, including one from a 21 year-old male fatality, did not possess the H275Y mutation. This indicates that these Pandemic influenza A (H1N1) viruses are sensitive to oseltamivir. In addition, a total of 521 Pandemic influenza (H1N1) 09 viruses were tested using the phenotypic assay and all 521 viruses were sensitive to oseltamivir with IC50 values in the range of 0.2 to 1.4 nM (Table 1).

Influenza type/subtype	***Seasonal A (H1N1)***				***Pandemic influenza (H1N1) 09***
Year	**2006**	**2007**	**2008**	**2009**	**2009**
Number of viruses	17	138	4	25	521
Mean IC50*	1.84	0.83	728	1399	0.392
Std. dev.	0.71	0.63	136	1990	0.231
Min IC50	0.25	0.01	547	305	0.092
Max IC50	3.099	4.219	870	7912	1.402

**IC50: Concentration of oseltamivir (nM) at which there is 50% inhibition of neuraminidase activity.*

Compiled by:
Liza Lopez
Population and Environmental Health
ESR Kenepuru Science Centre
PO Box 50 348, PORIRUA
Tel : 04 914 0647 Fax: 04 978 6690 Email:liza.lopez@esr.cri.nz

Dr. Sue Huang
WHO National Influenza Centre
ESR Wallaceville Science Centre
PO Box 40158, Upper Hutt