

Annual report

Annual report of the National Influenza Surveillance Scheme, 2010

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Abstract

The 2010 influenza season was moderate overall, with more laboratory-confirmed cases than in earlier years (with the exception of 2009). That said, self-reported influenza-like illness (ILI) was equal to or lower than 2008 and earlier years. In 2010, the number of laboratory-confirmed notifications for influenza was 0.8 times the 5-year mean. High notification rates were reflected in an increase in presentations with ILI to sentinel general practices and emergency departments. Notification rates were highest in the 0–4 year age group. Infections during the season were predominantly due to influenza A(H1N1)pdm09, with 90% of notifications being influenza A (56% A(H1N1)pdm09, 30% A(unknown) and 4% A(H3N2)) and 10% being influenza B. The A(H1), A(H3) and B influenza viruses circulating during the 2010 season were antigenically similar to the respective 2010 vaccine strains. Almost all (99%) of the circulating influenza B viruses that were analysed were from the B/Victoria lineage.

Keywords: influenza, surveillance, vaccine, influenza-like illness, sentinel surveillance

Introduction

Influenza or ‘the flu’ is a common, highly infectious respiratory viral disease. The virus spreads from person to person by airborne droplets of exhaled respiratory secretions, commonly generated by coughing or sneezing.^[1] Typical symptoms include sudden onset of fever, sore throat, runny nose, cough, fatigue, headache, and aches and pains.

Influenza causes annual epidemics of respiratory disease. Influenza epidemics usually occur during the winter months in temperate climates, causing an increase in hospitalisations for pneumonia, an exacerbation of chronic diseases and also contributing to increased mortality. Those most susceptible include the elderly and very young people, or people of any age who have a higher risk of complications (e.g. pneumonia, heart failure) due to certain chronic medical conditions, e.g. heart, lung, kidney, liver, immune, or metabolic diseases. Healthy children and adults usually only display minor symptoms.

Laboratory-confirmed influenza is a notifiable disease in all states and territories and data are reported from each state or territory health department to the National Notifiable Diseases Surveillance System (NNDSS).

In temperate zones of Australia, the annual influenza season runs from May to October, with notifications generally peaking in mid-August. Influenza activity varies from year to year. Australia experienced a mild season in 2006, moderate seasons in 2007 and 2008 and an extra-ordinary season in 2009 due to the influenza A(H1N1) pandemic. In years prior to 2010 (with the exception of 2008), influenza A has been the predominant type circulating in Australia. The A(H1) subtype has been the most commonly reported since the start of the 2009 (H1N1) pandemic and the A(H3) subtype the most commonly reported prior to 2009.

Surveillance methods

- Data used to describe the 2010 influenza

season were classified under the areas of epidemiology, morbidity, mortality and virology. Influenza surveillance was based on the following sources of data:

- notifications of laboratory-confirmed influenza required by legislation in all states and territories, and notified to the NNDSS;
- subtype and strain data of circulating influenza viruses provided by the World Health Organization (WHO) Collaborating Centre for Reference and Research on Influenza;
- consultation rates for influenza-like illness (ILI) identified by sentinel general practitioners (GPs);
- consultation rates for ILI identified by hospital emergency departments (EDs);
- rates of ILI and absence from work from a community survey;
- hospitalised cases of influenza from 15 sentinel hospitals across Australia through the Influenza Complications Alert Network (FluCAN);
- testing rates for influenza by sentinel laboratories in New South Wales, Victoria, Western Australia and Tasmania; and
- mortality data from the New South Wales Registry of Births, Deaths and Marriages (BDM) and Australian Bureau of Statistics (ABS).

National Notifiable Diseases Surveillance System

In 2010, laboratory-confirmed influenza was a notifiable disease under state and territory legislation in all jurisdictions. Laboratory notifications were sent to NNDSS for national collation. In this report, data were analysed by the date of diagnosis; the best substitute for the date of onset. The date of diagnosis was set as the earliest of the dates of onset, specimen collection or notification. Age, sex, Indigenous status,

method of laboratory diagnosis and postcode or locality of patient residence were included in NNDSS notifications.

FluTracking

FluTracking is a project of the University of Newcastle, the Hunter New England Local Health District, the Hunter Medical Research Institute and the Australian Government Department of Health. FluTracking is an online health surveillance system established to detect epidemics of influenza and monitor the transmission and clinical severity of ILI across Australia. It involves participants from around Australia completing a simple online weekly survey, which collects data on the rate of ILI symptoms in communities.

National Health Call Centre Network

The National Health Call Centre Network (NHCCN) is a national initiative that provides information on the number and proportion of calls received by the NHCCN relating to ILI or influenza. Data are reported daily for all jurisdictions, with the exception of Queensland and Victoria.

Sentinel general practitioner surveillance

Sentinel GP surveillance schemes for influenza monitor clinical consultations for ILI. In Australia, there are two such schemes: the Australian Sentinel Practices Research Network (ASPREN), which collects infectious disease data including ILI, at a national level from approximately 100 GPs across all states and territories and the Victorian Infectious Diseases Reference Laboratory General Practice Sentinel Surveillance Program (VIDRL GPSS). The Northern Territory Tropical Influenza Surveillance Scheme, which previously reported GP ILI rates separately, joined ASPREN in March 2010. ASPREN reports ILI rates throughout the year, while the reporting period for VIDRL GPSS was from early May to late October in 2010. The national case definition of ILI is:

presentation with fever, cough and fatigue. Both sentinel surveillance schemes used the national case definition for ILI in 2010.

Emergency department surveillance

Rates for ILI presentation were collected from 56 EDs across New South Wales and eight EDs in Perth, Western Australia. Data were provided to the Office of Health Protection within the Australian Government Department of Health* (Health) on a weekly basis, through the *Weekly Influenza Report, NSW*, and the *West Australian Virus Watch* report.

Laboratory surveillance

WHO Collaborating Centre for Reference and Research on Influenza

The WHO Collaborating Centres for Reference and Research on Influenza are located in Australia, China, Japan, the United Kingdom and the United States of America (USA), and are responsible for analysing influenza viruses collected through an international surveillance network involving 122 national influenza centres in 94 countries. The Melbourne centre analyses viruses received from Australia and from laboratories throughout Oceania, the Asian region and beyond. All virus isolates are analysed antigenically, and a geographically and temporally representative number of viruses, together with any strains demonstrating uncharacteristic reactions during antigenic characterisation, are further analysed by genetic sequencing of the viral haemagglutinin gene and the neuraminidase gene. Virological, serological and epidemiological data form the basis from which WHO makes recommendations in February (for the Northern Hemisphere) and in September (for the Southern Hemisphere) for the vaccine formulation to be used in the following winter. WHO vaccine formulation recommendations are made in the context of strains that are antigenically 'like' laboratory reference strains that are named according to a standard nomenclature for influenza viruses. For human

isolates this nomenclature is based on type, the place of isolation, sequential number and year of isolation and for influenza A, the subtype of the HA and NA may also be included in brackets after the designation. An example of a human isolate is A/Sydney/5/97(H3N2), an influenza A(H3N2) virus that was the 5th sequential influenza A isolated in Sydney in the year 1997.

The WHO recommendations are then translated into actual virus strains acceptable to regulatory authorities and vaccine manufacturers, by national and regional committees (such as the Australian Influenza Vaccine Committee).

Sentinel laboratory networks

Laboratory testing data are collected by PathWest (Western Australia), VIDRL (Victoria), the Institute for Clinical Pathology and Medical Research, Westmead Hospital (New South Wales) and sentinel Tasmanian laboratories and reported weekly during the influenza season.

Mortality

Death certificate data from the New South Wales Registry of Births, Deaths and Marriages provided an estimate of the number of deaths from pneumonia and influenza in New South Wales and was expressed as a rate per 1,000 deaths from all-causes and compared to a predicted seasonal mean with a 95% confidence interval alert level. These were obtained weekly from the New South Wales Influenza Surveillance Report.^[2]

Deaths data compiled by the ABS from information provided by the state and territory Registrars of Births, Deaths and Marriages, and coded using the 10th revision of the *International Classification of Diseases and Related Health Problems* (ICD-10) were used to estimate levels of influenza deaths. In this report, deaths for 2010 with an underlying cause of influenza and pneumonia (ICD-10 J09–J18) are presented.^[3] ICD-10 code J09 was introduced in July 2009. The expanded range of codes, J09–J18, correlates with previous versions of ICD-10 codes J10–J11.

* Known at the time as Department of Health and Ageing

Morbidity data

There was no direct measure of morbidity of disease readily available during the 2010 influenza season. Instead, morbidity was assessed through a number of indicators including:

- Paediatric admissions to Intensive Care Units (ICUs) and deaths data collected by the Australian Paediatrics Surveillance Unit (APSU);
- Hospitalised cases of influenza and pneumonia from 15 sentinel hospitals across Australia through the Influenza Complications Alert Network (FluCAN);
- ED presentations for ILI in New South Wales, Western Australia and the Northern Territory; and
- ILI presentations to GP surveillance networks.

Notification rates for laboratory-confirmed influenza were calculated using the estimated 2010 December resident population supplied by the ABS.^[4] All rates are represented as the rate per 100,000 population unless stated otherwise.

Results

The 2010 influenza season began in late-July, although there was a very gradual increase in notifications above non-seasonal levels from much earlier in the year. All sentinel data sources were tracking below or similar to trends seen in previous years during the main season. Between September and the end of the year, NNDSS notifications were above the 5-year mean due to notifications peaking later than recent years and unusually high activity during December.

Laboratory-confirmed cases

The first increase in notifications of laboratory-confirmed influenza in the 2010 season were registered in late June (week 26) with 99 cases diagnosed. Notifications peaked late September (week 39) and were almost back to inter-seasonal levels by the middle of November (week 47)

(Figure 1). However higher than usual levels of influenza activity across all jurisdictions characterised the final weeks of 2010. The total number of notifications for the year was 13,467, which was 0.8 times the 5-year mean. This decrease was entirely due to the significantly higher number of notifications during the 2009 pandemic (n=59,023) compared with the previous four years.

Geographic spread

In 2010, 32% of laboratory-confirmed influenza notifications occurred in South Australia, 24% in Queensland, 15% in Victoria, 12% in Western Australia and New South Wales, 4% in the Northern Territory and 1% in Tasmania and the Australian Capital Territory combined (Figure 2, Table 1). The number of notifications peaked earlier in Victoria, the Australian Capital Territory and Queensland (weeks 36-37, ending 3 and 10 September respectively), New South Wales plateaued at 101 notifications for weeks 37 through to 39, while the remaining jurisdictions peaked in week 39 (in the week ending 24 September).

Laboratory-confirmed influenza rates of notification for 2010 varied across the country, ranging from 21 cases per 100,000 population in Tasmania to 259 cases per 100,000 population in South Australia. The rate of notification of influenza infection for Australia was 60 cases per 100,000 population (Table 1).

Age-sex profile

Age-specific notification rates for laboratory-confirmed influenza reported to the NNDSS in 2010 are shown in Figure 3. The highest notification rates were seen in children aged 0–4 years, which were around 1.8 times higher than the overall notification rate (111 cases per 100,000 population compared with a total rate of 60 cases per 100,000 population for all notifications). People aged 65 years or over are the target for influenza vaccination as they are at an increased risk of complications from influenza. Notification rates for people in this age group were 35 cases per 100,000 population for males

Figure 1: Laboratory-confirmed influenza notifications, 2006 to 2010, Australia, by month and year of diagnosis

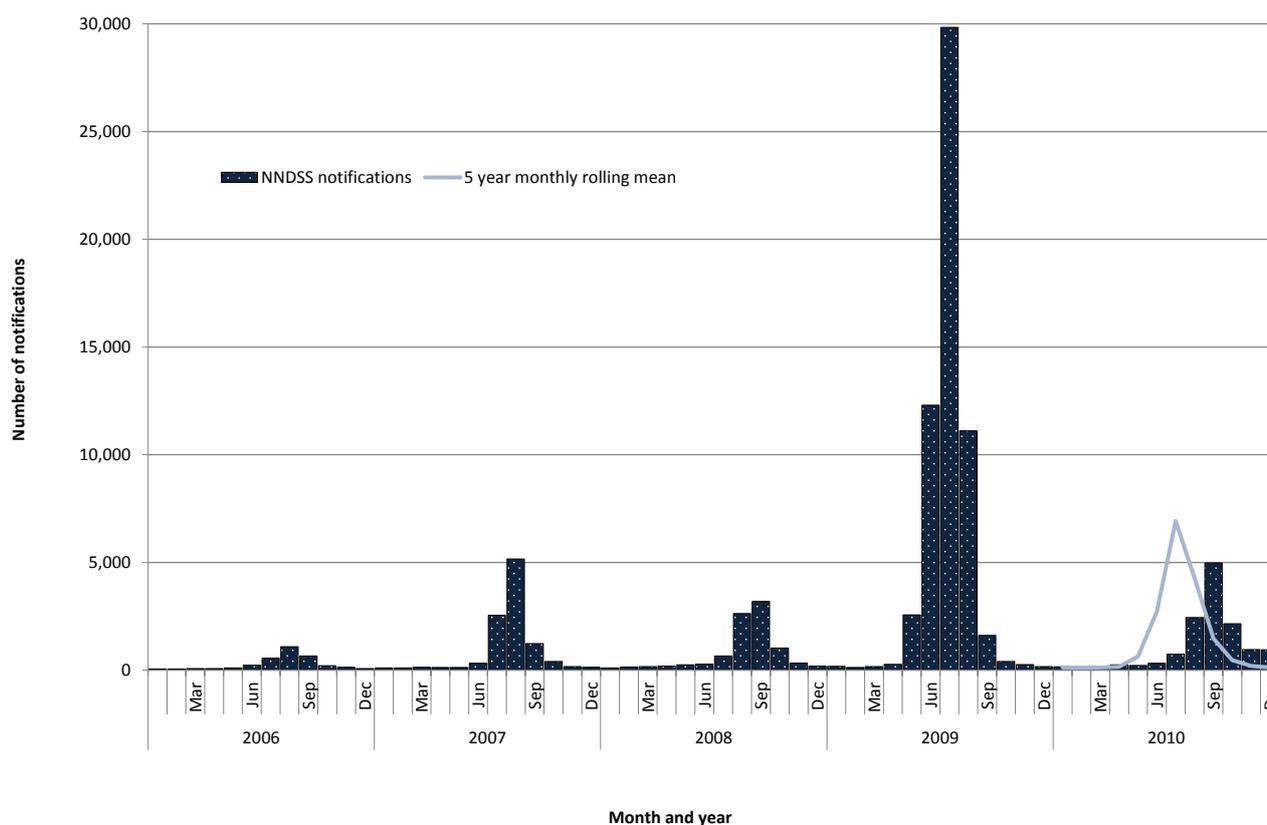


Table 1: Notifications and rates of laboratory-confirmed influenza, 2010, by state or territory and sex*

State or territory	Total notifications	% of total notifications	Notification rate (per 100,000 population)	Notifications*		Notification rate* (per 100,000 population)	
				Male	Female	Male	Female
ACT	95	1%	26	47	48	26	27
NSW	1,604	12%	22	733	847	20	23
NT	479	4%	209	248	231	208	209
Qld	3,221	24%	71	1,472	1,748	65	78
SA	4,258	32%	259	1,990	2,268	245	273
Tas.	104	1%	21	55	49	22	19
Vic.	2,081	15%	38	1,003	1,039	37	37
WA	1,625	12%	71	777	848	67	75
Australia	13,467	100%	60	6,325	7,078	57	63

* Excludes 64 notifications for which sex was not stated.

Figure 2: Laboratory-confirmed influenza notifications, 29 May June to 31 December 2010, by state or territory and week of diagnosis

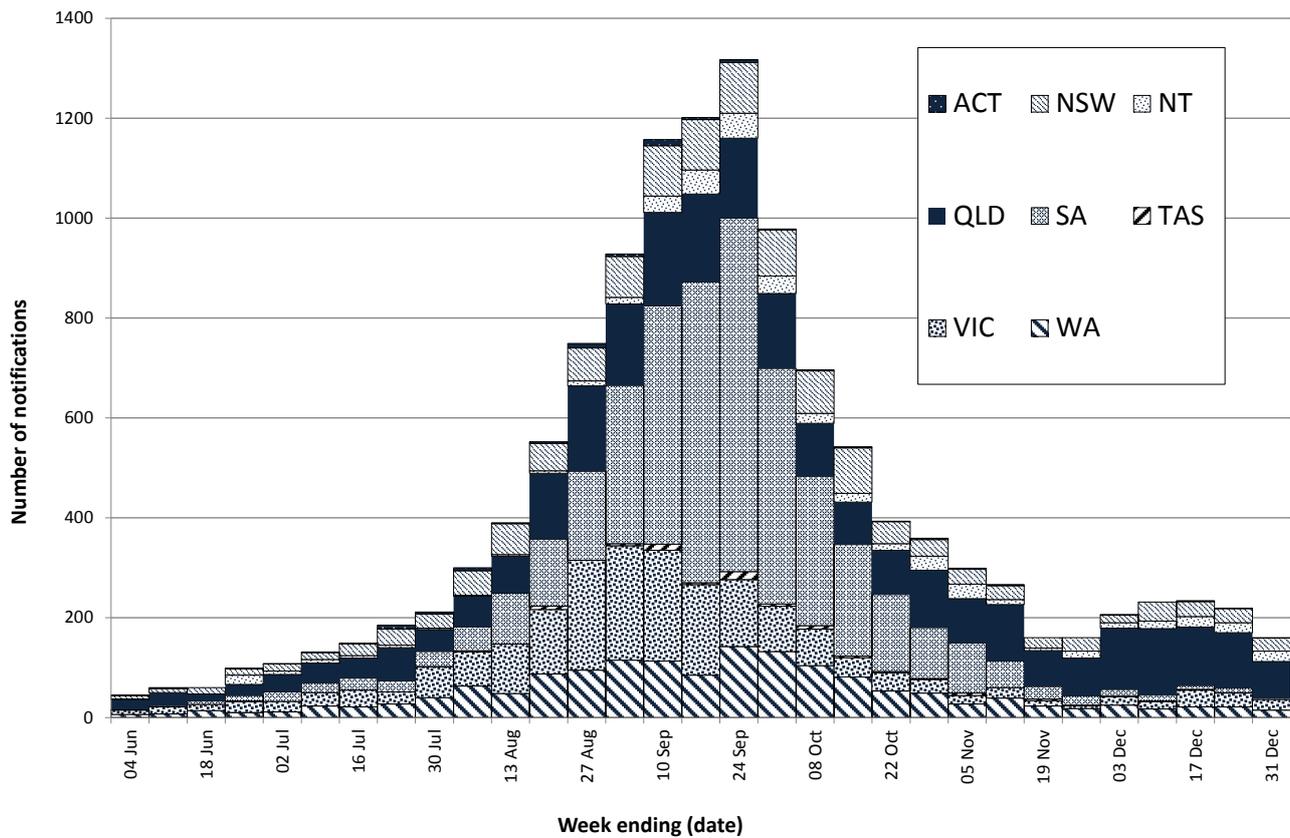
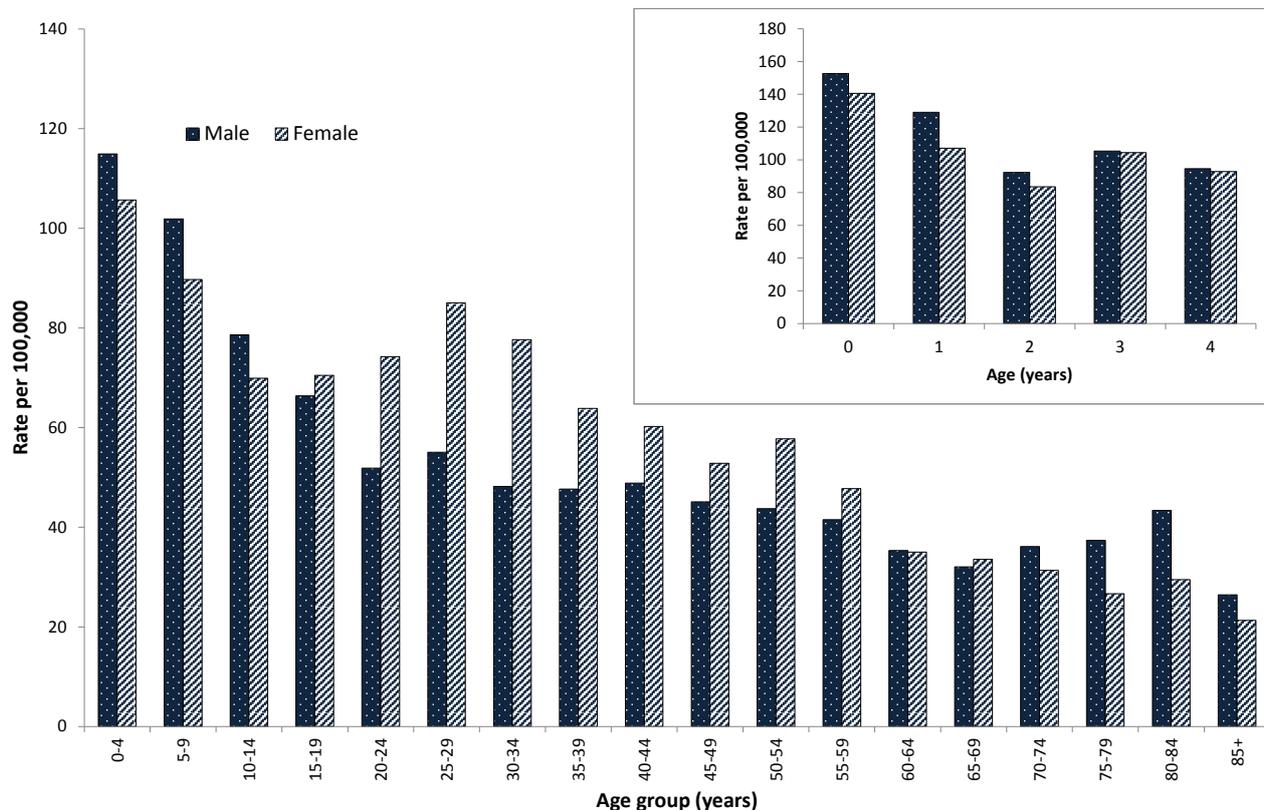


Table 2: Summary of Australian influenza viruses collected in 2010 and typed by HI or PCR at the WHO Collaborating Centre for Reference and Research on Influenza, VIDRL, by antigenic type

Type/subtype	ACT	NSW	NT	Qld	SA	Tas.	WA	Vic.	Total
A(H1) pandemic 2009	12	122	139	335	140	1	208	249	1,206
A(H3)	3	11	1	117	3	3	30	27	195
A(NS)	0	0	2	0	0	0	0	1	3
B(VIC)	0	30	2	47	0	0	147	10	236
B(YAM)	0	0	0	0	0	0	2	0	2
Mixed A	0	0	0	1	1	0	0	2	4
Mixed A/B	0	0	0	0	0	0	0	2	2
Total	15	163	144	500	144	4	387	291	1,648

Note: If year of sample collection was unknown it was assumed based on the year it was received at the Centre or the year stated in the virus' designation. Some samples collected in 2010 may not have been received at the Centre until 2011.

Figure 3: Notification rate of laboratory-confirmed influenza, Australia, 2010, by age group (insert – single year of age) and sex*



* Notifications (n=97) with unknown age and/or sex were excluded from analysis.

and 29 cases per 100,000 population for females. This compares with 2009 pandemic year where influenza rates were higher in this age group for males (72 cases per 100,000 population) than females (64 cases per 100,000 population).

Total notifications in 2010 were approximately equal for both males (47%, n=6,312) and females (53%, n=7,058). However, notifications were slightly higher in females than in males for persons aged between 20 and 69 years, and persons aged 85 years and over. For children aged less than 15 years and persons aged 70 to 84 years, notifications for males exceeded those for females by 17%.

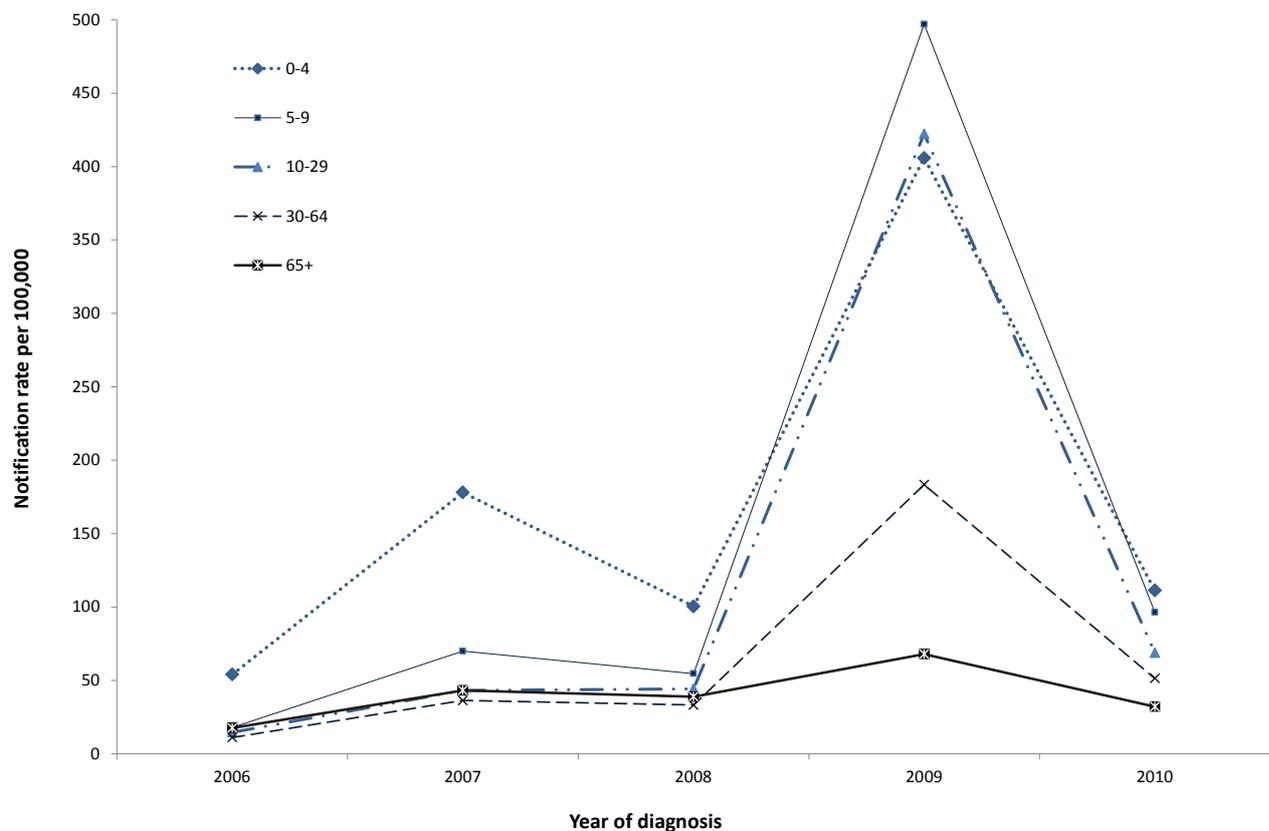
Figure 4 shows rates of notifications for key age groups for the years 2006 to 2010. Overall, notification rates were lower in 2010 for all age groups, compared with the 2009 pandemic year. Notification rates decreased dramatically

for persons aged 0 to 29 years, from 431 cases per 100,000 population in 2009 to 80 cases per 100,000 population in 2010.

Virus type and subtype

Analysis of NNDSS influenza typing data indicated the influenza A(H1N1)pdm09 virus remained the predominant subtype in 2010. Almost all (n=13,449) of the influenza cases notified to NNDSS in 2010 included some typing data. Of those with type information, 90% (n=12,096) of notifications were type A (56% (n=7,561) were A(H1N1)pdm09, 30% (n=3,985) were A (unsubtyped) and 4% (n=549) were A(H3N2)) and 10% (n=1,302) were type B (Figure 5). Mixed influenza type A and B infections accounted for less than 1% (n=51) of notifications and typing data were not available for 18 cases.

Figure 4: Notification rate of laboratory-confirmed influenza, Australia, 2006 to 2010, by diagnosis year and age group*



* Notifications of unknown age (n=37 for 2010) were excluded from analysis.

While very little influenza B was detected in Australia in 2010, comprising 10% of influenza notifications to NNDSS (Figure 6), this was a significant increase from the previous year (Figure 5). With the predominance of the influenza A(H1N1)pdm09 virus, influenza B comprised a very small proportion (1%, n=472) of notifications in 2009, as well as a very small number of absolute notifications, compared with previous years (877 notifications in 2006 and 958 notifications in 2007 (Figure 7). In 2008, influenza B was the predominant influenza type for the first time since influenza became nationally notifiable. A breakdown of notifications by type and age indicates that the rate of influenza A was higher than influenza B in all age groups in 2010 (Figure 8).

Virology

The WHO Collaborating Centre for Reference and Research on Influenza (WHOCC) typed and subtyped 1,648 influenza virus samples that were collected in 2010 (Table 2). This represented 12% of 13,467 laboratory-confirmed cases reported to the NNDSS. Influenza A(H1) pandemic 2009 viruses comprised 73% (n=1,206) of viruses, followed by influenza B (14%, n=238; consisting of 99% B/Victoria lineage and just 1% of these were B/Yamagata lineage viruses) and influenza A(H3N2) (12%, n=195).

The 2010 Southern Hemisphere and Australian influenza vaccine included a A/California/7/2009 (H1N1)-like virus, A/Perth/16/2009 (H3N2)-like virus; and a B/Brisbane/60/2008-like virus. The WHOCC conducted antigenic characterisation by Haemagglutination Inhibition (HI) assays on 1,549 influenza virus isolates (Table 3). Nearly

Figure 5: Percentage of laboratory-confirmed influenza notifications, Australia, 2006-2010, by subtype

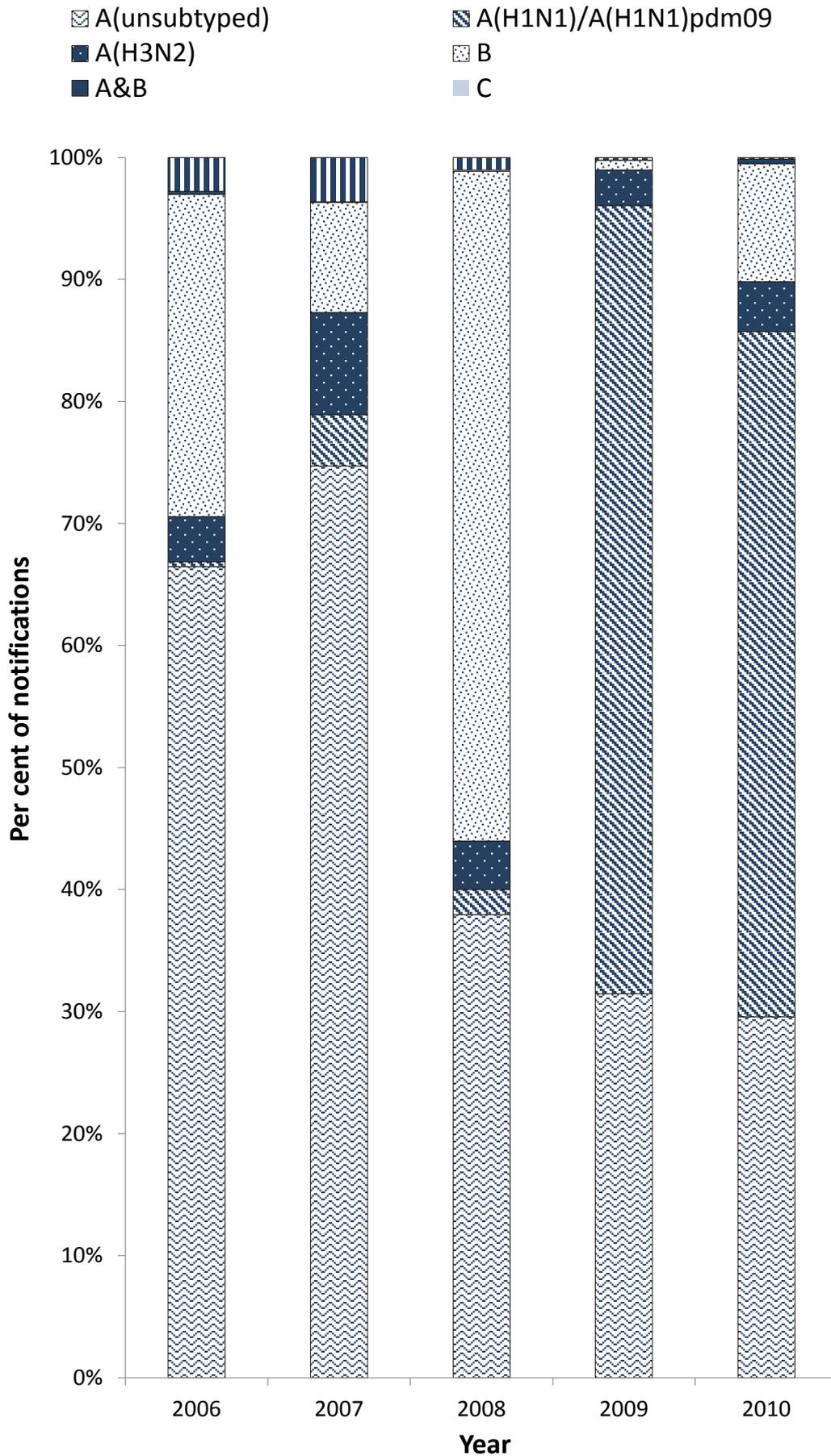
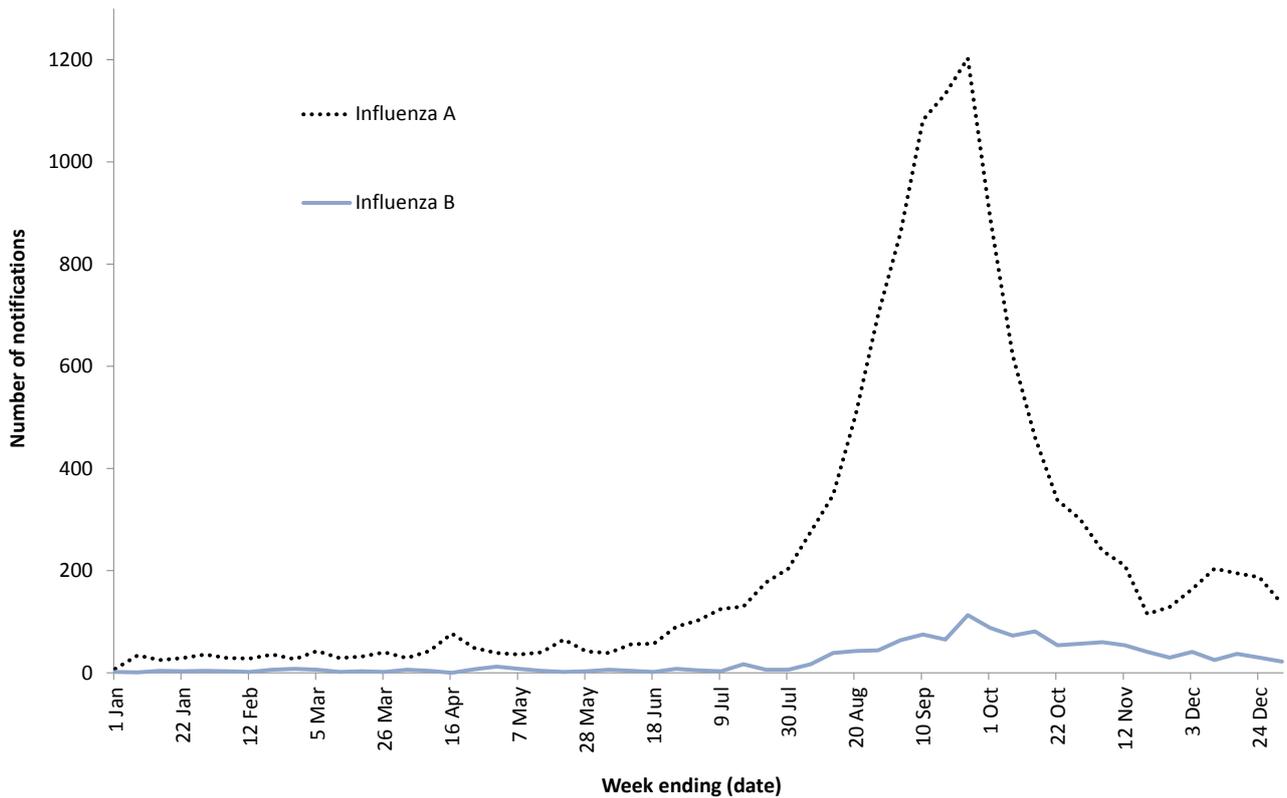


Figure 6: Laboratory-confirmed influenza notifications, Australia, 2010, by type and week of diagnosis*



* Notifications of type "A&B" (n=51) and "untyped" (n=18) influenza were excluded from this analysis.

Figure 7: Laboratory-confirmed influenza notifications, Australia, 2006 to 2010, by type and week of diagnosis

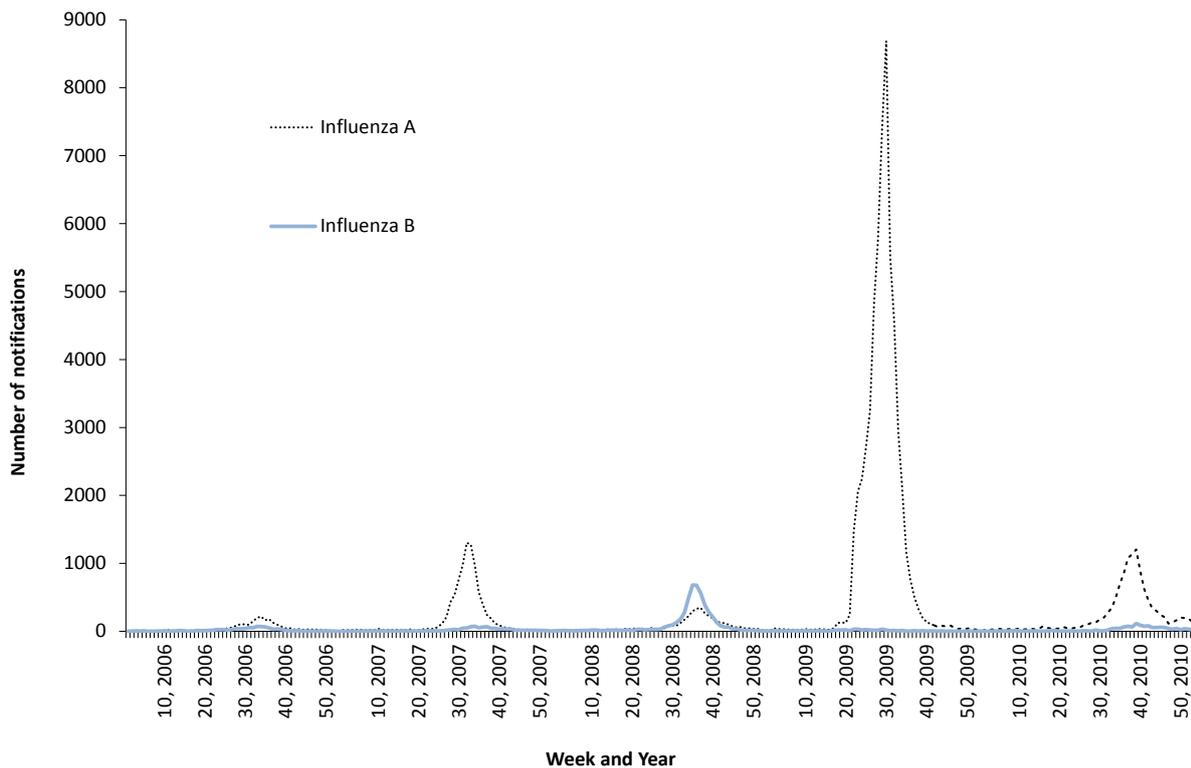


Figure 8: Notifications rate of laboratory-confirmed influenza, Australia, 2010, by type and age group

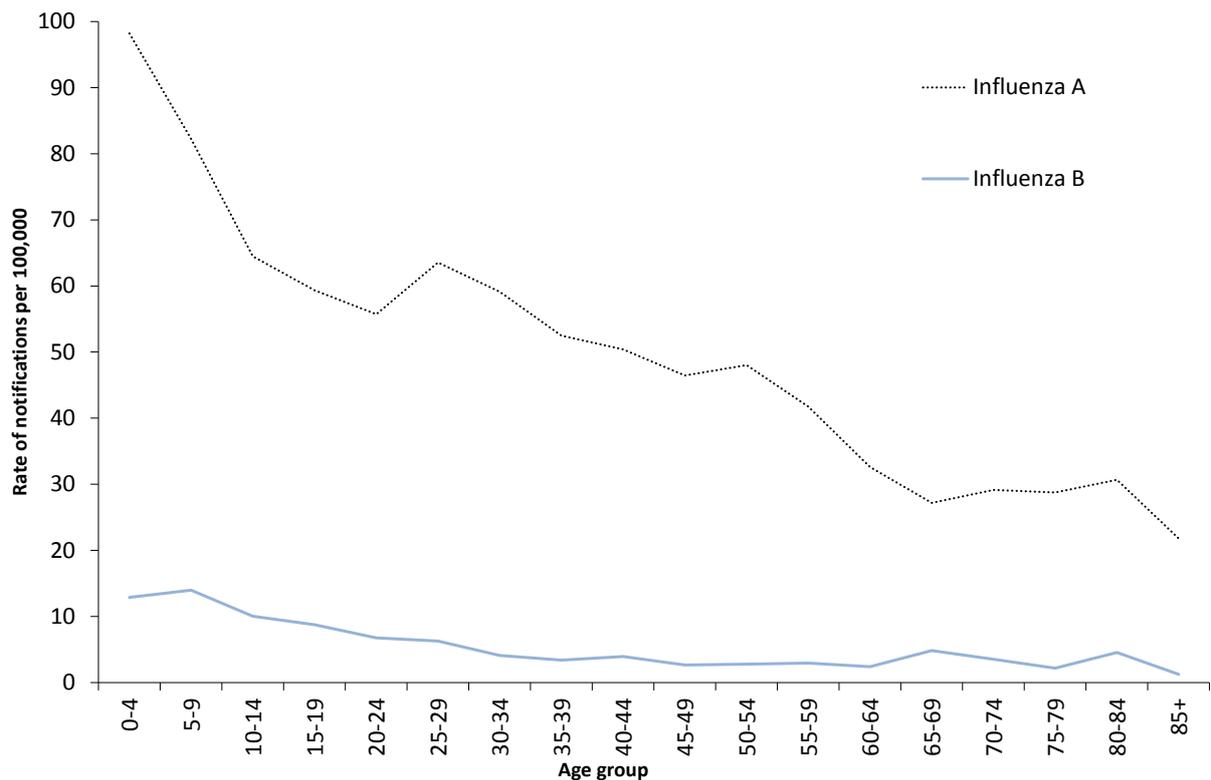


Table 3: Influenza isolates analysed by HI from samples collected by the WHOCC, VIDRL, 2010, by strain

	ACT	NSW	NT	Qld	SA	Tas.	Vic.	WA	Total
A(H1N1)pdm09	2	122	96	335	124	0	237	205	1,121
A/California/7/2009-like ¹	2	121	94	329	123	0	235	205	1,109
A/California/7/2009-like (low reactor)	0	1	2	6	1	0	2	0	12
A(H3N2)	1	11	1	115	3	1	24	30	186
A/Perth/16/2009-like ¹	0	11	0	109	3	1	23	28	175
A/Perth/16/2009-like (low reactor)	1	0	1	6	0	0	1	2	11
B	0	30	2	47	0	0	10	149	238
B/Florida/4/2006-like	0	0	0	0	0	0	0	0	0
B/Florida/4/2006-like (low reactor)	0	0	0	0	0	0	0	2	2
B/Brisbane/60/2008-like ¹	0	30	2	46	0	0	9	146	233
B/Brisbane/60/2008 (low reactor)	0	0	0	1	0	0	1	1	3
Mixed viruses	0	0	0	0	0	0	4	0	4
Mixed H3/(H1N1)pdm09	0	0	0	0	0	0	2	0	2
Mixed B/(H1N1)pdm09	0	0	0	0	0	0	2	0	2
Total	3	163	99	497	127	1	275	384	1,549

¹ Composition of the 2010 Southern Hemisphere influenza vaccine

all (99%, n=1,109) of the A(H1N1)pdm09 isolates were characterised as A/California/7/2009-like, while the remainder were characterised as 'low reactor' compared with the reference virus. Of the circulating influenza A(H3N2) viruses analysed, 94% (n=175) were antigenically similar to the A/Perth/16/2009 virus. For influenza B viruses, 98% (n=233) were closely related to the B/Brisbane/60/2008 virus (a B/Victoria lineage virus). A small number (n=2) of vaccine mismatched influenza B viruses were closely related to the B/Florida/4/2006 virus (B/Yamagata lineage) and were also detected. Thus, the majority of circulating viruses that were isolated in 2010 were antigenically similar to the 2010 vaccine viruses.

Low reactor: these viruses show ≥ 8 fold reduction compared to the HI titre obtained with the reference virus and antisera.

Viruses collected in 2010 were also tested for resistance to the antiviral drugs oseltamivir and zanamivir. Neuraminidase inhibition assay (NAI) was performed on 1,541 viral isolates (Table 4). Just three of the A(H1N1)pdm2009 isolates and one of the A(H3) isolates tested, showed resistance to oseltamivir.

Influenza-like illness – national online community survey

Data from the Flutracking survey indicated that national participation more than doubled between the peak week of 2008 (n=4,827 and 207.3 respondents per 100,000 population) and the peak week of 2010 (10,773 respondents and 48.2 respondents per 100,000 population).

The peak in the proportion of Flutracking survey participants reporting a fever and cough in 2010 (4%) was lower than the two previous years (5% in 2009 and 6% in 2008) (Figure 9). The timing of the 2010 peak (week ending 5 September 2010) was eight weeks later than the peak week in 2009 (week ending 12 July 2009) and one week later than the peak week in 2008 (week ending 31 August 2008).

Influenza-like illness – National Health Call Centre Network

In 2010, 34,120 calls were made to the NHCCN relating to ILI, comprising 6% of total calls. Calls relating to ILI increased gradually throughout the year, peaking at 1,086 calls (9%) in mid-September (week 38) (Figure 10). The percentage of total calls to the NHCCN relating to ILI peaked at 9.0% in early June (week 27) and plateaued until around mid-September. While there is a seasonal trend in the number and percentage of calls to the NHCCN related to ILI, it is not as marked as the seasonal trend in notifications.

Influenza-like illness consultations from sentinel general practitioner surveillance systems

Data from ASPREN and VIDRL sentinel GPs showed that for 2010 there were 4,655 notifications for ILI. An average of 94 doctors reported to ASPREN each week (range 74 to 107), with an average of 9,172 consultations per week (range 3,082 to 11,205) across all states and territories.

Overall, the consultation rates for ILI were lower in 2010 than in years 2008 and 2009 (Figure 11). Consultation rates increased gradually through to August, increased sharply in late August (week 34) and peaked at 15 ILI cases per 1,000 consultations in late September (week 41) which was consistent with NNDSS notifications. Consultation rates for ILI then decreased through November but they were relatively stable in December. In 2010 consultations rates peaked lower and later than in 2009 and 2008, although rates were higher than the previous year during the 2010-11 inter-seasonal period (also consistent with NNDSS notifications).

At a state level, ASPREN GPs in New South Wales had higher rates of ILI notifications compared with all the other states and territories with 15 consultations for ILI per 1,000 consultations, followed by South Australia and the Australian Capital Territory (both with 10 per 1,000 consultations).

A breakdown of ASPREN data by age and sex indicates that the highest rate of ILI presentations were recorded in children under 1 year of age and aged 1–4 years (Figure 12). This is consistent with NNDSS influenza notifications. The rate of ILI presentations was higher for females aged 20 to 74 years, which is consistent with trends in laboratory-confirmed influenza notifications.

ASPREN data are not completely representative of the Australian population. In 2010, average consultation rates ranged from 7 per 1000 population in Victoria to 79 per 1000 population in Western Australia. It is also difficult to compare across different years, as representativeness varies over time, due to changes in the number of reporting doctors.

Swab tests for laboratory-confirmed influenza were performed for 19% of ILI notifications (550/2,915) through ASPREN; this excludes ILI notifications from Victoria and Western

Australia that were not swab tested under similar conditions. Of these ILI notifications tested in 2010, 21% (n=114) were positive for influenza, with the majority attributable to influenza A(H1N1)pdm09 (16%, n=86).

Influenza-like illness – sentinel emergency department surveillance

Presentations to New South Wales EDs for ILI were low and relatively stable in 2010, peaking at just 2.1 presentations per 1,000 consultations in early October (week 41) compared with an interseasonal rate of 0.9 (Figure 13). The rise in laboratory-confirmed notifications of influenza to NNDSS through the 2010 season was not reflected in the presentation rates to New South Wales EDs. Presentation rates in 2010 were generally well below levels observed across the previous four years.

Presentations to emergency departments in Western Australia for ILI increased gradually from the beginning of the year, following the

Table 4: Neuraminidase inhibitor resistance in influenza viruses collected and tested at the WHOCC, 2010, by subtype

Type/subtype	NI resistant virus isolates tested by enzyme inhibition assay ¹			NI resistant clinical samples tested by pyrosequencing ²		Frequency of oseltamivir resistance (%)
	Tested	Oseltamivir resistant	Zanamivir resistant	Tested	H275Y mutation (oseltamivir-resistant)	
A(H1) pandemic 2009	1,117	3	0	4	0	0.30%
A(H3)	185	1	0	0	0	0.50%
B(VIC)	236	0	0	0	0	0
B(YAM)	2	0	0	0	0	0
Total	1,541	4	0	4	0	0.30%

Figure 9: Percentage of Flutracking respondents reporting fever and cough, Australia, April to October, 2008 to 2010, by week of reporting

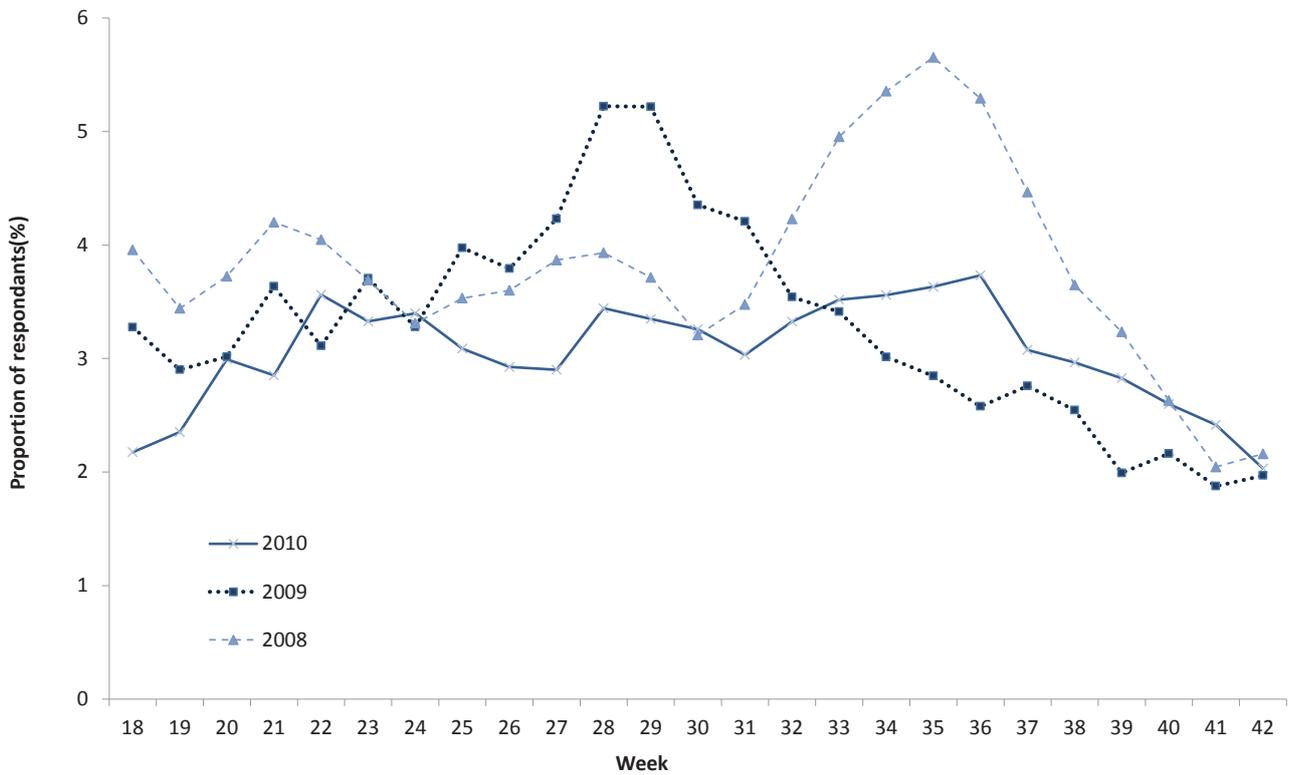
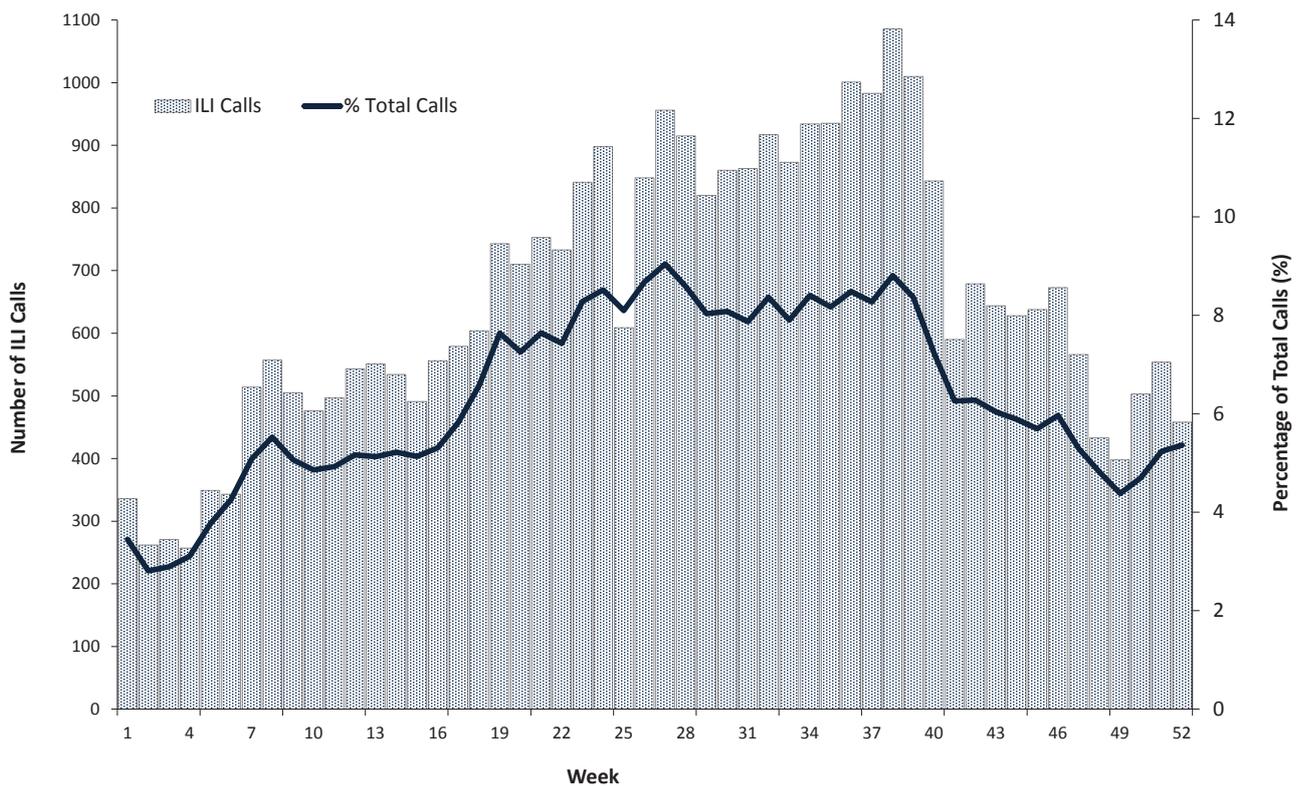


Figure 10: Number of ILI-related calls to the NHCCN compared with the percentage of total calls, Australia, 2010, by week of reporting



trend seen in 2008 (Figure 14). The number of presentations peaked at 678 in late September 2010 (week 40), which was consistent with the peak of Western Australia influenza notifications to NNDSS. The proportion of presentations admitted to hospital peaked at 11.0% (n=299) in early November (week 46). ED presentations for ILI in the peak week of 2010 were lower than the pandemic year of 2009 (n=1,266) and similar to 2008 (n=633).

Sentinel ED surveillance data were timely, and a useful indicator of seriousness of disease but, at the time, were only available from New South Wales and Western Australia. ED surveillance systems operated in other jurisdictions as well but these did not routinely report data to the National Influenza Surveillance Scheme in 2010.

Laboratory surveillance

Sentinel laboratory data from New South Wales, Western Australia, the Northern Territory**, Victoria and Tasmania showed that the number of laboratory virology tests for respiratory illness increased gradually from around 200 tests per week in March and April to a peak of 767 tests per week in mid-September (Figure 15).

The percentage of virology specimens testing positive peaked at approximately 18% in week 36 (week ending 10 September respectively) (Figure 15). The peak in week 36 confirms the increase in the number of seasonal influenza cases. Since the number of tests did not increase greatly during these weeks, it also indicates that increasing numbers were not an artefact of increased testing.

** Reported by the Western Australia National Influenza Centre.

Figure 11: GP consultation rates for influenza-like illness, Australia, 2008 to 2010, by week of reporting

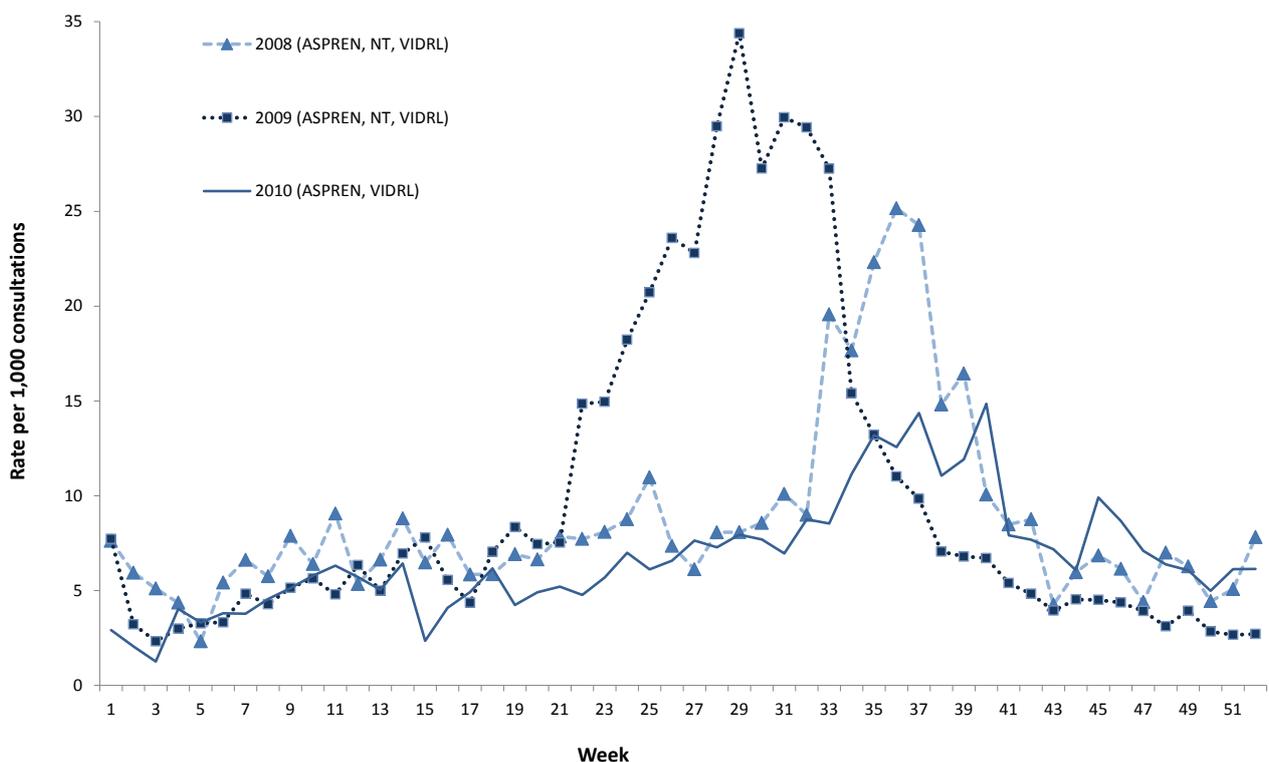
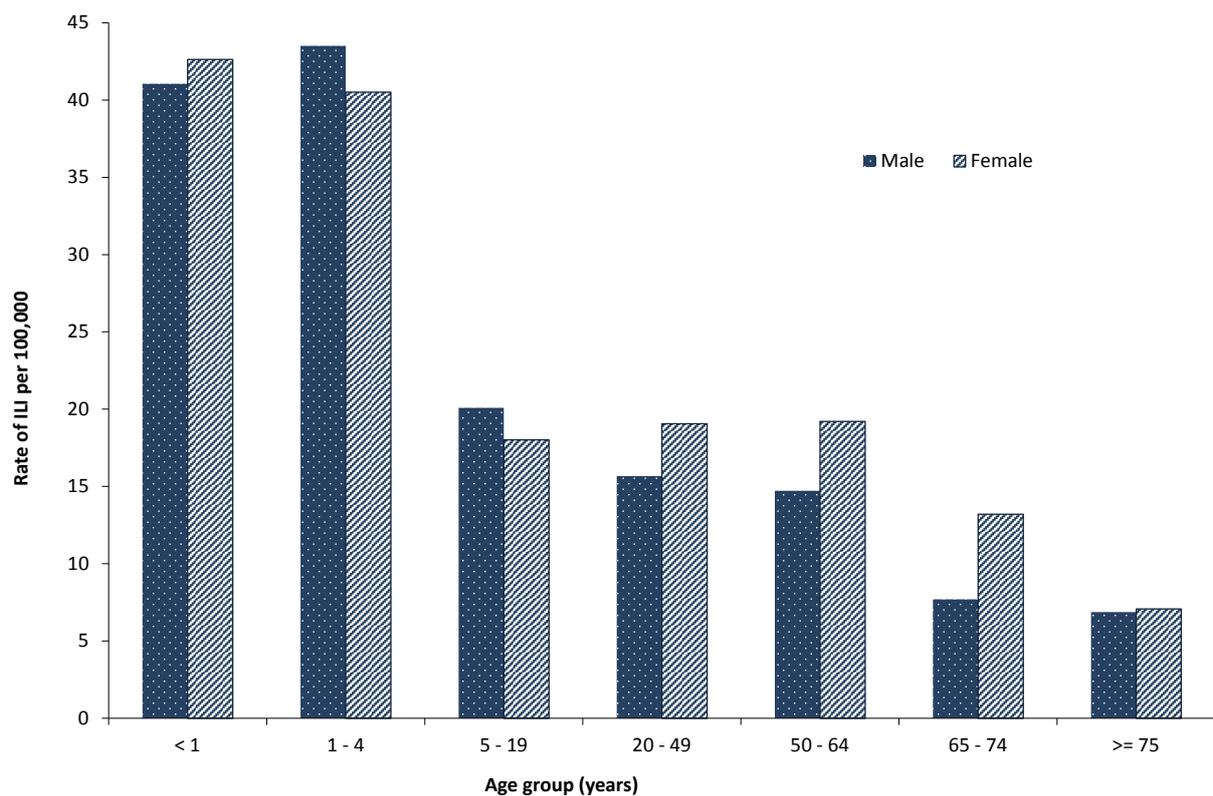


Figure 12: Consultation rates for influenza-like illness, ASPREN, 2010, by age group and sex



Morbidity

Australian Paediatric Surveillance Unit surveillance (APSU)

APSU reported that between 1 June and 25 October 2010, there were 25 cases of children aged 15 years or younger admitted to ICUs in Australia following complications due to influenza infection, seven of which were reported to have an underlying chronic condition. Of the admissions, 23 (92%) were attributed to influenza A (including 17 H1N1pdm09 and six untyped) and two (8%) were influenza B. The ages at the time of admission ranged from six days to 11 years, with a median age of 3 years.

FluCAN

FluCAN reported 296 influenza-associated hospitalisations from sentinel hospitals between 13 February and 29 October 2010, including 76 admitted directly to the ICU. Weekly hospitalisations peaked at 36 admissions in mid-September, in line with the peak in laboratory-confirmed influenza notifications (Figure 16).

The majority of admissions (n=231 or 78%) were associated with influenza A(H1N1)pdm09. Risk factors were present for 70% (n=207) of hospitalisations and around 7% (n=20) were pregnant.

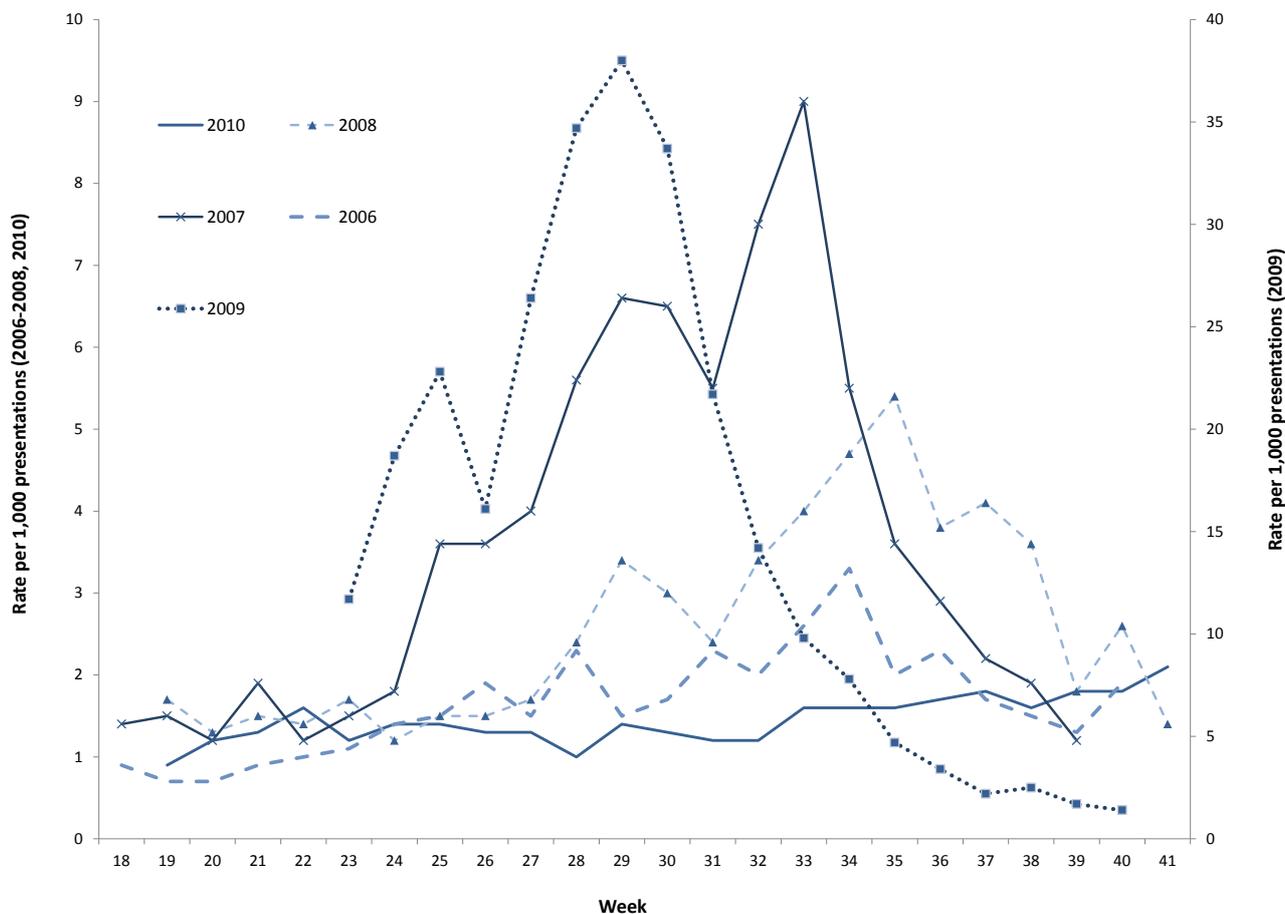
Mortality

Mortality from a primary influenza infection is rare and most of the deaths attributed to influenza occur from complications including pneumonia, obstructive airways disease and sudden cardiac deaths. These occur predominantly in identified risk groups such as those aged over 65 years or under six months of age, or those with chronic medical conditions.

Deaths from pneumonia and influenza – New South Wales

Mortality rates from influenza in New South Wales reported by the Registry of Births, Deaths and Marriages showed that rates of deaths from influenza and pneumonia peaked in early September at approximately 140 per 1,000 deaths (Figure 17).^[2] The combined pneumonia and influenza death rates were equal to or below

Figure 13: Presentation rates for influenza-like illness at hospital emergency departments New South Wales, April to October, 2006 to 2010, by week of reporting



the predicted seasonal baseline for the majority of the season. Death rates were well below the upper 95% confidence interval of the predicted seasonal baseline during 2010.

Australian Bureau of Statistics death data

Influenza and pneumonia (ICD-10 codes J09–J18)^[5] were noted as the underlying cause of death for 2,364 persons in 2010 (1.6% of all deaths), of which 56% (n=1,324) were female.^[3] The rate of influenza and pneumonia deaths was 8.8 per 100,000 deaths. The standardised death rate was higher in males, with 10.4 per 100,000 deaths, compared to females at 7.8 per 100,000 deaths.

Discussion

The seriousness of disease and impact of influenza are difficult to measure due to the nature of the illness and limitations of surveillance

systems. Influenza surveillance in Australia relies on a network of data sources and systems, varying in their ability to detect true cases of influenza. Ideally, the number of laboratory-confirmed notifications would include all cases, rather than just those that have been tested, and sentinel GP and ED surveillance systems would indicate the burden of disease on health systems and the community. Hospitalisation and death data could also be improved to allow for true indicators of clinical severity, morbidity and mortality due to influenza infection. It is possible that notifications in 2010 may have been affected by heightened media attention and public awareness following the 2009 pandemic, however it is not currently possible to measure the extent of this impact (if any).

Based on available data, the 2010 influenza season in Australia was considered moderate overall in comparison with previous seasons.

Figure 14: Number of influenza-like illness consultations in hospital emergency departments, Western Australia, January to December, 2008 to 2010, by week of reporting

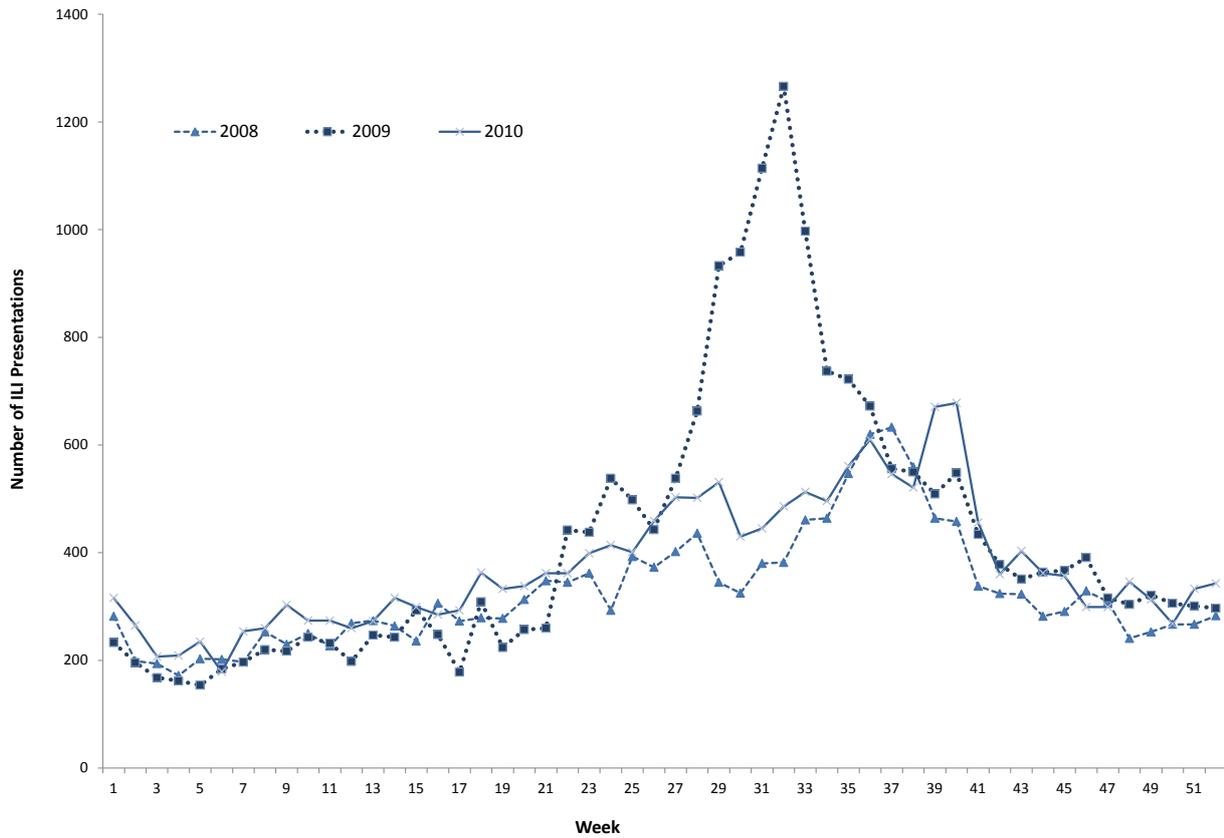
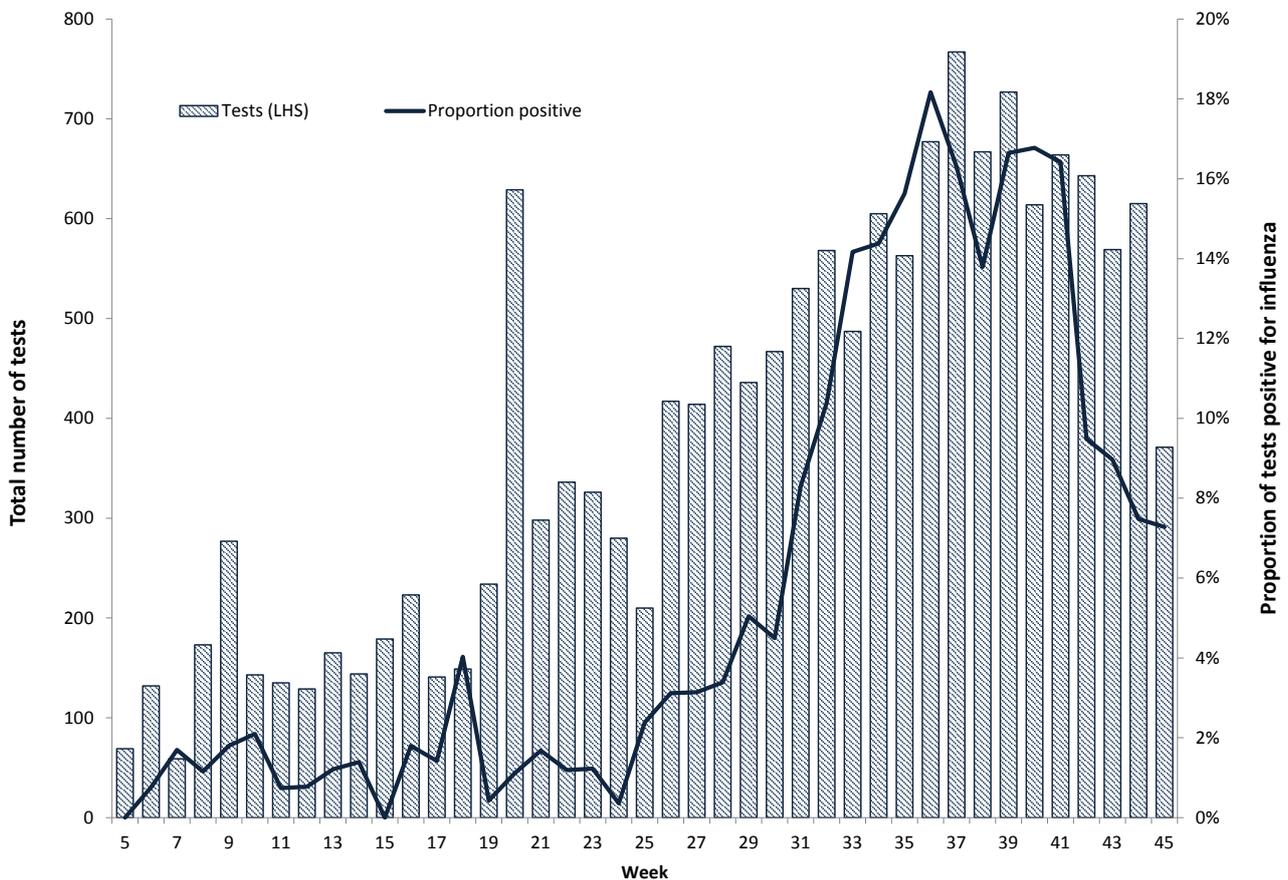


Figure 15: Number of virology specimens tested and percentage testing positive for influenza, February to November, 2010, by week of reporting



Laboratory-confirmed influenza notifications were around 0.8 times the 5-year mean, however excluding the 2009 pandemic year, 2010 notifications were almost double the previous four years. While generally the larger jurisdictions recorded higher case numbers and smaller jurisdictions had higher rates, as per previous seasons, a significant difference in 2010 was the proportion of notifications attributed to South Australia (comprising almost a third of total notifications with a rate of 259 notifications per 100,000 population).

As observed during previous years (with the exception of 2009), the highest rates of laboratory-confirmed influenza occurred in children under 5 years of age, especially in those aged less than 1 year. While notification rates for people in the 5-9, 10-29 and 30-64 year age groups decreased significantly compared with 2009, the predominance of the influenza A(H1N1)pdm09 strain ensured that the rates for these age groups remained high compared with those recorded in earlier years.

All sentinel ILI data sources (including GP and ED presentations, the Flutracking community survey and calls to the National Health Call Centre Network) indicated that the 2010 season was low to moderate overall. Trends in ILI were largely consistent with laboratory-confirmed influenza data, with the majority of data sources peaking in September.

The 2010 season was predominantly attributed to influenza A(H1N1)pdm09, which accounted for 56% of all laboratory-confirmed influenza notifications (followed by 30% unsubtype influenza A). Of influenza viruses circulating during the 2010 season, A(H1) viruses were mostly antigenically similar to the vaccine strain A/California/7/2009 (H1N1) and A(H3) strains were mostly similar to the vaccine strain A/Perth/16/2009 (H3N2). While influenza B only accounted for 10% of notifications in 2010, this compares with just 1% during the previous year. Around 99% of influenza B viruses characterised by the WHOCC were from the Victoria lineage and most were similar to the B/Brisbane/60/2008 vaccine strain.

Figure 16: Number of influenza hospitalisations at sentinel hospitals, 13 February to 29 October 2010, by week of reporting and influenza subtype

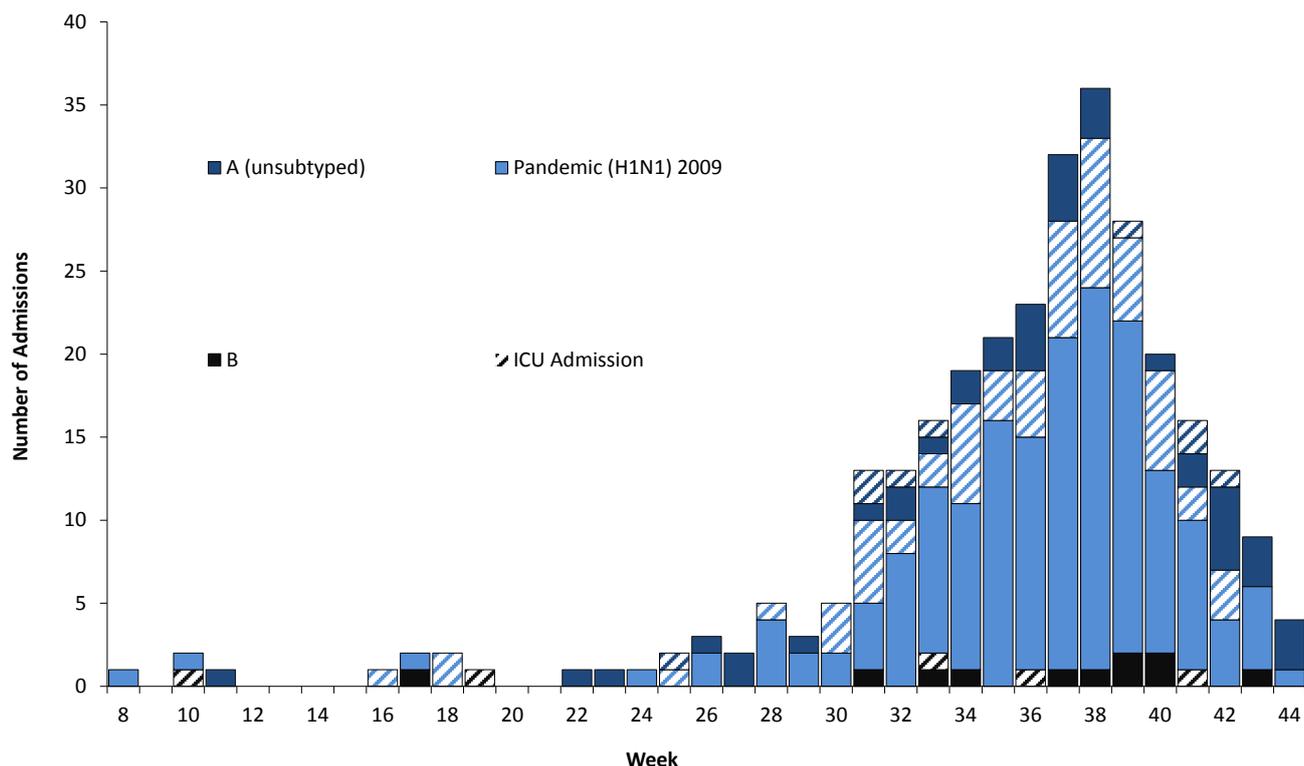
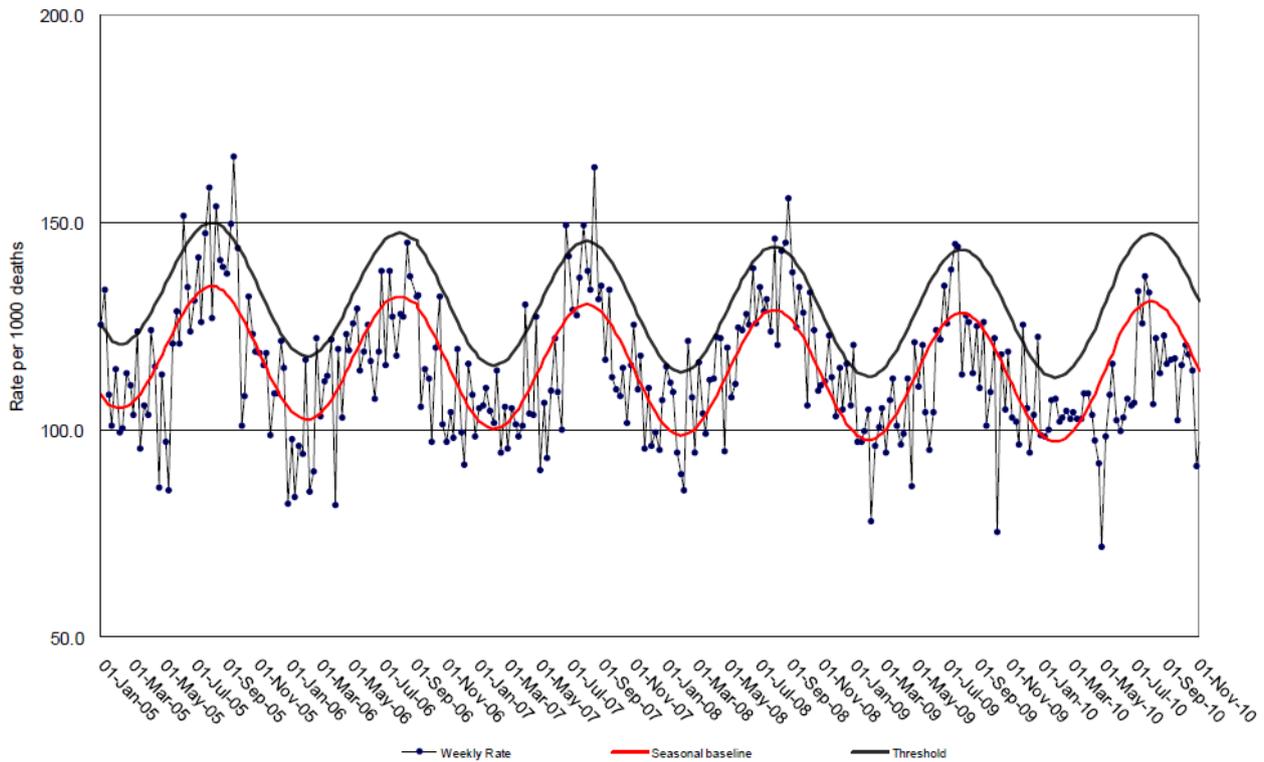


Figure 17: Observed and predicted rate of influenza and pneumonia deaths as per New South Wales registered death certificates, 1 January 2005 to 1 November 2010



Based on data generated during the 2010 Southern Hemisphere influenza season, at their technical meeting in September 2010, the WHO recommended the following influenza virus strains for inclusion in the 2011 Southern Hemisphere seasonal influenza vaccine:

- A/California/7/2009-like virus (H1N1);
- A/Perth/16/2009-like virus (H3N1); and
- B/Brisbane/60/2008-like virus.

The recommendation for the 2011 Southern Hemisphere vaccine was identical to the recommended composition of the 2010 Southern Hemisphere vaccine.

Overall, all data sources were consistent in indicating trends in influenza activity and support the characterisation of the 2010 influenza season as moderate.

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