Australian Government
Department of Health and Ageing

AUSTRALIAN INFLUENZA SURVEILLANCE SUMMARY REPORT

No.24, 2009, REPORTING PERIOD: 17 October 2009 – 23 October 2009

Key Indicators

The counting of every case of pandemic influenza is no longer feasible in the PROTECT phase. Influenza activity and severity in community is instead monitored by the surveillance systems listed below.

Is the situation changing?	Indicated by: laboratory confirmed cases reported to NetEpi/NNDSS; GP Sentinel ILI Surveillance; and ED presentations of ILI at sentinel hospitals (NSW and WA). Laboratory data are used to determine the proportion of pandemic (H1N1) 2009 circulating in the community.
How severe is the disease, and is severity changing?	Indicated by: number of hospitalisations, ICU admissions and deaths from sentinel hospital surveillance; emergence of more severe clinical picture in hospitalised cases and ICU admissions.
Is the virus changing?	Indicated by: emergence of drug resistance or gene drift/shift from laboratory surveillance.
What is ahead?	Forward projections of cases, morbidity and mortality.

Key Points

Is the situation changing?

- As of 23 October 2009 there were 37,149 confirmed cases of pandemic (H1N1) 2009 in Australia. The number of cases reported represents a small proportion of pandemic (H1N1) 2009 cases which have occurred in the community. The number of new confirmed pandemic (H1N1) 2009 cases and hospitalisations has decreased nationally with a number of jurisdictions reporting no new notifications in the last week, indicating that the first wave of the pandemic has subsided.

- National influenza activity continues to decrease. Most jurisdictions have reported that pandemic (H1N1) 2009 activity is at or near baseline levels.
    - ILI presentation rates to General Practitioners at a national level have reached the baseline levels achieved at the end of the 2007 and 2008 seasons. In most jurisdictions ILI data have remained stable, however in some jurisdictions this is above background levels. Three jurisdictions experienced increases in ILI presentation rates during this reporting period.
    - ILI presentations to emergency departments have remained stable across reporting systems in Western Australia, New South Wales and South Australia this reporting period.
    - Absenteeism rates decreased in the last week and are at levels similar to those seen at the same time in 2007.

- Type A influenza is the predominant seasonal influenza type reported by all jurisdictions. The pandemic strain has almost replaced the current seasonal H1N1 virus. The number of respiratory tests positive for influenza A and the number that were pandemic (H1N1) 2009 are now very low. Of the seasonal influenza A notifications, A/H3N2 is the predominant subtype reported by most jurisdictions.

How severe is the disease?

- The number of people with pandemic (H1N1) 2009 requiring hospitalisation continues to decrease. Five jurisdictions have reported no new hospitalisations in the week ending 23 October 2009. In total, 4,833 people have been hospitalised, with 13% admitted to Intensive Care Units. The overall hospitalisation rate is 22.6 per 100,000 population with the highest rates in children aged less than 5 years (68.0 for males and 54.1 for females per 100,000 population).

- Due to the presence of underlying chronic disease (some of which is undiagnosed) and their higher level of social disadvantage, Indigenous Australians are vulnerable to complications from the pandemic (H1N1) 2009 virus. Indigenous Australians are approximately 10 times more likely than non-Indigenous Australians to be hospitalised for conditions associated with pandemic (H1N1) 2009. Of the hospitalisations for which Indigenous status is known, 803 (21%) have been Indigenous Australians.

- Pregnant women represent 27% of all hospitalisations for pandemic (H1N1) 2009 of women aged between 15 and 44 years, reinforcing the fact that pregnancy, particularly in the second and third trimesters, is an important risk factor for hospitalisation associated with pandemic (H1N1) 2009.

- The Australian Paediatric Surveillance Unit (APSU) completed reporting on 30 September 2009. Since reporting began there were a total of 126 notifications of children hospitalised with severe complications of influenza. Sixty percent had no underlying medical conditions.

- As of 23 October 2009, the number of deaths associated with pandemic (H1N1) 2009 was 186. Of these deaths, 3 were pregnant women and 24 (13%) were Indigenous.

- The median age of confirmed cases that died is 54 years (range 2-92 years of age), compared to the median age for deaths from seasonal flu from 2001 to 2006 which is 83 years.

- Reports from the Australian jurisdictions indicate that most of the deaths had underlying medical conditions including cancer, diabetes mellitus and morbid obesity.

Is the virus changing?

- In Australia, the WHO Collaborating Centre for Reference and Research on Influenza has tested 347 pandemic (H1N1) 2009 viral isolates by NA enzyme inhibition assay and 145 clinical specimens were tested for the H275Y mutation (known to confer resistance to oseltamivir). Of these, one clinical specimen was resistant to oseltamivir when tested by NA enzyme inhibition assay and four clinical specimens were positive for the H275Y mutation.
- To date, the WHO has received formal notification of 39 cases of oseltamivir resistance pandemic (H1N1) 2009 viruses worldwide.

What is ahead?

While the first pandemic influenza wave has now subsided in Australia, it is not possible to predict with certainty what will happen over the following months. However, there are four potential scenarios in relation to a second wave in Australia:

1. A typical winter flu season next year which will include the new pandemic flu strain. While eventually each pandemic strain becomes part of the seasonal spectrum, this can take a few seasons;
2. A major outbreak next flu season due to a significant change in the virus;
3. Multiple small waves through the summer period into the 2010 influenza season as the virus finds new pockets of susceptible individuals in the community (similarly to what has been observed in the UK, with continued out-of-season transmission); and
4. A major out-of-season influenza outbreak due to importation of the virus back into Australia from infected travellers arriving from the Northern Hemisphere.

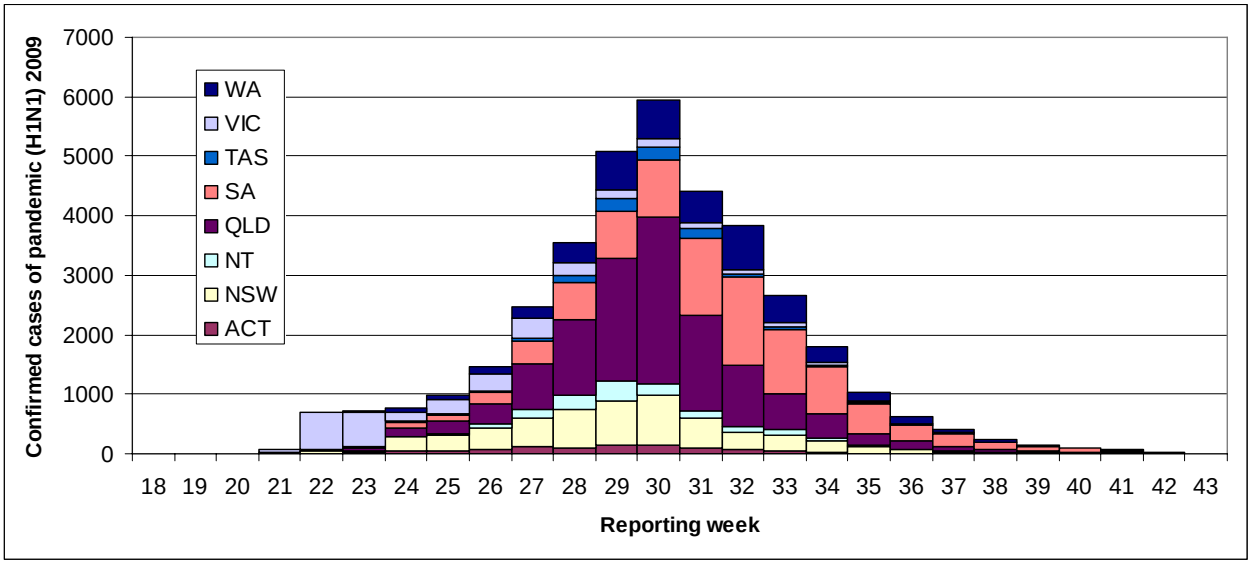
1. Current influenza activity in Australia – Is the situation changing?

Notifications of confirmed pandemic (H1N1) 2009 and seasonal influenza

There have been 11 new laboratory confirmed pandemic (H1N1) 2009 notifications in the last reporting week, with 4 jurisdictions reporting no new notifications. As of 23 October 2009 there were 37,149 confirmed cases of pandemic (H1N1) 2009 in Australia, including 186 associated deaths. The number of new confirmed pandemic (H1N1) 2009 cases and hospitalisations has decreased nationally, indicating that the first wave of the pandemic has subsided. The number of cases reported represents only a small proportion of pandemic (H1N1) 2009 circulating in the community.

The national epidemic curve shows the jurisdictional distribution of confirmed cases of pandemic (H1N1) 2009 over time in Australia (Figure 1).

Figure 1. Laboratory confirmed cases of pandemic (H1N1) 2009 in Australia by jurisdiction, to 23 October 2009



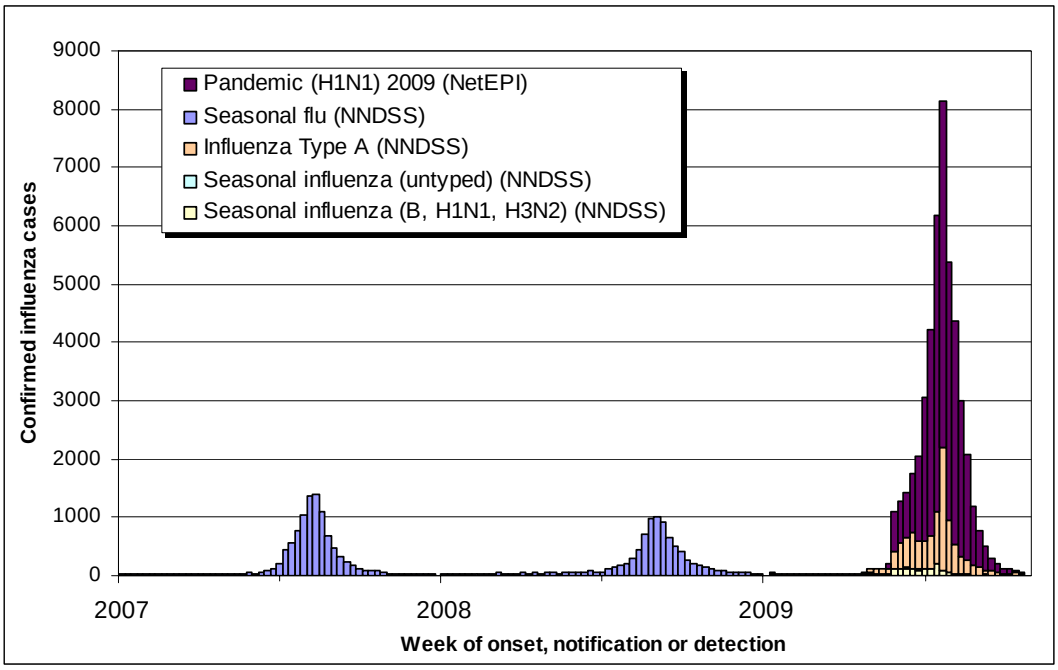
Source: NetEPI database

As Figure 2 shows, influenza activity in 2009 started earlier than in 2008 and there was a rapid increase in the number of confirmed influenza cases (both seasonal and pandemic (H1N1) 2009) from week 21 (starting 16 May 2009). The first wave of the pandemic has lasted approximately 18 weeks, making it a relatively short influenza season in comparison to the previous 5 years (range 21-29 weeks).

The high number of confirmed notifications of seasonal influenza seen during May and June are most likely due to the increase in testing for pandemic (H1N1) 2009. Overall, numbers of laboratory confirmed notifications of influenza have decreased in the past few weeks.

Laboratory confirmed notifications of influenza for this reporting week are 0.5 times the 5 year weekly mean and the notifications year to date are 8.1 times the 5 year, year to date mean.

Figure 2. Influenza activity in Australia, by reporting week, years 2007, 2008 and 2009*



* Data on pandemic (H1N1) 2009 cases is extracted from NetEPI; data on seasonal influenza is extracted from NNDSS.

Sources: NNDSS and NetEPI databases

On 17 June 2009 Australia commenced the transition to a new response phase called PROTECT, in which laboratory testing is directed towards people with moderate or severe illness; those more vulnerable to severe illness; and those in institutional settings. This means that the number of confirmed cases does not reflect how many people in the community have acquired pandemic (H1N1) 2009 infection.

As the counting of every case is no longer feasible in the PROTECT phase, influenza activity, including Influenza Like Illness (ILI) activity in the community, is instead monitored by surveillance systems including:

- GP Sentinel ILI surveillance;
- Emergency Department presentations of ILI at sentinel hospitals in several jurisdictions; and
- Absenteeism rates.

Laboratory data are used to determine the proportion of pandemic (H1N1) 2009 circulating in the community.

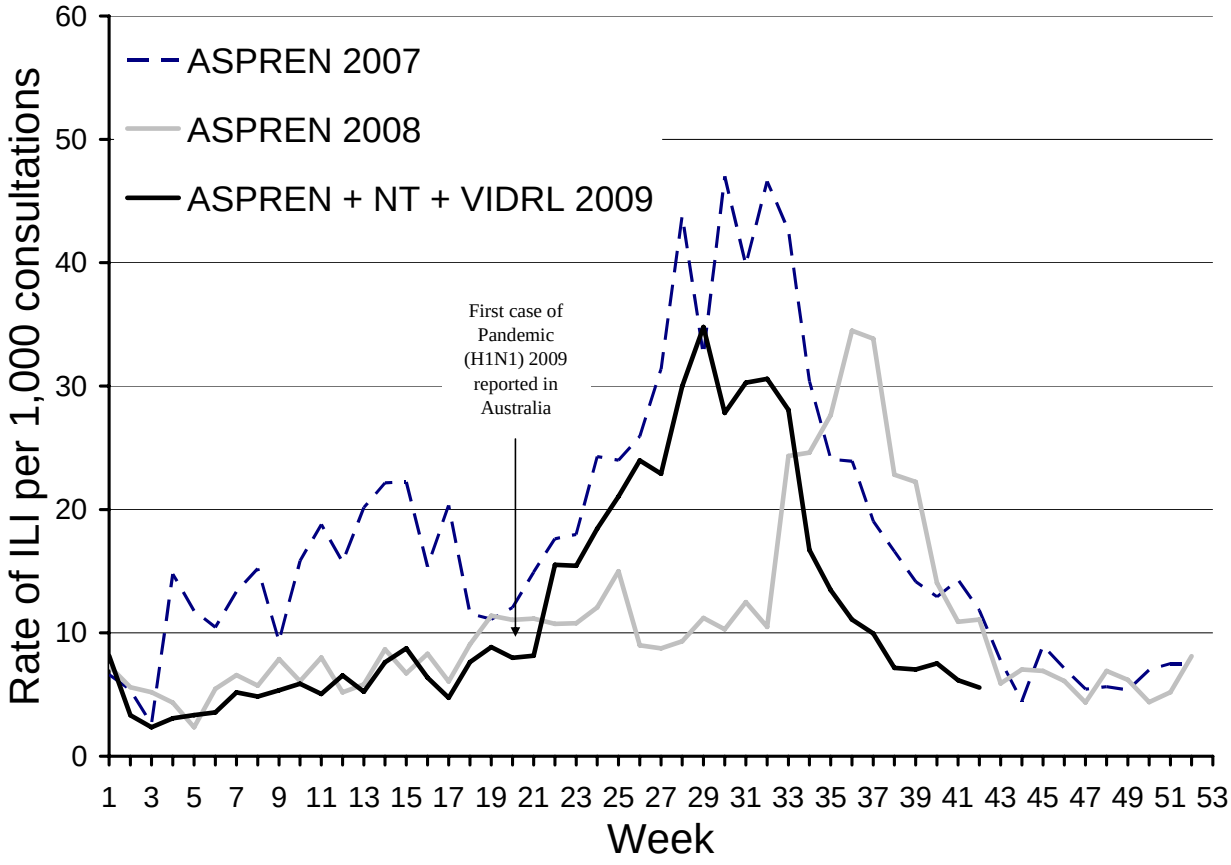
Influenza Like Illness activity in Australia

Sentinel General Practice

ILI presentations to General Practitioners continue to decrease nationally and have reached the baseline levels achieved at the end of the 2007 and 2008 seasons. In most jurisdictions ILI data have remained stable, however in some jurisdictions this is above background levels. Increases in ILI presentation rates were observed in three jurisdictions in the current reporting period.

Combined data available from the Australian Sentinel Practices Research Network (ASPREN), the Northern Territory GP surveillance system and VIDRL, up until 18 October 2009, show that nationally, influenza like Illness (ILI) consultation rates remained stable this reporting period and are below levels seen in 2007 and 2008 (Figure 3). In the last week, the presentation rate to sentinel GPs in Australia was approximately 6 cases per 1,000 patients seen.

Figure 3. Rate of ILI reported from GP ILI surveillance systems from 2007 to 18 October 2009 by week*



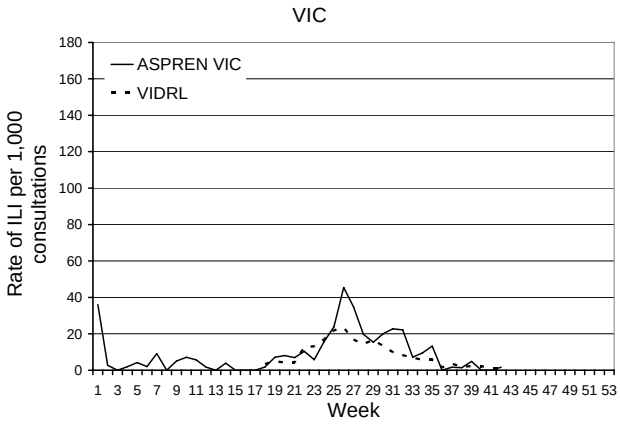
* Delays in the reporting of data may cause data to change retrospectively. As data from the NT and the VIDRL surveillance systems are combined with ASPREN data, rates may not be directly comparable across 2007, 2008 and 2009.

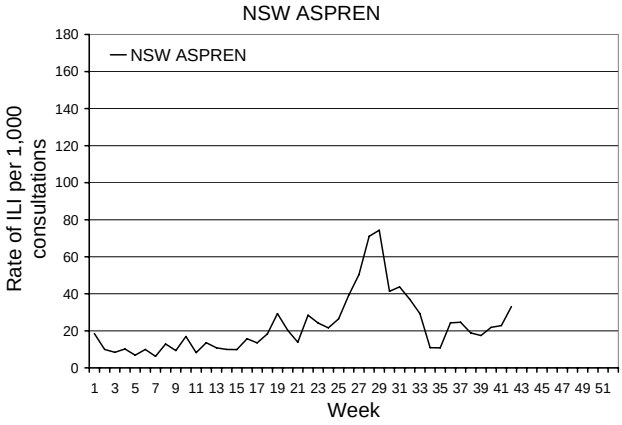
SOURCE: ASPREN, NT, VIDRL

Further analysis of the ILI data during this period indicated that levels remained stable in most jurisdictions, however this is above background levels in some jurisdictions. Slight increases were observed in three jurisdictions (Figure 4).

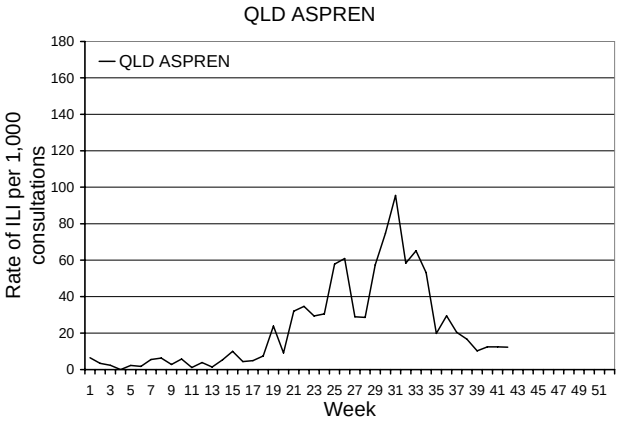
Care should be taken when interpreting Figure 4 graphs due to lags in reporting in some instances and small numbers being reported from jurisdictions. The last data point may be modified in future reports.

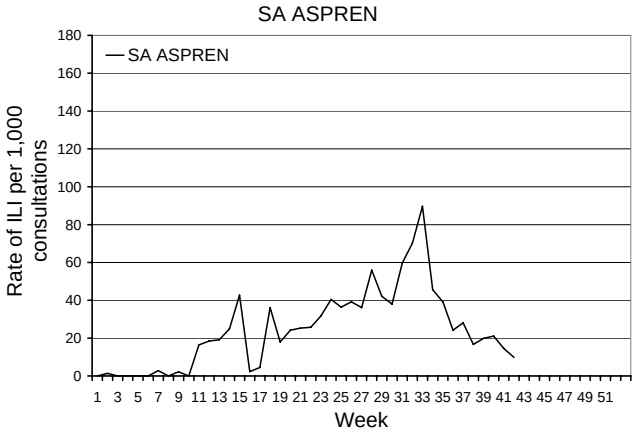
Figure 4. Rate of ILI reported from ASPREN, VIDRL and NT by State from January 2009 to 18 October 2009 by week

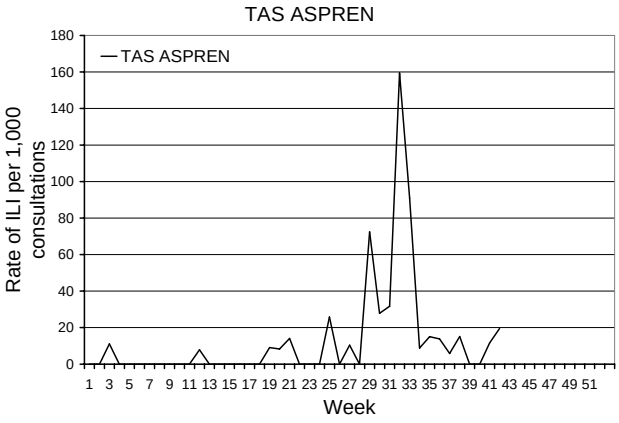


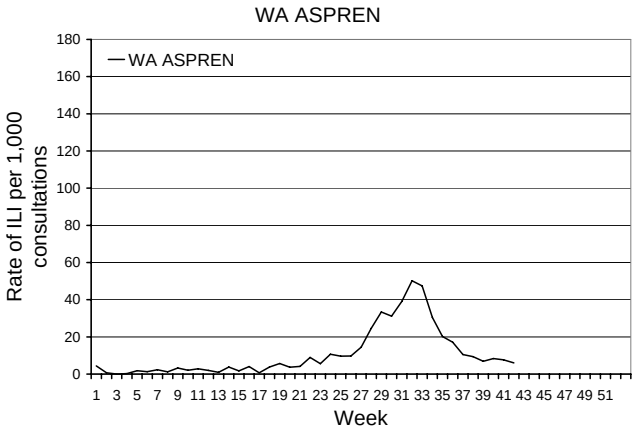


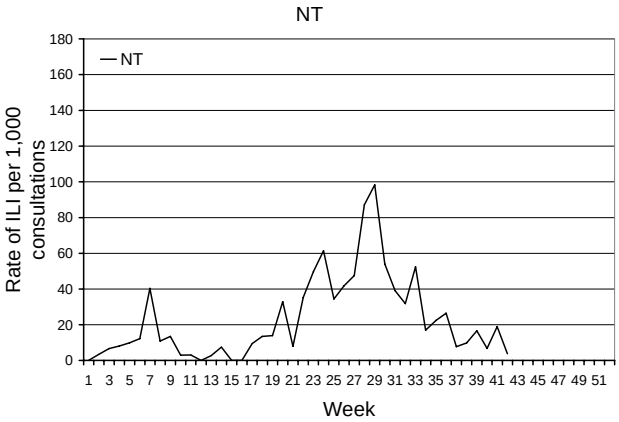
SOURCE: ASPREN (VIC) & VIDRL

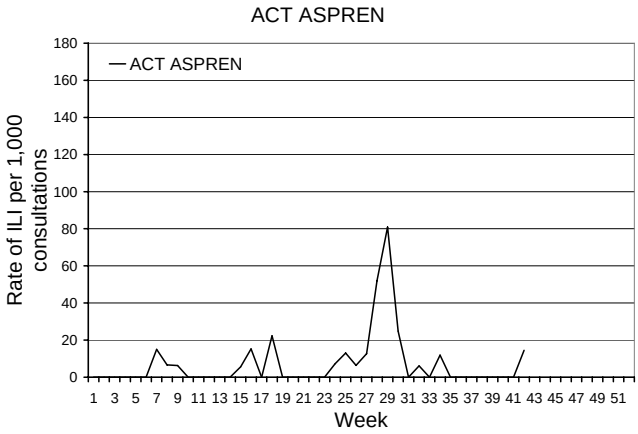












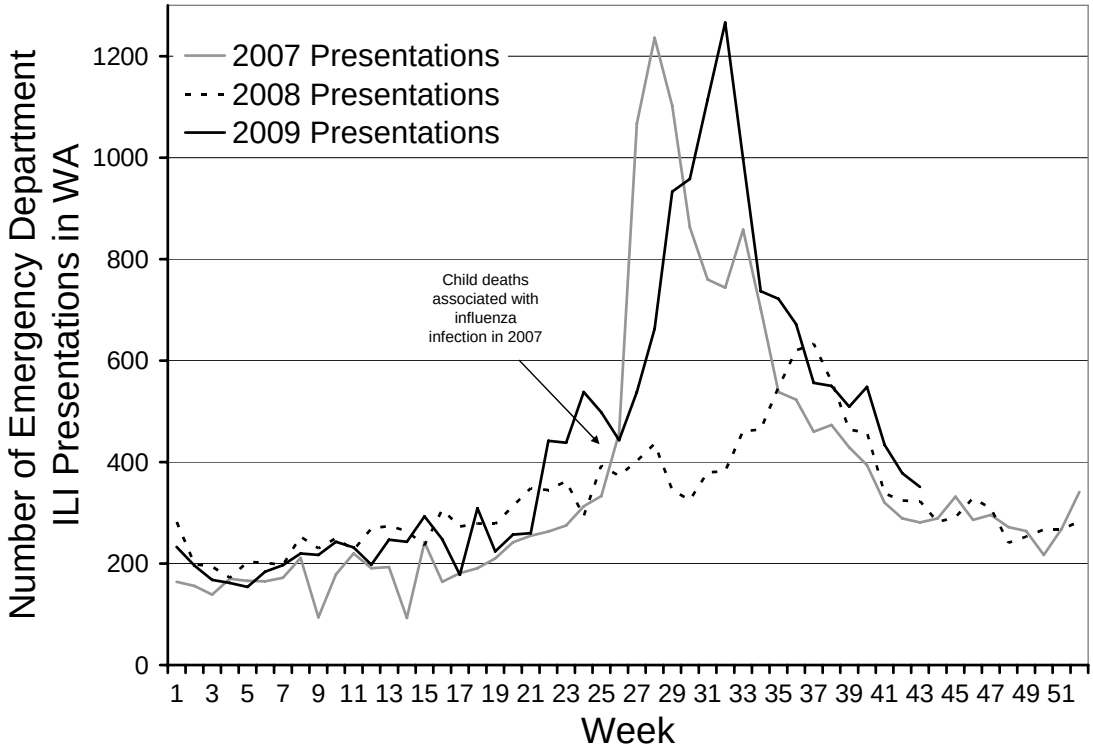
SOURCE: NT Surveillance

Emergency departments

ILI presentations to EDs continue to drop across reporting systems in Western Australia, New South Wales and South Australia this reporting period.

The number of ILI presentations reported in Western Australian EDs continue to decrease in the week ending 25 October 2009 (Figure 5). The proportion of ILI presentations admitted to hospital also decreased slightly to 6.6% (down from 7.4% in the previous week).

Figure 5. Number of Emergency Department presentations due to ILI in Western Australia from 1 January 2007 to 25 October 2009 by week



In early July 2007 (week 26), several deaths associated with influenza infection were reported in children from Western Australia. The public response to these deaths could account for the sudden increase in ILI presentations to Perth EDs in 2007.

SOURCE: WA 'Virus Watch' Report

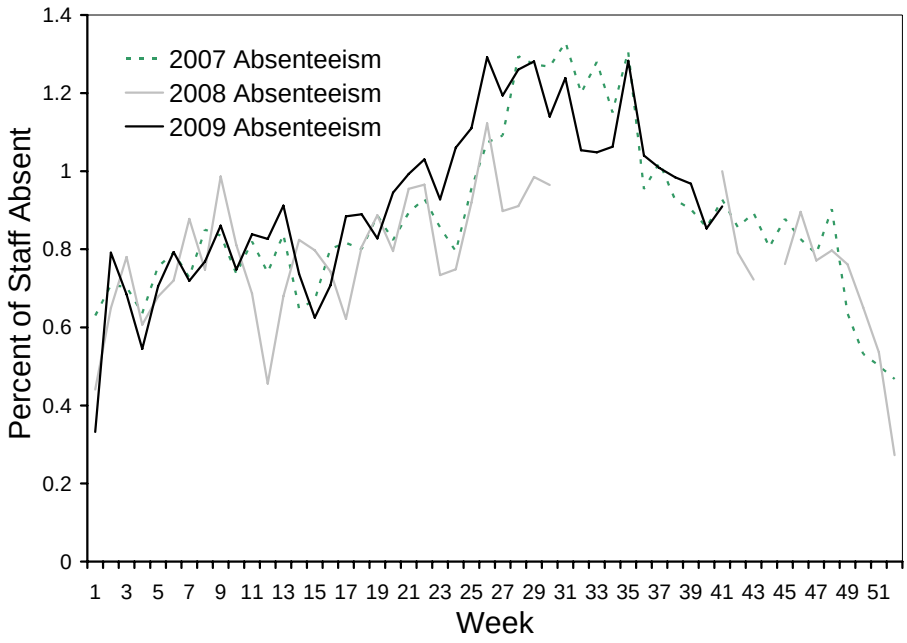
ILI presentations to South Australian EDs decreased to 6 presentations this reporting period compared with 13 presentations in the previous week. There was one admission during this period to emergency short stay.[1]

In the week ending 23 October 2009, ILI presentations to New South Wales EDs remained stable and at low levels (rate 1.5 per 1,000 presentations).

Absenteeism

Absenteeism rates increased slightly in the week ending 14 October 2009, however current levels are similar to those seen in previous years (Figure 6).

Figure 6. Rates of absenteeism of greater than 3 days absent, National employer, 1 January 2007 to 14 October 2009, by week.



SOURCE: Absenteeism data

Laboratory surveillance: How much ILI and influenza is due to pandemic (H1N1) 2009?

The number of respiratory tests positive for Influenza A and the number that are pandemic H1N1 2009 are now very low.

The proportion of pandemic (H1N1) 2009 to seasonal influenza varies across jurisdictions. This proportion is used as an indicator to help determine if a person has influenza, then how likely it is to be pandemic (H1N1) 2009. The number of respiratory tests positive for Influenza A and the proportion of these which were pandemic (H1N1) 2009 are shown in Table 1.

Table 1. Laboratory tests that tested positive for influenza A and pandemic (H1N1) 2009

	ASPREN – national	VIC NIC	WA NIC	NT (reported by WA NIC)
Latest report				
Number of specimens tested	8	5 (at 25/10)	197 (at 25/10)	n/a
% tested which were Influenza A	13% (1)	0%(0)	1%(2)	0%(0)
% tested which were pandemic (H1N1) 2009	0% (0)	0%(0)	100%(2)	0%(0)
Previous report				
Number of specimens tested	7	8 (at 18/10)	314 (at 18/10)	n/a
% tested which were Influenza A	14% (1)	25% (2)	2%(6)	0%(0)
% tested which were pandemic (H1N1) 2009	0% (0)	0%(0)	83%(5)	0%(0)

*ASPREN tests are collected every Tuesday. Results are reported for a rolling fortnight as data changes retrospectively.
^VIDRL Influenza Report available from: http://www.vidrl.org.au/surveillance/flu%20reports/flurpt09/flu09.html

2. How severe is the disease, and is severity changing?

Overview of pandemic (H1N1) 2009 severity

While pandemic (H1N1) 2009 is generally considered a mild disease at the community level, it has had serious consequences at the acute end of the disease. Figures of hospitalisations, ICU admissions and deaths are currently used as indicators to provide evidence on the severity of the disease in Australia (Tables 2 and 3).

Of particular note is the difference in the age distribution of the novel influenza virus to seasonal influenza and the increasing median age as the severity of the disease progresses: 21 years for all confirmed cases; 31 years for hospitalised cases; 45 years for ICU cases; and 54 years for deaths. The disease has also had a differential impact upon Indigenous Australians, who are ten times more likely to be hospitalised with the disease than non-Indigenous Australians. Pregnant women are also over-represented in the more severe cases with pregnancy being a risk factor in 27% of women aged 15 to 44 years who require hospitalisation for the disease.

Table 2. Summary of severity indicators of pandemic (H1N1) in Australia, to 23 October 2009#

	Confirmed pandemic (H1N1) 2009 cases	Hospitalised cases	ICU cases	Deaths
Total number	37,149	13% (4,833/37,149 confirmed cases)	13% (650/4,833 hospitalisations)	186
Crude rate per 100,000 population	173.1	22.6	3.2	0.8
Median age (years)	21	31	45	54
% Females	51% (18,125/37,029)	51% (2,455/4,833)	53% (347/650)	42% (78/186)
Indigenous people~	11% (3,822/34,344)	20% (803/3,908)	20% (100/499)	13% (24/186)
% Pregnant*	4% (369/10,234 females aged 15-44 years)	27% (278/1,030 hospitalised females aged 15-44 years)	17% (47/278 hospitalised pregnant women)	4% (3/78 female deaths)

#Data are extracted from a number of sources depending on the availability of information. Figures used in the analysis have been provided in parentheses. Data is not always complete for each summarised figure.
~The denominator for this row is the number of confirmed cases for which Indigenous status is known.
*Includes women in the post-partum period

Hospitalisations of Pandemic (H1N1) 2009 confirmed cases

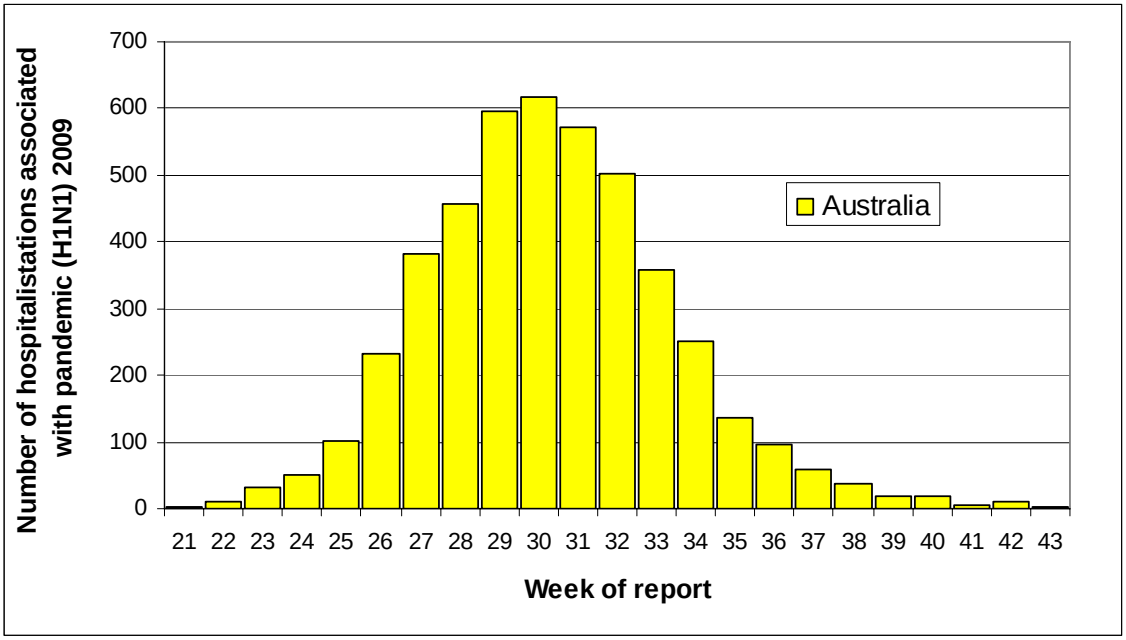
As of 23 October 2009, jurisdictions have reported 4,833 hospitalisations associated with pandemic (H1N1) 2009. There has been considerable variation across the jurisdictions, with the highest crude rate occurring in the Northern Territory (169.1 per 100,000 population) and the lowest crude rate reported in Victoria (8.0 per 100,000 population) (Table 3). The number of cases per day requiring hospitalisation has decreased since late August. Five jurisdictions have reported no new hospitalisations in the week ending 23 October 2009 (Figure 7).

Table 3. Summary of hospitalisations and deaths associated with pandemic (H1N1) 2009 in Australia, by jurisdiction, to 23 October 2009

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	AUS
Total pandemic (H1N1) 2009 hospitalisations	43	1,276	372	1243	505	107	424	863	**4,833**
Percentage of pandemic (H1N1) 2009 hospitalisations	0.9%	26.4%	7.7%	25.7%	10.4%	2.2%	8.8%	17.9%	**100%**
Crude rate per 100,000	12.5	18.3	169.1	29.0	31.5	21.5	8.0	39.9	**22.6**
Total pandemic (H1N1) 2009 deaths	2	51	6	41	28	7	24	27	**186**
Percentage of pandemic (H1N1) 2009 deaths	1.1%	27.4%	3.2%	22.0%	15.1%	3.8%	12.9%	14.5%	**100%**
Crude rate per 100,000	0.6	0.7	2.7	1.0	1.7	1.4	0.5	1.2	**0.9**

Source: NETEPI database

Figure 7. Weekly numbers of hospital admissions of confirmed cases, to 23 October 2009, Australia



Source: NETEPI database

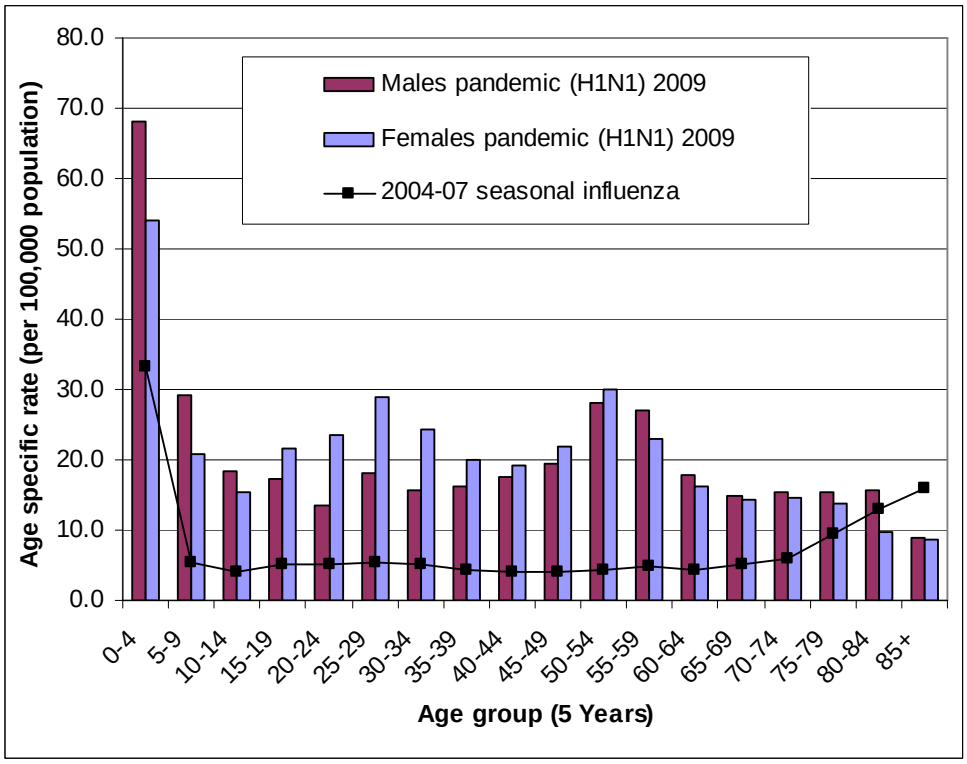
Age and sex distribution of hospitalised confirmed cases

Of the 4,833 hospitalisations since the beginning of the outbreak, the overall hospitalisation rate is 22.6 per 100,000 population, with the highest rates in children aged less than 5 years (68.0 for males and 54.1 for females per 100,000 population). The median age of hospitalised cases is 31 years (range 0-98 years). Jurisdictions have reported that 803 (21%) of the 3,908 cases hospitalised for which there was information on Indigenous Status were Aboriginal and/or Torres Strait Islander.

The age distribution of hospitalisations associated with pandemic (H1N1) 2009 is different to previous influenza seasons (Figure 9). In comparison with the 2004-2007 influenza seasons, young children aged under 5 years continue to be hospitalised at a higher rate than other age groups (males in particular) and there is a peak in the 50 to 60 years age group and a marked decrease in those aged over 75 years.

For comparative purposes, for the period 2000-01 to 2006-07, an average of 1,925 people with influenza (a rate of 9 admissions per 100,000 population) were admitted to hospital per year. For all influenzas[a] and pneumonias[b] for the same period, an average of 73,271 people were admitted to hospital per year.[2]

Figure 8. Age specific rates of hospitalisations associated with pandemic (H1N1) 2009 to 23 October 2009, compared with average annual age specific rates of hospitalisations associated with seasonal influenza 2004-05 to 2006-07*, Australia



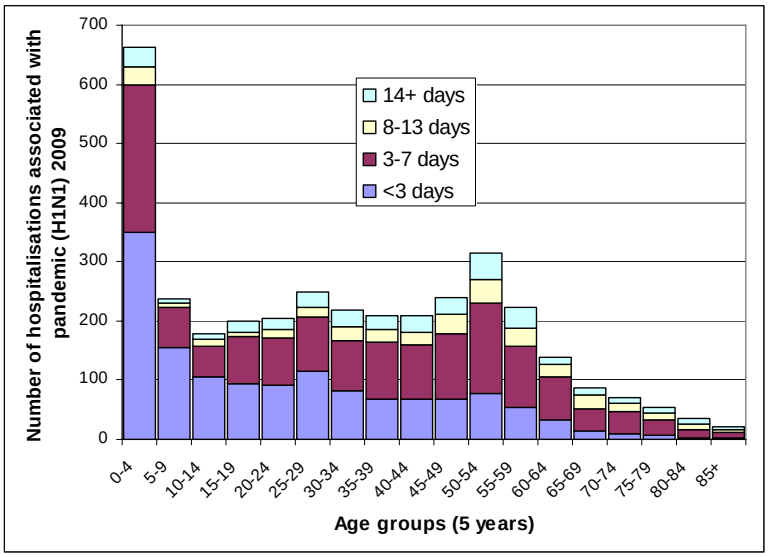
*The rates for pandemic (H1N1) 2009 are from 15 June to 23 October 2009 whereas the rates for seasonal influenza are averaged annual rates (i.e. for a full influenza season).

Source: NETEPI database

Information on length of stay is available for 74% (3,550) of the 4,833 hospitalised cases. The median length of stay in hospital is 3 days (range 0-100 days). Approximately 20% (697/3,550) of all hospitalised patients stayed in hospital for more that 7 days. A breakdown by age group shows that children aged less than 5 years were more likely to be hospitalised, but for shorter periods than older children and adults. Only 10% (64/662) of children aged less than 5 years remained in hospital for longer than 7 days compared with 27% (493/1,817) for those aged 30 years and over (Figure 9).

[a] ICD10-AM codes J10-J11
[b] ICD10-AM codes J12-J18

Figure 9. Hospitalised confirmed cases of pandemic (H1N1) 2009, by length of hospital stay and age group, to 23 October 2009, Australia



Source: NETEPI database

Pregnancy as a risk factor for hospitalisation associated with pandemic (H1N1) 2009

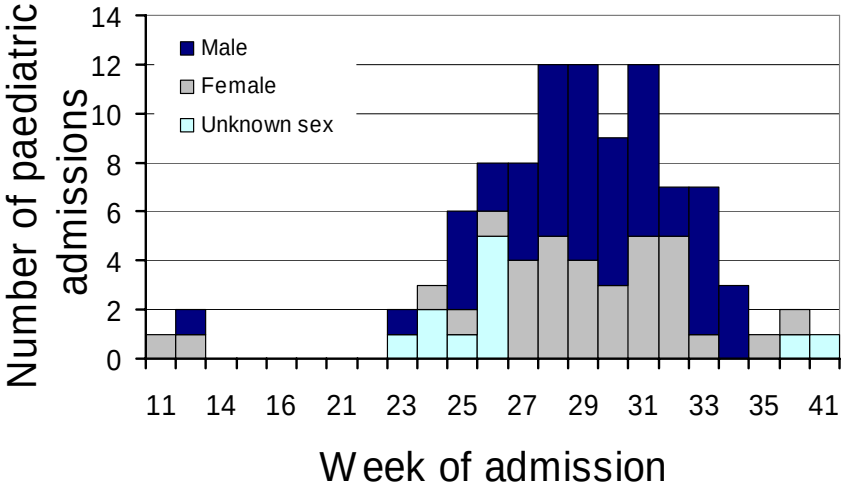
A total of 278 (6%) of the 4,833 hospitalised confirmed cases for whom further information was available were pregnant women. Pregnant women represent 27% of all hospitalisations for pandemic (H1N1) 2009 of women aged 15 to 44 years. There have been 3 deaths in pregnant women associated with pandemic (H1N1) 2009.

Paediatric hospital admissions

Since reporting began in 2009, 126 children have been reported as hospitalised with complications from influenza by the Australian Paediatric Surveillance Unit (APSU). Admission data has been provided for 96 cases (Figure 10). APSU completed reporting on 30 September 2009.

Of the 91 cases, for which data are available, the average age of children admitted to hospital is four years and six months, with an age range from one month to 16 years. Complications were mostly for pneumonia and encephalitis. Thirty-three of the 83 (40%) cases for which data is available had underlying conditions.

Figure 10. Number of paediatric hospital admissions APSU, 11 March 2009 to 30 September 2009, by week of admission.



SOURCE: APSU

Confirmed cases requiring intensive care

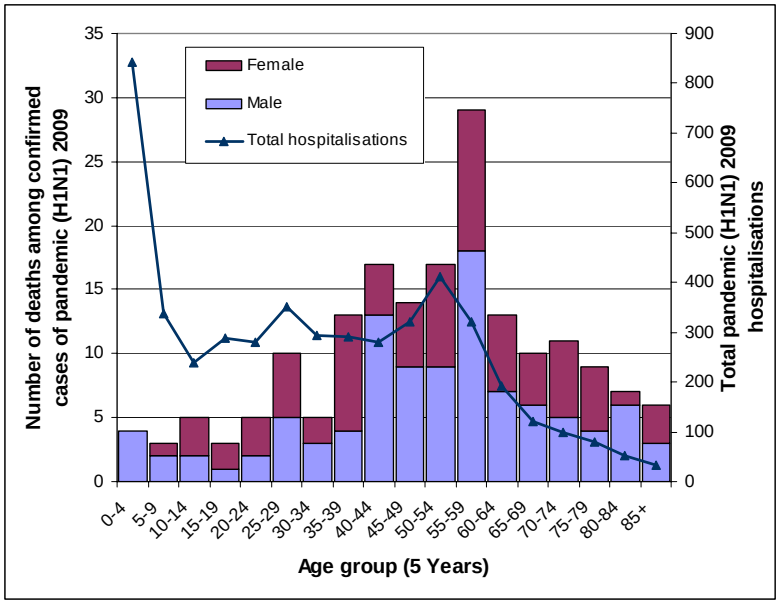
Up to Week 43 (week ending 23 October 2009), 13% (650/4,833) of hospitalisations associated with pandemic (H1N1) 2009 have required admission to ICU. Approximately 20% (100/499) of ICU cases have been reported as Indigenous. The median age of cases in ICU is 45 years (range 0-84 years).

Deaths associated with pandemic (H1N1) 2009

There were 186 deaths associated with the pandemic (H1N1) 2009 virus in Australia between 19 June 2009 and 23 October 2009.[c] Of these 186 deaths, 51 occurred in New South Wales, 41 in Queensland, 27 in Western Australia, 28 in South Australia, 24 in Victoria, 7 in Tasmania, 6 in the Northern Territory, and 2 in the Australian Capital Territory. Of the 186 deaths, 24 (13%) were Indigenous.[d] Reports from Australians jurisdictions indicate that most of the cases had underlying medical conditions including cancer, diabetes mellitus and morbid obesity.

The median age of confirmed cases that died was 54 years (range 2-92 years). This median age is lower than the median age of deaths associated with seasonal influenza for the period 2001-2006 (83 years). The highest proportion of deaths (25%) has occurred in the 50-59 year age group.

Figure 11. Numbers of deaths associated with pandemic (H1N1) 2009, by age group and sex, compared with total laboratory confirmed pandemic (H1N1) 2009 notifications by age group, to 23 October 2009, Australia



Source: NETEPI database

Deaths associated with influenza and pneumonia

There are difficulties estimating the number of deaths due to influenza in Australia. Deaths coded as being due to laboratory confirmed influenza are known to underestimate the true number. Influenza may not be listed on the death certificate if it wasn't recognised as the underlying cause. Coding of pneumonia and influenza provides an additional measure, although this will overestimate the number of deaths as it will include other causes of pneumonia.

[c] For the most recent figures on hospitalisations and deaths please access the latest Situation Report at <http://www.healthemergency.gov.au/internet/healthemergency/publishing.nsf/Content/updates>

[d] It is estimated that 2.4% of the total Australian population are Aboriginal and/or Torres Strait Islander.

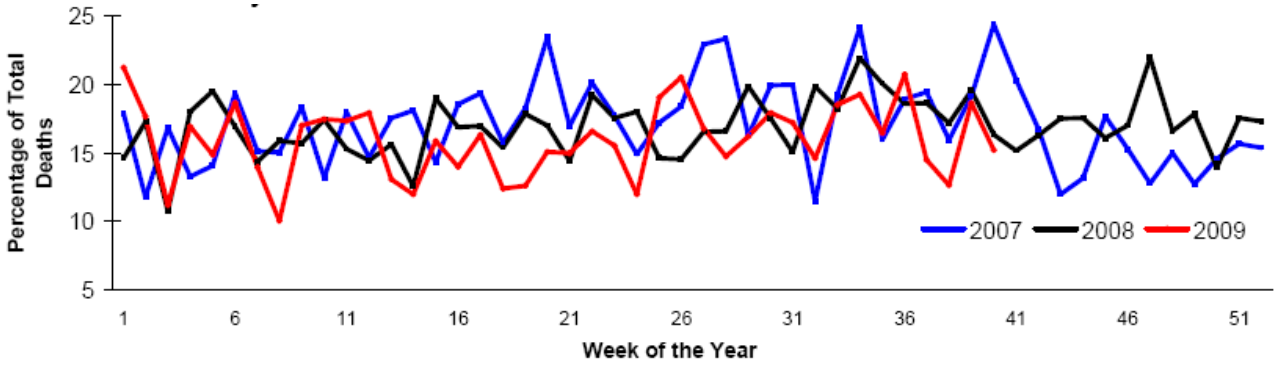
The median number of annual deaths in Australia for the years 2001 to 2006 from influenza and pneumonia is 3,089 and for laboratory diagnosed influenza is 40. In 2007 (the latest year for which data has been released) there were 2,623 deaths with influenza and pneumonia as the underlying cause of death. In 2007, influenza and pneumonia was the 13th leading cause of death in Australia *(Source: ABS, Causes of Death 2007.).* Mortality figures are likely to be an underestimate due to inherent difficulties in assigning causes of death and therefore appropriate ICD codes. ABS mortality data are released two years in arrears.

Although mortality data from all causes are generally not available for the current year, some information on influenza and pneumonia deaths are reported by individual jurisdictions from their Births, Deaths and Marriages Registers.

In NSW, death certificate data as of 9 October 2009 show that there were 95 influenza or pneumonia deaths per 1,000 deaths in NSW, which was below the expected seasonal threshold for this time of year of 151 per 1,000.

In Western Australia, pneumonia and influenza deaths continue to fluctuate but remain below levels seen at the same time in 2007 and 2008 (Figure 12).

Figure 12: Percentage of all deaths classified as influenza and pneumonia, WA Registry of Births, Deaths and Marriages, 1 January 2008 to 18 September 2009



SOURCE: WA 'Virus Watch' Report

3. Is the virus changing?

Laboratory Confirmed Influenza

From 1 January to 23 October 2009, type A is the predominant seasonal influenza type reported by all jurisdictions. Of the type A notifications for which there is subtyping information in NNDSS, the ratio of seasonal H1N1 to H3N2 is 1 : 2.3.

Antigenic characteristics

WHO Collaborating Centre for Reference & Research on Influenza (WHO CC)

In 2009 up to 25 October 2009, 1,101 Australian influenza isolates have been subtyped by the WHO CC in Melbourne. Of these, 601 influenza isolates have been antigenically characterized.

Isolates tested by the WHO CC are not a random sample of all those in the community hence proportions of pandemic (H1N1) 2009 to seasonal are not representative of the proportions circulating. Early in the pandemic all influenza A untypeable samples were sent to the WHO CC for testing and later many pandemic (H1N1) 2009 positive samples were sent for confirmation, resulting in biases in the data.

In general, seasonal influenza A strains circulating in the community are the same as strains in the vaccine, with the A(H3N2) virus drifting from the version in the vaccine. Influenza B strains match more closely with those in the 2009-10 Northern Hemisphere vaccine and may also be drifting.

Antiviral Resistance

Pandemic (H1N1) 2009

To date, the WHO has received formal notification of 39 cases of oseltamivir resistant pandemic (H1N1) 2009 viruses worldwide. The isolates have a mutation in the neuraminidase that confers resistance to oseltamivir (referred to as H275Y), but they remain sensitive to zanamivir. Of the 39 oseltamivir resistant viruses:

- 12 were associated with the use of oseltamivir for post exposure prophylaxis;
- 6 were associated with the use of oseltamivir treatment in patients with severe immunosuppression;
- 4 were isolated from samples from patients receiving oseltamivir treatment; and
- 2 were isolated from patients who were not taking oseltamivir for either treatment or prophylaxis.

Characterisation of the remaining viruses is under way.[3] Media have reported that a genetic mutation of the new strain of influenza A virus resistant to oseltamivir has been detected in a woman who had not been given the drug. This is the first case of a human to human infection of the H1NI flu virus. WHO continues to monitor the situation closely.

In Australia, the WHO Collaborating Centre for Reference and Research on Influenza has confirmed that one of the 347 Pandemic (H1N1) 2009 viral isolates tested in NA enzyme inhibition assay was resistant to oseltamivir, but remains sensitive to zanamivir. Four of the 145 pandemic (H1N1) clinical specimens tested for the H275Y mutation known to confer resistance to oseltamivir tested positive for the mutation.

The US CDC has reported 5 new oseltamivir resistance strains of the pandemic (H1N1) 2009 virus since 1 September 2009, totalling 17 cases reported to date. All of the 114 pandemic (H1N1) viral isolates tested by the US CDC were sensitive to zanamivir.[4]

In New Zealand, all of the 325 pandemic (H1N1) 2009 viruses tested up to 18 October 2009 were sensitive to oseltamivir, including one from a fatal case of a 21 year-old male. None of the 12 pandemic (H1N1) 2009 clinical specimens tested positive for the H275Y mutation which confers resistance to oseltamavir.[5]

The UK HPA has reported that 3 of 1,733 pandemic viruses tested in England up to 22 October carry the mutation which confers resistance to oseltamivir, and two of these have been shown phenotypically to be resistant to the drug, but remain sensitive to zanamivir.[6]

Seasonal Influenza

The last WHO report on resistance of seasonal strains to oseltamivir was released on 4 June 2009, during the Northern Hemisphere influenza season 2008-2009. This report stated that 96% of seasonal influenza A (H1N1) isolates tested from 36 countries worldwide were resistant to oseltamivir.[7]

In Australia since 1 January 2009, 36 of the 37 seasonal H1N1 viruses tested were resistant oseltamivir. All of the 40 A(H3N2) viruses and the 6 influenza B viruses tested were sensitive to both oseltamivir and zanamivir.

In New Zealand and up to 18 October 2009, all of the 28 seasonal A(H1N1) viruses tested positive for the H275Y mutation.[8]

The US CDC reported in the week ending 17 October that 99.6% (1,146/1,151) of the seasonal A(H1N1) isolates tested were resistant to oseltamivir and all of the 271 Influenza A(H3N2) isolates tested were resistant to adamantanes.[9]

Data considerations

The information in this report is reliant on the surveillance sources available to the Department of Health and Ageing. As access to sources increase and improve, this report will be refined and additional information will be included.

This report aims to increase awareness of pandemic (H1N1) 2009 and seasonal influenza in Australia by providing an analysis of the various surveillance data sources throughout Australia. While every care has been taken in preparing this report, the Commonwealth does not accept liability for any injury or loss or damage arising from the use of, or reliance upon, the content of the report. Data validation may cause the reported figures to change retrospectively. For further details about information contained in this report please contact the Influenza Team through flu@health.gov.au.

NetEpi
All jurisdictions except QLD are reporting pandemic (H1N1) 2009 cases using NetEpi, a web-based outbreak case reporting system. Data from jurisdictional systems are being imported into NetEpi by VIC, NSW, WA, TAS and SA, and the remainder are entering directly into NetEpi. QLD ceased reporting into NetEpi on 6 July 2009.

Analyses of Australian cases are based on clinical onset date, if this information is available. Where an onset date is not available, notification date has been used. Victorian cases use a calculated onset date which is the earliest available date calculated from specimen date, onset date, notification date or detection date. This assumption was made for all calculations and data on which the figures are based.

State and Territory reporting
The jurisdictions report directly to the National Incident Room, Commonwealth Department of Health and Ageing, on hospitalisations, numbers admitted to ICUs and deaths.

National Notifiable Diseases Surveillance System (NNDSS)
NNDSS comprises of notifications from jurisdictions of laboratory-confirmed influenza cases. Laboratory confirmed influenza is notifiable in all jurisdictions in Australia. Confirmed pandemic (H1N1) 2009 cases are being received from all jurisdictions through NNDSS except for Victoria and New South Wales. NSW is also unable to send seasonal influenza notifications data.

Data Analysis
Analysis of confirmed cases in done on combined NetEpi and NNDSS data. Analysis of morbidity (hospitalisations and ICU admissions) and mortality data is done on combined NetEpi and QLD hospitalisation data.

Laboratory Surveillance data
Laboratory testing data are extracted from the ‘NSW Influenza Report,’ ‘The 2009 Victorian Influenza Vaccine Effectiveness Audit Report’ (VIDRL) and the ‘South Australian Seasonal Influenza Report’. These reports are provided weekly.

WHO Collaborating Centre for Reference & Research on Influenza (WHO CC)
Data are provided weekly to the Surveillance Branch from the WHO CC.

Sentinel General Practice Surveillance
The Australian Sentinel Practices Research Network (ASPREN) has Sentinel GPs who report influenza-like-illness (ILI) presentation rates in NSW, SA, ACT, VIC, QLD, TAS and WA. As jurisdictions joined ASPREN at different times and the number of GPs reporting has changed over time, the representativeness of ASPREN data in 2009 may be different from that of previous years. ASPREN data are sent to the Surveillance Branch on a weekly basis. Northern Territory GP surveillance data are sent to the Surveillance Branch on a weekly basis. VIDRL influenza surveillance data are sent to the Surveillance Branch on a weekly basis.

A new testing protocol introduced through ASPREN requires GPs to test all patients presenting with an ILI on one day of the week. These data should provide a cross section of age, sex and severity of patients who seek GP assistance for ILI. This system is in the early stages of implementation and will be further developed over coming weeks.

Sentinel Emergency Department (ED) data
WA - ED surveillance data are extracted from the 'Virus Watch' Report. This report is provided weekly. The Western Australia Influenza Surveillance Program collects data from 8 Perth Emergency Departments (EDs).

NSW - ED surveillance data are extracted from the 'NSW Influenza Surveillance Report'. This report is provided weekly. The New South Wales Influenza Surveillance Program collects data from 49 EDs across New South Wales.

SA – ED surveillance data are extracted from the 'South Australian Seasonal Influenza Report'. This report is provided weekly. The South Australian Influenza Surveillance Program collects data from 4 EDs in South Australia.

Absenteeism
A national organisation provides data on the number of employees who have been on sick leave for a continuous period of more than three days. These data are not influenza or ILI specific and absenteeism may be a result of other illnesses.

Mortality data
Mortality data are extracted from the NSW Health 'Weekly Influenza Epidemiology Report' and the WA 'Virus Watch' Report.

Paediatric hospital admissions data
Reports of ICU admissions are provided to the Surveillance Branch on a weekly basis by the Australian Paediatric Surveillance Unit. APSU conducts surveillance of severe complications of influenza in children aged 15 years and under. Surveillance began on 1 June 2009.

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