

Influenza in Queensland

2011–2016

Influenza Surveillance Report

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An electronic version of this document is available at http://www.health.qld.gov.au/ph/cdb/sru_influenza.asp

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Introduction

Influenza is a viral respiratory disease of global public health importance. The propensity for influenza A viruses to mutate, and change the dynamics of an influenza season, is central to this importance. The seasonal pattern is one of outbreaks or epidemics in the winter months in temperate regions of the world; while in tropical areas, influenza activity may increase at any time of year. The disease varies in severity and may be mild to moderate in some people, but very severe in others. Infection in the very young, the elderly, and those with underlying medical conditions, can lead to severe complications, pneumonia, and death¹.

Laboratory confirmed influenza is a nationally notifiable condition in Australia and has been notifiable in Queensland since 2001. In Queensland, notification is mandated under the provisions of the Public Health Act (2005) and its subordinate Regulation². A case definition, which requires a positive laboratory result, is applied to identify valid notifications. Annual influenza counts and rates vary by year and jurisdiction within Australia^{3,4}.

Although temporal trends and the profile of circulating subtypes can vary by year, the Queensland season typically occurs between May and October each year. Surveillance data are monitored all year round with a weekly report published during the season.

The purpose of this report is to provide a descriptive data summary of the 2016 influenza season in Queensland compared with the 2011–2015 seasons.

Methods

Data were extracted for 2011 to 2016 influenza notifications from the Queensland Health notifiable conditions register on 2 February 2017. Hospital admission data for 2011 to 2016 were extracted from *EpiLog*, a register of influenza admissions to Queensland public hospitals, on 15 February 2017. Percentage positive data were obtained from AUSLAB and represent the public laboratory system only. Influenza strain data were obtained through Forensic and Scientific Services (FSS), Health Support Queensland on 24 February 2017. All reported data were correct at the time of extraction but may be subject to change following routine data quality revisions.

Denominator data for rate calculations were obtained from the *Australian Bureau of Statistics*⁵ on 12 September 2016.

The International Organization for Standardization (ISO) week date system 8601 was used to determine the week of disease onset⁶.

Data analyses were undertaken using *Microsoft Excel 2010*⁷ and *Stata/SE* version 14⁸.

Data summaries

Influenza notifications

Profile of the 2016 season

The 2016 influenza season in Queensland was characterised by a dominance of influenza A (92%), with the subtype A/H3N2 representing 73% of those viruses further characterised. The epidemic curve for the 2016 season is shown in Figure 1. A sustained increasing trend in notifications and percentage positive was apparent from week 28 (week beginning 11 July) reaching a peak in week 35 (week beginning 29 August) with 1,866 notifications and a percentage positive of 29. The total number of notifications for the year was 23,261.

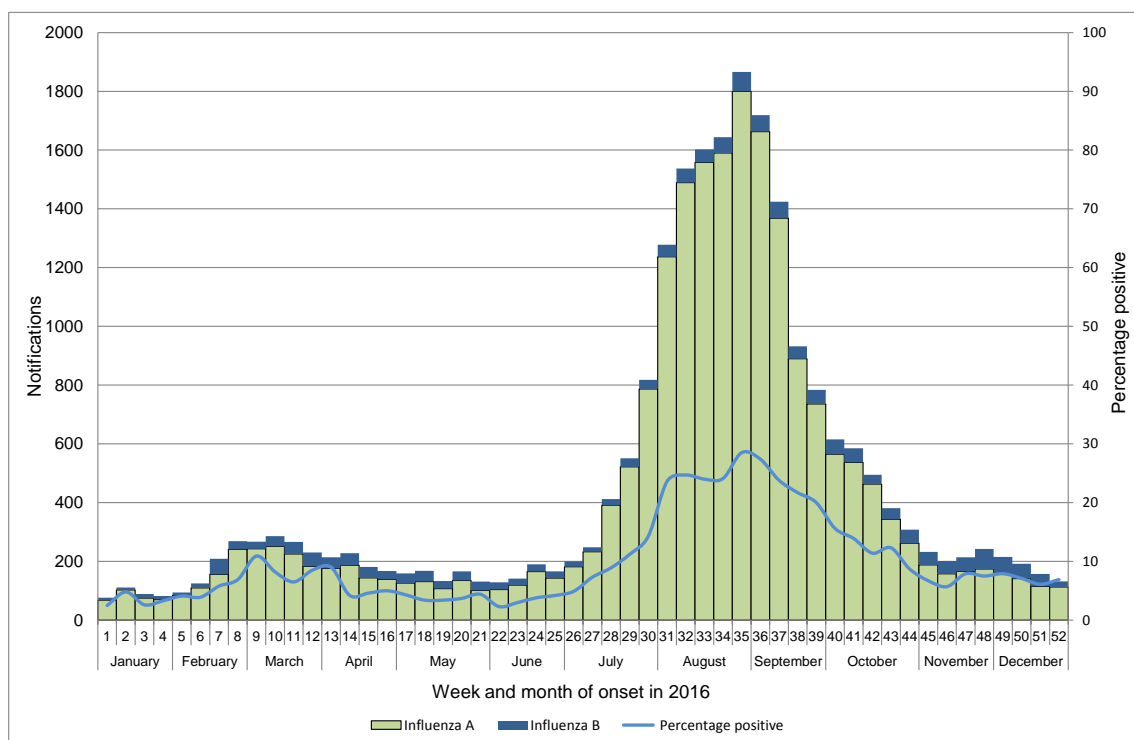


Figure 1 Influenza notifications in Queensland by type, week and month of onset, 1 January to 31 December 2016

The statewide notification profile was largely influenced by activity in the southern region which experienced peaks in weeks 33 and 35, with 975 and 968 notifications, respectively. The central region's peak occurred in week 35, with 694 notifications. The tropical region experienced a sustained rise in notifications from week 33 reaching a plateau between weeks 35 and 38, with a mean weekly notification count of 203 during this period. Percentage positive for the southern, central and tropical regions during their respective intervals of peak activity was recorded as 27%, 27%, and 30%. These percentages have been averaged where the peak activity occurred over more than one week. Figure 2 summarises the regional notification data for 2016.

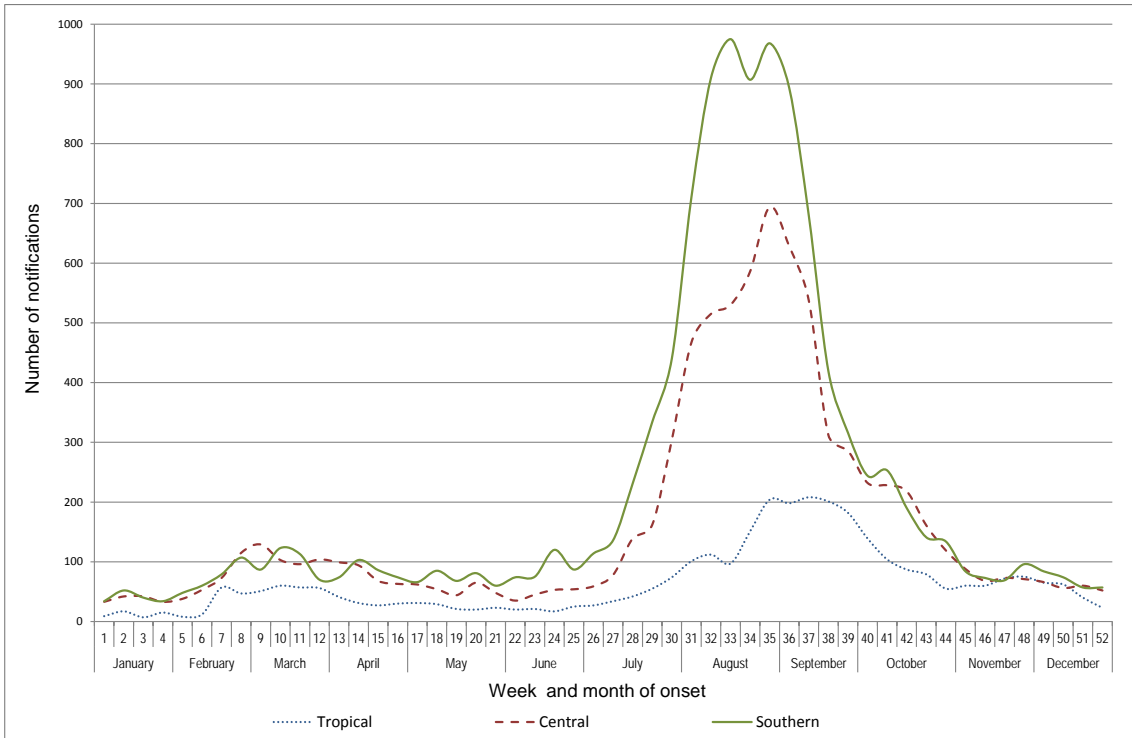


Figure 2 Influenza notifications in Queensland by type, week and month of onset, 1 January to 31 December 2016

Data from the World Health Organization Collaborative Centre for Reference and Research on Influenza (WHO CC) indicate that the circulating strains were consistent with the 2016 quadrivalent influenza vaccine (QIV).

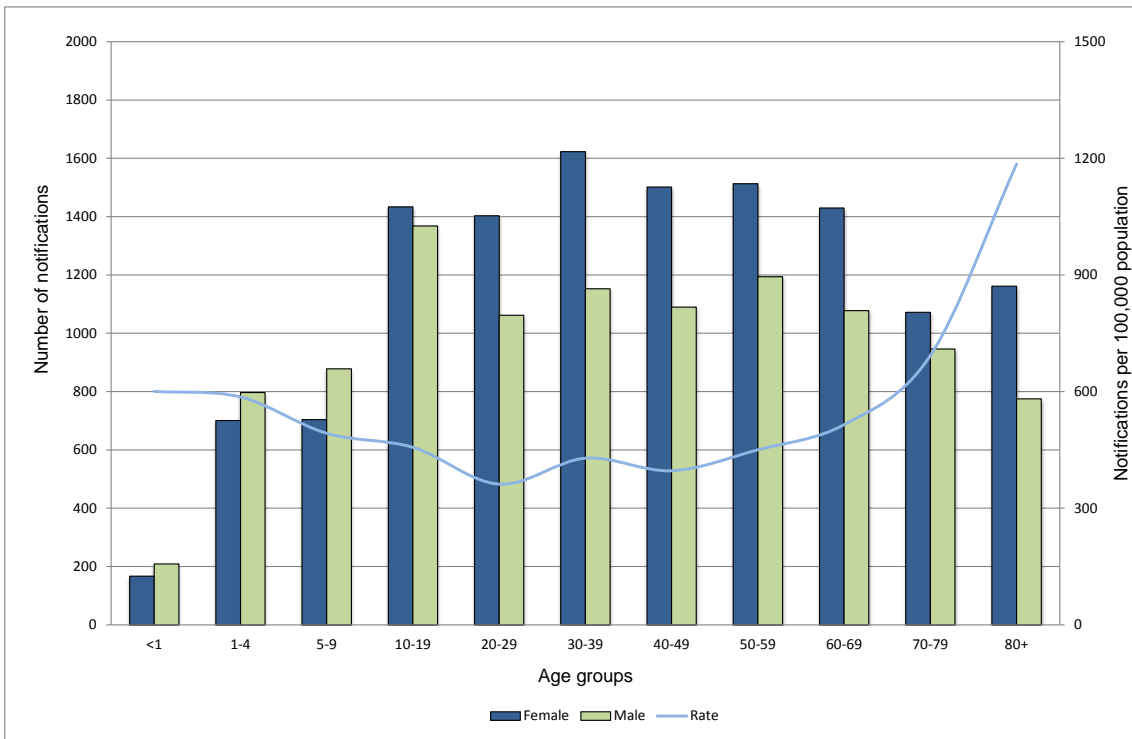


Figure 3 Influenza notifications in Queensland by age group, gender and annual age group specific rates, 1 January to 31 December 2016

Figure 3 shows the age and gender distribution of notifications. The overall mean and median ages were 40 and 41 years, respectively. Fifty five percent of notifications were female.

Hospital admissions for confirmed influenza provide a useful proxy measure for disease severity. Figure 4 summarises public hospital influenza admission data for the 2016 season.

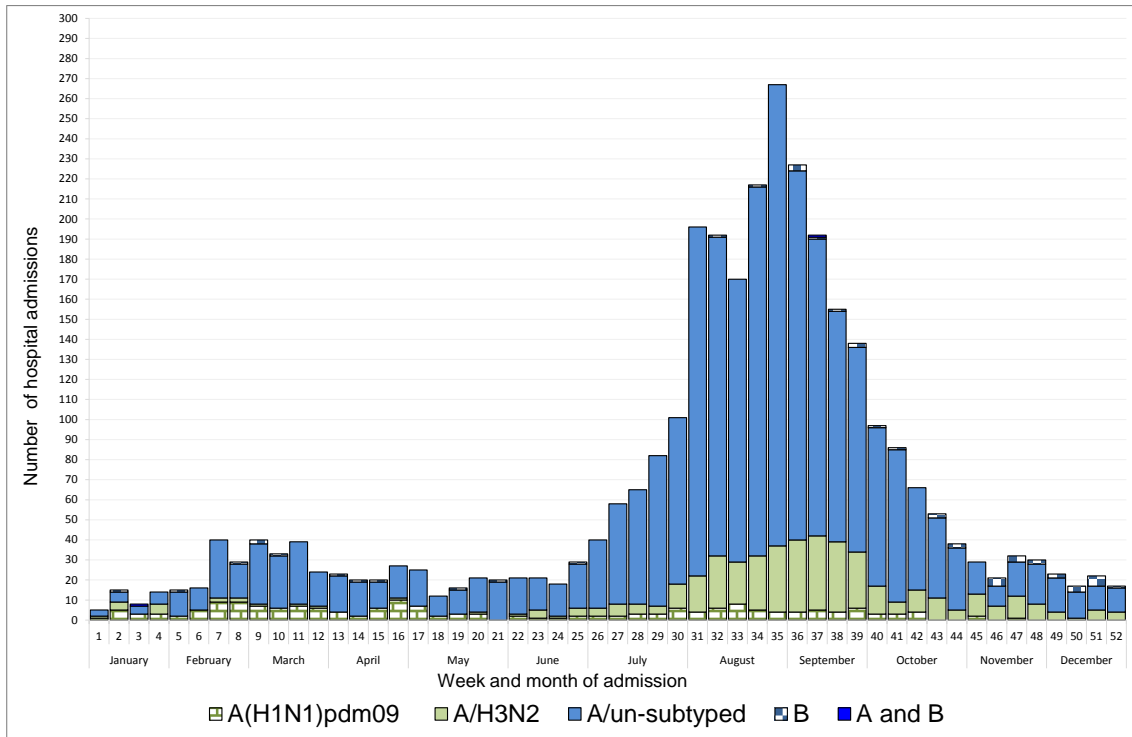


Figure 4 Laboratory confirmed influenza admissions in Queensland residents, to Queensland public hospitals, by influenza type, subtype, and week of admission, 1 January to 31 December 2016

Figure 5 shows the age and gender distribution of public hospital influenza admissions. The overall mean and median ages were 54 and 63 years, respectively. Fifty one percent of admissions were female.

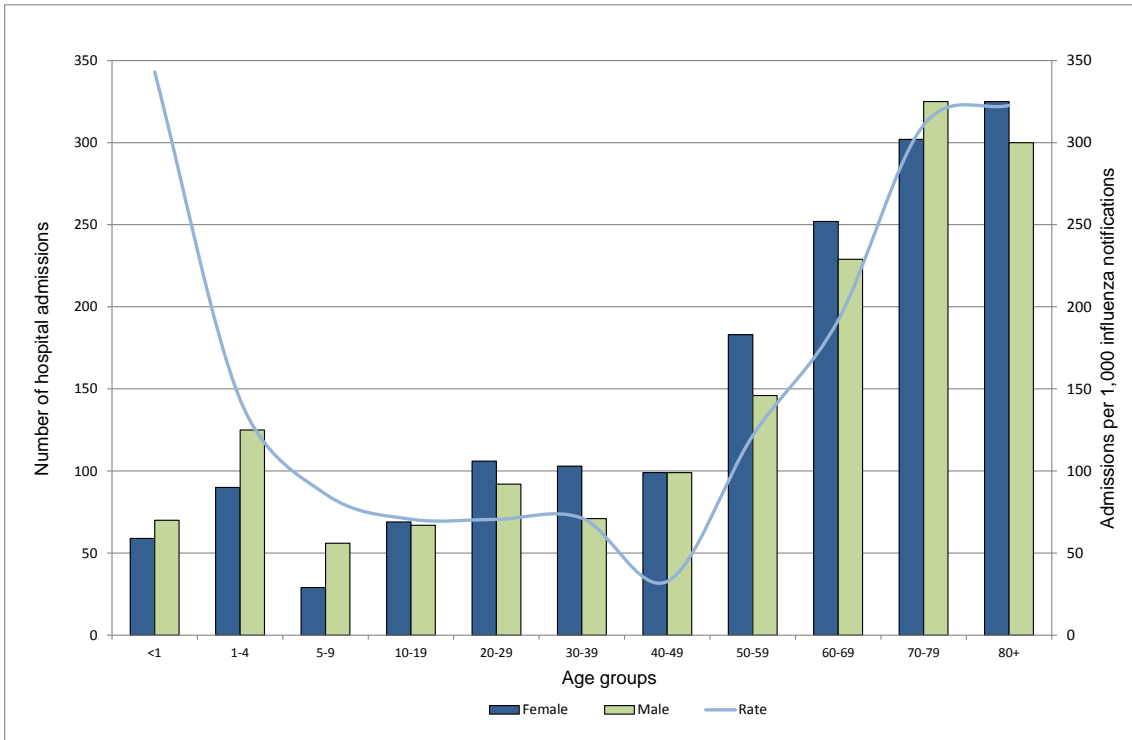


Figure 5 Laboratory confirmed admissions to Queensland public hospitals by age group, gender and age group specific admission rates, 1 January to 31 December 2016

Comparison between seasons: 2011 to 2016

The nature of influenza seasons can vary considerably from year to year depending on which viruses are circulating. Influenza A predominated in all years within the reporting period (Table 1) with the exception of 2015. Influenza A(H1N1)pdm09 was the most common subtype during the A dominated seasons with the exception of 2012 and 2016 when A(H3N2) predominated.

Table 1 Influenza season summary for Queensland 2011 to 2016 by type, subtype, and public hospital admission count

	Annual total counts					
	2016	2015	2014	2013	2012	2011
Total influenza	23,283	28,059	17,902	5,511	16,909	10,386
Influenza type						
A	21,435	9,772	15,312	3,572	12,513	8,342
A(H1N1)pdm09	835	197	2,023	697	49	2,982
A (H3N2)	2,216	1,338	880	194	1,900	900
Subtype unavailable	18,384	8,237	12,409	2,681	10,564	4,460
B	1,848	18,287	2,590	1,939	4,396	2,039
Victoria lineage	15	140	6	12	179	138
Yamagata lineage	25	140	21	117	12	4
Lineage unavailable	1,808	18,007	2,563	1,810	4,205	1,897
Type unavailable	0	0	0	0	0	5
Hospitalisations*	3,197	1,636	2,231	486	1,479	759

*Queensland public hospitals only

Table 2 summarises key features of the 2011 to 2016 seasons including total notifications, relative percentages of influenza A and B, peak week, and median age. It is noteworthy that the peak week varied by 0 – 4 weeks but most frequently occurred during week 35.

Table 2 Influenza season profile for Queensland 2011 to 2016 by type, peak week and median age of notifications and hospitalisations

	Annual total counts					
	Total	Influenza A notifications (%)	Influenza B notifications (%)	Peak week (notifications)	Median age Notifications	Median age Hospitalisations
2016	23,283	21,435 (92.1)	1,848 (7.9)	35 (1,866)	40	63
2015	28,059	9,772 (34.8)	18,287 (65.2)	34 (3,444)	28	52
2014	17,902	15,312 (85.5)	2,590 (14.5)	35 (1,715)	34	51
2013	5,511	3,572 (64.8)	1,939 (35.2)	35 (354)	38	45
2012	16,909	12,513 (74.0)	4,396 (26.0)	33 (1,963)	27	50
2011	10,381*	8,342 (80.4)	2,039 (19.6)	31 (1,001)	25	34

*Totals exclude untyped notifications

Comparison of year to date (YTD) notification counts across years (Figure 6), at a particular point in time, can be misleading because the start of the season can vary. Short lived increases in counts between seasons can occur even in temperate regions and may be misinterpreted as early seasonal activity.

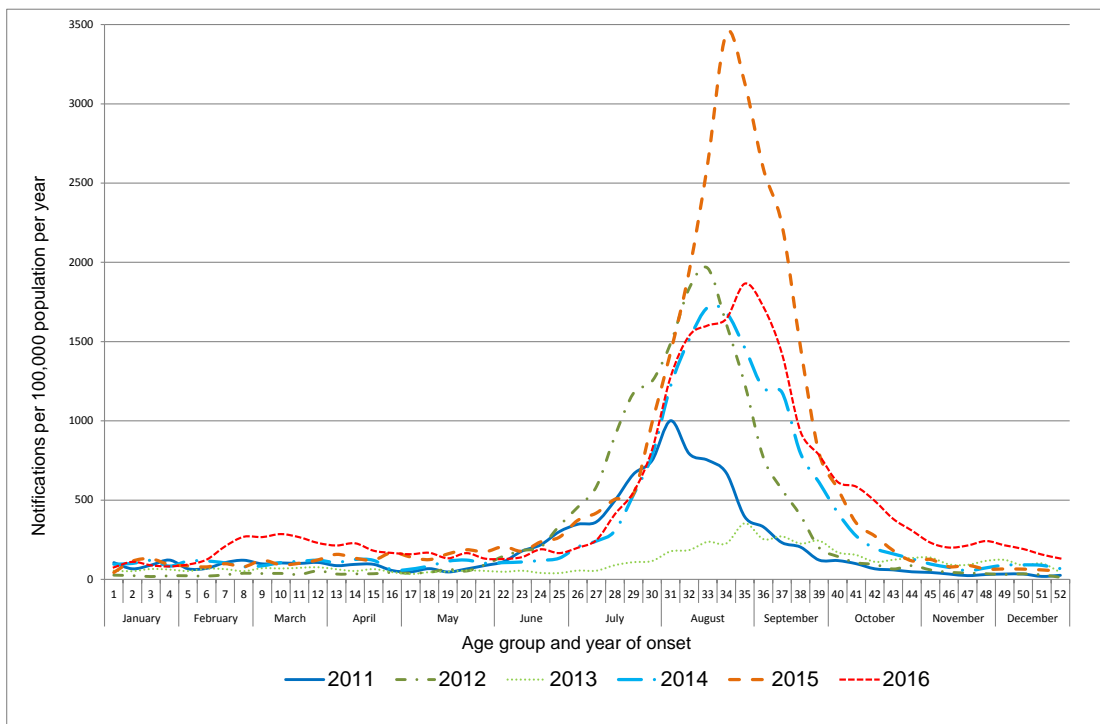


Figure 6 Influenza notifications in Queensland by month of onset, 1 January 2011 to 31 December 2016

Assessment of season severity requires consideration of more than the notification count. As influenza transmission in the population begins to rise in the lead up to the annual season, the percentage of laboratory tests that are positive also rises. At the peak of a season the percentage positive will also reach its maximum; and has ranged between 10% - 40% during the reporting period (Figure 7).

The age distribution of influenza notifications and hospitalisations in any given season can be influenced by the types and subtypes of circulating viruses; and may vary as the season progresses.

Influenza can affect susceptible individuals in all age groups. However, typically, the extremes of the age range, pregnant women and people with underlying medical conditions are disproportionately affected. In addition, age sub groups within the population may be more prone to severe disease depending on the types and subtypes of circulating influenza virus during a particular season. Annual age specific notification rates are shown in Figure 8.

During the reporting period the relative proportions of influenza A and B have shown considerable variation (Table 2). An important point to note is that during a given season the proportion of notifications made up by influenza A and B is rarely constant, although overall one may dominate.

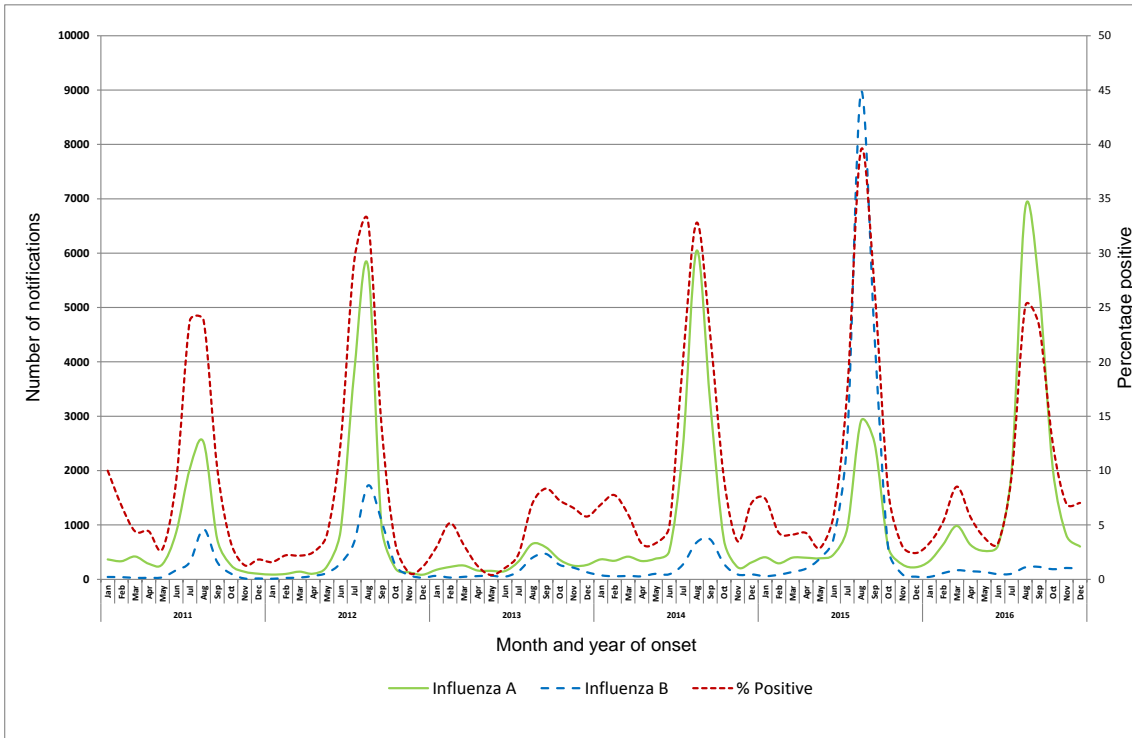


Figure 7 Influenza notifications in Queensland by type, month and year of onset and percentage of positive influenza tests (public laboratory system only), 1 January 2011 to 31 December 2016

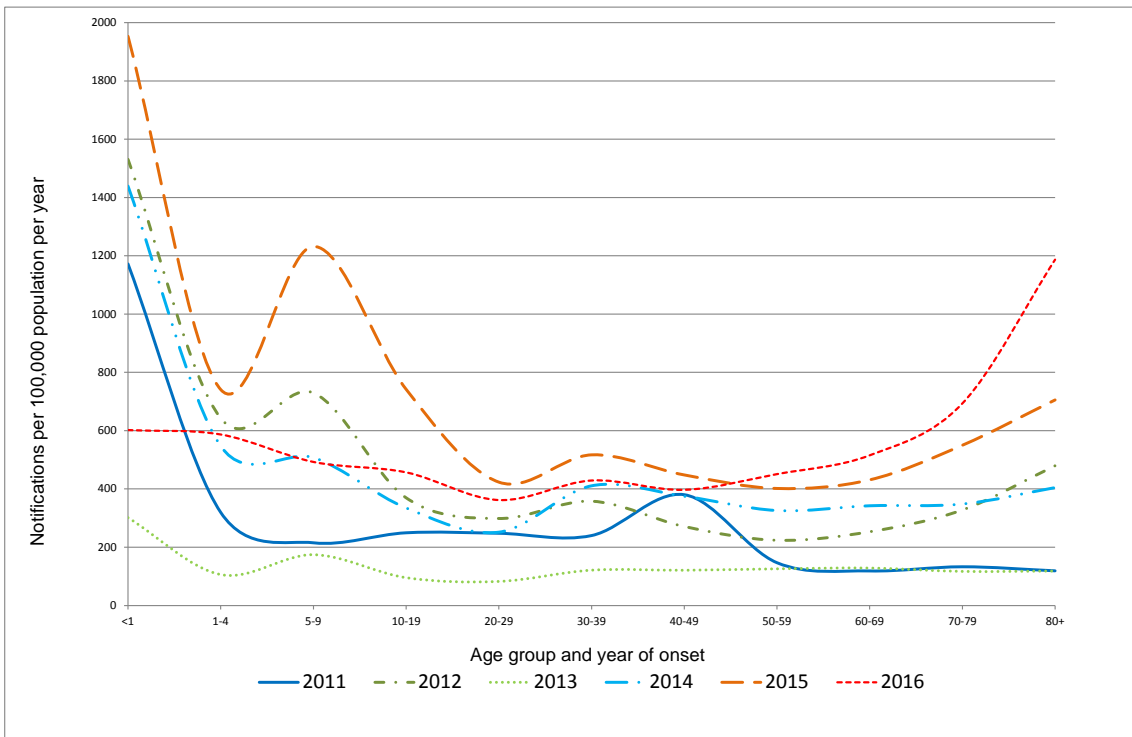


Figure 8 Influenza notification rates in Queensland by age group and year of onset, 1 January 2011 and 31 December 2016

Influenza hospitalisations (public hospitals)

Hospital admissions for influenza (Table 1 and Figure 9) vary depending on season severity. Data presented are for public hospitals only.

The highest number of hospitalisations (3,197) in the reporting period was in 2016.

Age specific admission rates are shown in Figure 10.

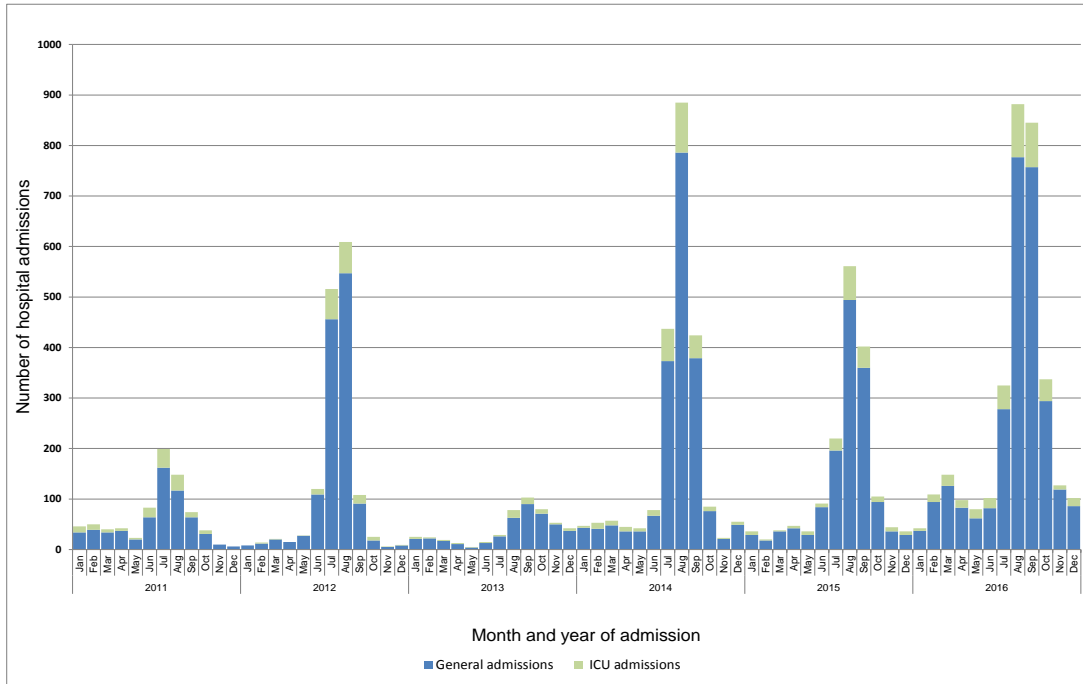


Figure 9 Influenza admissions to Queensland public hospitals by month, year and admission type, 1 January 2011 to 31 December 2016

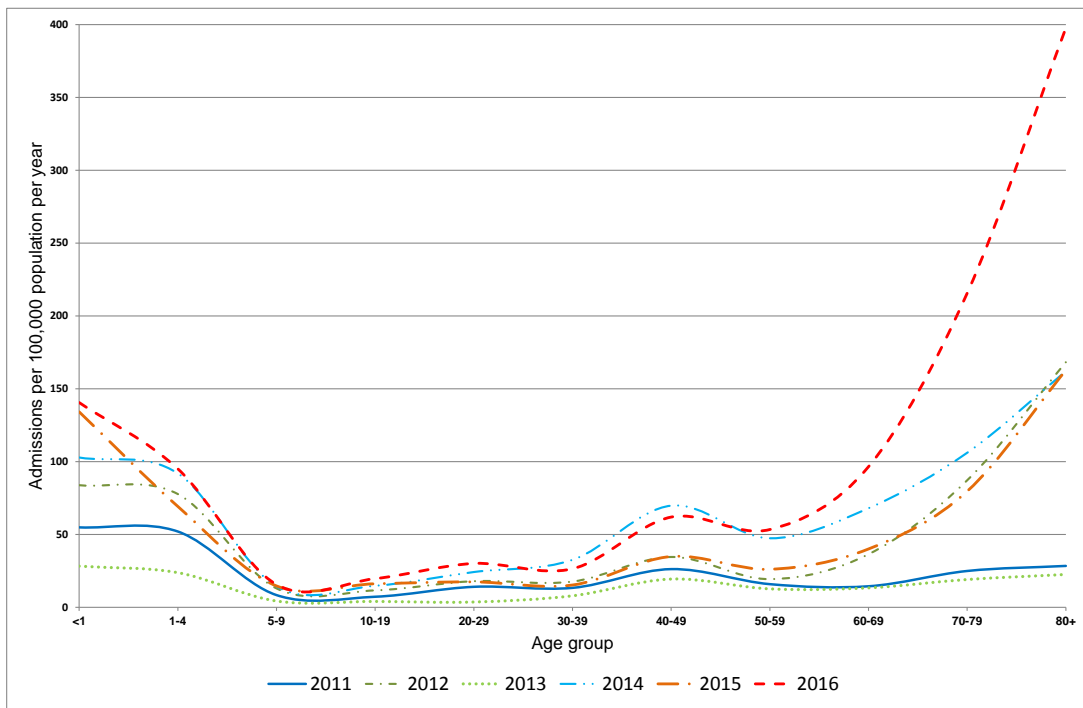


Figure 10 Influenza admission rates to Queensland public hospitals by age group and year of admission, 1 January 2011 to 31 December 2016

Summary

- Influenza notifications in Queensland are monitored all year round
- The pattern of influenza notifications and hospitalisations varies by year and is influenced by which viruses are circulating
- The 2016 influenza season in Queensland was characterised by:
 - dominance of influenza A/H3N2
 - second highest number of notifications (23,283) since influenza became notifiable in 2001
 - highest number of hospitalisations (3,197) in the reporting period (data available from 2011 onward)

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Appendices

Appendix 1 Composition of influenza vaccine for the southern hemisphere season 2011 to 2016

Southern hemisphere season	Australian vaccine composition			
	A/H1N1	A/H3N2	B	Additional B for QIV*
2016	A/California/7/2009 (H1N1)pdm09-like virus	A/Hong Kong/4801/2014 (H3N2)-like virus	B/Brisbane/60/2008-like virus	B/Phuket/3073/2013-like virus
2015	A/California/7/2009 (H1N1)pdm09-like virus	A/Switzerland/9715293/2013 (H3N2)-like virus	B/Phuket/3073/2013-like virus	B/Brisbane/60/2008-like virus
2014	A/California/7/2009 (H1N1)pdm09-like virus	A/Texas/50/2012 (H3N2)-like virus	B/Massachusetts/2/2012-like virus	B/Brisbane/60/2008-like virus
2013	A/California/7/2009 (H1N1)pdm09-like virus	A/Victoria/361/2011 (H3N2)-like virus	B/Wisconsin/1/2010-like virus	B/Brisbane/60/2008-like virus
2012	A/California/7/2009 (H1N1)pdm09-like virus	A/Perth/16/2009 (H3N2)-like virus	B/Brisbane/60/2008-like virus	N/A
2011	A/California/7/2009 (H1N1)pdm09-like virus	A/Perth/16/2009 (H3N2)-like virus	B/Brisbane/60/2008-like virus	N/A

*Quadrivalent influenza vaccine

Appendix 2

Hospital and Health Services (2015 edition) with regions



Prepared by: Statistical Reporting and Coordination, Health Statistics Branch, 29 January 2015
 Hospital and Health Services by recognised public hospitals and primary health centres as at 29 November 2014

Regions and Hospital and Health Services		
Tropical	Central	Southern
Torres and Cape	Central Queensland	Metro South
Cairns and Hinterland	Central West	Darling Downs
North West	Wide Bay	West Moreton
Townsville	Sunshine Coast	South West
Mackay	Metro North	Gold Coast