

Influenza in Queensland

2010–2015

Influenza Surveillance Report

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Contents

Introduction.....	4
Methods	4
Data Summaries.....	5
Influenza Notifications.....	5
Profile of the 2015 season	5
Comparison between seasons: 2010 to 2015	8
Influenza hospitalisations (public hospitals)	12
Summary	13
References	14
Appendices.....	15

Figures

Figure 1	Influenza notifications in Queensland by type and week of onset, 1 January to 31 December 2015.....	5
Figure 2	Influenza notifications in Queensland by type and month of onset, 1 January to 31 December 2015.....	6
Figure 3	Influenza A and B as a percentage of notifications by week of onset, 1 January 2015 to 31 December 2015.....	6
Figure 4	Influenza B specimens (counts and percentage) further characterised by month and strain 1 January to 31 December 2015.....	7
Figure 5	Age and sex distribution of influenza notifications in Queensland, 1 January to 31 December 2015.....	7
Figure 6	New laboratory confirmed influenza admissions in Queensland residents, to Queensland public hospitals, by the influenza type, subtype, and week of admission, 1 January 2015 to 31 December 2015	8
Figure 7	Influenza notifications in Queensland by type, month and year of onset and percentage of positive influenza tests (public laboratory system only)	10
Figure 8	Influenza notifications in Queensland by month of onset, 1 January 2010 to 31 December 2015	10
Figure 9	Percentage of influenza positive laboratory tests (public laboratory system only) by month and year of testing.....	11
Figure 10	Influenza notification rate per 100,000 population per year in Queensland by age group and year of onset, 1 January 2010 and 31 December 2015	11
Figure 11	Influenza admissions to Queensland public hospitals by month, year and admission type, 1 January 2011 to 31 December 2015.....	12
Figure 12	Influenza admission rates to Queensland public hospitals by age group and year of admission, 1 January 2011 to 31 December 2015	13

Tables

Table 1	Influenza season summary for Queensland 2010 to 2015 by type, subtype, and public hospital admission count	9
Table 2	Influenza season profile for Queensland 2010 to 2015 by type, peak week and median age of notifications and hospitalisations	9

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 infections tend to be sporadic. 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. Annual influenza counts and rates vary by year and jurisdiction within Australia³.

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 2015 influenza season in Queensland compared with the 2010–2014 seasons.

Methods

Data were extracted for 2010 to 2015 influenza notifications from the Queensland Health notifiable conditions register on 2 February 2016. Hospital admissions data for 2011 to 2015 were extracted from *EpiLog*, a register of influenza admissions to Queensland public hospitals, on 15 February 2016. EpiLog data for 2010 were unavailable for inclusion in the analysis. Influenza strain data were obtained through Forensic and Scientific Services (FSS), Health Support Queensland on 6 March 2016. 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 directly from the *Australian Bureau of Statistics*⁵ on 15 February 2016.

Data analyses were undertaken using *Microsoft Excel 2010*⁶ and *Stata/SE* version 11⁷.

Data Summaries

Influenza Notifications

Profile of the 2015 season

The 2015 influenza season in Queensland was characterised by a dominance of influenza B (65%) not seen since 2008, when influenza B accounted for 55% of notifications. The epidemic curve for the 2015 season is shown in Figures 1 and 2. The trend (Figure 3) was one of an increasing weekly proportion of influenza B reaching a peak in the week beginning 10 August (week 33). The season started in mid June with notifications rising to a peak in the week beginning 17 August (week 34). The total number of notifications (28,059) was the largest recorded since influenza became notifiable in 2001. Influenza A co-circulated (35%), with 16% further subtyped: A/H1 (13%) and A/H3 (87%). As the season evolved a sustained increasing trend in the proportion of B/Brisbane (Victoria lineage) relative to B/Phuket (Yamagata lineage) was observed (Figure 4).

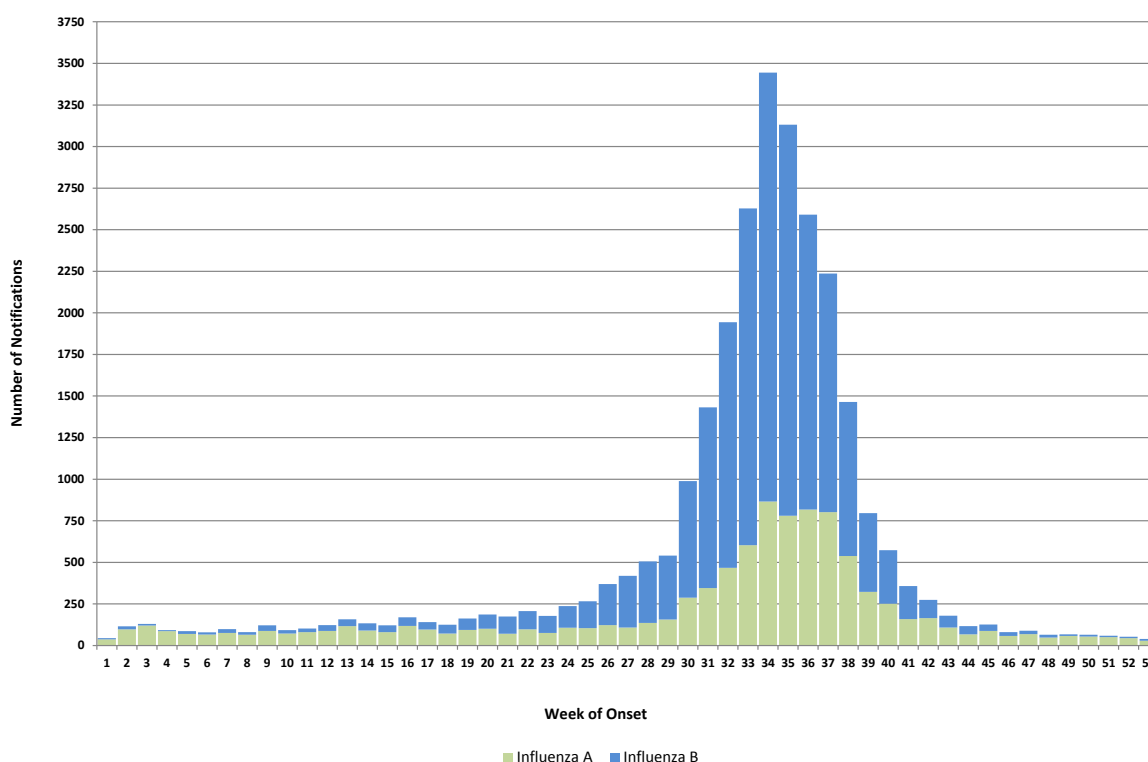


Figure 1 Influenza notifications in Queensland by type and week of onset, 1 January to 31 December 2015

The statewide notification profile was driven by activity in the southern and central regions, which both reached their peak during the week beginning 17 August, with 1,760 and 1,486 notifications, respectively. Activity in the tropical region showed a different pattern with no single peak week; but a rise in notifications from early August, followed by a four week plateau before a decline in mid September. The 2015 total

number of notifications for the southern, central, and tropical regions was 13,869, 11,783 and 2,407, respectively.

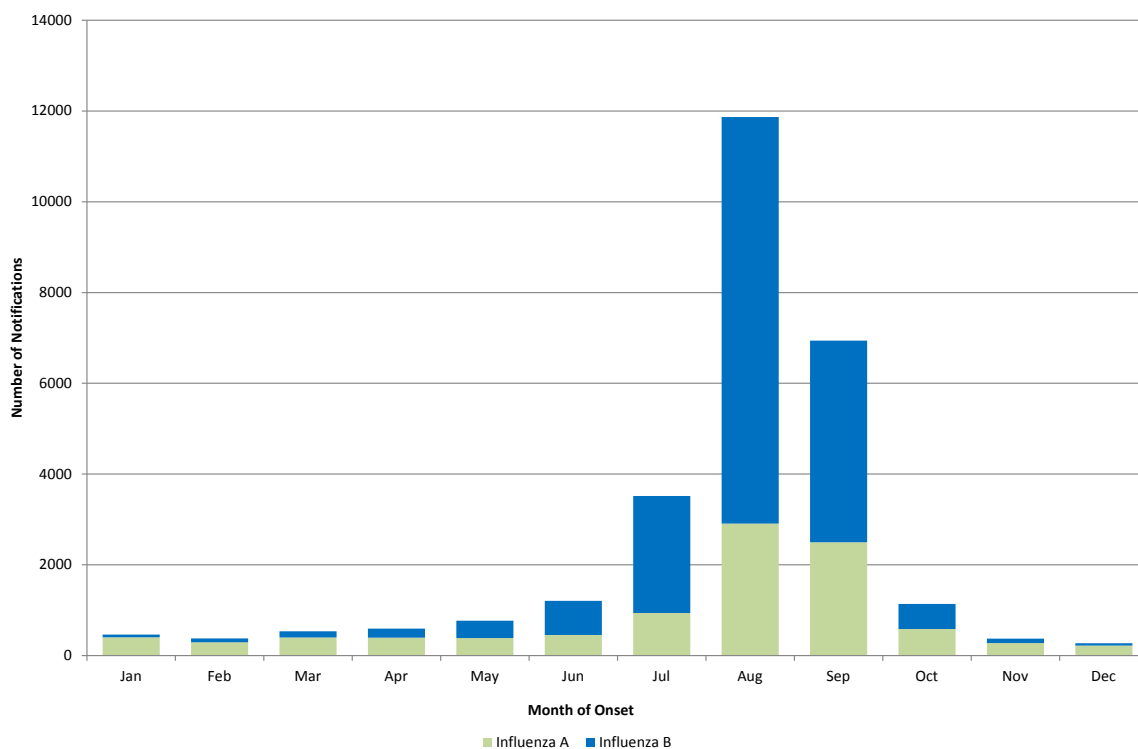


Figure 2 Influenza notifications in Queensland by type and month of onset, 1 January to 31 December 2015



Figure 3 Influenza A and B as a percentage of notifications by week of onset, 1 January 2015 to 31 December 2015

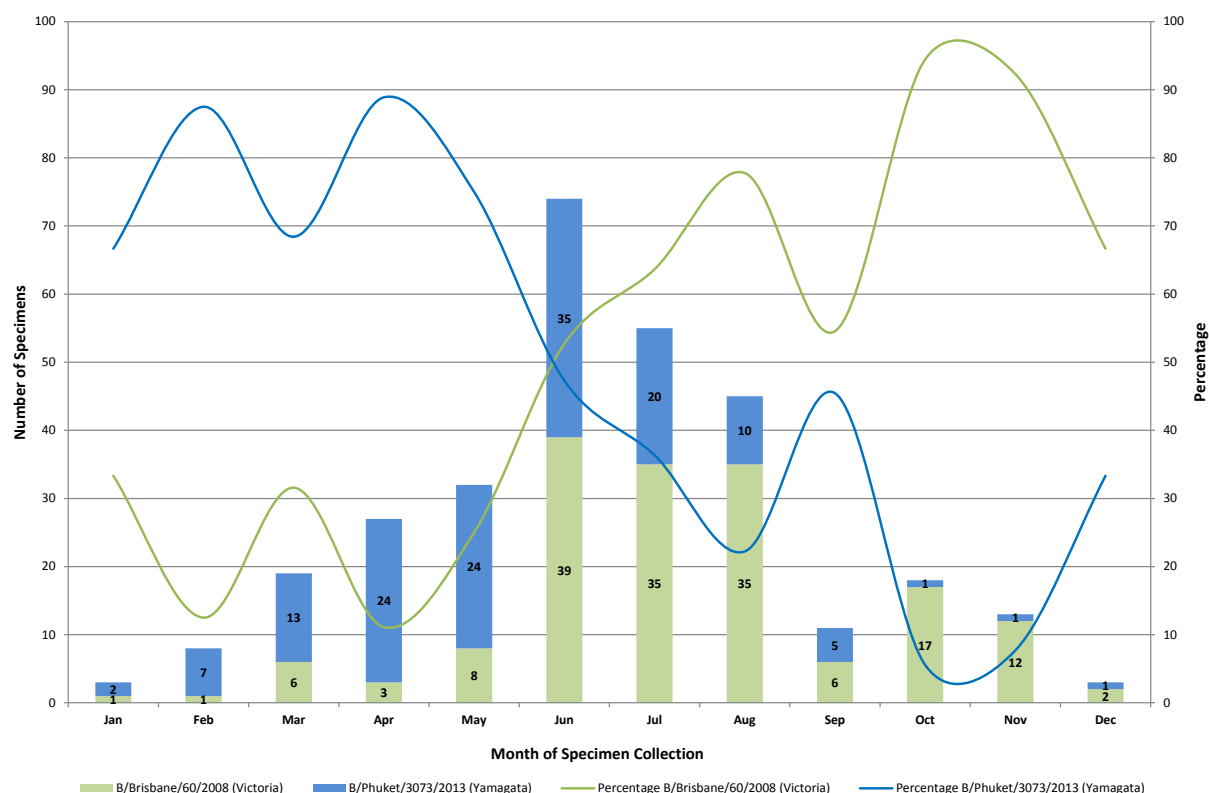


Figure 4 Influenza B specimens (counts and percentage) further characterised by month and strain 1 January to 31 December 2015

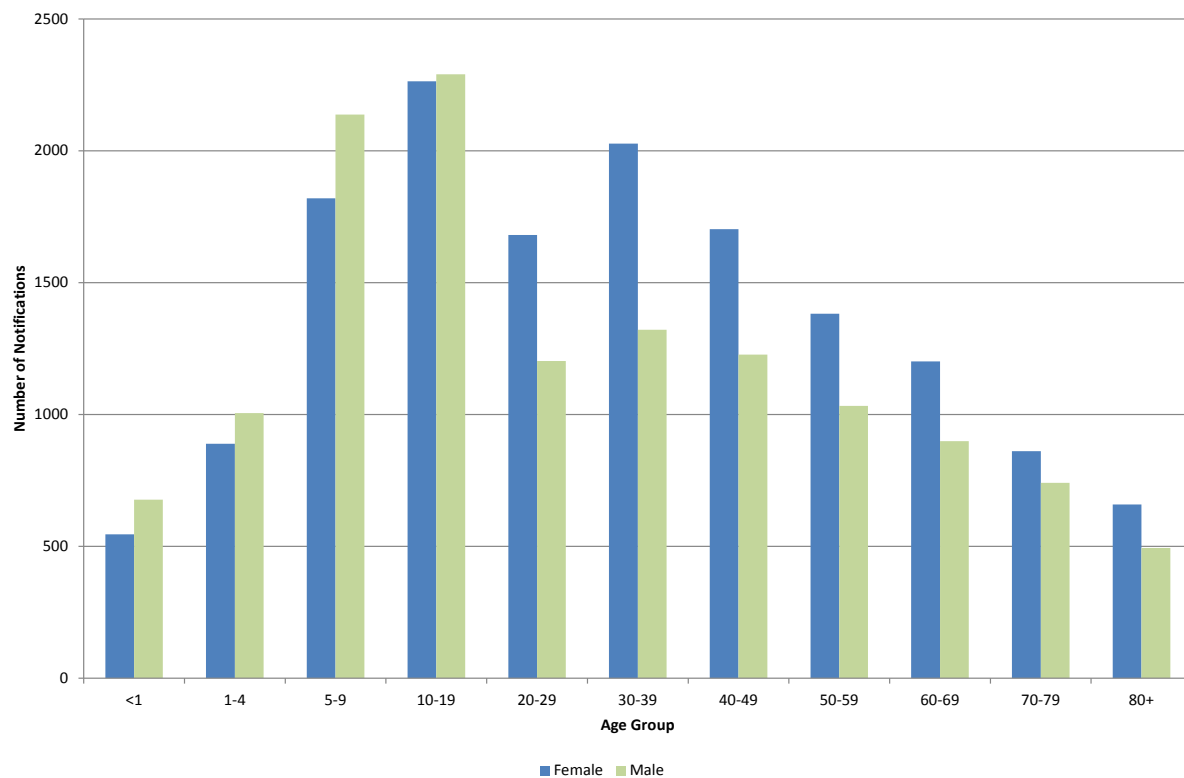


Figure 5 Age and sex distribution of influenza notifications in Queensland, 1 January to 31 December 2015

Figure 5 shows the age and sex distribution of notifications. The age distribution was different to previous years, likely reflecting the predominance of influenza B. The

overall mean and median ages were 32 and 28 years, respectively. However, influenza A notifications had mean and median ages of 40 and 39 years, respectively; while influenza B had mean and median ages of 28 and 21 years, respectively. The weekly median age for all influenza notifications reached a minimum of 18 years in the week beginning 3 August (week 32). The sex ratio was 86.7 males per 100 females; with median ages of 23 and 31 years respectively.

Hospital admissions for confirmed influenza provide a useful proxy measure for disease severity. Figure 6 summarises the data for the 2015 season. It is noteworthy that from week 28 the number of admissions with influenza A progressively and consistently increased compared with influenza B. This is in contrast to the pattern for overall notifications.

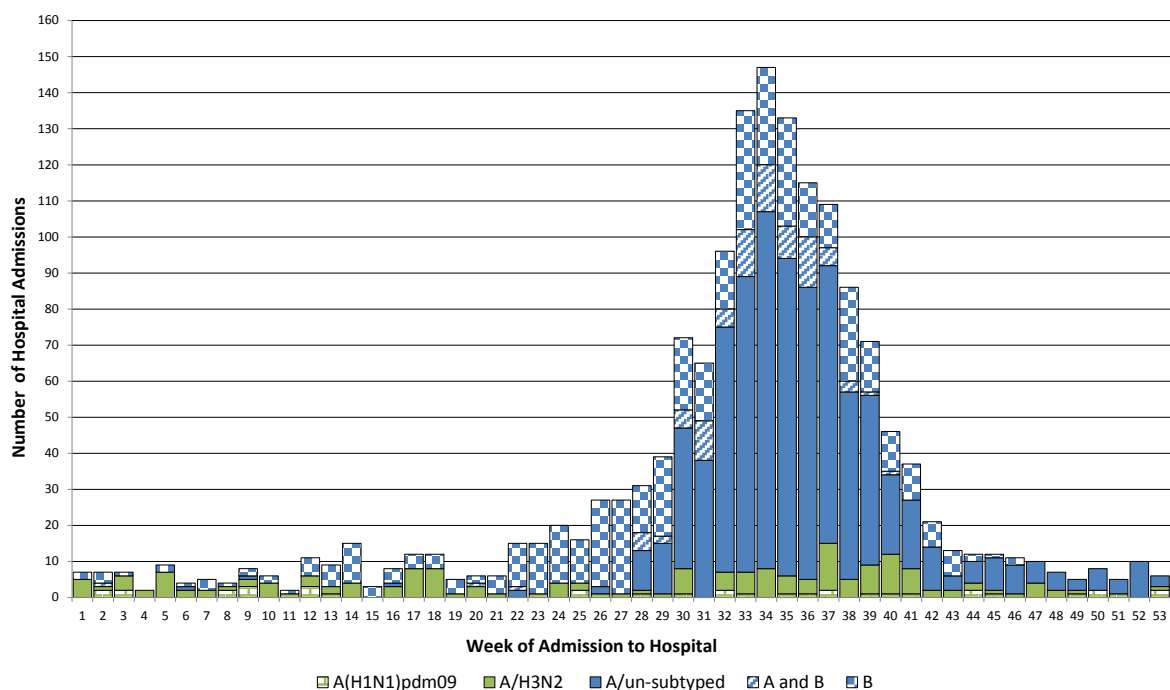


Figure 6 New laboratory confirmed influenza admissions in Queensland residents, to Queensland public hospitals, by the influenza type, subtype, and week of admission, 1 January 2015 to 31 December 2015

Comparison between seasons: 2010 to 2015

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 when A(H3N2) predominated.

Table 1 Influenza season summary for Queensland 2010 to 2015 by type, subtype, and public hospital admission count

	Annual Total Counts					
	2015	2014	2013	2012	2011	2010
Total influenza	28059	17902	5511	16909	10386	3222
Influenza Type						
A	9772	15312	3572	12513	8342	2963
A(H1N1)pdm09	197	2023	697	49	2982	1281
A (H3N2)	1338	880	194	1900	900	418
Subtype unavailable	8237	12409	2681	10564	4460	1264
B	18287	2590	1939	4396	2039	255
Victoria lineage	165	17	12	178	148	46
Yamagata lineage	143	66	145	17	5	0
Lineage unavailable	17979	2507	1782	4201	1886	209
Type unavailable	0	0	0	0	5	4
Hospitalisations*	1636	2231	486	1479	759	N/A

*Queensland public hospitals only

Table 2 summarises key features of the 2010 to 2015 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 – 6 weeks but most frequently occurred during August (weeks 33 – 35).

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.

Table 2 Influenza season profile for Queensland 2010 to 2015 by type, peak week and median age of notifications and hospitalisations

Year	Total	Influenza A Notifications (%)	Influenza B Notifications (%)	Peak Week (Notifications)	Median Age	
					Notifications	Hospitalisations
2010	3218*	2963 (92.1)	255 (7.9)	37 (184)	29	N/A
2011	10381*	8342 (80.4)	2039 (19.6)	31 (1001)	25	34
2012	16909	12513 (74.0)	4396 (26.0)	33 (1963)	27	50
2013	5511	3572 (64.8)	1939 (35.2)	35 (354)	38	45
2014	17902	15312 (85.5)	2590 (14.5)	33 (1715)	34	51
2015	28059	9772 (34.8)	18287 (65.2)	34 (3444)	28	52

*Totals exclude untyped notifications

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 (Figures 7 & 9).

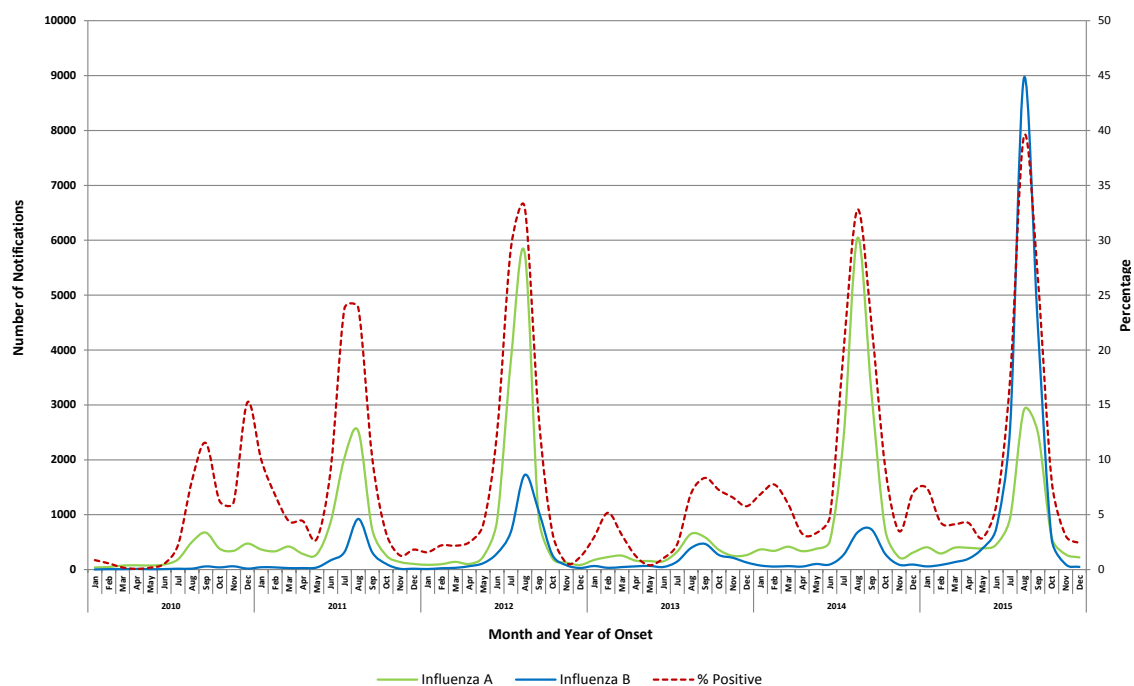


Figure 7 Influenza notifications in Queensland by type, month and year of onset and percentage of positive influenza tests (public laboratory system only)

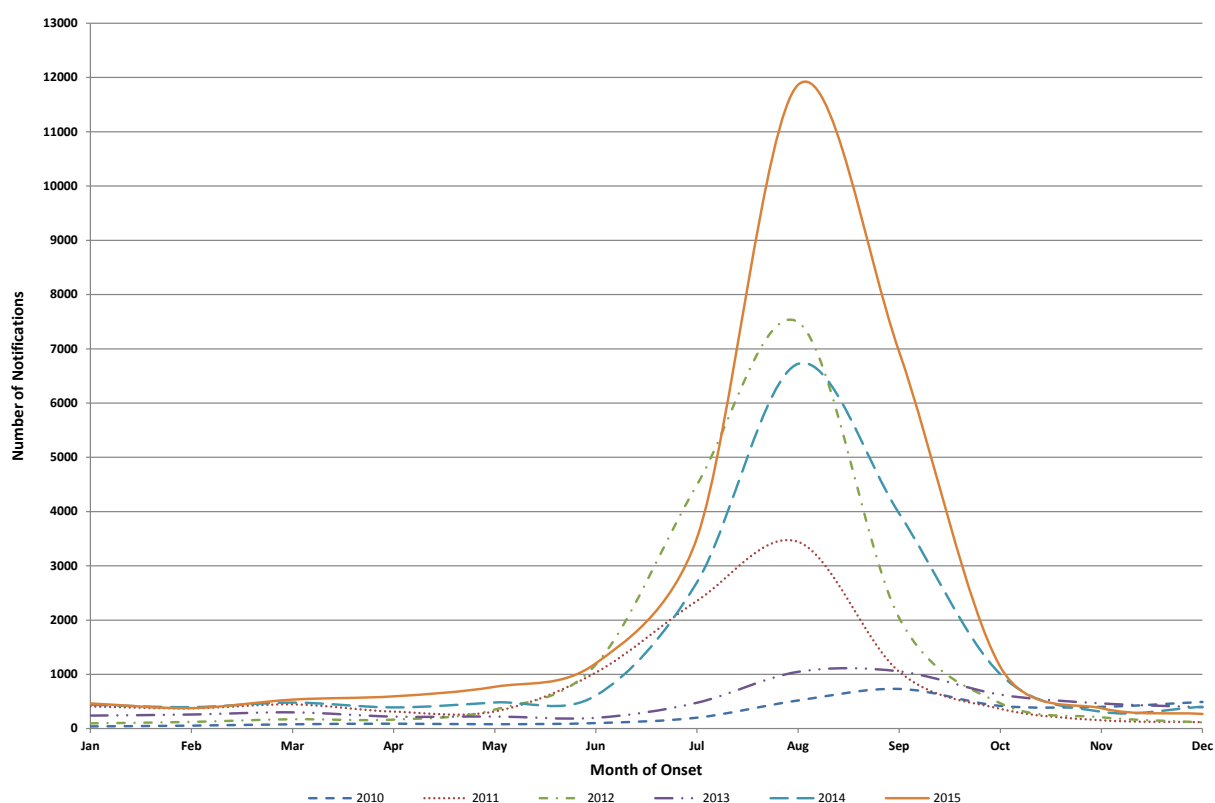


Figure 8 Influenza notifications in Queensland by month of onset, 1 January 2010 to 31 December 2015

Comparison of year to date (YTD) notification counts across years (Figure 8), at a particular point in time, can be misleading because the start of the season can vary.

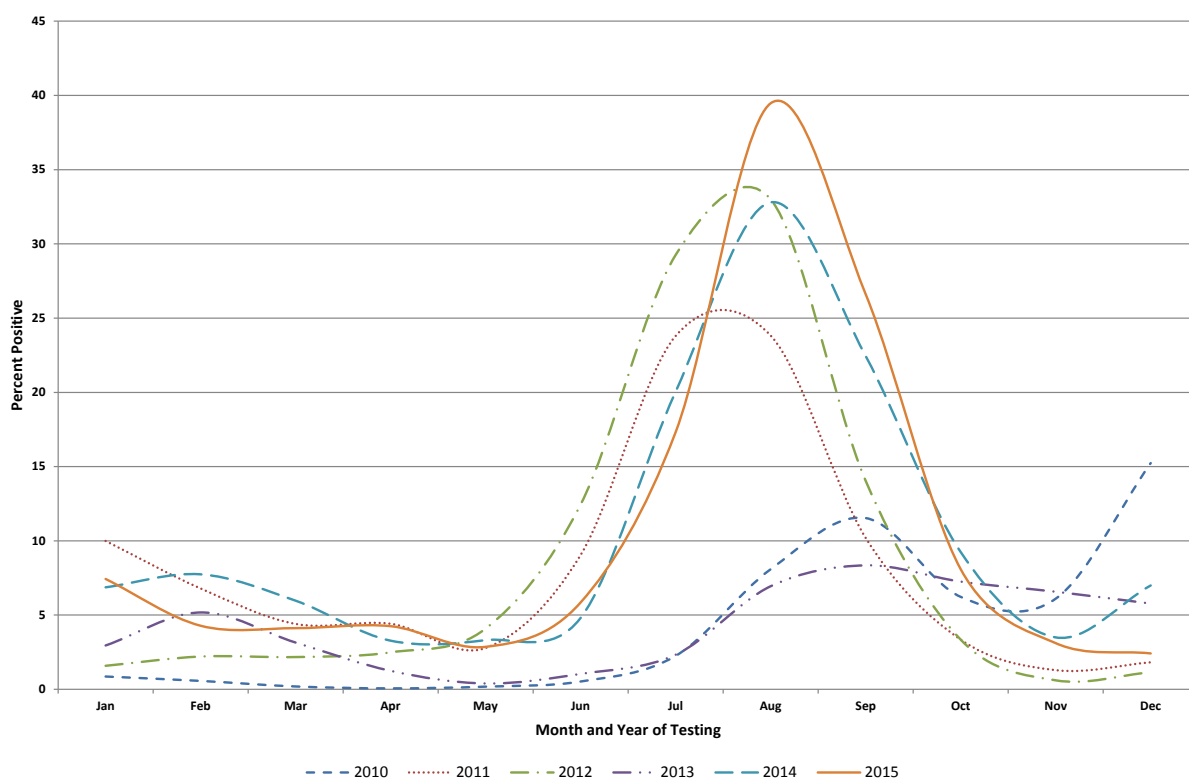


Figure 9 Percentage of influenza positive laboratory tests (public laboratory system only) by month and year of testing

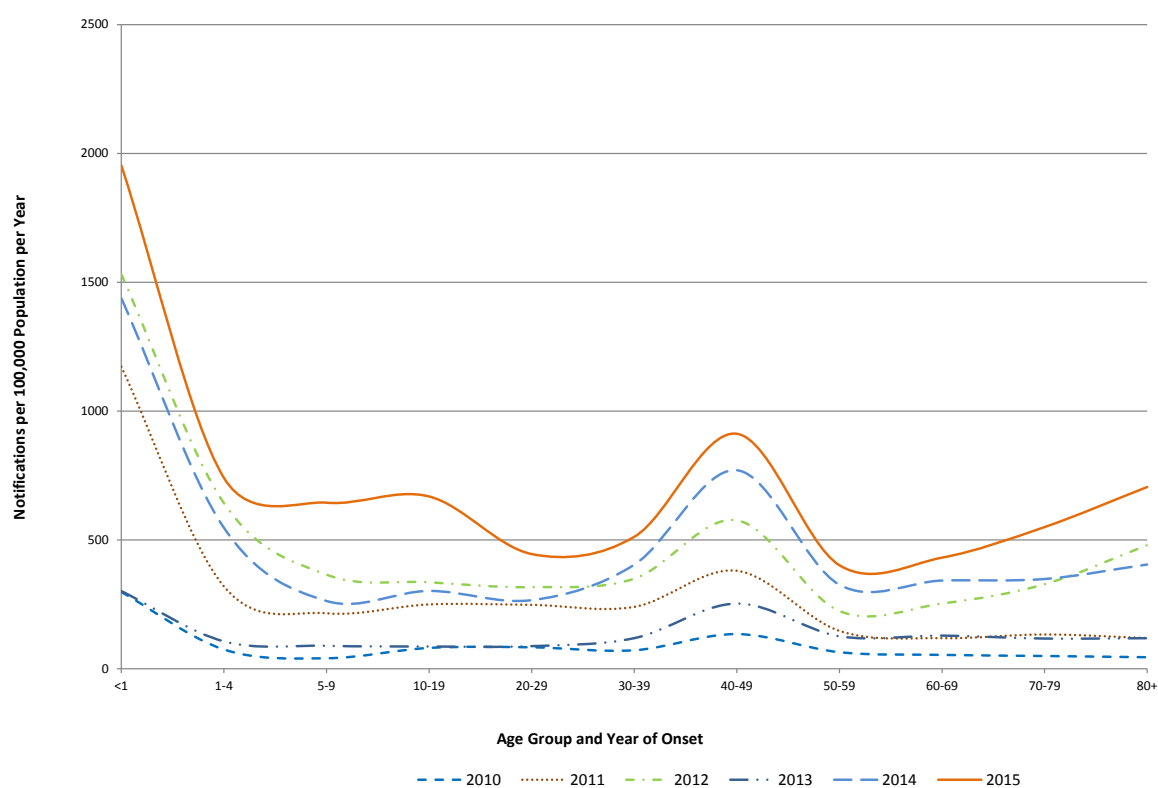


Figure 10 Influenza notification rate per 100,000 population per year in Queensland by age group and year of onset, 1 January 2010 and 31 December 2015

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 10.

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.

Influenza hospitalisations (public hospitals)

Hospital admissions for influenza (Figure 11) vary depending on season severity. Data presented are for public hospitals only. Age specific admission rates are shown in Figure 12.

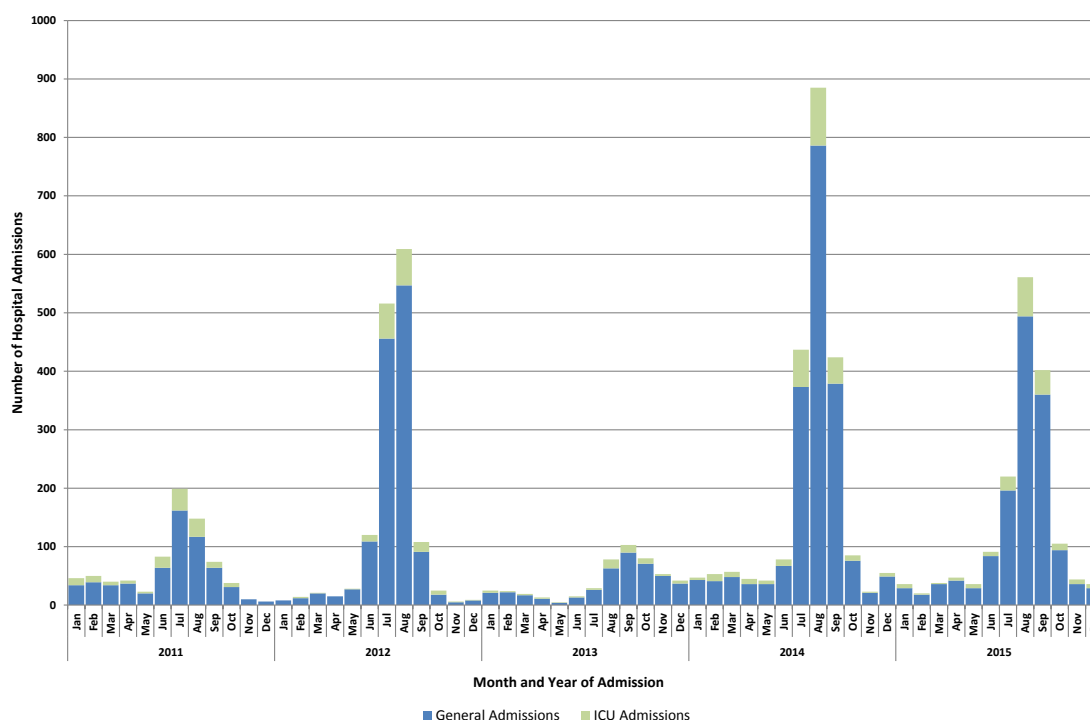


Figure 11 Influenza admissions to Queensland public hospitals by month, year and admission type, 1 January 2011 to 31 December 2015

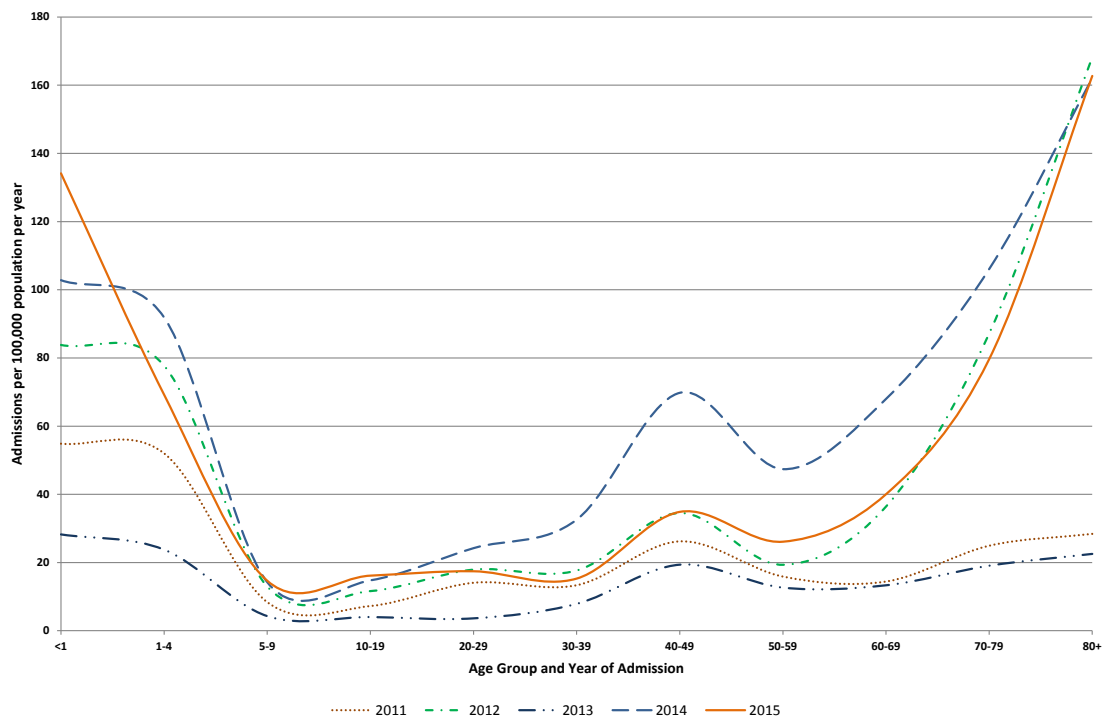


Figure 12 Influenza admission rates to Queensland public hospitals by age group and year of admission, 1 January 2011 to 31 December 2015

Summary

- Influenza notifications in Queensland are monitored year all round.
- The pattern of influenza notifications varies from year to year and is influenced by which viruses are circulating.
- The 2015 influenza season in Queensland:
 - was dominated by influenza B for the first time since 2008
 - had the highest number of notifications (28,059) since laboratory confirmed influenza became a notifiable condition in 2001
 - had fewer hospitalisations compared with the A(H1N1) dominated 2014 season, despite a higher notification rate

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Appendices

Appendix 1 Composition of influenza vaccine for the southern hemisphere season 2010 to 2015

Southern Hemisphere Season	Australian Vaccine Composition			
	H1N1	H3N2	B	Additional B for QIV
2010	A/California/7/2009 (H1N1)-like virus	A/Perth/16/2009 (H3N2)-like virus	B/Brisbane/60/2008-like virus	Not Applicable
2011	A/California/7/2009 (H1N1)-like virus	A/Perth/16/2009 (H3N2)-like virus	B/Brisbane/60/2008-like virus	Not Applicable
2012	A/California/7/2009 (H1N1)-like virus	A/Perth/16/2009 (H3N2)-like virus	B/Brisbane/60/2008-like virus	Not Applicable
2013	A/California/7/2009 (H1N1)-like virus	A/Victoria/361/2011 (H3N2)-like virus	B/Wisconsin/1/2010-like virus	B/Brisbane/60/2008-like virus
2014	A/California/7/2009 (H1N1)-like virus	A/Texas/50/2012 (H3N2)-like virus	B/Massachusetts/2/2012-like virus	B/Brisbane/60/2008-like virus
2015	A/California/7/2009 (H1N1)-like virus	A/Switzerland/9715293/2013 (H3N2)-like virus	B/Phuket/3073/2013-like virus	B/Brisbane/60/2008-like virus

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