

Alberta Health

Seasonal Influenza in Alberta

2017–2018 Season Summary

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Key Findings

- There were 9,069 laboratory-confirmed influenza cases reported in Alberta which is the largest number of cases in the previous five seasons.
- The predominant circulating strain was Influenza A (H3N2), but there were also a large number of cases due to Influenza B.
- Calgary Zone season started earlier than the other zones and had the highest number of cases reported (n = 3,343), but the Central Zone had the highest rate of cases per capita (293.4 cases per 100,000 population).
- The elderly population had the highest burden of laboratory-confirmed influenza this season, but there were also high rates of cases among children under five years old.
- There were 278 laboratory-confirmed influenza outbreaks across Alberta, of which the majority occurred in long-term care facilities, acute care facilities, and supportive living/home living sites.
- There were 3,053 hospitalizations, 242 ICU admissions and 92 deaths, of which 84 deaths were directly related to influenza.
- There was low antiviral resistance among influenza virus isolates tested in Canada and none were from Alberta.
- Albertans continue to increasingly utilize pharmacies for their influenza vaccine (50 per cent of all doses administered), but the number of doses (n = 1,229,350) and vaccine coverage among Albertans (29 per cent) only increased slightly from the previous season.

1. Influenza Activity in Alberta

This season Alberta had the largest number of laboratory-confirmed influenza cases reported compared with the previous five seasons (**Figure 1**). A total of 9,069 influenza cases (212 cases per 100,000 population) were reported to Alberta Health. Last season, only 4,494 influenza cases (108 per 100,000 population) were reported. The season started early (**Figure 2**) when the number of laboratory-confirmed influenza cases exceeded the seasonal threshold in week 40 of 2017, and the number of cases reported peaked in week 50 of 2017 (n = 901). This year, influenza A (H3N2) was the predominant circulating strain with 46 per cent (n = 4,149) of cases, but there were also a large number of influenza B cases reported which accounted for 38 per cent (n = 3,402) of cases. The remaining cases were influenza A (H1N1) (n = 286) cases and influenza A (Unsubtyped) (n = 1,232) cases.

There were 17,151 visits to the emergency room by 9,974 people and 28,996 visits to general practitioners by 26,733 people due to influenza (**Figure 3**). Pharmacies dispensed 26,793 antiviral prescriptions (**Figure 4**) during the season. The largest number of prescriptions dispensed occurred during week 50 (n = 2,892), which coincided with the peak week for laboratory-confirmed influenza diagnoses reported.

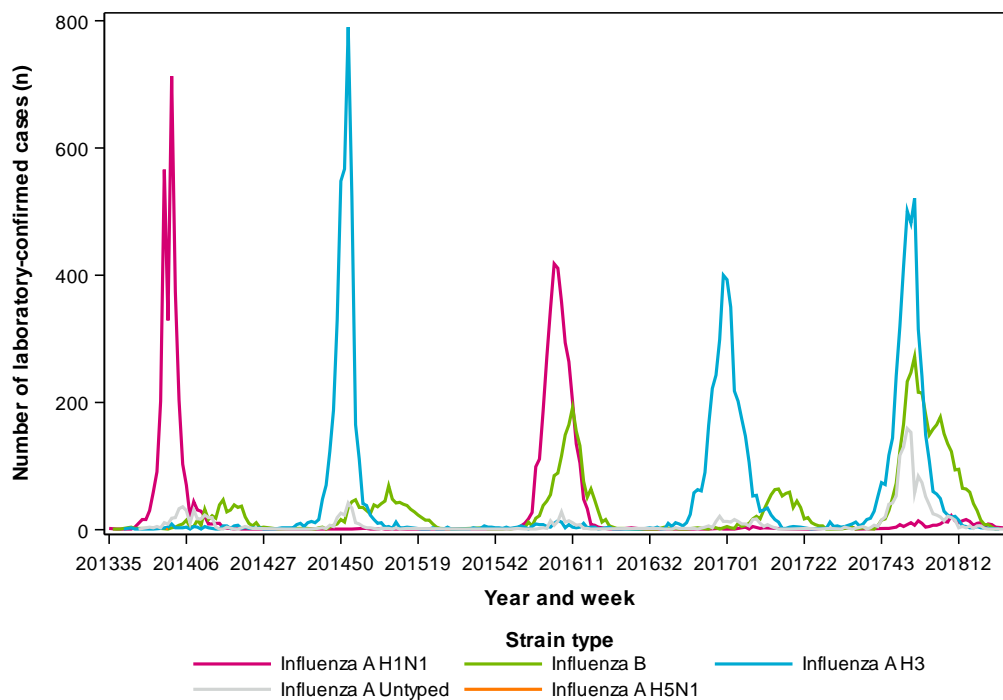


Figure 1 Laboratory-confirmed influenza cases by strain type and week of diagnosis

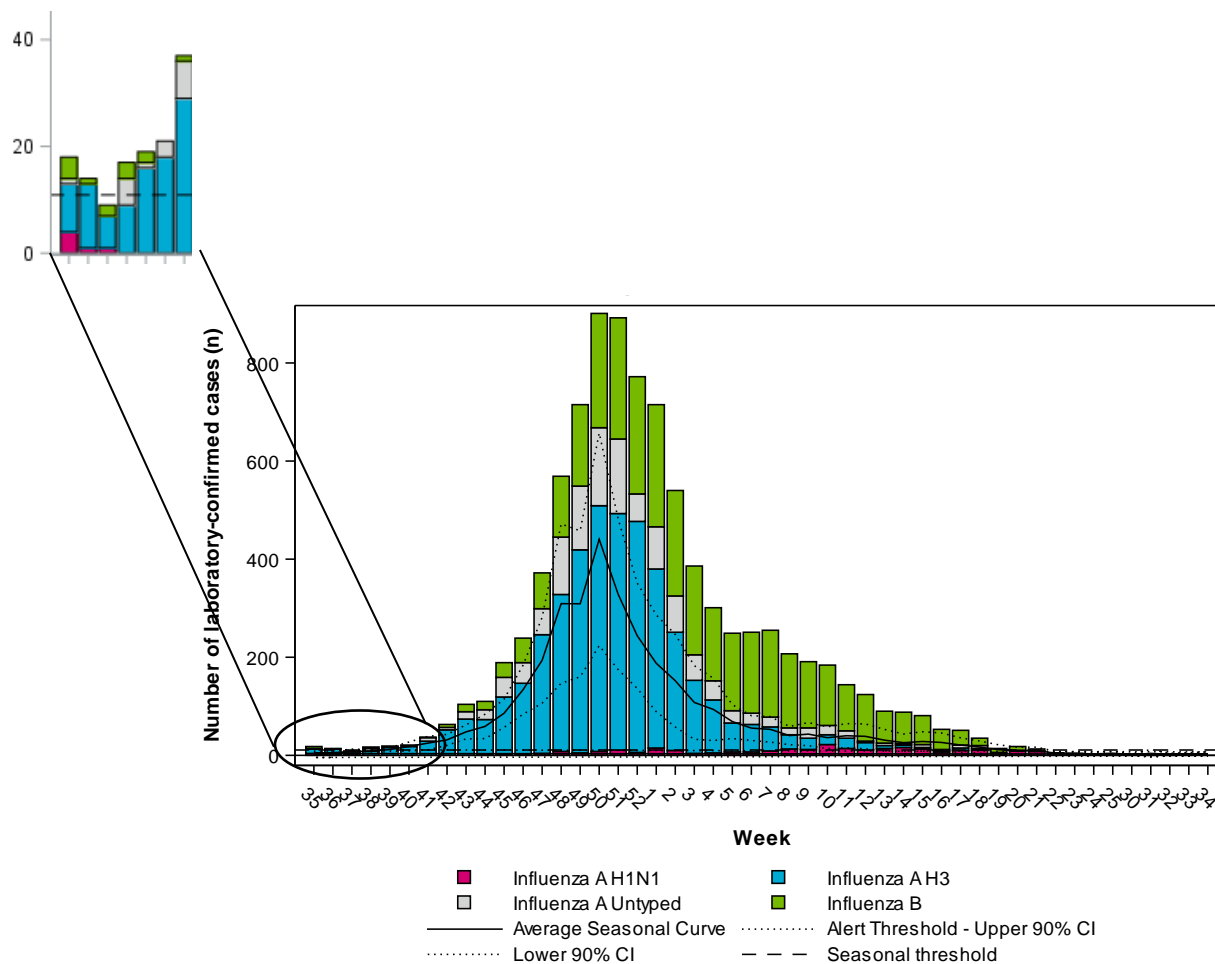


Figure 2 Laboratory-confirmed influenza cases by strain type and week of diagnosis compared to the average seasonal epidemic curve, 2017–2018 season. The average seasonal peak was shifted to match this season’s peak for comparison (see appendix for data notes).

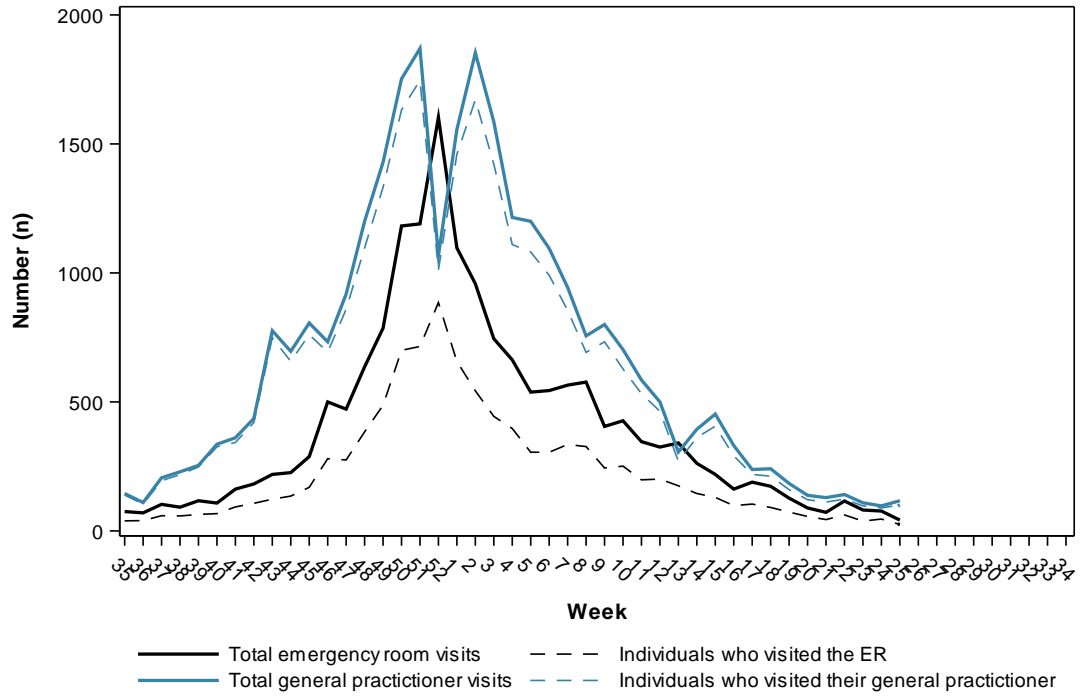


Figure 3 Total number of visits and number of individuals who sought care for influenza in the emergency room or from a general practitioner by week, 2017–2018 season

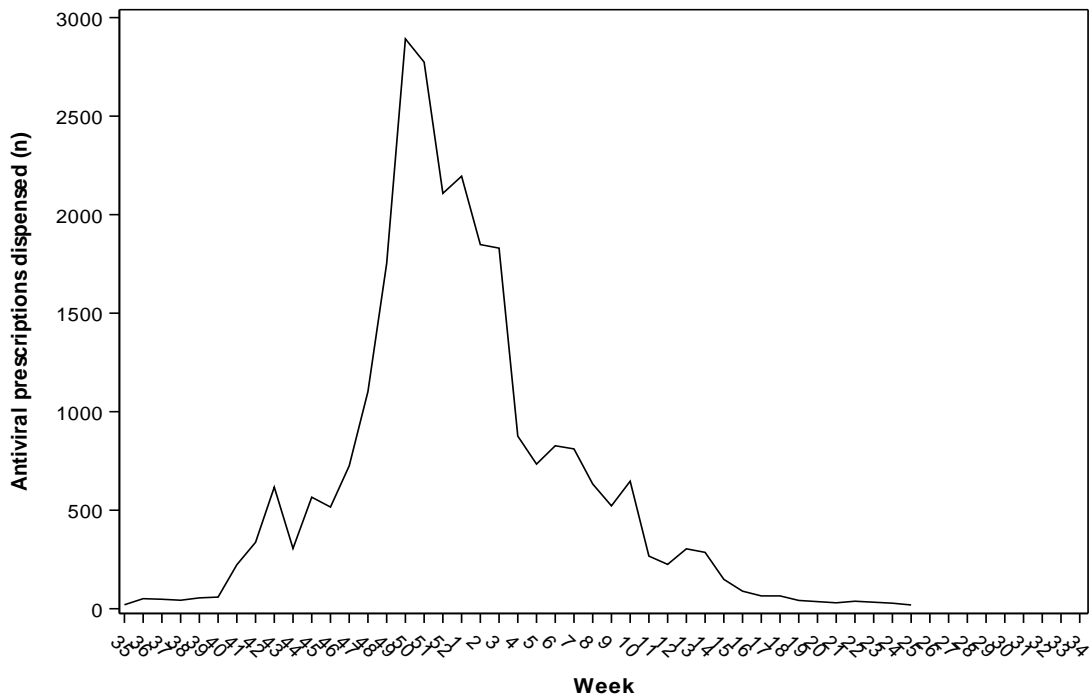


Figure 4 Antiviral prescriptions dispensed by pharmacists by week, 2017–2018 season

2. Alberta Health Services Zone

Similar to last season, Calgary Zone had the highest number of laboratory-confirmed influenza cases (n = 3,343) and Central Zone had the highest number of cases per capita (293.4 cases per 100,000 population) (Table 1). The influenza season in Calgary started earlier again this season compared with other zones (Figure 5), but the number of cases in each zone peaked at similar times (between weeks 50 and 52) (Figure 5).

Table 1 Rate (per 100,000 population) of laboratory-confirmed influenza cases by Alberta Health Services Zone and season

Zone	2017–2018		2016–2017		2015–2016		2014–2015		2013–2014	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
North	1,312	273.3	471	97.7	845	174.6	658	137.1	691	146.9
Edmonton	2,309	167.0	1,272	93.6	1,567	117.7	1,564	120.0	1,365	108.2
Calgary	3,343	203.7	1,827	113.0	1,699	107.0	1,612	103.7	997	66.2
Central	1,398	293.4	644	135.3	772	162.7	667	141.6	621	133.5
South	632	207.1	362	119.7	425	141.5	355	118.8	238	80.7
Alberta*	9,069	211.6	4,577	108.0	5,308	127.1	4,858	118.2	3,912	97.9

*unknown zone included in Alberta total

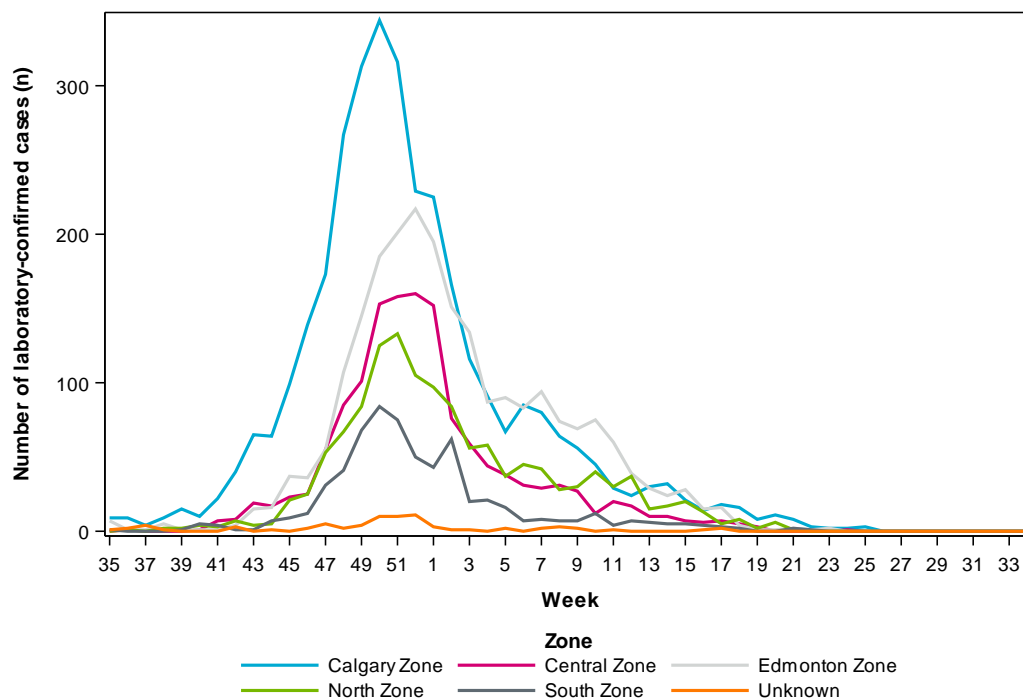


Figure 5 Laboratory-confirmed influenza cases by week of diagnoses and Alberta Health Services Zone, 2017–2018 season

3. Age

The rate of illness was highest among the elderly and children under five years old (**Table 2**). The rate of illness and number of cases among the elderly were the highest in the 2017–2018 season compared with the previous five seasons.

Table 2 Number and rate (per 100,000 population) of laboratory-confirmed influenza cases by age and season

Age Group	2017–2018		2016-2017		2015-2016		2014-2015		2013-2014	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
0-11 months	198	348.0	120	212.9	237	425.4	156	287.2	241	453.9
1-4 years	548	249.0	273	125.3	602	280.5	371	175.1	436	209.1
5-9 years	572	210.7	215	80.1	481	184.3	319	126.4	194	80.1
10-14 years	359	146.0	162	68.0	235	101.0	193	84.3	104	46.1
15-19 years	298	123.8	195	80.6	176	72.2	149	60.6	120	48.7
20-24 years	294	104.6	168	58.6	223	76.5	146	49.6	179	61.8
25-34 years	745	105.7	398	56.1	724	102.4	351	50.4	601	89.9
35-54 years	1,750	145.3	760	63.7	1,301	109.9	734	62.5	1,059	91.9
55-64 years	1,076	202.8	500	96.8	618	123.4	404	83.6	483	104.3
65-79 years	1,536	382.1	749	195.9	487	133.6	718	206.3	305	91.9
80+ years	1,689	1,319.3	1,033	824.1	222	181.4	1,317	1,100.9	190	162.9
All ages	9,069	211.6	4,577	108.0	5,308	127.1	4,858	118.2	3,912	97.9

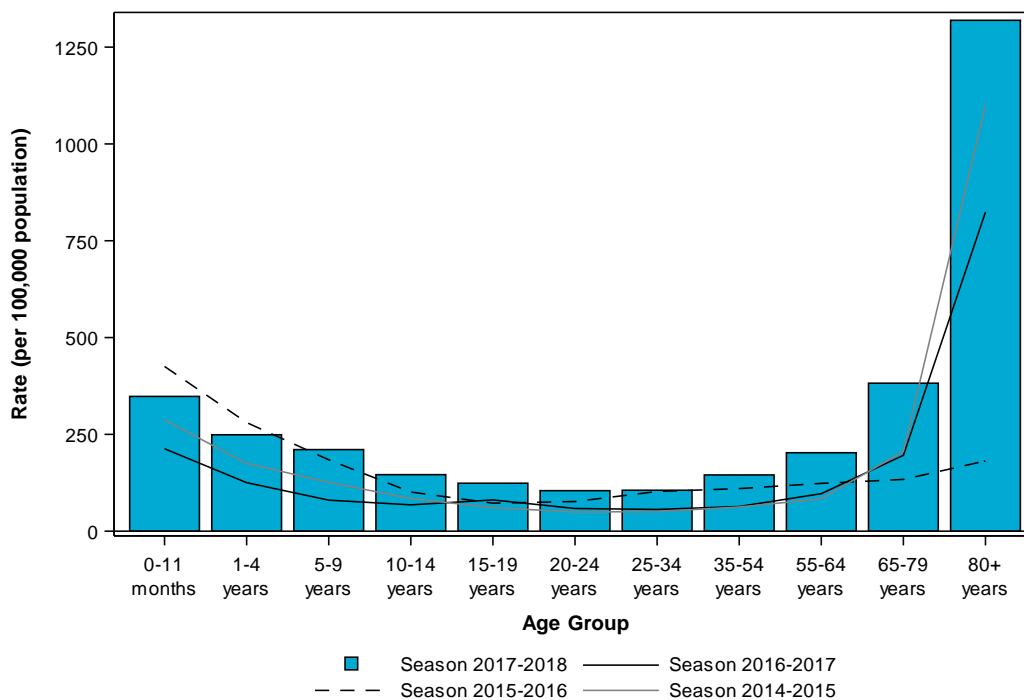


Figure 6 Laboratory-confirmed influenza cases by age group and season

4. Outbreaks

During the 2017–2018 season there were 278 laboratory-confirmed influenza outbreaks reported to Alberta Health. This is the highest number of reported outbreaks in the last five seasons and represents a 42 per cent increase in the number of outbreaks compared to the 2016-2017 season. Most of the outbreaks occurred in long-term care facilities (n = 99), supportive living/home living sites (n = 125), or acute care facilities (n = 38) (**Figure 7**). Influenza A (H3N2) (n = 194) or Influenza B (n = 57) were the organisms responsible for the majority of the laboratory-confirmed outbreaks (**Figure 8**). However, there were also 23 outbreaks where both Influenza A (H3N2) and Influenza B were detected, and one outbreak where Influenza A (H1N1) and Influenza B were detected. Overall, 36 per cent of the outbreaks occurred in Calgary (n = 100) and 31 per cent occurred in Edmonton (n = 87) (**Figure 9**).

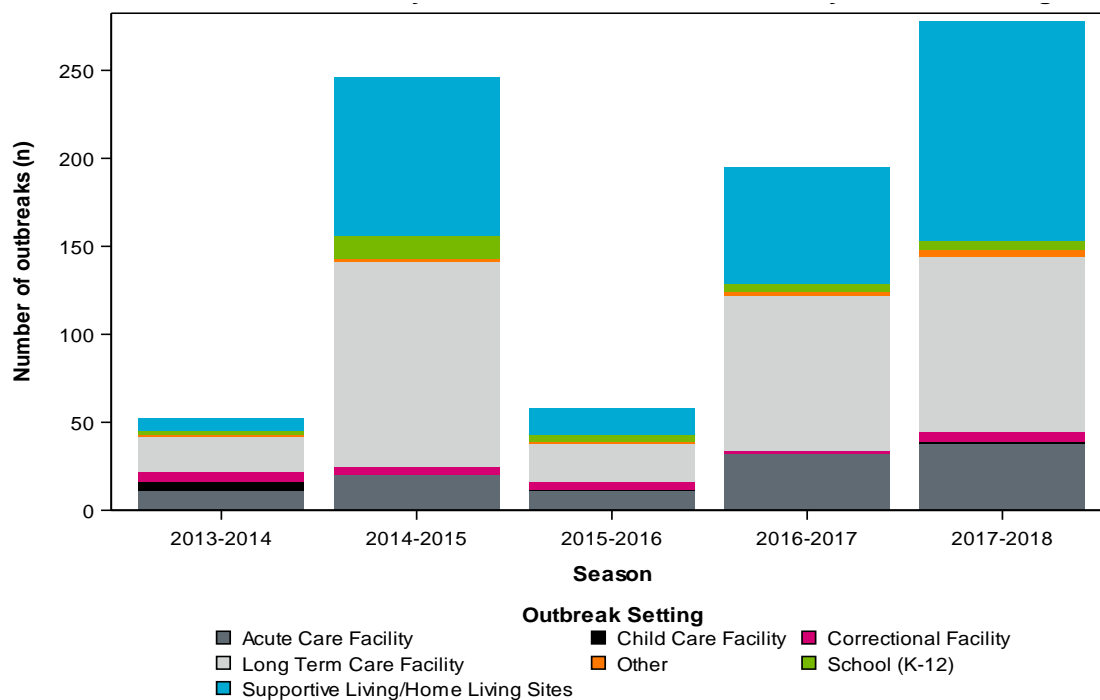


Figure 7 Number of laboratory-confirmed influenza outbreaks reported by season and outbreak setting

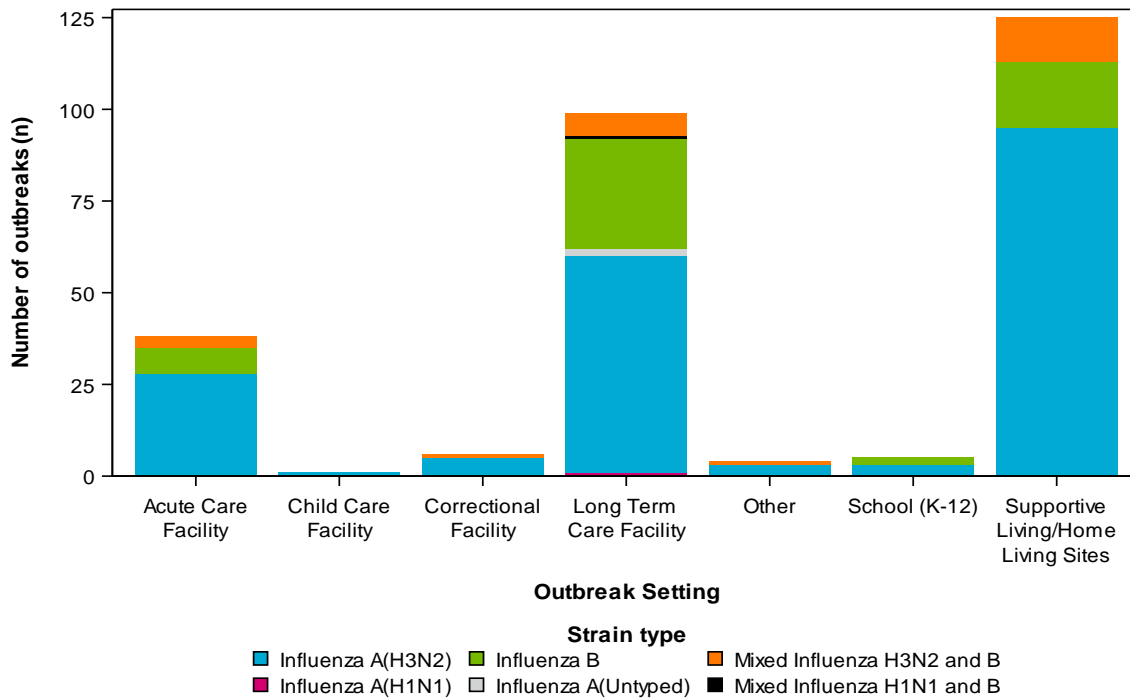


Figure 8 Number of laboratory-confirmed influenza outbreaks reported by strain type and outbreak setting, 2017–2018 season

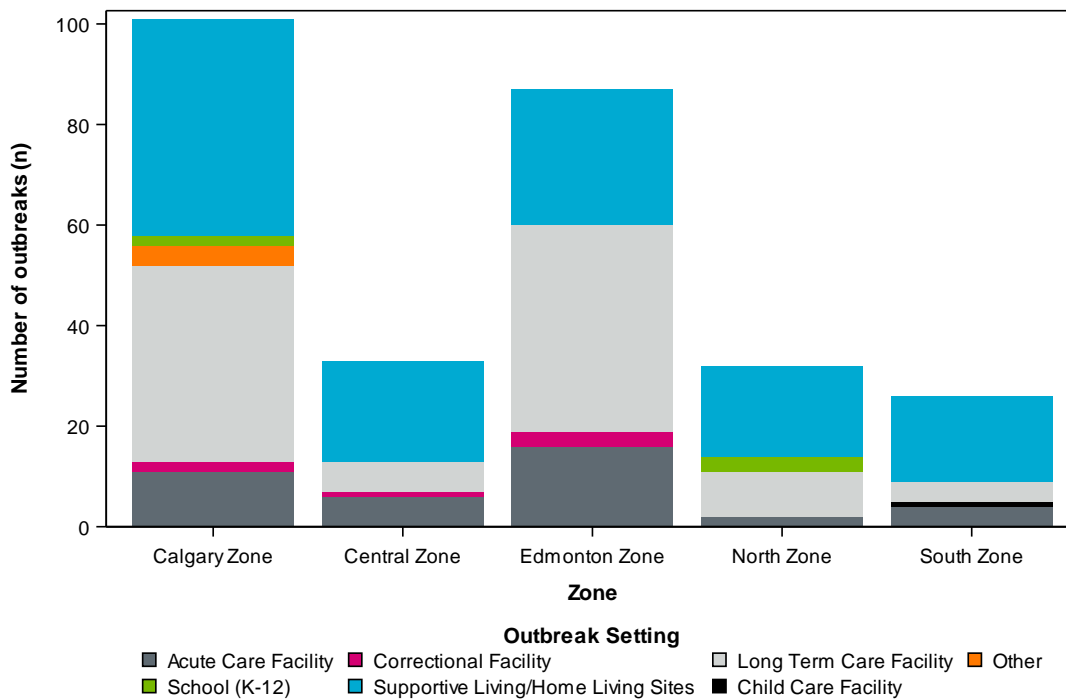


Figure 9 Number of laboratory-confirmed influenza outbreaks reported by Alberta Health Services zone and outbreak setting, 2017–2018 season

5. Hospitalizations

This season there were almost double the number of laboratory-confirmed influenza associated hospitalizations (n = 3,053) compared with the previous season (**Table 3**). Although the rate of ICU admissions and hospitalized influenza-associated deaths were high this season, they were lower compared with the 2015-2016 and 2014-2015 seasons, respectively. The highest rate of hospitalizations was among the elderly, mainly due to Influenza A (H3N2) (**Figure 10**). There were similar rates of ICU admissions among those who were 80 years or older (22.7 cases per 100,000 population) and under one year old (22.8 cases per 100,000 population). There were 92 deaths among hospitalized cases with laboratory-confirmed influenza, of which 84 deaths were directly related to influenza. Most of the hospitalized influenza-associated deaths occurred among those who were 65 years or older (n = 74). There were no influenza-associated deaths reported among people under 20 years old who were hospitalized.

Table 3 Number and rate (per 100,000 population) of laboratory-confirmed influenza hospitalizations, ICU admissions, and hospitalized deaths associated with influenza by season

Season	Hospitalizations		ICU admissions		Influenza-associated deaths	
	Count	Rate	Count	Rate	Count	Rate
2017–2018	3,053	71.2	242	5.6	84	2.0
2016-2017	1,718	40.6	118	2.8	54	1.3
2015-2016	1,760	42.1	274	6.6	55	1.3
2014-2015	1,936	47.1	168	4.1	94	2.3
2013-2014	1,220	30.5	223	5.6	30	0.8

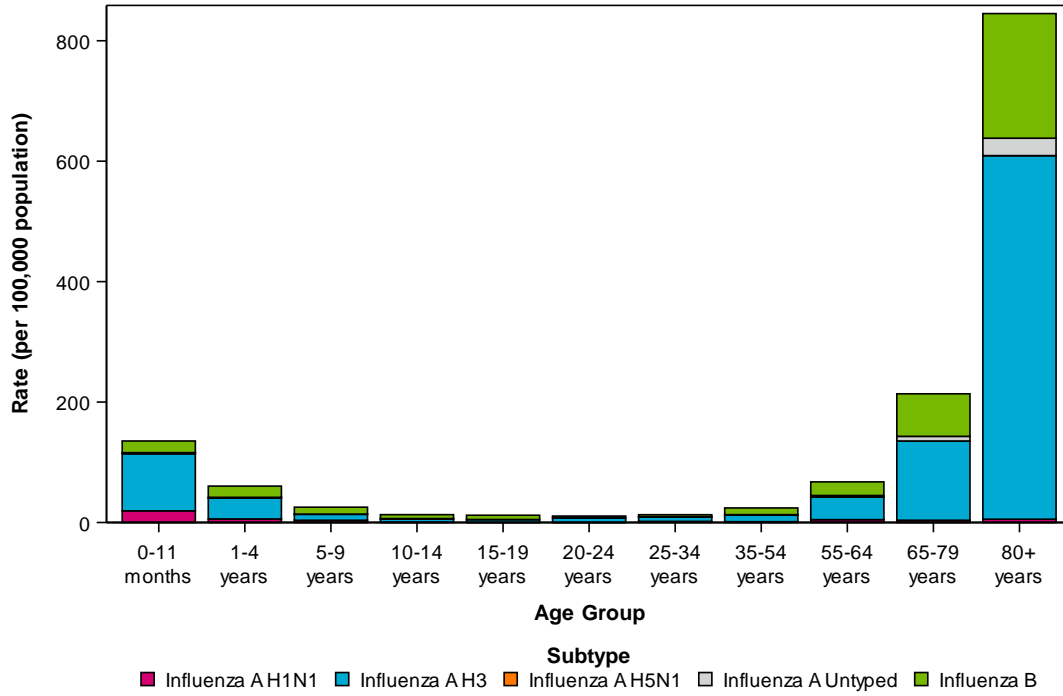


Figure 10 Rate of laboratory-confirmed, hospitalized influenza cases by age group and strain type, 2017–2018 season

6. Antiviral Resistance

None of the 279 viral isolates from Alberta tested by the Canadian National Microbiology Laboratory (NML) were resistant to oseltamivir or zanamivir. Up to June 23, 2018 (week 25), the NML had tested 1,728 influenza viruses for resistance to oseltamivir and 1,724 for resistance to zanamivir (1). Only three viruses were resistant to oseltamivir (Influenza A (H1N1; pdm09), A (H3N2), and Influenza B), and only two influenza B viruses were resistant to zanamivir.

7. Immunization

The seasonal influenza vaccine program is universal and offered to all Alberta residents. This season there were 1,229,350 vaccine doses administered, and vaccine coverage among Albertans was 29 per cent (**Table 4** and **Figure 11**). Although the total number of vaccine doses administered and coverage remained relatively stable across the previous seasons, there is an increasing trend towards Alberta residents receiving their influenza vaccine from a pharmacist (**Figure 12**). Last season 45 per cent of people received their vaccine from a pharmacist, but this season that has increased to 50 per cent.

Table 4 Influenza vaccine doses administered and vaccine coverage by season

Season	Doses	
	Administered	Coverage
2011-2012	874,046	23%
2012-2013	919,348	24%
2013-2014	1,157,550	29%
2014-2015	1,254,950	30%
2015-2016	1,146,569	27%
2016-2017	1,171,825	27%
2017–2018	1,229,350	29%

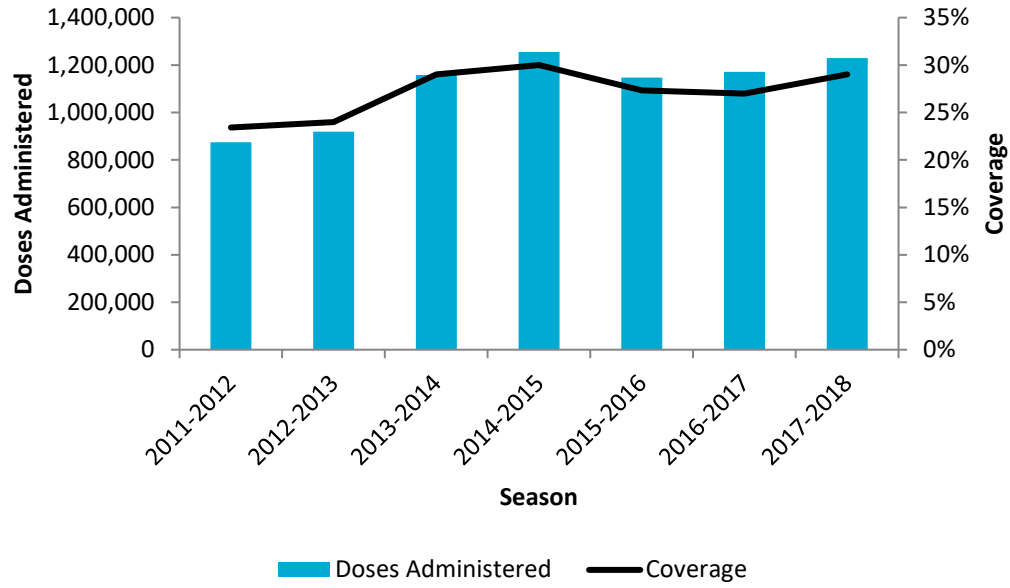


Figure 11 Influenza vaccine doses administered and vaccine coverage by season

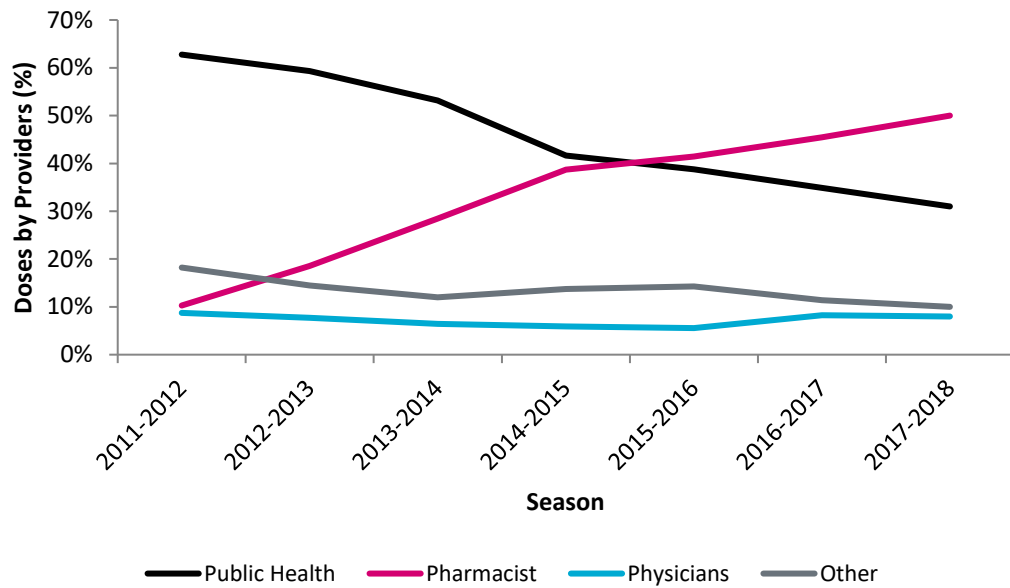


Figure 12 Percentage of influenza vaccine doses administered by provider type and season

8. Acknowledgements

We would like to thank our partners from Alberta Health Services (AHS), the Alberta Provincial Laboratory (ProvLab), First Nations Inuit Health Branch (FNIB), Alberta Blue Cross, TARRANT Viral Watch sentinel physician system, and the Canadian National Microbiology Laboratory (NML) for their partnership in influenza surveillance in Alberta.

9. References

1. Public Health Agency of Canada. FluWatch report: May 20, 2018 to June 23, 2018 (Week 21-25) [Internet]. 2018 [cited 2018 Aug 24]. Available from: <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/fluwatch/2017-2018/week21-25-may-20-june-23-2018.html>
2. World Health Organization. WHO Global Epidemiological Surveillance Standards for Influenza [Internet]. 2013 [cited 2018 Aug 24]. Available from: http://www.who.int/influenza/resources/documents/influenza_surveillance_manual/en/
3. Alberta Health. Public health disease management guidelines : epidemics [Internet]. [cited 2018 Aug 24]. Available from: <https://open.alberta.ca/publications/epidemics>
4. Alberta Health. Public health disease management guidelines : influenza, seasonal [Internet]. 2018 [cited 2018 Aug 24]. Available from: <https://open.alberta.ca/publications/influenza>

Appendix

Data

The 2017–2018 influenza season report includes data from August 28, 2017 to June 23, 2018 (week 25).

Data Sources

- Communicable Disease Reporting System (CDRS), Alberta Health
- Provincial Surveillance Initiative (PSI), Alberta Health
- Alberta Health Care Insurance Plan (AHCIP) Quarterly Population Registry, Alberta Health
- Immunization/Adverse Reactions to Immunization (Imm/ARI), Alberta Health
- Supplemental Enhanced Service Event (Physician Claims), Alberta Health
- Pharmaceutical Information Network (PIN), Alberta Health
- Alberta Blue Cross

Defining Thresholds for Laboratory-Confirmed Influenza Surveillance

Estimating the timing and magnitude of the influenza season is an important aspect of influenza surveillance. The World Health Organization (WHO) recommends creating two thresholds from the average epidemic curve of the previous seasons; one to determine when the influenza season has begun (seasonal threshold) and one to determine the point when influenza activity is unusually high (alert threshold) (2).

Seasonal Threshold

The start of the influenza season was defined as the week when the per cent positivity of influenza A laboratory tests at Alberta's Provincial Laboratory (ProvLab) was ≥ 10 per cent of all respiratory laboratory tests ordered that week. The end of the influenza epidemic was defined as the week when per cent positivity of influenza B was < 10 per cent of all respiratory laboratory tests ordered that week. All weeks in between these time periods were considered part of the influenza season. Per cent positivity is an accepted method to determine the start and end of the influenza season (2); however, we compared this to another method which assesses exceedances in the seasonal threshold. The seasonal threshold was calculated as the average number of cases reported per week, in weeks considered outside of the influenza season (i.e. pre-season weeks). The start of the influenza season, using this method, was defined as the third consecutive week where the number of laboratory-confirmed cases exceeded the seasonal threshold; the end of the influenza season was defined as the third consecutive week where the number of laboratory-confirmed cases was below the seasonal threshold.

Average Seasonal Epidemic Curve and Alert Threshold

The average seasonal epidemic curve of laboratory-confirmed influenza surveillance was estimated using data collected between the 2010–2011 and 2016–2017 seasons. Laboratory-confirmed influenza has been routinely reported since 2009; however, the 2009–2010 pandemic season was excluded. The peaks of each season were aligned, and the average number of cases reported per aligned week was calculated to obtain a 90 per cent confidence limit. Until the current season has peaked, the best estimate of the peak is utilized to align the current season to the average epidemic curve. Typically, the first estimate used is the median of the previous five seasons. The upper 90 per cent confidence limit defines the alert threshold. If the number of cases reported in a week exceed the alert threshold then the season is considered to be unusually high.

Defining Laboratory-Confirmed Influenza Outbreaks

Influenza outbreaks that occur in group settings such as hospitals, residential institutions, schools, and child care facilities are reported to Alberta Health. Outbreaks are defined as the occurrence of a communicable disease in a community, region, or setting where the number of cases is more than would be expected for a defined period of time (3). Influenza outbreaks in hospitals, residential institutions, and other closed communities are defined as two or more cases of influenza-like illness, with at least one laboratory-confirmed case (4). School influenza outbreaks require greater than 10 per cent absenteeism or absenteeism that is 10 per cent higher than baseline levels (4).

Other Alberta publications

- Alberta Health Services weekly influenza reports
<https://www.albertahealthservices.ca/influenza/influenza.aspx>
- Annual Notifiable Diseases Summary
<https://open.alberta.ca/publications/9781460137222>
- STI Summary 2016
<https://open.alberta.ca/publications/alberta-sti-2016-summary-report>
- Annual Tick Surveillance report
<https://open.alberta.ca/publications/2369-0690>
- Historical trends of selected notifiable communicable diseases in Alberta, 1919 to 2014
<https://open.alberta.ca/publications/9781460125618>
- Alberta Notifiable Disease Report (NDR) Manual, 9th edition (2018).
<https://open.alberta.ca/dataset/43769dee-7d57-4d9a-b863-7be03e7f6f00/resource/e84919a3-3df5-4cd8-9568-f1f44bd411a3/download/ND-Report-Manual-2018.pdf>