

Seasonal Influenza in Alberta 2018-2019 Season

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Seasonal Influenza in Alberta: 2018-2019 Season

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Key Highlights

- This season there were 7,698 laboratory-confirmed influenza cases (179 cases per 100,000 population) reported in Alberta.
- The season began early at week 42 (mid-October), peaked during week 48 (n=629; end of November), and ended on week 29 (mid-July).
- The predominant circulating strain this season was Influenza A (H1N1) (n=3,849 cases; 50 per cent of total cases). However, a smaller, second wave of Influenza A (H3N2) occurred late in the season.
- Calgary Zone had the highest number of cases reported (n=2,969), and North Zone had the highest rate of cases (295 cases per 100,000 population).
- The highest number of laboratory-confirmed influenza cases were among the 20-49 year age group (n=2,289), and the highest rate of laboratory-confirmed influenza cases was among the 0-4 year age group (488 cases per 100,000 population)
- There were 1,976 hospitalizations, 228 ICU admissions, and 52 deaths (in hospital) among people with laboratory-confirmed influenza during the season.
- A total of 120 influenza outbreaks were reported in Alberta. Most of the outbreaks were due to Influenza A (H3N2) (n=68), and occurred in supportive living/home living sites (n=39).
- There were 1,317,659 influenza vaccine doses administered this season, and vaccine coverage in Alberta was 31 per cent. The per cent of doses administered was: 55 per cent by pharmacists, 27 per cent by Public Health, and 18 per cent by other providers.
- All of the Alberta influenza viral isolates tested were sensitive to oseltamivir and zanamivir, and all isolates were resistant to amantadine. More information on influenza antiviral resistance in Canada can be found on the Public Health Agency of Canada's [FluWatch](#) website.
- Additional information is available on Alberta Health's [Interactive Health Data Application \(IHDA\)](#) and in [Supplementary Alberta Health Reports](#).

Influenza Activity

This season there were 7,698 laboratory-confirmed influenza cases (179 cases per 100,000 population) reported in Alberta (Figure 1 & Table 1). Last season, there were 9,115 laboratory-confirmed influenza cases (215 cases per 100,000 population) reported (Table 1). The 2018-2019 season started at week 42, which was two weeks later than the previous season, and peaked rapidly during week 48. The predominant circulating strain was Influenza A (H1N1) which accounted for 50 per cent (n=3,849) of laboratory-confirmed influenza cases reported. The remaining cases were Influenza A (H3N2) (n=1,439; 19 per cent of cases), Influenza A (Untyped) (n=2,047; 27 per cent of cases) and Influenza B (n=363; 5 per cent of cases). There was very little Influenza B activity; however, there was a second wave of Influenza A (H3N2). This began in February 2019 and peaked at the beginning of April (week 14), which led to a long season. The season ended at week 29 compared with week 24 in the previous season (Figure 2).

Calgary Zone had the highest number of laboratory-confirmed influenza cases reported (n=2,969), and the North Zone had the highest rate of laboratory-confirmed influenza cases (295 cases per 100,000 population)(Table 1 and Figures 3-4). Similar to previous seasons, the Calgary Zone peaked earlier in the season (week 46) compared with other zones (Figure 5). The Central Zone peaked in week 50, the Edmonton Zone peaked in week 49, the North Zone peaked in week 50, and the South Zone peaked in weeks 49 and 50.

Table 1. Number and rate (per 100,000 population) of laboratory-confirmed influenza cases by Alberta Health Services zone and season

Season	Zone											
	Alberta		Calgary		Central		Edmonton		North		South	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
2009-2010	4,959	135	1,704	125	803	180	1,375	119	635	146	442	156
2010-2011	991	27	249	18	168	37	330	28	190	43	54	19
2011-2012	1,219	32	293	21	152	34	450	38	163	36	161	56
2012-2013	2,888	75	781	54	373	82	1,091	90	327	71	316	108
2013-2014	3,911	98	997	67	620	134	1,365	109	691	147	238	81
2014-2015	4,853	119	1,612	104	664	142	1,563	121	658	138	354	119
2015-2016	5,308	128	1,699	108	772	164	1,567	119	845	176	425	142
2016-2017	4,578	109	1,827	114	645	137	1,272	95	471	99	362	120
2017-2018	9,115	215	3,383	208	1,402	296	2,319	169	1,316	277	634	209
2018-2019	7,698	179	2,969	180	942	198	1,734	124	1,407	295	545	178

Note:

Unknown zone included in Alberta total

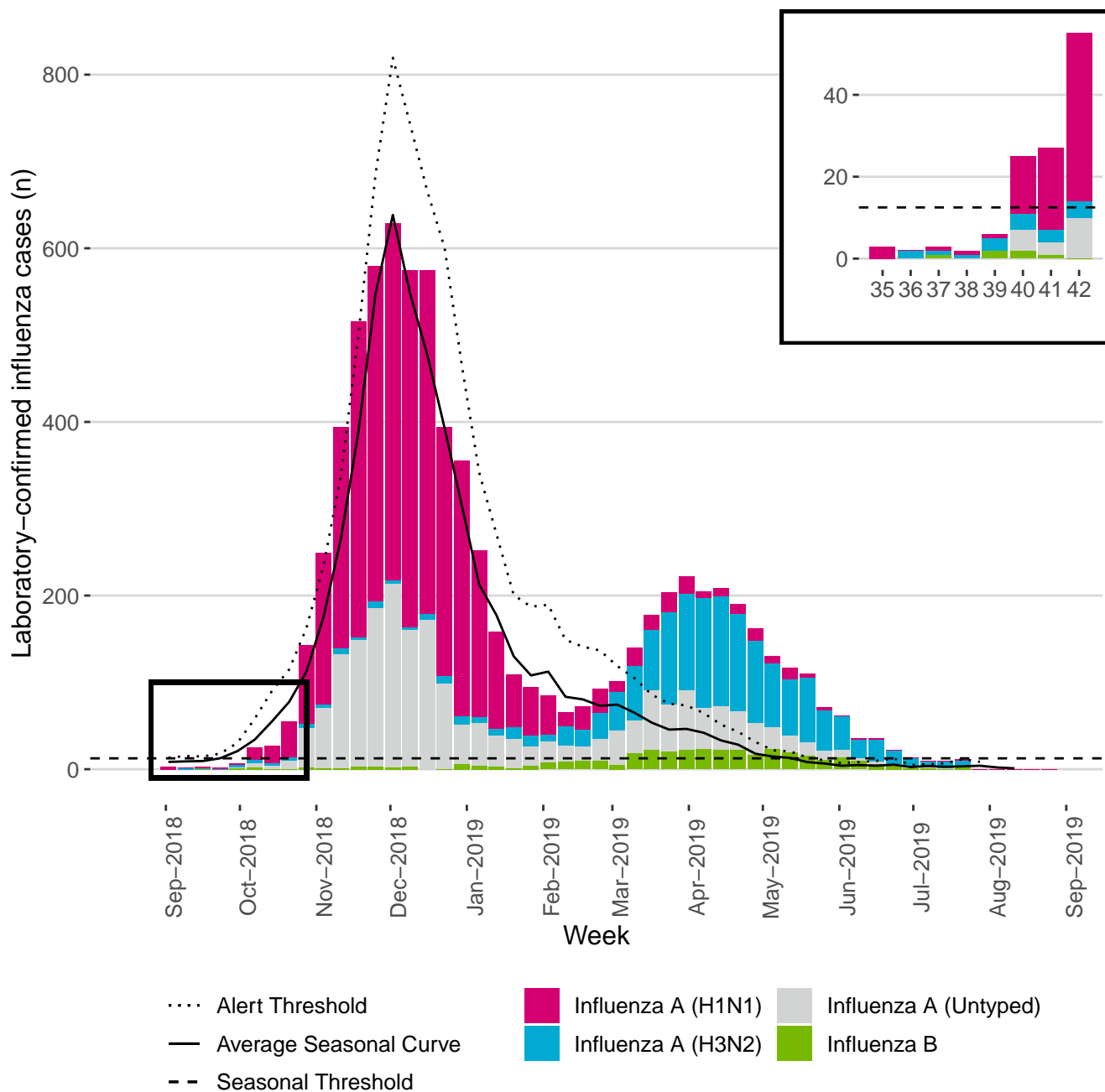


Figure 1. Laboratory-confirmed influenza cases by week, 2018-2019. The seasonal threshold is the average number of cases per week at interseasonal levels, and can be used to define the season start and end. The seasonal curve is the average number of cases each week based on aligning peaks from the previous five seasons. The seasonal curve is shifted to align with the peak week of the current season. The alert threshold is the upper 90% confidence limit of the seasonal curve, which identifies unusually high numbers of cases, if exceeded. More information is available in the [Appendix](#).

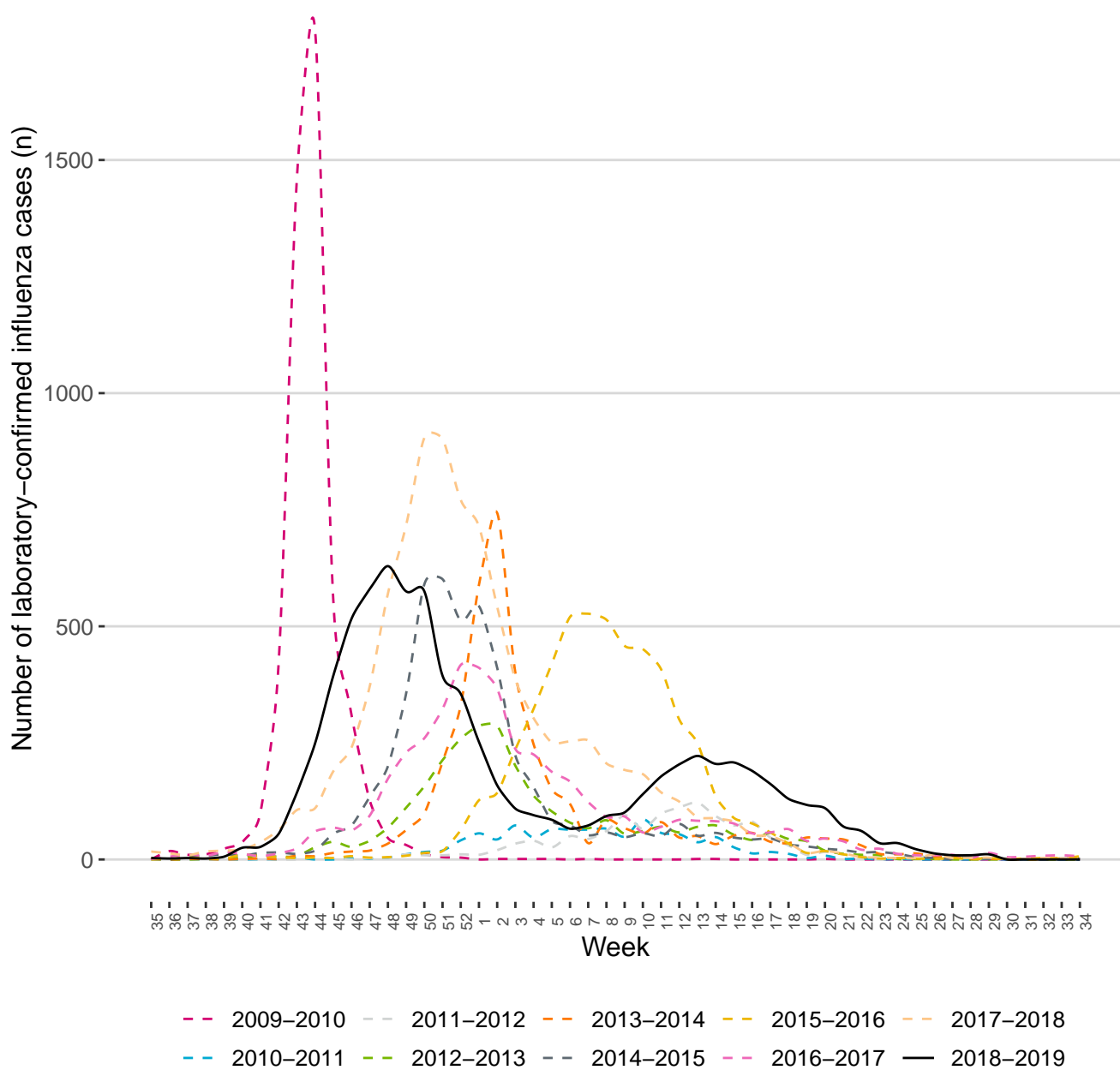


Figure 2. Laboratory-confirmed influenza cases by week and season

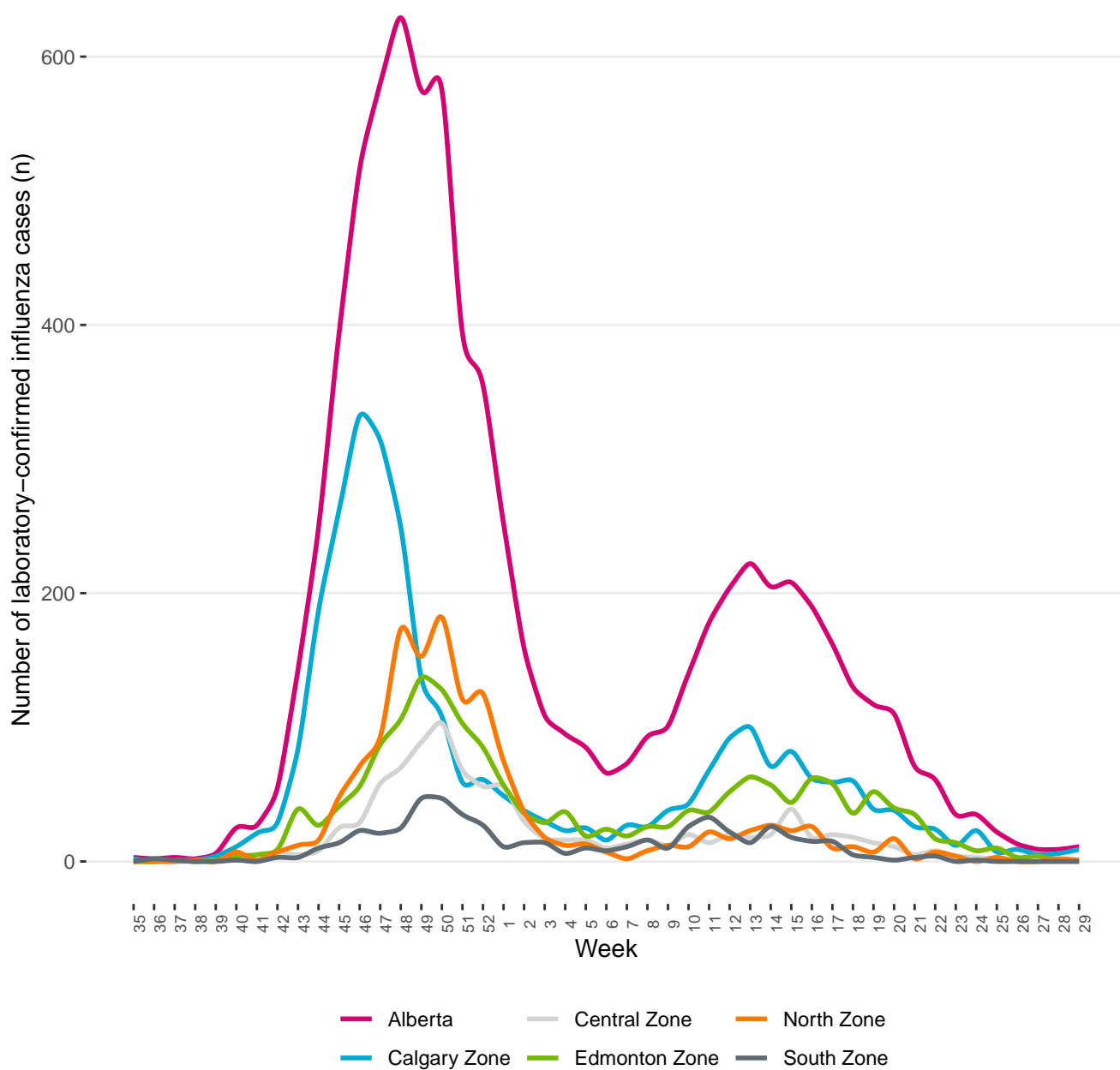
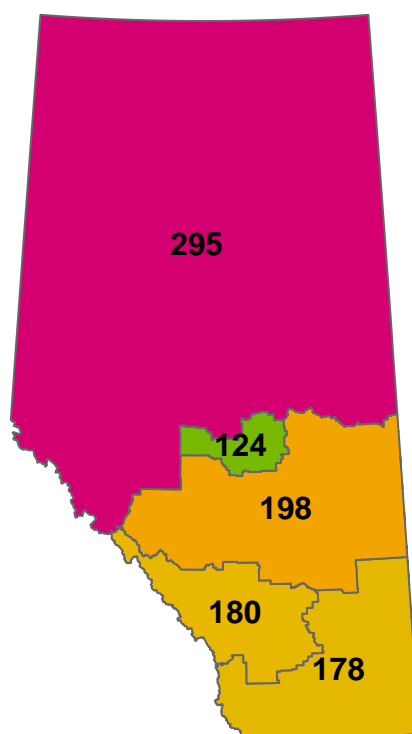


Figure 3. Numbers of laboratory-confirmed influenza cases by week and Alberta Health Services Zone, 2018-2019

(a)



(b)



(c)

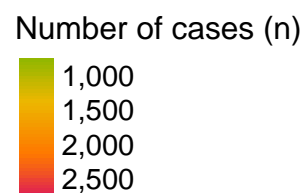
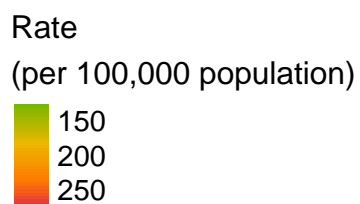
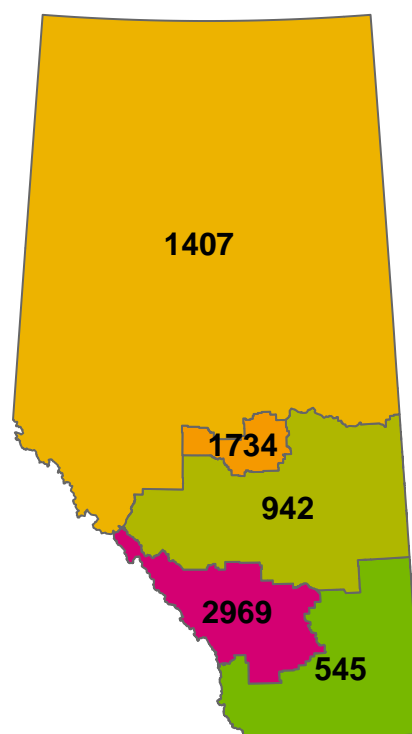


Figure 4. (a) Alberta Health Services Zone legend, (b) rate (per 100,000 population) and (c) numbers of laboratory-confirmed influenza cases by Alberta Health Services Zone

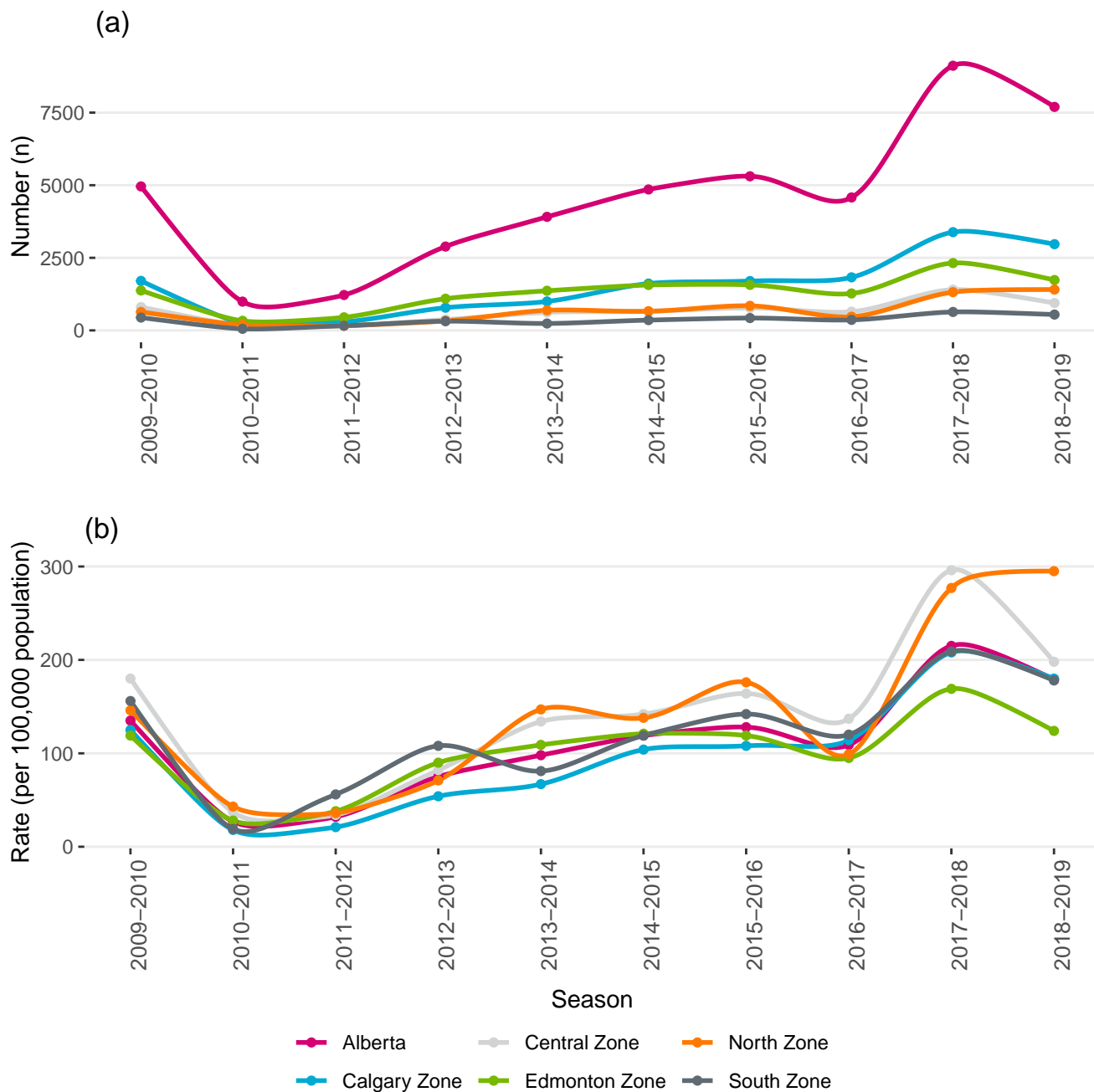


Figure 5. (a) Number and (a) rate (per 100,000 population) of laboratory-confirmed influenza cases by Alberta Health Services Zone and season

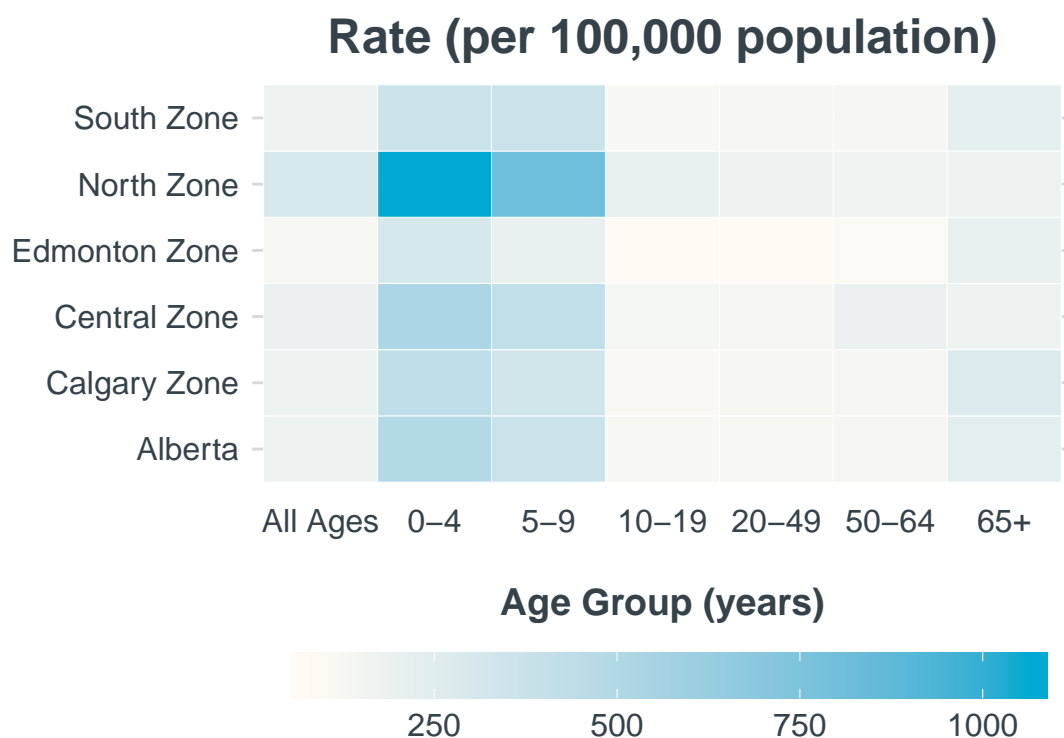
Age

The highest number of laboratory-confirmed influenza cases was among the 20-49 year age group (n=2,289), and the highest rate of laboratory-confirmed influenza cases was among the 0-4 year age group (488 cases per 100,000 population)(Table 2 and Figures 6-7).

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

Season	Age Group											
	0-4		5-9		10-19		20-49		50-64		65+	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
2009-2010	535	226	634	297	1,227	258	1,881	110	526	80	151	39
2010-2011	249	102	68	31	84	18	319	19	95	14	176	45
2011-2012	249	99	92	42	81	17	321	19	142	20	334	82
2012-2013	589	229	243	105	217	46	772	44	401	55	666	156
2013-2014	677	258	194	79	224	47	1,557	87	765	101	494	111
2014-2015	527	197	318	125	342	71	1,040	56	593	76	2,033	438
2015-2016	839	309	481	182	412	85	1,924	104	942	119	709	147
2016-2017	393	143	214	78	357	73	1,115	60	714	90	1,782	355
2017-2018	754	274	572	208	660	132	2,363	127	1,524	190	3,240	617
2018-2019	1,355	488	1,028	372	620	121	2,289	122	1,106	137	1,299	235

(a)



(b)

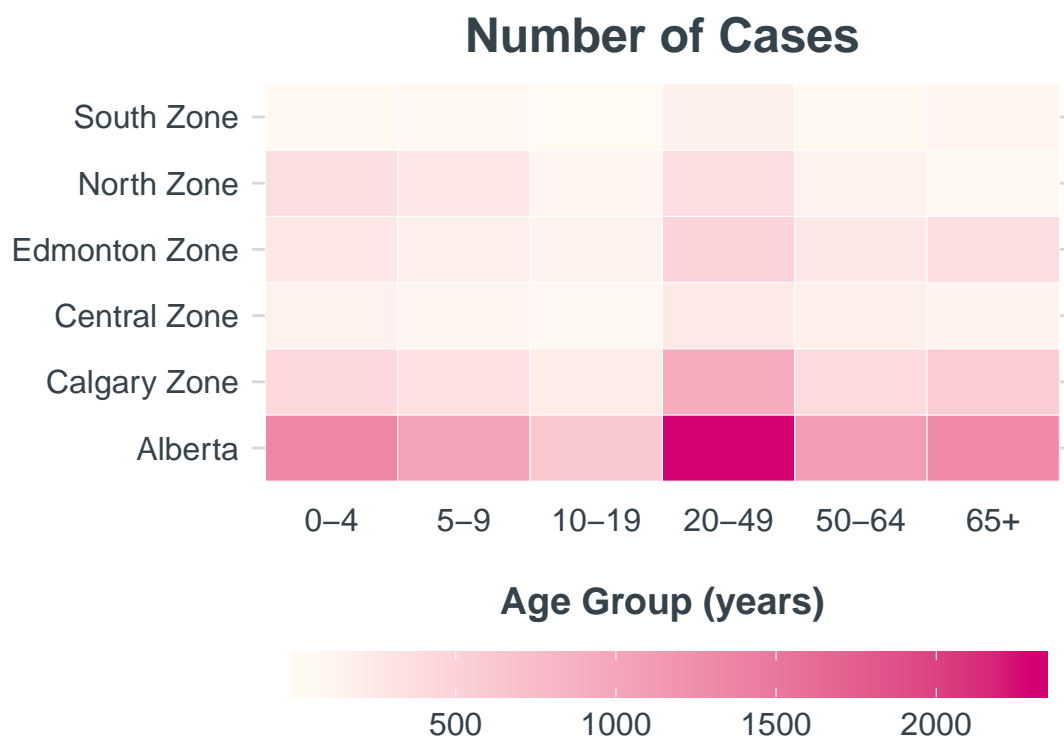


Figure 6. (a) Rate (per 100,000 population) and (b) number of laboratory-confirmed influenza cases by Alberta Health Services zone and age group, 2018-2019

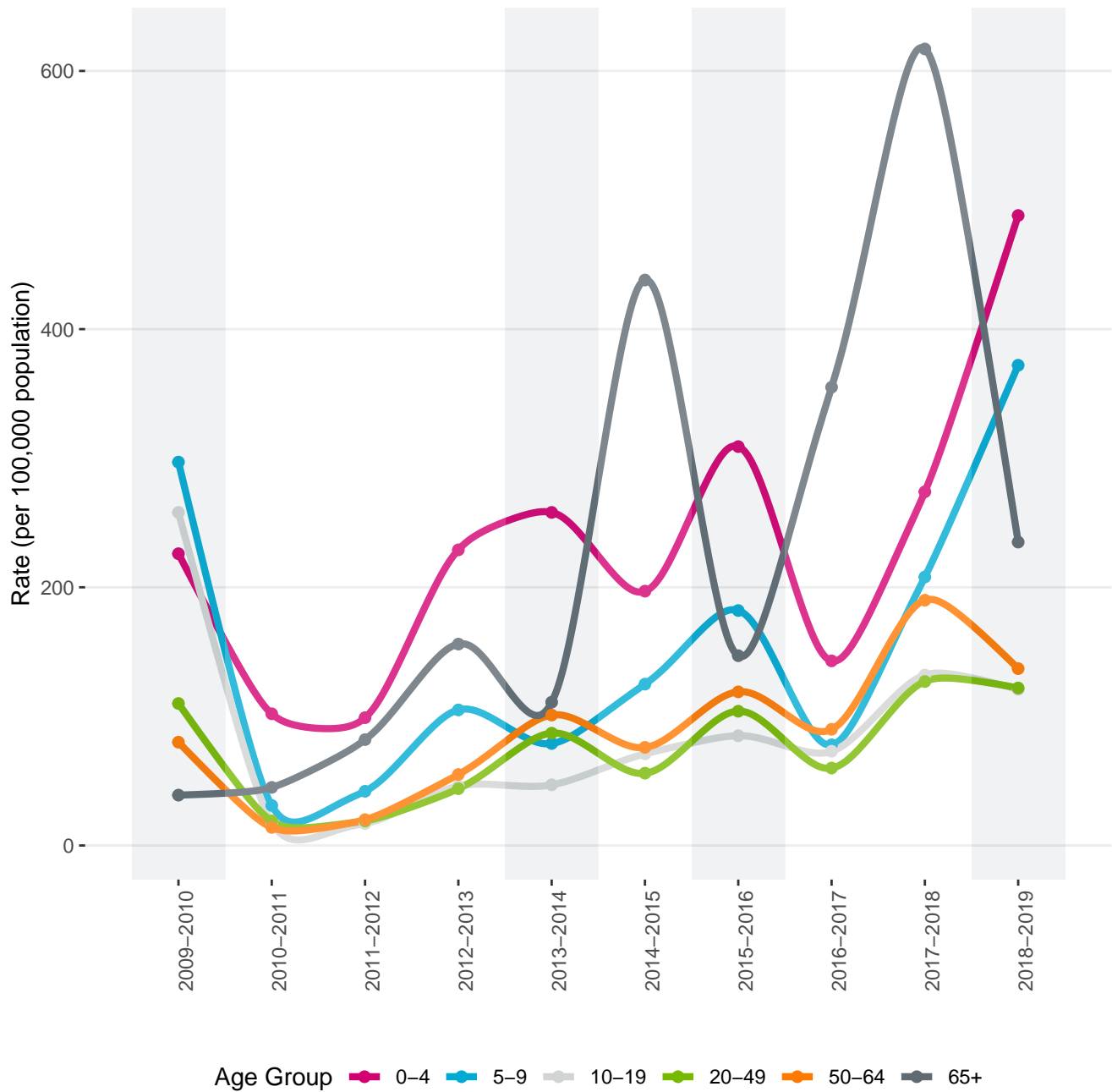


Figure 7. Rate (per 100,000 population) of laboratory-confirmed influenza cases by age group and season. The shaded grey boxes indicate seasons where Influenza A (H1N1) was the predominant circulating strain.

Antivirals, and ED and GP Visits

This season community pharmacies dispensed 11,018 influenza antivirals (Tamiflu or Relenza)(Figure 8). There were 15,430 visits to the emergency department and 23,851 visits to general practitioners due to influenza-like illness (ILI) (Figure 8).

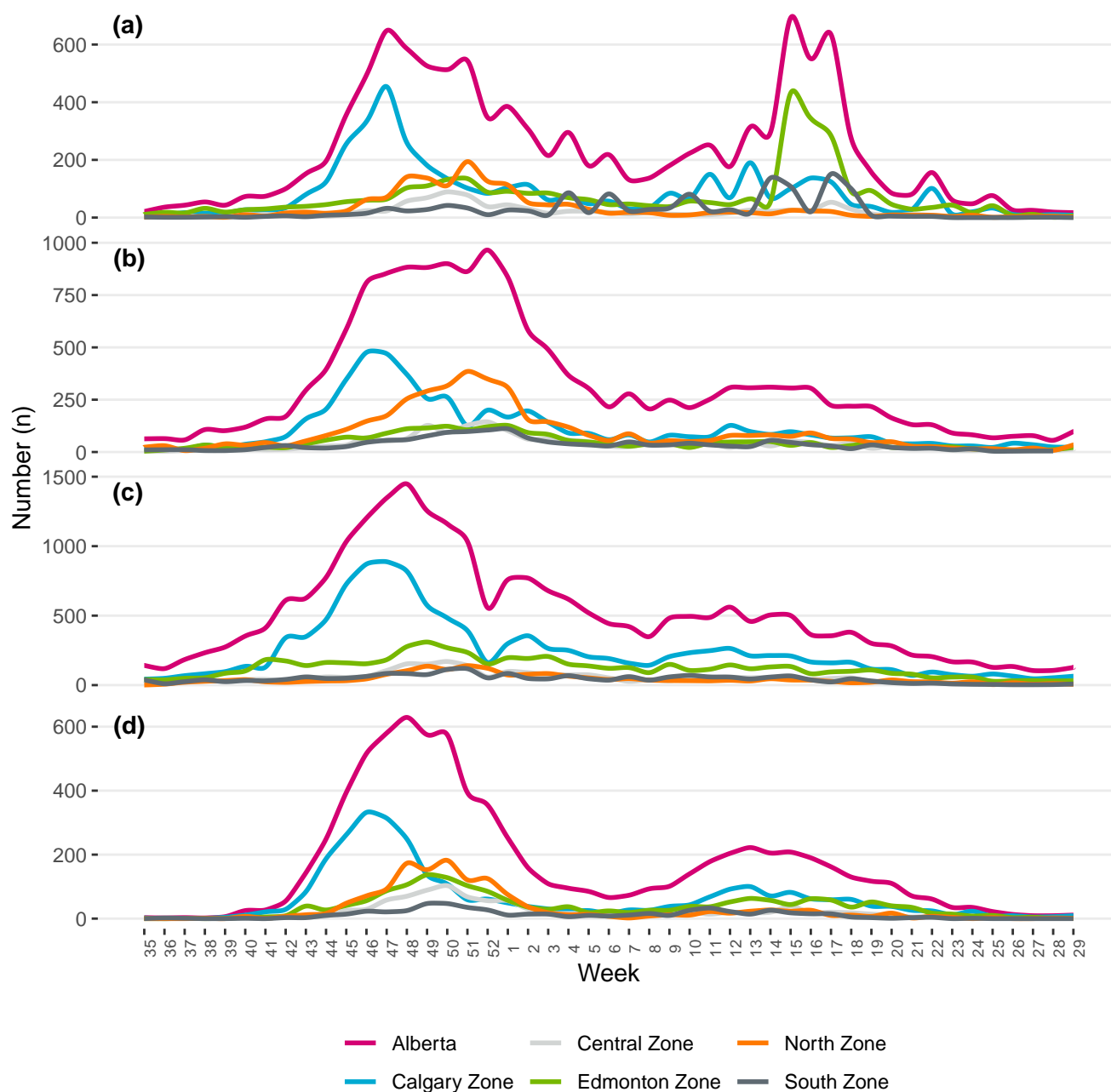


Figure 8. (a) Dispensation events by community pharmacists for influenza antiviral medication, (b) emergency department (ED) visits for influenza-like illness (ILI), (c) general practitioner (GP) office visits for ILI, and (d) laboratory-confirmed influenza cases by Alberta Health Services zone and week, 2018-2019

Severe Outcomes

This season there were 1,976 hospitalizations (45.9 hospitalizations per 100,000 population) among people with laboratory-confirmed influenza (Table 3 and Figures 9-10). For every 100 cases of laboratory-confirmed influenza, there were 25.7 hospitalizations which was slightly less than most other seasons (Table 1 and Figure 9). Influenza A (H1N1) led to a high rate of hospitalizations among those aged 0-4 years (72.8 hospitalizations per 100,000 population) and Influenza A (H3N2) led to a high rate of hospitalizations among those aged 65+ years (73 hospitalizations per 100,000 population)(Figure 10).

There were 228 ICU admissions (5.3 ICU admissions per 100,000 population) among people with laboratory-confirmed influenza this season (Table 1 and Figures 9-10). The population rate (per 100,000 population) and case rate (per 100 laboratory-confirmed influenza cases) of ICU admissions were similar to the previous season (Table 3 and Figure 9). The rate of ICU admissions was highest among those aged 0-4 years (10.4 per 100,000 population), 50-64 years (8.9 per 100,000 population), and 65+ years (10.2 per 100,000 population)(Figure 10). There were 52 deaths (in hospital) during the season: 6 among those 20-49 years, 15 among those 50-64 years, and 31 among those 65+ years.

Table 3. Number, population rate (per 100,000 population), and case rate (per 100 laboratory-confirmed influenza cases) of hospitalizations, ICU admissions and deaths (in hospital) among those with laboratory-confirmed influenza

Season	Severe Outcome								
	Hospitalizations			ICU Admissions			Deaths (in hospital)		
	Count	Pop. Rate	Case Rate	Count	Pop. Rate	Case Rate	Count	Pop. Rate	Case Rate
2009-2010	1,175	31.9	23.7	213	5.8	4.3	18	0.5	0.4
2010-2011	416	11.1	42.0	76	2.0	7.7	31	0.8	3.1
2011-2012	426	11.2	34.9	46	1.2	3.8	37	1.0	3.0
2012-2013	973	25.1	33.7	150	3.9	5.2	45	1.2	1.6
2013-2014	1,222	30.7	31.2	222	5.6	5.7	39	1.0	1.0
2014-2015	1,937	47.4	39.9	168	4.1	3.5	114	2.8	2.3
2015-2016	1,760	42.5	33.2	274	6.6	5.2	63	1.5	1.2
2016-2017	1,721	41.0	37.6	119	2.8	2.6	65	1.5	1.4
2017-2018	3,097	73.0	34.0	249	5.9	2.7	93	2.2	1.0
2018-2019	1,976	45.9	25.7	228	5.3	3.0	52	1.2	0.7

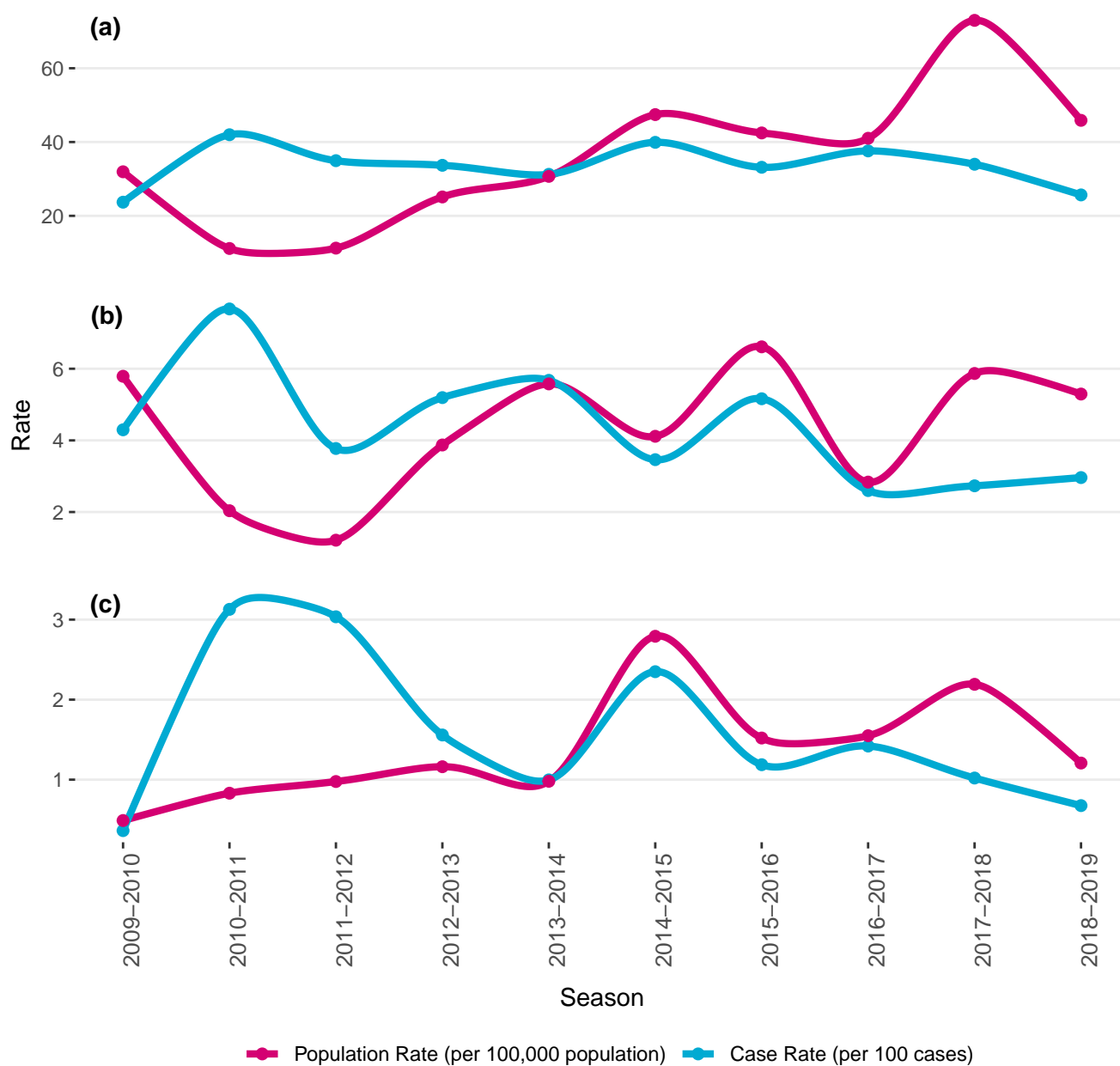


Figure 9. Population rate (per 100,000 population) and case rate (per 100 laboratory-confirmed influenza cases) of (a) hospitalization, (b) ICU admissions, and (c) deaths (in hospital) of those with laboratory-confirmed influenza by season

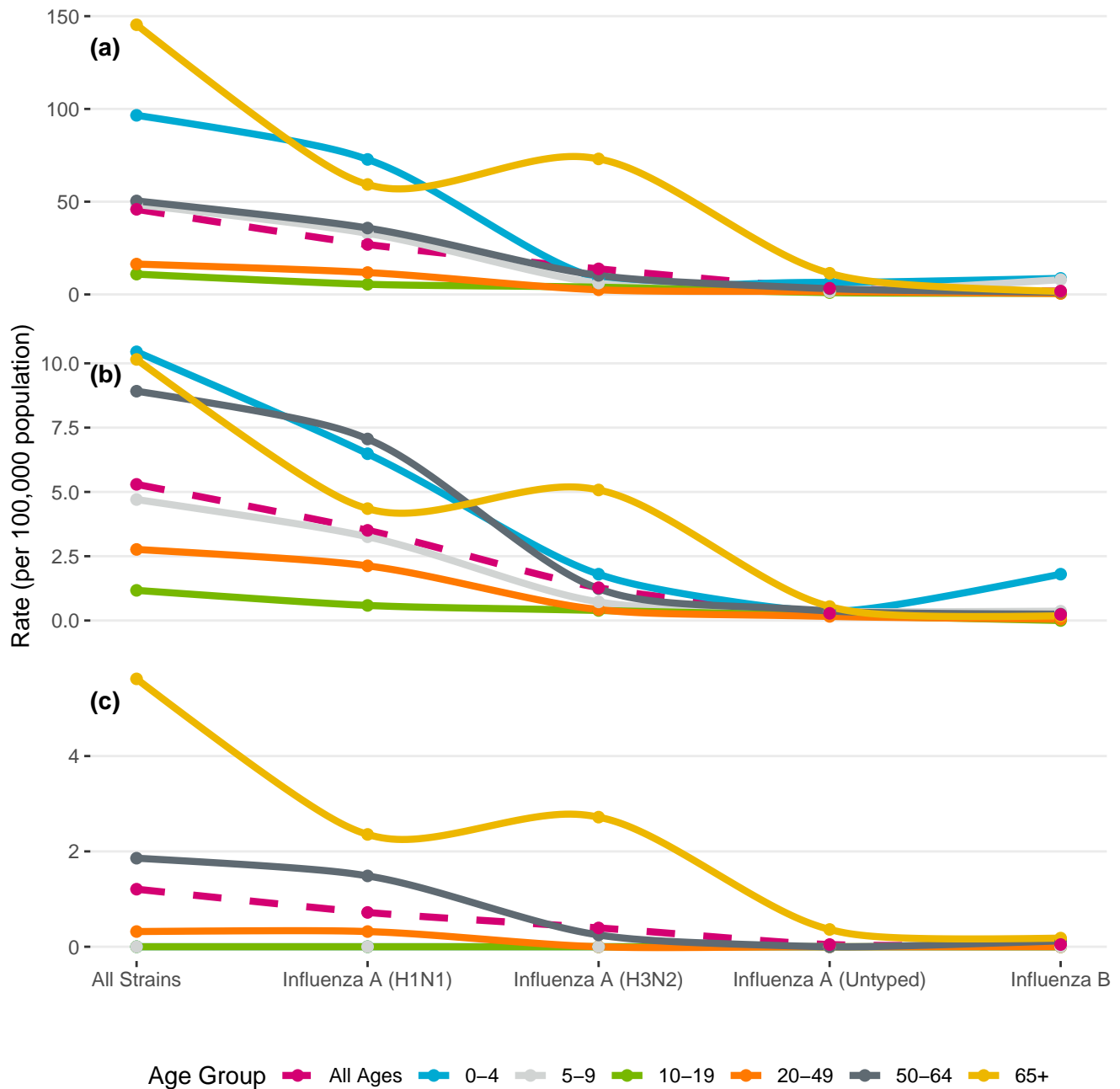


Figure 10. Rate (per 100,000 population) of (a) hospitalizations, (b) ICU admissions, and (c) deaths (in hospital) among those with laboratory-confirmed influenza by age group and strain type, 2018-2019

Outbreaks

During the 2018-2019 season there were 120 laboratory-confirmed influenza outbreaks (Figure 11). There were 68 outbreaks due to Influenza A (H3N2), 37 outbreaks due to Influenza A (H1N1), 13 outbreaks due to Influenza A (Untyped), and 2 outbreaks due to Influenza B. Influenza A (H3N2) accounted for 57 per cent of outbreaks this season.

Early in the season, most of the outbreaks were due to Influenza A (H1N1), of which 11 were in schools (K-12), seven in supportive/home living sites, six in long-term care, six in acute care facilities, four in child care facilities and three in correctional facilities. Although it was predominantly an Influenza A (H1N1) season, the majority of the outbreaks occurred during the second wave of Influenza A (H3N2) later in the season. Of the outbreaks due to Influenza A (H3N2), there were 29 in supportive living/home living sites, 28 in long-term care, seven in acute care facilities, three in schools (K-12), and one in a work camp.

The highest number of outbreaks occurred in the Calgary Zone (n=50), which accounted for 42 per cent of outbreaks in Alberta. In all of the zones, except for Edmonton Zone, the majority of the outbreaks were due to Influenza A (H3N2) (Figure 12). In the Edmonton Zone, most of the outbreaks were due to Influenza A (H1N1). Additionally, most of the outbreaks in each zone occurred in supportive living/home living sites or long-term care, but in the Edmonton Zone outbreaks occurred mainly in schools (K-12) and child care facilities (Figure 13).

There was a lower number of outbreaks compared to the previous two seasons, which were predominantly Influenza A (H3N2) seasons (Figure 14). However, there was a higher number of outbreaks which occurred in schools (K-12) and child care facilities due to Influenza A (H1N1) compared to the previous two seasons (Figure 15).

Table 4. Influenza outbreaks by Alberta Health Services Zone and season

Season	Zone											
	Alberta		Calgary		Central		Edmonton		North		South	
	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent
2009-2010	48	100	8	17	8	17	17	35	12	25	3	6
2010-2011	43	100	12	28	9	21	17	40	5	12	0	0
2011-2012	69	100	25	36	5	7	21	30	10	14	8	12
2012-2013	100	100	25	25	8	8	42	42	13	13	12	12
2013-2014	52	100	15	29	5	10	22	42	7	13	3	6
2014-2015	246	100	65	26	36	15	81	33	35	14	29	12
2015-2016	58	100	18	31	6	10	26	45	2	3	6	10
2016-2017	193	100	72	37	22	11	64	33	15	8	20	10
2017-2018	278	100	101	36	33	12	87	31	31	11	26	9
2018-2019	120	100	50	42	11	9	26	22	19	16	14	12

Note:

Unknown zone included in Alberta total

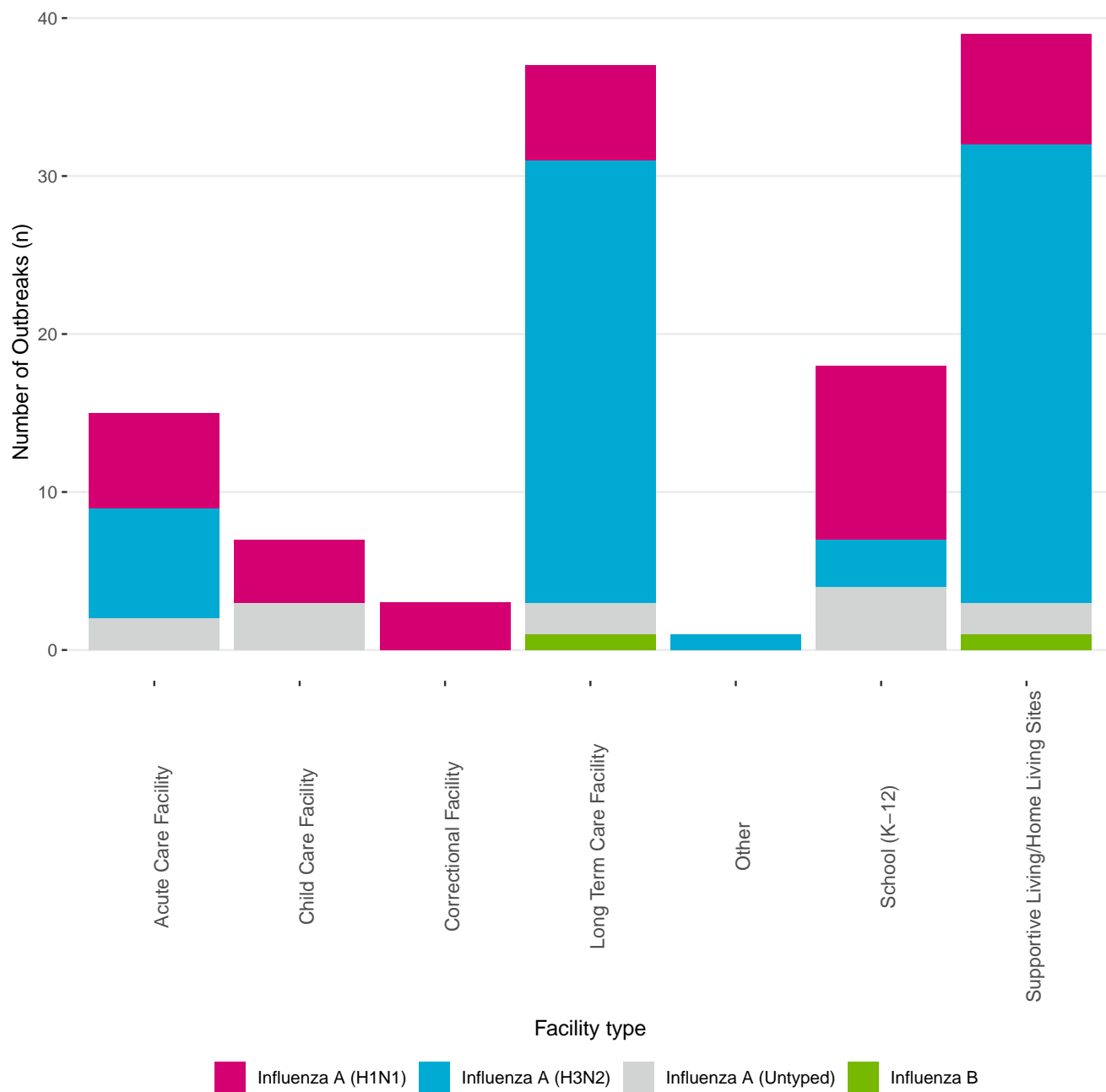


Figure 11. Number of laboratory-confirmed influenza outbreaks by facility type and strain type, 2018-2019

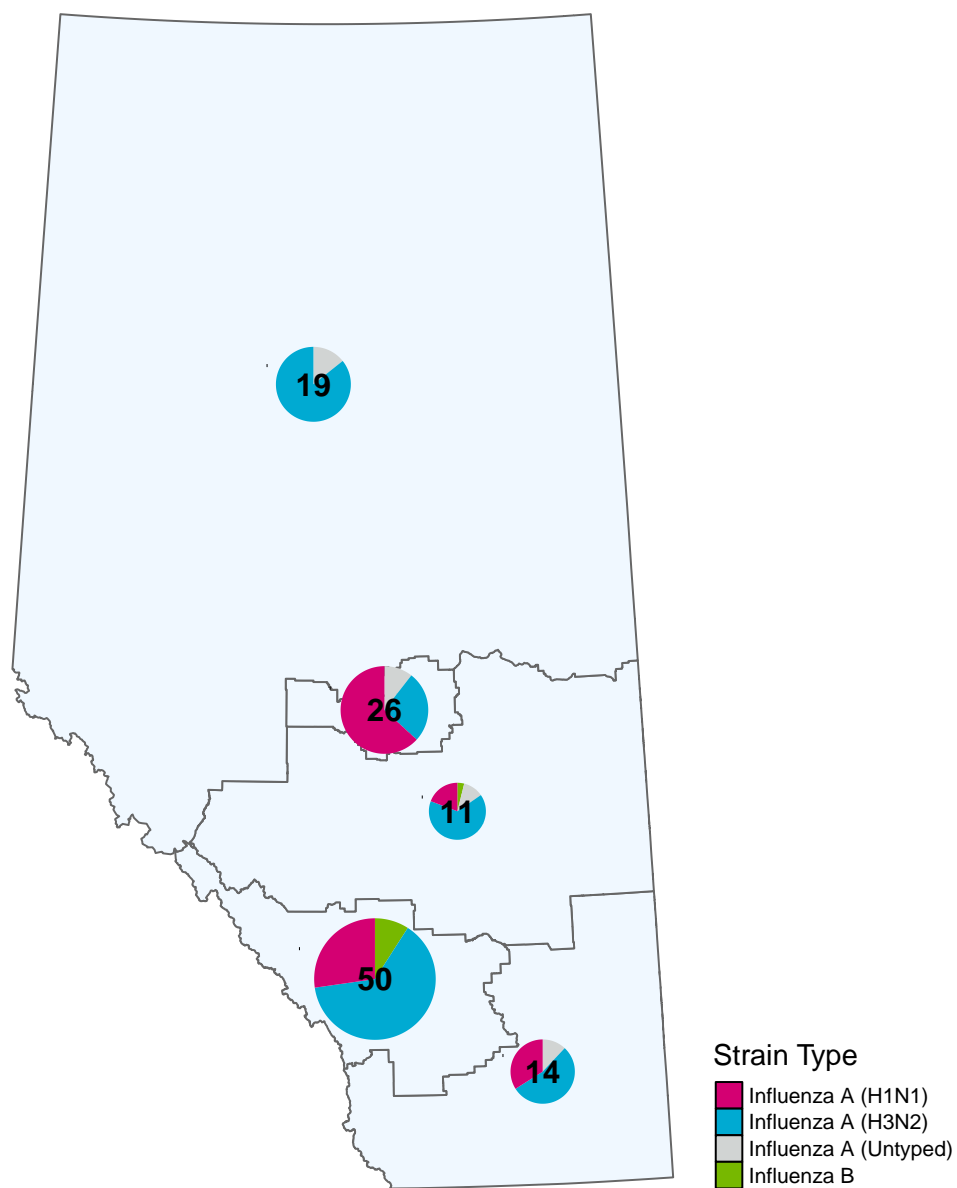


Figure 12. Map of the number of influenza outbreaks by Alberta Health Services Zone and strain type, 2018-2019

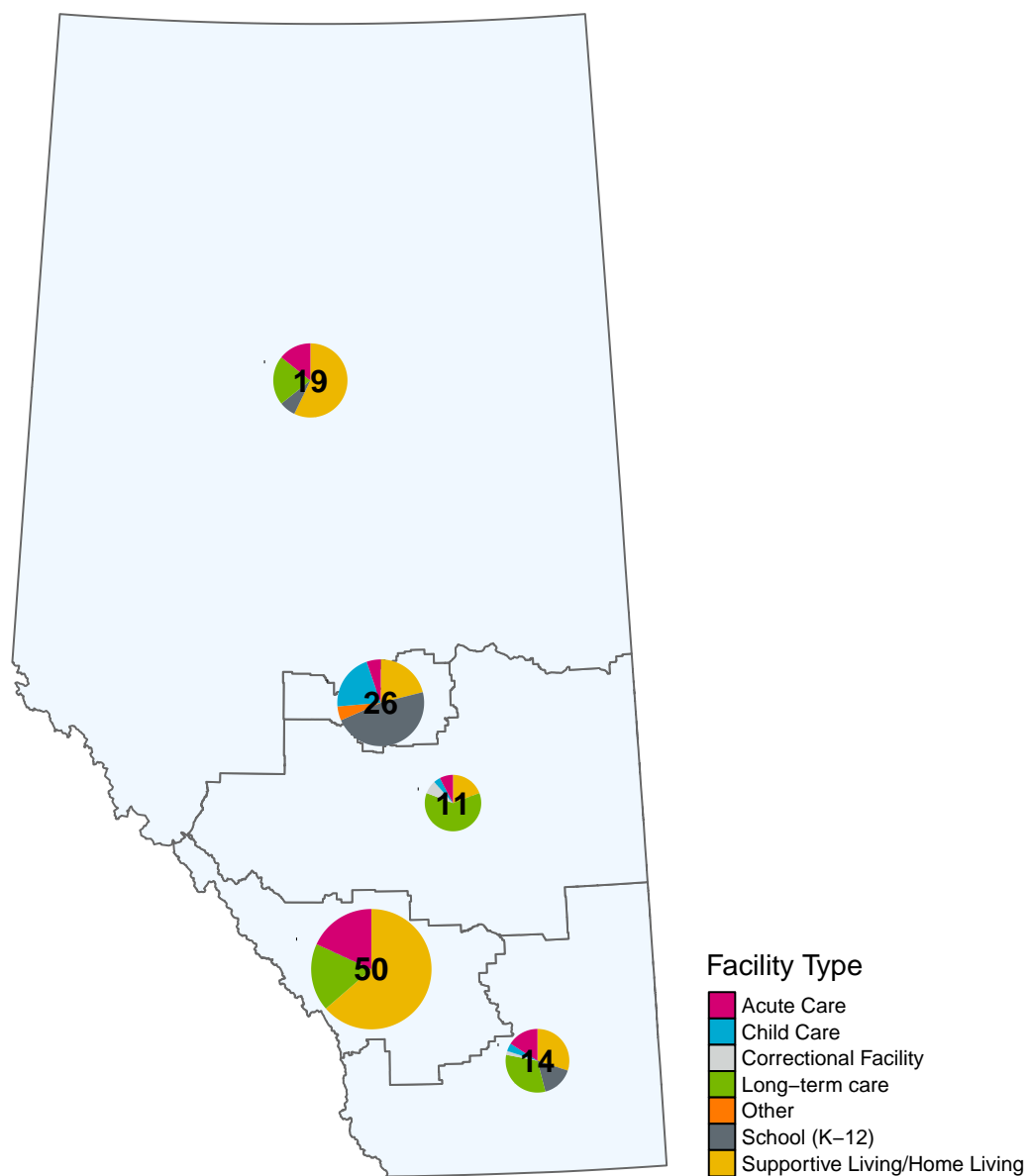


Figure 13. Map of the number of influenza outbreaks by Alberta Health Services Zone and facility type, 2018-2019

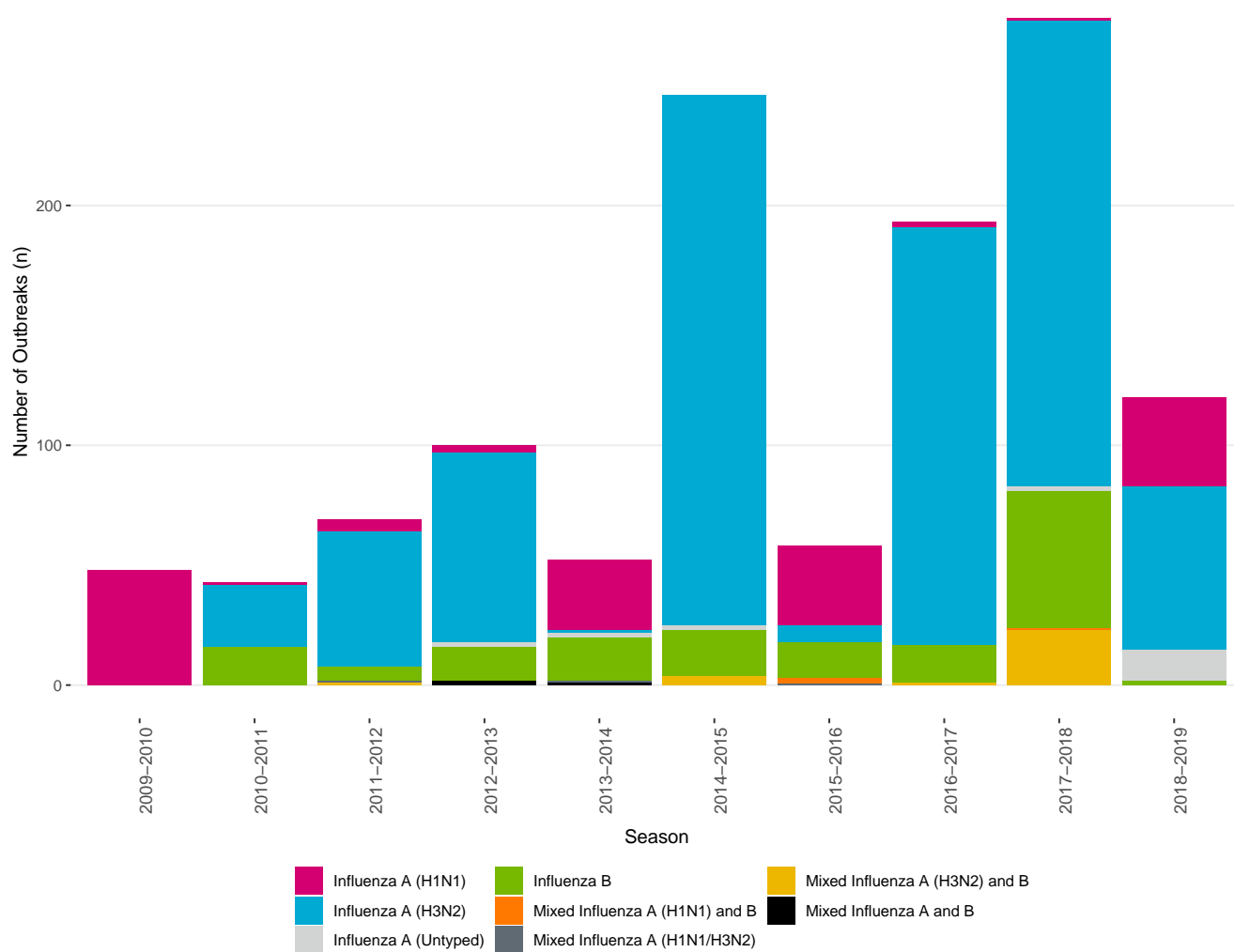


Figure 14. Number of laboratory-confirmed influenza outbreaks by strain type and season

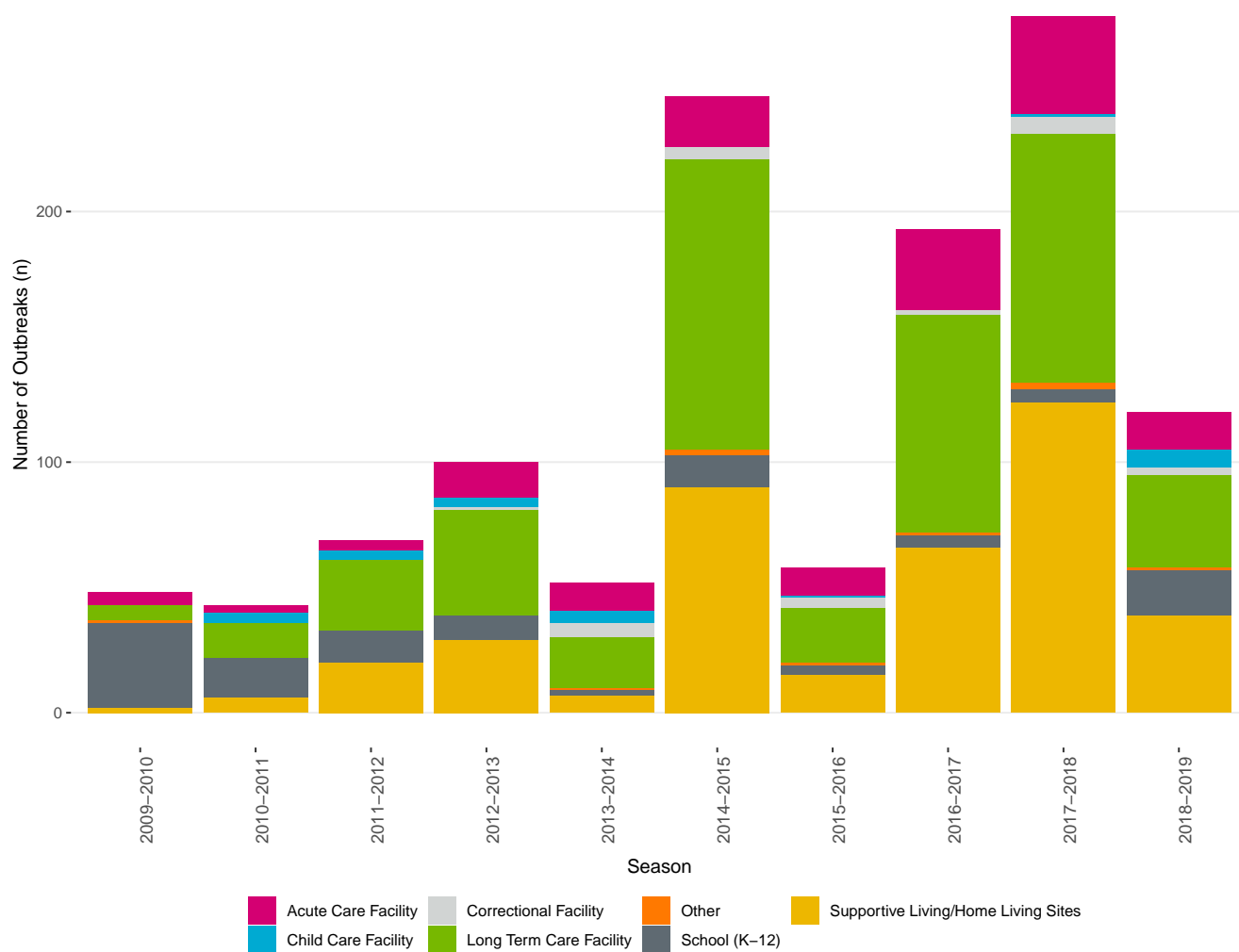


Figure 15. Number of laboratory-confirmed influenza outbreaks by facility type and season

Influenza Vaccination

The seasonal influenza vaccine program in Alberta is universal and offered to all residents. There were 1,317,659 influenza doses administered, and vaccine coverage was 31 per cent (Table 1 and Figure 16). Influenza vaccine coverage increased 2 per cent from the previous season and was the highest reported since the 2010-2011 season (2014-2015 season also had 31 per cent coverage). Pharmacists administered 723,986 doses, which accounted for 55 per cent of doses administered (Table 1 and Figure 17). The number of doses provided by pharmacists increased 5 per cent in 2018-2019, which follows an increasing trend each season since pharmacists began administering influenza vaccine in Alberta. This season was also the first time that pharmacists could administer vaccine to those aged 5-9 years. Public Health administered 27 per cent of doses and other providers administered 18 per cent of doses (Figure 17).

Table 5. Influenza vaccine doses administered and vaccine coverage by season

Season	Public Health	Pharmacy	Other Provider	Total Doses	Coverage (%)
2010-2011	529,350	45,353	179,327	754,030	20
2011-2012	548,567	89,854	235,624	874,045	23
2012-2013	545,076	170,359	203,912	919,347	24
2013-2014	614,966	329,548	213,035	1,157,549	29
2014-2015	522,380	485,669	246,900	1,254,949	31
2015-2016	444,107	475,331	227,130	1,146,568	28
2016-2017	408,663	533,053	230,108	1,171,824	28
2017-2018	384,984	616,625	227,741	1,229,350	29
2018-2019	359,718	723,986	233,955	1,317,659	31

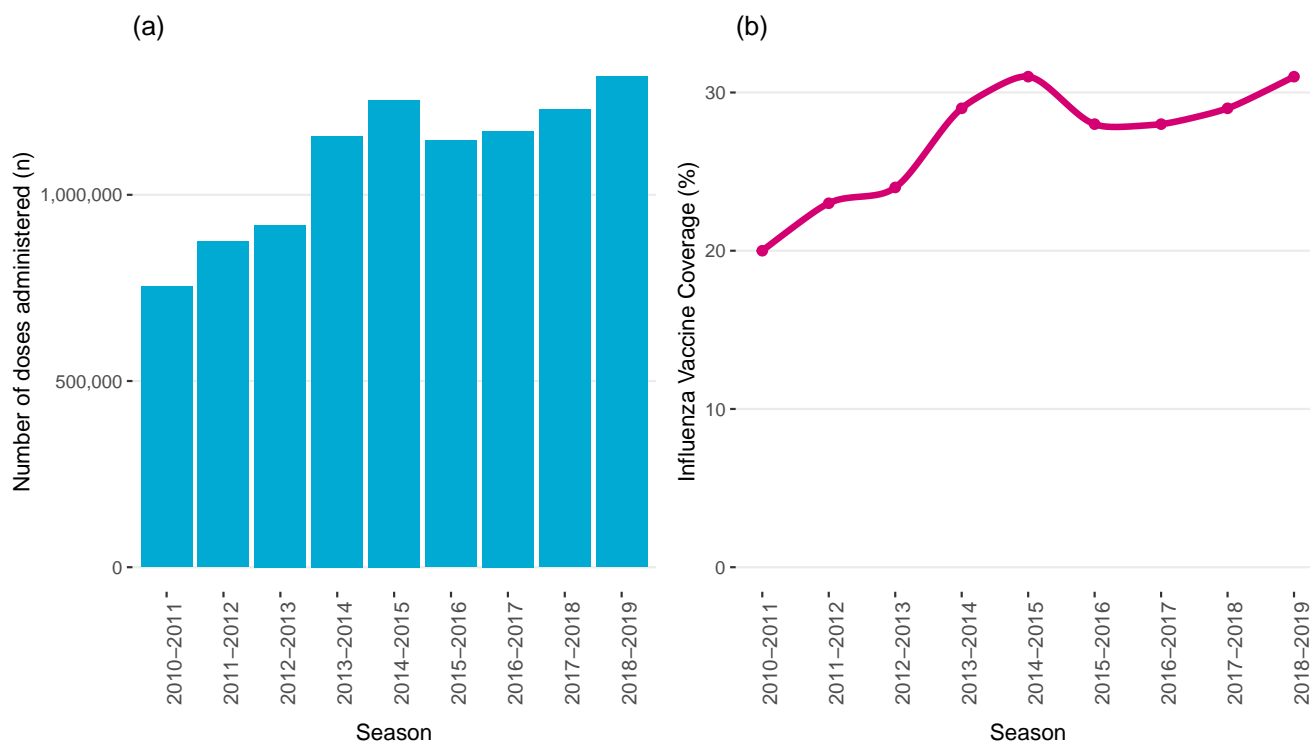


Figure 16. Influenza vaccine (a) doses administered and (b) coverage by season

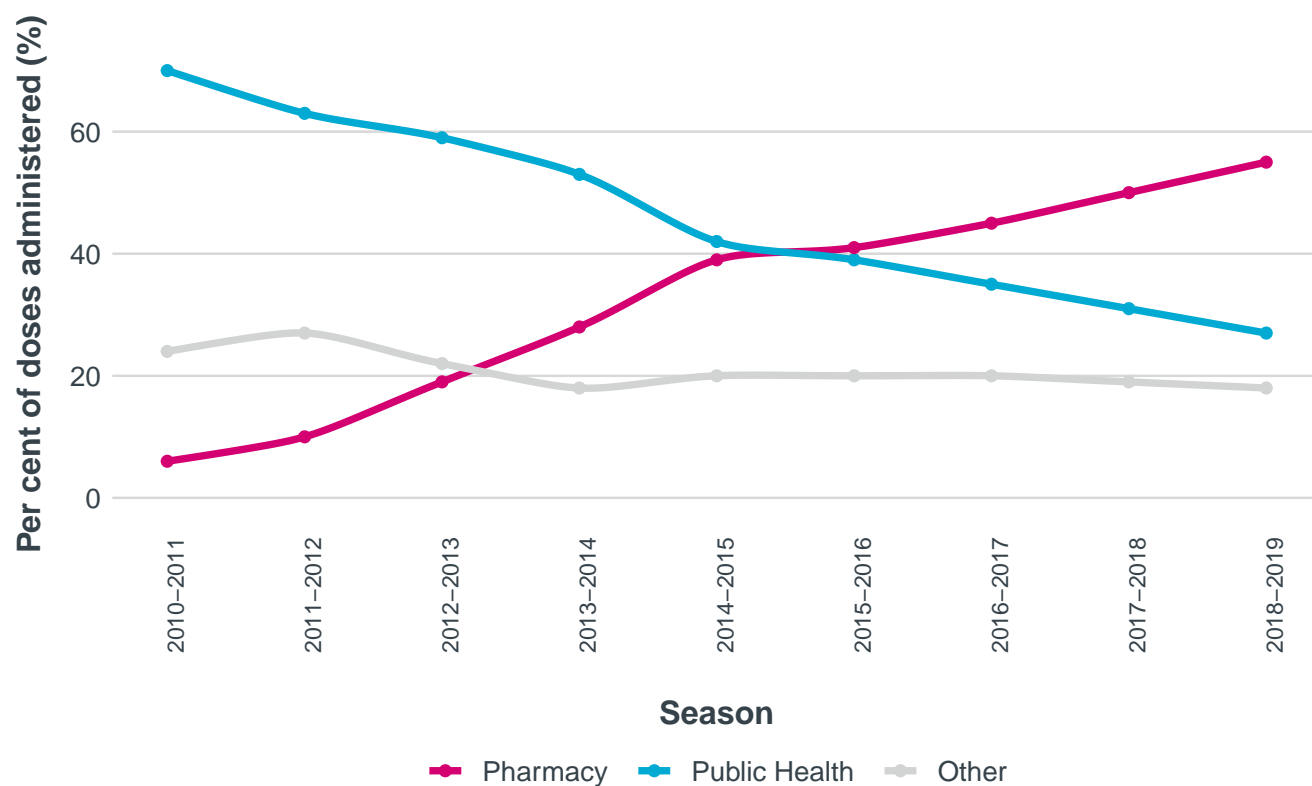


Figure 18. Per cent of influenza vaccine doses administered by provider type and season

Acknowledgements

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

Supplementary Alberta Health Publications

- Alberta Seasonal Influenza
<https://open.alberta.ca/publications/2561-3154>
- Alberta Notifiable Disease Guidelines
<https://www.alberta.ca/notifiable-disease-guidelines.aspx>
- Alberta Notifiable Diseases
<https://open.alberta.ca/publications/alberta-notifiable-disease-summary>
- Alberta STIs and HIV
<https://open.alberta.ca/publications/9781460145449>
- Alberta Tick Surveillance
<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>

Appendix

Data

The 2018–2019 influenza season report includes data from August 26, 2018 (week 35) to July 20, 2019 (week 29).

Data Sources

- Communicable Disease Reporting System (CDRS), Alberta Health
- Provincial Surveillance Information (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).

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 from the previous five seasons. 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. 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. 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. School influenza outbreaks require greater than 10 per cent absenteeism or absenteeism that is 10 per cent higher than baseline levels. Please see the [Public Health Disease Management Guidelines: Influenza, Seasonal](#) and [Public Health Disease Management Guidelines: Epidemics](#) for more information.