Declining influenza activity in BC

During week 14 (April 1 to 7, 2018), ongoing but low level influenza activity continues in BC. Although some surveillance indicators remain at elevated levels for this time of year, influenza activity in BC has declined substantially following the epidemic peak in early January.

At the BCCDC Public Health Laboratory, a mix of influenza A and B viruses were detected, with overall influenza positivity declining to below 25% in week 14. Among influenza A detections, A(H3N2) remains the dominant subtype; however, A(H1N1)pdm09 has also been detected.

Since our last bulletin, one new long-term care facility (LTCF) outbreak was reported to BCCDC with onset in week 12. No new lab-confirmed influenza outbreaks were reported with onset during the current reporting period (week 14, ending April 7, 2018).
British Columbia

Sentinel Physicians
The proportion of patients with influenza-like illness (ILI), among those presenting to sentinel sites, was above expected levels for week 14. Rates are subject to change as reporting becomes more complete. To date, 57% of sentinel sites have reported data for week 14.

**Percent of patient visits to sentinel physicians due to influenza-like illness (ILI) compared to historical average, British Columbia, 2017-18**

<table>
<thead>
<tr>
<th>Week Number</th>
<th>2017-18 Season*</th>
<th>Historical Average (95% CI)†</th>
</tr>
</thead>
</table>

* Data are subject to change as reporting becomes more complete.
† 10-year historical average for 2017-18 season based on 2005-06 to 2016-2017 seasons, excluding 2008-09 and 2009-10 due to atypical seasonality; CI=confidence interval.

BC Children’s Hospital Emergency Room
In week 14, the proportion of visits to BC Children’s Hospital Emergency Room (ER) attributed to ILI remained within expected levels for this period.

**Percent of patients presenting to BC Children’s Hospital ER attributed to influenza-like illness (ILI), British Columbia, 2017-18**

Source: BCCH Admitting, Discharge, Transfer database (ADT). Data includes records with a triage chief complaint of “flu” or “influenza” or “fever/cough.”

* 5-year historical average for 2017-18 season based on 2012-13 to 2016-17 seasons; CI=confidence interval.
Medical Services Plan
In week 14, BC Medical Services Plan (MSP) general practitioner claims for influenza illness (II), as a proportion of all submitted MSP claims, declined in the province overall. In week 14, rates for the province overall and in FHA and VCHA were above the 10-year 75th percentile, while rates in IHA, VIHA and NHA were within expected levels.

Service claims submitted to MSP for influenza illness (II)* as a proportion of all submitted general practitioner service claims, British Columbia, 2017-18

* Influenza illness is tracked as the percentage of all submitted MSP general practitioner claims with ICD-9 code 487 (influenza).

Data for the period August 1, 2009 to July 31, 2010 have been excluded from the 10-year median calculation due to atypical seasonality during the 2009/2010 H1N1 pandemic year. MSP data beginning August 1, 2017 corresponds to sentinel ILI week 31; data are current to April 10, 2018.

Data provided by Population Health Surveillance and Epidemiology, BC Ministry of Health Services.
Laboratory Reports

BCCDC Public Health Laboratory

In week 14, 264 patients were tested for respiratory viruses at the BCCDC Public Health Laboratory (PHL). Of these, 58 (22%) tested positive for influenza; 25 (43%) had influenza A detected [14 A(H3N2), 9 A(H1N1)pdm09 and 2 subtype pending] and 33 (57%) had influenza B detected. Influenza positivity at the BCCDC PHL declined to 22% in week 14, falling below 25% for the first time since week 49. Influenza B comprised more than half (57%) of all influenza detections in week 14. Based on national surveillance reports, B(Yamagata) is the predominant influenza B lineage circulating in BC and elsewhere in Canada this season. Influenza A(H3N2) remains the dominant subtype among influenza A detections; however, A(H1N1)pdm09 has also been detected.

Cumulatively during the 2017-18 season (since week 40, starting October 1, 2017), 3,690 (33%) patients tested positive for influenza at the BCCDC PHL, including 1,842 (50%) with influenza A [1,327 A(H3N2), 445 A(H1N1)pdm09, 70 subtype pending], 1,830 (50%) with influenza B and 18 patients with both influenza A [15 with A(H3N2) and three with A(H1N1)pdm09] and B detected. More than half (60%) of A(H3N2) cases have been detected among elderly adults ≥65 years old, with 8% <20 years old, 17% 20-49 years old, and 15% 50-64 years old. Conversely, 39% of influenza B cases have been detected among elderly adults ≥65 years old, with 17% <20 years old, 24% 20-49 years old, and 20% 50-64 years old. Among A(H1N1)pdm09 cases, only 17% have been detected among elderly adults ≥65 years old, with 28% <20 years old, 38% 20-49 years old, and 17% 50-64 years old.

Rhinovirus or Enterovirus were the most commonly detected, while HMPV was the second most common, non-influenza respiratory viruses during this period.

Influenza and other virus detections among respiratory specimens submitted to BCCDC Public Health Laboratory, 2017-18

Source: BCCDC Public Health Laboratory (PHDRW); Data are current to April 11, 2018.
Cumulative number (since week 40) of influenza detections by type subtype and age group,
BCCDC Public Health Laboratory, 2017-18

Age distribution of influenza detections (cumulative since week 40),
BCCDC Public Health Laboratory, 2017-18

Source: BCCDC Public Health Laboratory (PHDRW); Data are current to April 11, 2018; figure includes cumulative influenza detections for specimens collected from weeks 40-14.
BC Children’s and Women’s Health Centre Laboratory
In week 14, 68 tests for influenza viruses were conducted at the BC Children’s and Women’s Health Centre (CWHC) laboratory. Of these, 1 (1%) was positive for influenza A and 2 (3%) were positive for influenza B. Rhinovirus was the most commonly detected respiratory virus during this period.

Influenza and other virus detections among respiratory specimens submitted to BC Children’s and Women’s Health Centre Laboratory, 2017-18

* Positive rates were calculated using aggregate data. The denominators for each rate represent the total number of tests; multiple tests may be performed for a single specimen and/or patient.
Influenza-like Illness (ILI) Outbreaks
Since our last bulletin, one new lab-confirmed influenza outbreak was reported in a long-term care facility (LTCF) with onset in week 12. To date, no influenza outbreaks have been reported for the current reporting week (i.e. with onset during week 14, ending April 7, 2018).

Cumulatively during the 2017-18 season (since week 37, starting September 10, 2017), 191 lab-confirmed influenza outbreaks have been reported, including 68 with influenza A detected [40 A(H3N2), 1 A(H1N1)pdm09 and 27 subtype unknown], 110 with influenza B, 4 with influenza A (H3N2) and influenza B, and 9 with influenza A (subtype unknown) and influenza B; of these, 178 were reported in LTCFs and 13 were reported from an acute care facility. Additionally, 31 school ILI outbreaks have occurred without etiologic agent identified.

So far during this season of mixed A(H3N2) and influenza B co-circulation, the number of LTCF outbreaks reported since week 40 (n=176) is lower than the tally for the same period during the A(H3N2) dominant epidemic in 2016-17 (n=192) and higher than during the A(H3N2) dominant epidemic in 2014-15 (n=163) and the recent A(H1N1)pdm09 dominant epidemics in 2013-14 (n=10) and 2015-16 (n=28), bearing in mind variation in the timing of seasonal epidemics that may influence final end-of-season comparisons. There has, however, been a greater contribution of outbreaks due to influenza B this season compared to prior recent seasons, mirroring greater influenza B contribution more generally this season, notably B(Yamagata).

Number of influenza-like illness (ILI) outbreaks reported, British Columbia 2017-18

* School-based ILI outbreak defined as >10% absenteeism on any day, most likely due to ILI.
† Facility-based influenza outbreaks defined as 2 or more ILI cases within 7-day period, with at least one laboratory-confirmed case of influenza.
Number of influenza-like illness (ILI) outbreaks by Influenza Subtype in long-term care facilities (LTCF), British Columbia 2017-18†

† Facility-based influenza outbreaks defined as 2 or more ILI cases within 7-day period, with at least one laboratory-confirmed case of influenza.
FluWatch (week 13, March 25 to 31, 2018)
The influenza season peaked in mid-February, but influenza activity remains elevated in many parts of the country. Laboratory detections of influenza are steadily decreasing. Weekly pediatric hospitalizations have been on a general decline since mid-February. To date this season, the majority of laboratory-confirmed cases, hospitalizations and deaths with influenza have been among adults 65 years of age and older. Details are available at: www.canada.ca/en/public-health/services/diseases/flu-influenza/influenza-surveillance/weekly-influenza-reports.html.

National Microbiology Laboratory (NML): Strain Characterization
From September 1, 2017 to April 12, 2018, the National Microbiology Laboratory (NML) received 3,006 influenza viruses from Canadian laboratories for antigenic characterization.

Influenza A(H3N2): Of the 1,343 influenza A(H3N2) viruses, only 342 (25%) had sufficient haemagglutination titre for antigenic characterization by haemagglutination inhibition (HI) assay. Of the 342 viruses characterized by HI assay, 273 (80%) were considered antigenically similar to a cell culture-propagated A/Hong Kong/4801/2014-like virus, the WHO-recommended A(H3N2) component for the 2017-18 northern hemisphere influenza vaccine, while 69 (20%) viruses (all belonging to genetic clade 3C.3a) showed reduced titre with ferret antisera raised against cell culture-propagated A/Hong Kong/4801/2014. Of the 335 out of 342 viruses that were antigenically characterized with available sequencing information, 241 belonged to genetic clade 3C.2a, 25 belonged to subclade 3C.2a1 and 69 belonged to clade 3C.3a; sequencing is pending for the remaining 7 isolates. Of the 1,001 viruses genetically characterized, 894 (89%) were reported to belong to genetic clade 3C.2a, which includes the A/Hong Kong/4801/2014 vaccine strain, while 105 (10%) belonged to subclade 3C.2a1 and 2 belonged to clade 3C.3a.

Influenza A(H1N1)pdm09: All of the 217 A(H1N1)pdm09 viruses characterized were antigenically similar to an A/Michigan/45/2015-like virus, the WHO-recommended influenza A(H1N1) component for the 2017-18 northern hemisphere influenza vaccine.

Influenza B: Of the 1,446 influenza B viruses characterized, 63 (4%) belonged to the B(Victoria) lineage and 1,383 (96%) belonged to the B(Yamagata) lineage. Among the 63 B(Victoria) viruses, 16 (25%) were characterized as antigenically similar to a B/Brisbane/60/2008(Victoria)-like virus, the WHO-recommended influenza B component for the 2017-18 northern hemisphere trivalent influenza vaccine, while 47 (75%) viruses showed reduced titre with ferret antisera produced against cell-propagated B/Brisbane/60/2008. Sequence analysis showed that 43 of the viruses that showed reduced titre had a two-amino acid deletion in the hemagglutinin (HA) gene; sequence is pending for the remaining 4 isolates. Among the 1,383 B(Yamagata) viruses, all were antigenically similar to a B/Phuket/3073/2013(Yamagata lineage)-like virus, the WHO-recommended influenza B component for the 2017-18 northern hemisphere quadrivalent influenza vaccine containing two influenza B strains.

National Microbiology Laboratory (NML): Antiviral Resistance
From September 1, 2017 to April 12, 2018, the NML received influenza viruses from Canadian laboratories for drug susceptibility testing.

Amantadine: Of the 1,587 influenza A viruses [1,379 A(H3N2) and 208 A(H1N1)pdm09] tested against amantadine, all were resistant except 8 A(H3N2) viruses which were sensitive.
Oseltamivir: Of the 1,239 influenza viruses [501 A(H3N2), 180 A(H1N1)pdm09, and 558 B] tested against oseltamivir, all were sensitive except one A(H3N2) virus and one A(H1N1)pdm09 virus with a H275Y mutation which were resistant.
Zanamivir: Of the 1,234 influenza viruses [497 A(H3N2), 180 A(H1N1)pdm09, and 557 B] tested against zanamivir, all were sensitive except one B virus which was resistant.
Mid-season 2017-18 Vaccine Effectiveness Estimates

Canada
On February 1, 2018, Canadian researchers published the first estimates of mid-season influenza vaccine effectiveness (VE) for the 2017-18 season. Adjusted VE against A(H3N2) was low at 17% (95%CI: -14 to 40%). Higher adjusted VE was observed for influenza B at 55% (95%CI: 38 to 68%), despite prominent use of lineage-mismatched B(Victoria) trivalent vaccine in most regions. The full report is available as an open-access publication from EuroSurveillance: http://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2018.23.5.18-00035

United States
On February 15, 2018, the US CDC published interim estimates of influenza vaccine effectiveness (VE) for the 2017-18 season. Adjusted VE against A(H3N2) was 25% (95% CI: 13 to 36%), comparable to Canadian estimates with both suggesting low protection against the dominant circulating strain. Adjusted VE against influenza B was 42% (95% CI: 25 to 56%), somewhat lower than previous Canadian findings despite the more prominent use of quadrivalent vaccines. The full report is available from Morbidity and Mortality Weekly Report (MMWR): https://www.cdc.gov/mmwr/volumes/67/wr/mm6706a2.htm?s_cid=mm6706a2_e

Spain (Navarre)
On February 15, 2018, Spanish researchers published interim estimates of influenza vaccine effectiveness (VE) for the 2017-18 season. The adjusted VE against influenza B, predominantly B(Yamagata), was 52% (95% CI: 12 to 74%) in the outpatient setting. This finding suggests moderate, cross-lineage protection against influenza B. The full report is available from Eurosurveillance: https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2018.23.7.18-00057

Hong Kong
On February 22, 2018, Hong Kong researchers published interim estimates of influenza vaccine effectiveness (VE) among hospitalized children for the 2017-18 season. The 2017-18 season in Hong Kong has been characterized by influenza B(Yamagata) activity. VE among children aged 6 months to 17 years of age was 65% (95% CI: 40 to 80) for influenza B. Differences in study design, patient populations and other epidemiological factors, as well as the use of predominantly quadrivalent influenza vaccine, which includes the B(Yamagata) lineage virus, should be taken into account in comparing these findings to other studies. The full report is available from Eurosurveillance: https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2018.23.8.18-00062

Europe (I-MOVE Group)
On March 1, 2018, European researchers from the I-MOVE multicentre case-control study published interim estimates of influenza vaccine effectiveness (VE) for the 2017-18 season. The 2017-18 season in I-MOVE countries has been characterised by predominant circulation of influenza B, with a greater proportion of A(H1N1)pdm09 than A(H3N2) among influenza A detections.

Adjusted VE against A(H3N2) was -16% (95% CI: -96 to 31) for all ages suggesting no protection, and consistent with Canadian findings of low VE. Despite predominant use of trivalent influenza vaccine containing lineage-mismatched influenza B(Victoria) antigen, adjusted VE against influenza B, that was predominantly B(Yamagata), was 39% (95% CI: 19 to 54) for all ages and 49% (95% CI: 19 to 67) when restricted to mismatched B(Yamagata) specimens. This finding suggests moderate, cross-lineage protection against influenza B, which has been observed previously for influenza B and is also consistent with Canadian findings. The full report is available from Eurosurveillance: https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2018.23.9.18-00086
Updated Antiviral Guidelines
The Association of Medical Microbiology and Infectious Disease Canada (AMMI Canada) previously released guidance on the use of antiviral drugs in anticipation of the low vaccine effectiveness for the 2017-18 influenza season. These guidelines are available at: https://www.ammi.ca/Update/79.ENG.pdf.
International

USA (week 13, March 25 to 31, 2018)
During week 13, influenza activity decreased in the United States. Overall, influenza A(H3N2) viruses have predominated this season. Since early March, influenza B viruses have been more frequently reported than influenza A viruses. The percentage of respiratory specimens testing positive for influenza in clinical laboratories remains elevated. The proportion of deaths attributed to pneumonia and influenza (P&I) was below the system-specific epidemic threshold in the National Center for Health Statistics (NCHS) Mortality Surveillance System. Five influenza-associated pediatric deaths were reported. A cumulative rate of 99.9 laboratory-confirmed influenza-associated hospitalizations per 100,000 population was reported. The proportion of outpatient visits for influenza-like illness (ILI) was 2.4%, which is above the national baseline of 2.2%. The geographic spread of influenza in 11 states was reported as widespread; Guam, Puerto Rico and 26 states reported regional activity; the District of Columbia and 10 states reported local activity; and the U.S. Virgin Islands and three states reported sporadic activity. Details are available at: www.cdc.gov/flu/weekly/.

WHO
There have been no new WHO influenza updates since our last bulletin. Previous updates are available at: www.who.int/influenza/surveillance_monitoring/updates/en/.
WHO Recommendations for Influenza Vaccines

WHO Recommendations for 2017-18 Northern Hemisphere Influenza Vaccine

On March 2, 2017, the WHO announced the recommended strain components for the 2017-18 northern hemisphere influenza vaccine:

- an A/Michigan/45/2015 (H1N1)pdm09-like virus;†
- an A/Hong Kong/4801/2014 (H3N2)-like virus;
- a B/Brisbane/60/2008 (Victoria-lineage)-like virus;
- a B/Phuket/3073/2013 (Yamagata-lineage)-like virus (quadrivalent vaccines only).

* These recommended strains are the same as those recommended for the 2017 southern hemisphere vaccine and represent a change for one of the four components used for the 2016-17 northern hemisphere vaccine.
† Recommended strain represents a change from an A/California/7/2009-like virus, which had been retained as the A(H1N1)pdm09 component since the 2009 pandemic, to an A/Michigan/45/2015-like virus belonging to the phylogenetic subclade 6B.1.

For further details: www.who.int/influenza/vaccines/virus/recommendations/2017_18_north/en/.

WHO Recommendations for the 2018-19 Northern Hemisphere Influenza Vaccine

On February 22, 2018, the WHO announced recommended strain components for the 2018-19 northern hemisphere influenza vaccine:

- an A/Michigan/45/2015 (H1N1)pdm09-like virus;†
- an A/Singapore/INFIMH-16-0019/2016 (H3N2)-like virus;‡
- a B/Colorado/06/2017-like (Victoria-lineage)virus.§
- a B/Phuket/3073/2013-like (Yamagata-lineage)virus (quadrivalent vaccines only).§

* Recommended strains represent a change for two of the four components used for the 2017-18 northern hemisphere vaccines. Recommended strains are similar to the 2018 southern hemisphere vaccine with the exception of the B/Colorado/06/2017-like virus which replaces the B/Brisbane/60/2008-like virus as the B(Victoria-lineage) virus component.
† Recommended strain is the same as recommended for the 2017-18 northern hemisphere and 2018 southern hemisphere vaccines. The A/Michigan/45/2015-like virus belongs to the phylogenetic subclade 6B.1.
‡ Recommended strain for the A(H3N2) component represents a phylogenetic clade-level change from a clade 3C.2a virus to a clade 3C.2a1 virus.
§ Recommended strain for the influenza B component represents a change for the B(Victoria)-lineage component compared to the 2017-18 northern hemisphere and 2018 southern hemisphere vaccines from a B/Brisbane/60/2008-like virus, which had been retained since the 2009-10 season, to a B/Colorado/06/2017-like virus, belonging to the clade 1A antigenic drift variant with a two-amino acid deletion at positions 162-163. The B(Yamagata)-lineage component, B/Phuket/3073/2013-like virus, recommended for quadrivalent vaccine remains unchanged from the 2017-18 northern hemisphere vaccine.

Additional Information

Explanatory Note:
The surveillance period for the 2017-18 influenza season is defined starting in week 40. Weeks 36-39 of the 2016-17 season are shown on graphs for comparison purposes.

List of Acronyms:

ACF: Acute Care Facility
AI: Avian influenza
FHA: Fraser Health Authority
HBoV: Human bocavirus
HMPV: Human metapneumovirus
HSDA: Health Service Delivery Area
IHA: Interior Health Authority
ILI: Influenza-Like Illness
LTCF: Long-Term Care Facility
MSP: BC Medical Services Plan
NHA: Northern Health Authority
NML: National Microbiological Laboratory
A(H1N1)pdm09: Pandemic H1N1 influenza (2009)
RSV: Respiratory syncytial virus
VCHA: Vancouver Coastal Health Authority
VIHA: Vancouver Island Health Authority
WHO: World Health Organization

Current AMMI Canada Guidelines on the Use of Antiviral Drugs for Influenza:
www.ammi.ca/Update/79.ENG.pdf

Web Sites:
BCCDC Emerging Respiratory Pathogen Updates:
http://www.bccdc.ca/health-professionals/data-reports/communicable-diseases/emerging-respiratory-virus-updates

Influenza Web Sites
USA Weekly Surveillance Reports: www.cdc.gov/flu/weekly/
Joint ECDC – WHO/Europe weekly influenza update (Flu News Europe): flunews europe.org
WHO – Weekly Epidemiological Record: www.who.int/wer/en/
WHO Collaborating Centre for Reference and Research on Influenza (Australia):
www.influenzacentre.org/
Australian Influenza Report:

Avian Influenza Web Sites
World Organization for Animal Health: www.oie.int/eng/en_index.htm

Contact Us:
Tel: (604) 707-2510
Fax: (604) 707-2516
Email: InfluenzaFieldEpi@bccdc.ca

Communicable Disease Prevention and Control Services (CDPACS)
BC Centre for Disease Control
655 West 12th Ave, Vancouver BC V5Z 4R4

Online: http://www.bccdc.ca/health-professionals/data-reports/communicable-diseases/influenza-surveillance-reports
Influenza-Like Illness (ILI) Outbreak Summary Report Form

Please complete and email to ilioutbreak@bccdc.ca

Note: This form is for provincial surveillance purposes. Please notify your local health unit per local guidelines/requirements.

ILI: Acute onset of respiratory illness with fever and cough and with one or more of the following: sore throat, arthralgia, myalgia, or prostration which could be due to influenza virus. In children under 5, gastrointestinal symptoms may also be present. In patients under 5 or 65 and older, fever may not be prominent.

Schools and work site outbreak: greater than 10% absenteeism on any day, most likely due to ILI.

Residential institutions (facilities) outbreak: two or more cases of ILI within a seven-day period.

A  Reporting Information

Health unit/medical health officer notified? □ Yes □ No

Person Reporting: ____________________ Title: ____________________

Contact Phone: ____________________ Email: ____________________

Health Authority: ____________________ HSDA: ____________________

Full Facility Name: ________________________________________________

Is this report: □ First Notification (complete section B below; Section D if available)

□ Update (complete section C below; Section D if available)

□ Outbreak Over (complete section C below; Section D if available)

B  First Notification

Type of facility: □ LTCF □ Acute Care Hospital □ Senior’s Residence

(if ward or wing, please specify name/number: ____________________)

□ Workplace □ School (grades: ) □ Other (__________)

Date of onset of first case of ILI (dd/mm/yyyy): DD / MMM / YYYY

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<tr>
<th>Numbers to date</th>
<th>Residents/Students</th>
<th>Staff</th>
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<td>With ILI</td>
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<td>Died</td>
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C  Update AND Outbreak Declared Over

Date of onset for most recent case of ILI (dd/mm/yyyy): DD / MMM / YYYY

If over, date outbreak declared over (dd/mm/yyyy): DD / MMM / YYYY

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<th>Numbers to date</th>
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D  Laboratory Information

Specimen(s) submitted? □ Yes (location: ________________) □ No □ Don’t know

If yes, organism identified? □ Yes (specify: ________________) □ No □ Don’t know

Communicable Disease Prevention & Control Services
655 W. 12th Ave.
Vancouver BC V5Z 4R4

Phone: (604) 707-2510
Fax: (604) 707-2516
ilioutbreak@bccdc.ca