Declining Influenza A(H3N2) Activity Continues in BC

In weeks 5-6 (February 1 to 14, 2015), surveillance indicators suggest declining influenza-like illness activity in BC. However, sporadic activity continues to be observed across all regions of the province. Influenza A(H3N2) remains the predominant circulating influenza virus, with ongoing co-circulation of respiratory syncytial virus.

The proportion of patients testing positive for influenza at the BC provincial laboratory continued to decline, falling to below 20% in week 6. BC Medical Service Plan (MSP) consultation rates returned to median level for this time of year across the province, following higher than expected activity throughout most of the season.

Since our last bulletin two weeks ago, four new lab-confirmed influenza outbreaks have been reported from long-term care facilities. The total number of facility outbreaks this season is now 155, exceeding by more than two-thirds the prior full season record in 2012-13 (n=91) also characterized by mismatched A(H3N2) activity.
**British Columbia**

**Sentinel Physicians**

The proportion of patients with influenza-like illness (ILI) among those presenting to sentinel physicians remained significantly higher than the historical average for this time of year in week 5, falling to below the historical average but still within the expected range in week 6. So far, 58% and 47% of sentinel sites have reported data for weeks 5 and 6, respectively.

**Percent of patient visits to sentinel physicians due to influenza-like illness (ILI) compared to historical average, British Columbia, 2014-15**

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**BC Children's Hospital Emergency Room**

The proportion of visits to BC Children’s Hospital Emergency Room (ER) attributed to ILI remained stable at 14-15% in weeks 5 and 6, consistent with those observed in previous seasons for this time of year.

**Percent of patients presenting to BC Children’s Hospital ER with triage chief complaint of “flu,” “influenza” or “fever/cough,” British Columbia, 2014-15**

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*Data from 2010-11 to 2014-15 are based on new variable (Triage Chief Complaint) for capturing ILI symptoms and are not directly comparable to data for 2009-10. In week 9 of the 2011-12 season, the BCCH ER implemented a new data collection system, the National Ambulatory Care Reporting System (NACRS); data are not directly comparable to data collected using old system.
Medical Services Plan
In weeks 5-6, BC Medical Services Plan (MSP) general practitioner claims for influenza illness (II), as a proportion of all submitted MSP claims, continued to decline across the province. In all regional Health Authorities and for the province overall, rates were within 10-year 25th and 75th percentiles.

Service claims submitted to MSP for influenza illness (II)* as a proportion of all submitted general practitioner service claims, British Columbia, 2014-15

* Influenza illness is tracked as the percentage of all submitted MSP general practitioner claims with ICD-9 code 487 (influenza). Data provided by Population Health Surveillance and Epidemiology, BC Ministry of Health Services. Note: MSP week beginning 3 August 2014 corresponds to Sentinel ILI week 32; data current to February 17, 2015.
Laboratory Reports

BC Public Health Microbiology & Reference Laboratory (PHMRL)

In weeks 5-6, the BC Public Health Microbiology & Reference Laboratory (PHMRL) tested 845 patients for respiratory viruses. Of these, 182 (22%) tested positive for influenza, including 165 (91%) influenza A [145 A(H3N2), 5 A(H1N1)pdm09, and 15 with subtype pending] and 17 (9%) influenza B. Influenza positivity has been gradually declining from a peak of 44% in week 52 to 26% in week 5 and <20% in week 6, driven primarily by decreased circulation of A(H3N2) and concurrent with declining test volumes. The number of patients positive for respiratory syncytial virus (RSV) declined during this period, but RSV percent positivity remained stable and after influenza was the most commonly detected respiratory virus.

Cumulatively, during the 2014-15 influenza season (since week 40, starting September 28, 2014), 2273 (30%) patients have tested positive for influenza at the BC PHMRL, including 2193 (96%) with influenza A [2157 A(H3N2), 10 A(H1N1)pdm09, 2 A(H7N9), and 24 subtype pending], and 80 (4%) with influenza B. One paediatric patient who had recently been vaccinated with the live-attenuated influenza vaccine (LAIV) tested positive for influenza A(H1N1)pdm09, A(H3N2) and influenza B in week 2; these are assumed to be vaccine strain detections, rather than true co-infection. Two adult patients with recent travel to China tested positive for avian influenza A(H7N9) in week 4.

So far this season, A(H3N2) has been the dominant subtype in BC, with lesser co-circulation of influenza B and minimal detection of A(H1N1)pdm09. The majority of influenza detections continue to be in elderly adults (≥65 years of age).

Influenza and other virus detections among respiratory specimens submitted to
BC Public Health Microbiology & Reference Laboratory, PHSA, 2014-15

Note: Data current to February 18, 2015.
BC Children’s and Women’s Health Centre Laboratory

In weeks 5-6, the BC Children’s and Women’s Health Centre Laboratory conducted 320 tests for influenza A and 204 tests for influenza B. Of these, 17 (5%) were positive for influenza A and 1 (0.5%) was positive for influenza B. RSV remained 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, 2014-15

* 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 issued two weeks ago, 4 new laboratory-confirmed influenza outbreaks in long-term care facilities (LTCFs) were reported. Three were due to influenza A(H3N2) and one was due to influenza A with subtype pending. All LTCF outbreaks had onset in week 5, including 1 in FHA, 2 in NHA and 1 in VIHA. Two laboratory-confirmed influenza A outbreaks in schools (1 in NHA in week 3 and 1 in IHA in week 5) were further reported; both were due to influenza A with subtype pending.

Cumulatively, since week 39 (starting September 21, 2014), 155 facility outbreaks due to laboratory-confirmed influenza have been reported, including 149 from LTCFs and 6 from acute care. All but five of these outbreaks were due to influenza A [all A(H3N2) where subtype information is available]; three were due to influenza B, and two were due to both influenza A and B detected in separate units.

The number of year-to-date facility outbreaks reported during the 2014-15 season is double the same period (week 40 – week 6) during the last 2012-13 season of dominant, mismatched H3N2 activity (n=78), and has surpassed by more than two-thirds the total number of facility influenza outbreaks reported across the entire 2012-13 season (week 40 – week 17) (n=91), which had previously been the year of record facility outbreak reports, now supplanted by the 2014-15 season.

Updated AMMI Guidelines: LTCF Outbreak Control

In the context of documented vaccine mismatch to circulating A(H3N2) viruses, all of which retain sensitivity to the neuraminidase inhibitor drugs, the Association of Medical Microbiology and Infectious Disease (AMMI) Canada has posted updated recommendations for antiviral use, notably in relation to LTCF outbreak control, available here: www.ammi.ca/guidelines.
Laboratory-confirmed Influenza Hospitalizations

On December 1, 2014, the BC Centre for Disease Control and the regional Health Authorities implemented an influenza severe outcome surveillance (SOS) pilot in BC for monitoring laboratory-confirmed influenza hospitalizations. An epidemic curve of hospitalized influenza cases by week of symptom onset is shown below, mirroring trends observed in other surveillance indicators. Of note, reporting delays should be taken into account in interpreting trends, particularly for the most recent weeks of the epidemic curve displayed.

Elderly adults are disproportionately represented among influenza-related hospitalizations this season, as is typically observed during A(H3N2)-dominant seasons. The median age of cases is 79 years (range: <1 year to >100 years). While individuals ≥65 years of age comprise <20% of the BC population, they comprise >70% of influenza hospitalizations reported to date in BC. Similarly, while individuals ≥80 years old make up <5% of the BC population, they comprise about half of all influenza-related hospitalizations. The majority (>80%) of cases have had one or more pre-existing comorbidities. Almost all cases have been due to influenza A, all A(H3N2) among those with subtype information available, with a minority due to influenza B.

* Based on partial week; data are subject to change as reporting becomes more complete. Includes influenza SOS case report forms received as of 3:00 PM PST on February 17, 2015.
Symptom onset date was imputed as hospital admission date minus two days where symptom onset was unknown. Only severe cases of laboratory-confirmed influenza admitted to an intensive care unit (ICU) are reported in FHA; in all other Health Authorities, both hospitalizations and ICU admissions are reported.
National FluWatch (week 5)
In week 5, most influenza indicators continued to decline. There is ongoing influenza activity in the Western, Central and the Atlantic provinces, predominantly due to influenza A. Influenza B detections have been increasing steadily, particularly in the Prairies and in Quebec. Although the overall number of regions reporting elevated activity (widespread and localized) in week 5 declined from the previous week, the number of regions reporting widespread activity in week 5 increased compared to the previous week. The percentage of influenza positive tests declined from 23% in week 4 to 20% in week 5. In week 5, 1729 (20%) influenza viruses were detected, including 1557 (90%) influenza A [431 A(H3N2), 5 A(H1N1)pdm09, and 1121 unsubtyped] and 172 (10%) influenza B. Influenza A(H3N2) continues to be the most common subtype of influenza affecting Canadians. Detections of RSV continue to be the second most frequently detected virus after influenza. In laboratory detections, hospitalizations, and deaths, the majority of cases have been among seniors ≥65 years of age. A record number of LTCF outbreaks has been reported this season to date (n=910) and has surpassed the number of LTCF outbreaks reported in each of the past four seasons. Details are available at: www.phac-aspc.gc.ca/fluwatch/14-15/index-eng.php.

National Microbiology Laboratory (NML): Strain Characterization
From September 1, 2014 to February 19, 2015, the NML has antigenically characterized 194 influenza viruses [95 A(H3N2), 2 A(H1N1)pdm09, and 97 influenza B] and genetically characterized 686 influenza A(H3N2) viruses that were received from Canadian laboratories.

Influenza A(H3N2): Of the 781 A(H3N2) viruses characterized so far this season by the NML, 778 (~100%) showed antigenic or genetic evidence of antigenic drift (i.e. vaccine mismatch). Of the 95 A(H3N2) viruses antigenically characterized by haemagglutinin inhibition (HI) assay: 89 (94%) were similar to A/Switzerland/9715293/2013, the WHO-recommended A(H3N2) component for the 2015 Southern Hemisphere influenza vaccine; one (1%) was similar to A/Texas/50/2012, the WHO-recommended A(H3N2) component for the 2014-15 Northern Hemisphere influenza vaccine used this season; and 5 (5%) showed reduced titres to A/Texas/50/2012 but could not be further characterized in relation to A/Switzerland/9715293/2013 due to insufficient titres. Genetic characterization was performed on 686 A(H3N2) viruses that did not grow to sufficient titres for antigenic characterization by HI assay. Of the 686 A(H3N2) viruses genetically characterized: 684 (~100%) belonged to a genetic group that typically shows reduced titres to A/Texas/50/2012 due to amino acid mutations at antigenic sites. The remaining two (<1%) viruses belonged to a genetic group that does not show reduced titres to A/Texas/50/2012.

Influenza A(H1N1)pdm09: Of the 2 A(H1N1)pdm09 viruses characterized, both were antigenically similar to A/California/7/2009, the WHO-recommended A(H1N1)pdm09 component for the 2014-15 Northern Hemisphere influenza vaccine.

Influenza B: Of the 97 influenza B viruses characterized, 90 (93%) viruses were antigenically similar to B/Massachusetts/2/2012 (Yamagata-lineage), the WHO-recommended influenza B vaccine component for the 2014-15 Northern Hemisphere influenza vaccine; 3 (3%) viruses showed reduced titres with antiserum produced against B/Massachusetts/2/2012, signalling antigenic drift from vaccine strain; and 4 (4%) were antigenically similar to B/Brissbane/60/2008 (Victoria-lineage), the WHO-recommended influenza B/Victoria vaccine component for the quadrivalent 2014-15 Northern Hemisphere influenza vaccine.
National Microbiology Laboratory (NML): Antiviral Resistance
From September 1, 2014 to February 19, 2015, the NML received influenza viruses from Canadian laboratories for drug susceptibility testing. Of the 857 influenza A viruses [855 A(H3N2) and 2 A(H1N1)pdm09] tested against amantadine, 854 A(H3N2) viruses and both A(H1N1)pdm09 viruses were resistant; one A(H3N2) virus was sensitive to amantadine. Of the 575 influenza viruses [491 A(H3N2), 2 A(H1N1)pdm09, and 82 influenza B] tested against oseltamivir, all were sensitive. Of the 574 influenza viruses [490 A(H3N2), 2 A(H1N1)pdm09, and 82 influenza B] tested against zanamivir, all were sensitive.

Interim Estimates of 2014/15 Influenza Vaccine Effectiveness, Canada

Canadian Sentinel Physician Surveillance Network (SPSN), Community-based
On January 29, the Canadian Sentinel Physician Surveillance Network (SPSN) published interim estimates of vaccine effectiveness (VE) against medically attended, laboratory-confirmed influenza infection for the 2014/15 influenza vaccine. Of the characterized viruses contributing to VE analysis, virtually all (99%) clustered with phylogenetic clades that are considered antigenically distinct from the vaccine strain. Consistent with this substantial vaccine mismatch in circulating viruses, little to no protection against the dominant circulating A(H3N2) viruses was found by the Canadian SPSN. VE against medically attended laboratory-confirmed A(H3N2) infection was estimated at -8%, with 95% confidence intervals (CIs) spanning -50% to 23%. When analyses were restricted to non-elderly adults 20-64 years old, VE was 2% (95% CI: -49 to 36%). Details are available at: www.eurosurveillance.org/ViewArticle.aspx?ArticleId=21022.

Canadian Immunization Research Network (CIRN), Hospital-based
On February 5, the Serious Outcomes Surveillance Network of the Canadian Immunization Research Network (CIRN) published interim estimates of VE against influenza-associated hospitalizations for laboratory-confirmed influenza for the 2014/15 influenza vaccine. Influenza A(H3N2) was the predominant influenza virus detected among hospitalized cases, accounting for 99% of influenza A viruses with known subtype. Unmatched VE estimates adjusted for age and comorbidity were -17% (95% CI: -56 to 13%) overall and -22% (95% CI: -77 to 16%) for influenza A(H3N2). Among elderly adults ≥65 years old, adjusted VE estimates were -25% (95% CI: -74 to 10%) and -33 (95% CI: -104 to 13%), respectively. Among non-elderly adults <65 years old, VE estimates were 11% (95% CI: -66 to 52%) and 8% (95% CI: -102 to 58%), respectively. Details are available at: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=21024.
International

USA (week 5)
During week 5, influenza activity decreased, but remained elevated in the United States. Of the 21,340 specimens tested, 3174 (15%) were positive for influenza, including 2768 (87%) influenza A [1058 A(H3N2), 6 A(H1N1)pdm09, and 1704 with subtyping not performed] and 406 (13%) influenza B. Of the 634 A(H3N2) influenza viruses collected since October 1, 2014, and characterized by HI assay, 199 (31%) were characterized as A/Texas/50/2012-like, the A(H3N2) component of the 2014-15 Northern Hemisphere influenza vaccine, and 435 (69%) either showed reduced titres with antiserum produced against A/Texas/50/2012 or belonged to a genetic group that typically shows reduced titres to A/Texas/50/2012. Among viruses that showed reduced titres with antiserum raised against A/Texas/50/2012, most were antigenically similar to A/Switzerland/9715293/2013, the A(H3N2) virus selected for the 2015 Southern Hemisphere influenza vaccine. The proportion of outpatient visits for ILI was 3.8%, above the national baseline of 2.0%, and the proportion of deaths attributed to pneumonia and influenza was above the epidemic threshold. Eleven influenza-associated paediatric deaths were reported in week 5. Details are available at: www.cdc.gov/flu/weekly/.

WHO (as of February 9, 2015)
Globally, influenza activity remained high in the Northern Hemisphere with influenza A(H3N2) viruses predominating so far this season. Antigenic characterization of most recent A(H3N2) viruses thus far indicated differences from the A(H3N2) virus used in the influenza vaccines for the Northern Hemisphere in 2014-2015. The vast majority of influenza A(H3N2) viruses tested to date this season were sensitive to neuraminidase inhibitors. In North America, the influenza activity seems to have peaked. Influenza A(H3N2) virus predominated this season. In Europe, the influenza season is well under way, particularly in western and central countries in the WHO European Region. Influenza A(H3N2) was the dominant virus detected this season. In northern Africa and the middle East, influenza activity due to influenza A(H3N2) and B seemed to have peaked but increasing activity with influenza A(H1N1)pdm09 was reported by Algeria and Iran. In the temperate countries of Asia, influenza activity appeared to have peaked in northern China, but was still increasing in Japan and the Republic of Korea. Influenza A(H3N2) virus predominated so far. In tropical countries of the Americas, influenza activity was low in most countries of the Caribbean, Central America and in the tropical countries of South America. In tropical Asia, influenza activity increased in south China, Hong Kong Special Administrative Region, and India. In the Southern Hemisphere, influenza activity remained at inter-seasonal levels. During weeks 2-3 (January 11-24, 2015), the WHO Global Influenza Surveillance and Response System (GISRS) laboratories tested more than 135,489 specimens. Of these, 32,188 were positive for influenza viruses: 28,139 (87%) were typed as influenza A and 4049 (13%) as influenza B. Of the sub-typed influenza A viruses, 1151 (8%) were influenza A(H1N1)pdm09 and 13,968 (92%) were A(H3N2). Of the characterized B viruses, 1463 (99%) belonged to the B-Yamagata lineage and 15 (1%) to the B-Victoria lineage. Details are available at: www.who.int/influenza/surveillance_monitoring/updates/en/.
WHO Recommendations for Influenza Vaccines

WHO Recommendations for 2014-15 Northern Hemisphere Influenza Vaccine
On February 20, 2014, the WHO announced the recommended strain components for the 2014-15 Northern Hemisphere trivalent influenza vaccine (TIV):*

- an A/California/7/2009(H1N1)pdm09-like virus;
- an A/Texas/50/2012(H3N2)-like virus;
- a B/Massachusetts/2/2012-like (Yamagata-lineage) virus.

*These recommended strains are the same as those used for the 2013-14 Northern Hemisphere vaccine. For further details: [www.who.int/influenza/vaccines/virus/recommendations/2014_15_north/en/](http://www.who.int/influenza/vaccines/virus/recommendations/2014_15_north/en/).

WHO Recommendations for 2015 Southern Hemisphere Influenza Vaccine
On September 25, 2014, the WHO announced the recommended strain components for the 2015 Southern Hemisphere trivalent influenza vaccine (TIV):

- an A/California/7/2009(H1N1)pdm09-like virus;*
- an A/Switzerland/9715293/2013(H3N2)-like virus;†
- a B/Phuket/3073/2013-like (Yamagata-lineage) virus.‡

†Recommended strain has been retained as the A(H1N1) component since the 2009 pandemic and has been included in the Southern Hemisphere vaccine since 2010 and in the Northern Hemisphere vaccine since 2010-11.

‡Recommended strain is the same influenza B-Yamagata lineage as the B/Massachusetts/2/2012-like virus recommended for the 2014-15 Northern Hemisphere vaccine but represents a phylogenetic clade-level change from clade 2 to clade 3.

Additional Information

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/guidelines

Web Sites:
BCCDC Emerging Respiratory Pathogen Updates:
www.bccdc.ca/dis-cond/DiseaseStatsReports/EmergingRespiratoryVirusUpdates.htm

Influenza Web Sites
Canada – Flu Watch: www.phac-aspc.gc.ca/fluwatch/
USA Weekly Surveillance Reports: www.cdc.gov/flu/weekly/
European Influenza Surveillance Scheme:
ecdc.europa.eu/EN/HEALTHTOPICS/SEASONAL_INFLUENZA/EPIEMIOLOGICAL_DATA/Pages/Weekly_Influenza_Surveillance_Overview.aspx
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: www.bccdc.ca/dis-cond/DiseaseStatsReports/influSurveillanceReports.htm
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.

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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.