Declining A(H3N2) activity and low-level influenza B circulation in BC

In weeks 7-8 (February 15 to 28, 2015) most influenza surveillance indicators were at expected seasonal levels. Influenza A(H3N2) activity continued to decline during this period, while influenza B has comprised an increasing proportion of influenza detections, although influenza B still remains at low levels overall in BC.

Ongoing monitoring for rising trends in influenza B activity, observed in recent weeks in other Canadian provinces (notably, Alberta and Quebec), is warranted. Of note, respiratory syncytial virus continued to co-circulate and was the most commonly detected respiratory virus, exceeding influenza, in weeks 7-8.

Since our last bulletin 2 weeks ago, 9 laboratory-confirmed influenza outbreaks (6 influenza A and 3 influenza B) have been reported for a total seasonal tally of 164 care facility outbreaks to date.

On February 26, the WHO released its updated recommendations for the 2015-16 Northern Hemisphere trivalent influenza vaccine, retaining the same A/California/7/2009(H1N1)pdm09-like virus as during the 2014-15 season, but replacing the A(H3N2) and influenza B vaccine components with A/Switzerland/9715293/2013(H3N2)-like and B/Phuket/3073/2013-like (Yamagata-lineage) viruses. These recommended strains are the same as those that will be used for the 2015 Southern Hemisphere influenza vaccine.
Sentinel Physicians
The proportion of patients with influenza-like illness (ILI) among those presenting to sentinel physicians was 0.4% in week 7 and 0.6% in week 8, within expected ranges for this time of year. So far, 53% and 44% of sentinel sites have reported data for weeks 7 and 8, respectively.

BC Children’s Hospital Emergency Room
The proportion of visits to BC Children’s Hospital Emergency Room (ER) attributed to ILI remained stable at 13% in weeks 7-8, consistent with rates observed in previous seasons for this time of year.

Source: BCCH Admitting, discharge, transfer database, ADT
* Data from 2009-10 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 7-8, BC Medical Services Plan (MSP) general practitioner claims for influenza illness (II), as a proportion of all submitted MSP claims, remained stable within 10-year 25\textsuperscript{th} and 75\textsuperscript{th} percentiles for the province overall and in all regional Health Authorities.

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 March 3, 2015.
Laboratory Reports

BC Public Health Microbiology & Reference Laboratory (PHMRL)

In weeks 7-8, the BC Public Health Microbiology & Reference Laboratory (PHMRL) tested 597 patients for respiratory viruses. Of these, 81 (14%) tested positive for influenza, including 51 (63%) influenza A [37 A(H3N2), 2 A(H1N1)pdm09, and 12 with subtype pending] and 30 (37%) influenza B. Influenza positivity continued a decreasing trend in weeks 7-8, driven by declining A(H3N2) activity. As influenza A activity has diminished, influenza B has comprised an increasing proportion of influenza detections, now comparable to influenza A, but still at low levels overall for both types of influenza. In weeks 7 and 8, 11% and 6%, respectively, of patients were positive for influenza A, compared to 4% and 6%, respectively, for influenza B. The proportion of patients testing positive for respiratory syncytial virus (RSV) remained steady in weeks 7-8 at 18% and surpassed influenza as the most commonly detected respiratory virus during this period.

Cumulatively, during the 2014-15 influenza season (since week 40, starting September 28, 2014), 2,351 (29%) patients have tested positive for influenza at the BC PHMRL, including 2,242 (95%) with influenza A [2,207 A(H3N2), 13 A(H1N1)pdm09, 2 A(H7N9), and 20 subtype pending], and 109 (5%) with influenza B.

Note: Data current to March 4, 2015.
BC Children’s and Women’s Health Centre Laboratory

In weeks 7-8, the BC Children’s and Women’s Health Centre Laboratory conducted 322 tests for influenza A and 197 tests for influenza B. Of these, 7 (2%) were positive for influenza A and 2 (1%) were 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 2 weeks ago, 9 new laboratory-confirmed influenza outbreaks have been reported, including one in acute care and 8 in long-term care facilities (LTCFs). Of these, 6 were due to influenza A [1 A(H3N2) and 5 with subtype pending] and 3 were due to influenza B, including one in an acute care facility. Of the newly reported outbreaks, 2 had symptom onset in week 5 (both in IHA), 3 in week 6 (2 IHA and 1 VCHA), 3 in week 8 (2 VCHA and 1 VIHA), and 1 in week 9 in VCHA.

Cumulatively, since week 39 (starting September 21, 2014), 164 facility outbreaks due to laboratory-confirmed influenza have been reported, including 157 from LTCFs and 7 from acute care. All but 8 of these outbreaks were due to influenza A [all A(H3N2) where subtype information is available]; 6 were due to influenza B, and 2 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 about double the same period (week 40 – week 8) during the last 2012-13 season of dominant, mismatched H3N2 activity (n=84), and has surpassed by more than three-quarters 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.

Number of influenza-like illness (ILI) outbreaks reported, compared to current sentinel ILI rate and historical average sentinel ILI rate, British Columbia, 2014-15

* Facility-based influenza outbreaks defined as 2 or more ILI cases within 7-day period, with at least one laboratory-confirmed case of influenza.
† School-based ILI outbreak defined as >10% absenteeism on any day, most likely due to ILI.
** Historical values exclude 2008-09 and 2009-10 seasons due to atypical seasonality.
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 chronic comorbidities. Almost all cases have been due to influenza A, predominately 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 March 3, 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.
FluWatch (week 7)
In week 7, all influenza indicators remained similar to, or declined, from the previous week. Overall, elevated activity was mostly reported in the Central and Atlantic provinces. For the past few weeks, influenza B detections have been increasing steadily, particularly in the Prairies and in Quebec. In week 7, influenza B detections were greater than influenza A detections in QC and AB. This increase in influenza B is expected as influenza B often shows up later in the influenza season. However, nationally, influenza A(H3N2) continues to be the most common type of influenza affecting Canadians. In week 7, 1,279 (12%) influenza viruses were detected, including 889 (70%) influenza A [262 A(H3N2), 6 A(H1N1)pdm09, and 621 unsubtyped] and 390 (31%) influenza B. Seniors continue to have the highest number of positive laboratory detections, hospitalizations and deaths. RSV continues to be the second most frequently detected virus after influenza. 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 March 5, 2015, the NML has antigenically characterized 277 influenza viruses [125 A(H3N2), 3 A(H1N1)pdm09, and 149 influenza B] and genetically characterized 827 influenza A(H3N2) viruses that were received from Canadian laboratories.

Influenza A(H3N2): Of the 952 A(H3N2) viruses characterized so far this season by the NML, 949 (~100%) showed antigenic or genetic evidence of antigenic drift (i.e. vaccine mismatch). Of the 125 A(H3N2) viruses antigenically characterized by haemagglutinin inhibition (HI) assay: 119 (95%) were similar to A/Switzerland/9715293/2013, the WHO-recommended A(H3N2) component for the 2015-16 Northern 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 (4%) 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 827 A(H3N2) viruses that did not grow to sufficient titres for antigenic characterization by HI assay. Of the 827 A(H3N2) viruses genetically characterized: 825 (~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 3 A(H1N1)pdm09 viruses characterized, all 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 149 influenza B viruses characterized, 142 (95%) 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 (2%) viruses showed reduced titres with antiserum produced against B/Massachusetts/2/2012, signalling antigenic drift from the vaccine strain; and 4 (3%) were antigenically similar to B/Brisbane/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 March 5, 2015, the NML received influenza viruses from Canadian laboratories for drug susceptibility testing. Of the 1,042 influenza A viruses [1,038 A(H3N2) and 4 A(H1N1)pdm09] tested against amantadine, all but one A(H3N2) virus was resistant; one A(H3N2) virus was sensitive to amantadine. Of the 764 influenza viruses [651 A(H3N2), 3 A(H1N1)pdm09, and 110 influenza B] tested against oseltamivir, all but one A(H3N2) virus was sensitive; one A(H3N2) virus was resistant to oseltamivir. Of the 759 influenza viruses [646 A(H3N2), 3 A(H1N1)pdm09, and 110 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.
USA (week 7)
During week 7, influenza activity continued to decrease, but remained elevated in the United States. Of the 18,505 specimens tested, 2,236 (12%) were positive for influenza, including 1,545 (69%) influenza A [623 A(H3N2), 7 A(H1N1)pdm09, and 915 with subtyping not performed] and 691 (31%) influenza B. Of the 752 A(H3N2) influenza viruses collected since October 1, 2014, and characterized by HI assay, 228 (30%) were characterized as A/Texas/50/2012-like, the A(H3N2) component of the 2014-15 Northern Hemisphere influenza vaccine, and 524 (70%) 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 2015-16 Northern Hemisphere influenza vaccine. The proportion of outpatient visits for ILI was 3.0%, above the national baseline of 2.0%, and the proportion of deaths attributed to pneumonia and influenza was above the epidemic threshold. Six influenza-associated paediatric deaths were reported in week 7. Flu activity has been elevated for 14 consecutive weeks in the United States. The average length of an influenza season for the past 13 seasons has been 13 weeks. Details are available at: www.cdc.gov/flu/weekly/.

WHO (as of February 23, 2015)
Globally, influenza activity remained high in the Northern Hemisphere with influenza A(H3N2) viruses predominating. Some countries reported an increase in influenza A(H1N1)pdm09 activity. 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 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 seemed to have peaked. Influenza A(H3N2) viruses have predominated this season. In Europe, the influenza season continued to rise, particularly in western and central countries. Influenza A(H3N2) remained the dominant virus detected this season. However, in south west Europe, the proportion of influenza A(H1N1) and influenza B increased. In northern Africa and the Middle East, influenza activity is ongoing. Some countries are reporting an increase in influenza A(H1N1)pdm09 activity (Jordan, Morocco, Tunisia). In the temperate countries of Asia, influenza activity decreased from its peak in northern China, but continued to increase in Mongolia and the Republic of Korea. Influenza A(H3N2) viruses have predominated so far. In tropical countries of the Americas, influenza activity remained low in most countries. In tropical Asia, influenza activity continued to increase in southern China, China Hong Kong Special Administrative Region and India. In the Southern Hemisphere, influenza activity remained at inter-seasonal levels. During weeks 4-5 (January 25 to February 7, 2015), the WHO Global Influenza Surveillance and Response System (GISRS) laboratories tested more than 138,720 specimens. Of these, 32,769 were positive for influenza viruses: 26,664 (81%) were typed as influenza A and 6,105 (19%) as influenza B. Of the sub-typed seasonal influenza A viruses, 1,580 (12%) were influenza A(H1N1)pdm09 and 11,094 (88%) were influenza A(H3N2). Of the characterized B viruses, 1,813 (97%) belonged to the B-Yamagata lineage and 50 (3%) 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.


WHO Recommendations for 2015-16 Northern Hemisphere Influenza Vaccine

On February 26, 2015, the WHO announced the recommended strain components for the 2015-16 Northern 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.§

* These recommended strains are the same as those that will be used for the 2015 Southern Hemisphere vaccine.

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

‡ A/South Australia/55/2014, A/Norway/466/2014, and A/Stockholm/6/2014 are A/Switzerland/9715293/2013-like viruses. Recommended strain is considered antigenically distinct from the A/Texas/50/2012-like virus recommended for the 2014-15 Northern Hemisphere vaccine and clusters within the emerging phylogenetic clade 3C.3a.

§ 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
- HSADA: 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/HEALHTOPICS/SEASONAL_INFLUENZA/EPIDEMOIOLOGICAL_DATA/Pages/Wee
    kly_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/influ SurveillanceReports.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.

### Reporting Information

- **Health unit/medical health officer notified?**
  - Yes [ ]
  - No [ ]

- **Person Reporting:** ______________________
- **Title:** ______________________
- **Contact Phone:** ______________________
- **Email:** ______________________
- **Health Authority:** ______________________
- **HSDA:** ______________________
- **Full Facility Name:** _______________________________________________

### First Notification

- **Type of facility:**
  - [ ] LTCF
  - [ ] Acute Care Hospital
  - [ ] Senior’s Residence
  - [ ] Workplace
  - [ ] School (grades: )
  - [ ] Other (___________)

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

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<th>Residents/Students</th>
<th>Staff</th>
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### 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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### Laboratory Information

- **Specimen(s) submitted?**
  - Yes [ ] (location: ______________)
  - No [ ]
  - Don’t know [ ]

- **If yes, organism identified?**
  - Yes [ ] (specify: ______________)
  - No [ ]
  - Don’t know [ ]

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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.