## Table of Contents:

### British Columbia:
- Sentinel Physicians [Page 2]
- Children’s Hospital ER [Page 2]
- Medical Services Plan [Page 3]
- Laboratory Surveillance [Page 5]
- ILI Outbreaks [Page 8]

### Canada:
- FluWatch Activity levels [Page 9]
- NML Strain Characterization [Page 9]
- NML Antiviral Resistance [Page 9]

### International:
- USA (CDC) Surveillance [Page 10]
- WHO [Page 10]
- Influenza Vaccine Components (WHO Recommendations)
  - 2016-17 Northern Hemisphere [Page 11]

### Additional Information:
- Explanatory note [Page 12]
- List of Acronyms [Page 12]
- Web Sites [Page 12]
- Outbreak Report Form [Page 13]

## End-of-season Summary:
### 2015-16 Influenza Season

The 2015-16 influenza season in BC was characterized by overall mild activity and mixed circulation of influenza A and B viruses, with a later than typical seasonality.

Influenza B viruses predominated earlier in the season starting in late December, while influenza A(H1N1)pdm09 viruses circulated later in the season from early January to mid-April. In most other seasons in BC, influenza A circulation peaked earlier than influenza B. Although A(H3N2) viruses were detected earlier than usual in the autumn of 2015, they remained at low level throughout the rest of the season.

Most influenza-like illness (ILI) surveillance indicators were lower than historical averages throughout the season. Cumulatively during the 2015-16 season (since week 32), 35 influenza outbreaks were reported from long-term care facilities (LTCFs). Despite their prominence among influenza detections overall, A(H1N1)pdm09 viruses were a lesser contributor to LTCF outbreaks, comprising only 6 of the 34 (18%) lab-confirmed outbreaks with known type/subtype, whereas 19 (56%) were associated with A(H3N2).

This will be the final regular influenza surveillance bulletin of the 2015-16 season. Further bulletins will be issued as needed until the next regular reporting period begins for the 2016-17 season.
British Columbia

Sentinel Physicians
During the 2015-16 season, the proportion of patients with influenza-like illness (ILI) among those presenting to sentinel sites was generally lower than or within expected 10-year historical ranges throughout the influenza season. Similarly, in weeks 17-19, sentinel ILI rates were below historical averages ranging from 0.03-0.09% (based on 56-76% of sentinel sites reporting per week). Sentinel ILI rates peaked around weeks 4-5, suggesting a later than typical seasonality.

Percent of patient visits to sentinel physicians due to influenza-like illness (ILI) compared to historical average, British Columbia, 2015-16

BC Children’s Hospital Emergency Room
During the 2015-16 season, the proportion of visits to BC Children’s Hospital Emergency Room (ER) attributed to ILI peaked around weeks 3-6, about one month later than the peak observed during the past 5 seasons. In weeks 17-19, ILI rates at the BC Children’s Hospital ER continued a downward trend, dropping to 5-7%, below the 5-year historical average for this time of year.

Percent of patients presenting to BC Children’s Hospital ER attributed to influenza-like illness (ILI), British Columbia, 2015-16

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 2015-16 season based on 2010-11 to 2014-15 seasons; CI=confidence interval
Medical Services Plan
During the 2015-16 season, BC Medical Services Plan (MSP) general practitioner claims for influenza illness (II), as a proportion of all submitted MSP claims, increased gradually beginning in week 51 and peaked in weeks 7-8, with some expected regional variation observed across health authorities. Overall, provincial rates were considerably lower than historical peak levels observed in previous seasons, which typically occur earlier in the season.

In week 19, MSP rates were below 10-year 25th percentiles in all regions of the province.

Service claims submitted to MSP for influenza illness (II)* as a proportion of all submitted general practitioner service claims, British Columbia, 2015-16

* 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 week beginning August 1, 2015 corresponds to sentinel ILI week 30; data are current to May 16, 2016.

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

BCCDC Public Health Laboratory

Cumulatively during the 2015-16 season (since week 40, starting October 4, 2015), 2,261 (26%) patients tested positive for influenza at the BCCDC Public Health Laboratory (PHL), including 1,273 (56%) with influenza A [966 A(H1N1)pdm09, 297 A(H3N2), and 10 subtype pending], 983 (43%) with influenza B, and five adult patients with influenza A and B co-infections.

Overall, the 2015-16 season was characterized by mixed circulation of influenza A and B viruses, with A(H1N1)pdm09 subtype viruses predominating over A(H3N2) subtype viruses since early January (week 2) and B/Victoria lineage viruses predominating over B/Yamagata lineage viruses throughout the season. Influenza positivity at the BCCDC PHL increased dramatically from less than 10% in week 50 to over 30% in week 2, peaking at 45% in week 6 and remaining elevated above 25-30% until week 14. In weeks 17-19, influenza positivity continued a declining trend from 15% in week 17 to 2% in week 19.

During the 2015-16 season, just over one-half (53%) of influenza detections were in non-elderly, working-aged adults 20-64 years, with a smaller proportion of detections in children <20 years (24%) and elderly adults ≥65 years (23%). However, this age distribution differs by influenza type/subtype: adults 20-64 years, and to a lesser extent children <20 years, comprise a larger proportion of A(H1N1)pdm09 and influenza B cases, while elderly adults ≥65 years comprise a larger proportion of A(H3N2) cases.

Among other respiratory viruses, RSV co-circulated with influenza viruses, while entero/rhinoviruses were detected throughout the season, most notably at the beginning of the season before influenza activity began to increase.
Cumulative number (since week 40) of influenza detections by type/subtype and age group, BCCDC Public Health Laboratory, 2015-16

Data are current to May 18, 2016; figure includes cumulative influenza detections for specimens collected from weeks 40-19.

Age distribution of influenza detections (cumulative since week 40) by type/subtype, BCCDC Public Health Laboratory, 2015-16

Data are current to May 18, 2016; figure includes cumulative influenza detections for specimens collected from weeks 40-19.
BC Children’s and Women’s Health Centre Laboratory

During the 2015-16 season (since week 40, starting October 4, 2015), the BC Children’s and Women's Health Centre Laboratory conducted 2,177 tests for influenza A and B. Of these, 126 (6%) were positive for influenza A and 121 (6%) were positive for influenza B. As with laboratory surveillance at the BCCDC PHL, influenza A and B viruses co-circulated throughout the season, with earlier dominance of influenza B viruses, followed by late-season circulation of influenza A viruses. Respiratory syncytial viruses (RSV) were also commonly detected among non-influenza respiratory virus detections.

In weeks 17-19, 5 out of 179 (3%) tests conducted at the BC Children’s and Women’s Health Centre Laboratory were positive for influenza A and 1 out of 179 (1%) was positive for influenza B.

* 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

In total during the 2015-16 season (since week 32, starting August 9, 2015), 38 influenza outbreaks were reported from facilities, including 35 from long-term care facilities (LTCFs), 1 from an acute care facility, and 2 from rehabilitation facilities:

- 17 with influenza A(H3N2) detected (including 2 non-LTCF outbreaks);
- 3 with influenza A(H1N1)pdm09 detected;
- 1 with influenza A detected (subtype could not be determined due to insufficient sample);
- 2 with both influenza A(H3N2) and A(H1N1)pdm09 detected;
- 2 with both influenza A(H3N2) and B detected;
- 1 with both influenza A(H1N1)pdm09 and B detected; and
- 12 with influenza B detected (including 1 non-LTCF outbreak).

In addition, 39 school ILI outbreaks were reported during the 2015-16 season.

Lab-confirmed influenza outbreaks continue to be reported in recent weeks, consistent with the late start to the 2015-16 season. Since our last bulletin 3 weeks ago, 3 new lab-confirmed influenza outbreaks (included in the tally of 38 above), all with influenza B detected, were reported in LTCFs in FHA, with ILI onset in weeks 15, 17 and 18.

Updated AMMI Guidelines: LTCF Outbreak Control

In December 2015, the Association of Medical Microbiology and Infectious Disease (AMMI) Canada posted updated recommendations for influenza antiviral drug treatment and prophylaxis for the 2015-16 season, notably in relation to control of influenza outbreaks in long-term care facilities, available from www.ammi.ca/guidelines.
National

FluWatch (week 17, April 24-30, 2016)

In week 17, all influenza indicators declined from the previous week. Elevated influenza B activity persisted in many regions across Canada: influenza B accounted for the majority of influenza detections in week 17. Additionally, all outbreaks reported this week were due to influenza B. In week 17, the percentage of tests positive for influenza continued to decrease from the previous week (18% in week 16 to 17% in week 17), driven by the decline in influenza A, but remained above the 5-year expected level for this time of year (range: 10-14%). However, with the late start to the 2015-16 influenza season, these above-normal levels are not unexpected. Hospitalizations, ICU admissions and deaths among the paediatric population, while declining, continue to remain above expected levels based on the past several influenza seasons. Details are available at: healthycanadians.gc.ca/diseases-conditions-maladies-affections/disease-maladie/flu-grippe/surveillance/fluwatch-reports-rapports-surveillance-influenza-eng.php.

National Microbiology Laboratory (NML): Strain Characterization

From September 1, 2015 to May 19, 2016, the National Microbiology Laboratory (NML) received 2,530 influenza viruses [212 A(H3N2), 1,343 A(H1N1)pdm09 and 975 B] from Canadian laboratories for antigenic characterization.

Influenza A(H3N2): Of the 212 influenza A(H3N2) viruses, only 59 (28%) had sufficient haemagglutination titre for antigenic characterization by haemagglutination inhibition (HI) assay. Of the 59 viruses characterized by HI assay, all were considered antigenically similar to cell-passaged A/Switzerland/9715293/2013, the WHO-recommended A(H3N2) component for the 2015-16 northern hemisphere influenza vaccine. Genetic characterization was performed to infer antigenic properties on the remaining 153 viruses that did not grow to sufficient haemagglutination titre for HI assay. Of the 153 A(H3N2) viruses genetically characterized, all were reported to belong to a genetic group in which most viruses were antigenically related to A/Switzerland/9715293/2013.

Influenza A(H1N1)pdm09: The 1,343 A(H1N1)pdm09 viruses characterized were antigenically similar to A/California/7/2009, the WHO-recommended A(H1N1) component for the 2015-16 northern hemisphere influenza vaccine.

Influenza B: Of the 975 influenza B viruses characterized, 198 (20%) were antigenically similar to B/Phuket/3073/2013 (Yamagata lineage), the recommended influenza B component for the 2015-16 northern hemisphere influenza vaccine, while 777 (80%) were characterized as B/Brisbane/60/2008 (Victoria lineage), the recommended influenza B component for the 2015-16 northern hemisphere quadrivalent influenza vaccine containing two influenza B components.

National Microbiology Laboratory (NML): Antiviral Resistance

From September 1, 2015 to May 19, 2016, the NML received influenza viruses from Canadian laboratories for drug susceptibility testing. Of the 1,547 influenza A viruses [215 A(H3N2) and 1,332 A(H1N1)pdm09] tested against amantadine, all were resistant with the exception of one A(H3N2) virus and one A(H1N1)pdm09 virus which were sensitive to amantadine. Of the 1,571 influenza viruses [171 A(H3N2), 937 A(H1N1)pdm09 and 463 B] tested against oseltamivir, all A(H3N2) and B viruses and 928/937 (99%) A(H1N1)pdm09 viruses were sensitive; nine A(H1N1)pdm09 viruses with a H275Y mutation were resistant. Of the 1,571 influenza viruses [171 A(H3N2), 937 A(H1N1)pdm09 and 463 B] tested against zanamivir, all were sensitive.
International

USA (week 18, May 1-7, 2016)
During week 18, influenza activity decreased in the United States. The most frequently identified influenza virus type reported by public health laboratories during week 18 was influenza B. The percentage of respiratory specimens testing positive for influenza in clinical laboratories decreased. The proportion of deaths attributed to pneumonia and influenza (P&I) was below system-specific epidemic thresholds. Three influenza-associated paediatric deaths were reported. A cumulative rate for the season of 31.0 laboratory-confirmed influenza-associated hospitalizations per 100,000 population was reported. The proportion of outpatient visits for ILI was 1.8%, which is below the national baseline of 2.1%. The geographic spread of influenza in 3 states was reported as widespread, 12 states reported regional activity, 20 states reported local activity, and 15 states reported sporadic activity. Details are available at: www.cdc.gov/flu/weekly/.

WHO (May 16, 2016)
Influenza activity in the Northern Hemisphere continued to decrease. A predominance of influenza B virus activity continued to be reported in most of North America and in some tropical areas. In a few countries in the Southern Hemisphere, slight increases in ILI activity were reported.

• In North America, influenza activity continued to decrease with influenza B detections predominating.
• Europe and temperate Asia reported decreased influenza activity with a continued predominance of influenza B virus activity.
• In North Africa, influenza activity continued to decrease in general, except in Egypt where in recent weeks influenza B activity continued.
• Influenza A virus was reported predominant in Eastern and Western Africa.
• In Central America and the Caribbean countries, influenza and other respiratory virus activity remained generally low, although levels of A(H1N1)pdm09 virus activity remained elevated in El Salvador and Guatemala. Active circulation of influenza A(H1N1)pdm09 activity was also reported in several countries in the Caribbean.
• In parts of tropical South America, low but increasing influenza A(H1N1)pdm09 activity was reported in Bolivia and Ecuador. In Peru, influenza detections decreased. In Brazil, influenza activity continued at elevated levels with a predominance of influenza A(H1N1)pdm09 virus. RSV activity remained elevated in Colombia.
• In tropical countries of South Asia, influenza activity decreased with influenza B virus predominant.
• In temperate South America, respiratory virus activity remained low. ILI activity increased slightly in a few countries but remained below seasonal thresholds.
• In the temperate countries of Southern Africa and Oceania, influenza virus activity remained low. Some islands in the Pacific reported increased ILI activity.
• From April 18 to May 1, 2016, the WHO GISRS laboratories tested more than 85,968 specimens, of which 12,819 were positive for influenza viruses: 4,580 (36%) were typed as influenza A and 8,239 (64%) as influenza B. Of the sub-typed influenza A viruses, 1,728 (82%) were influenza A(H1N1)pdm09 and 391 (19%) were influenza A(H3N2). Of the characterized B viruses, 353 (21%) belonged to the B/Yamagata lineage and 1,358 (79%) to the B/Victoria lineage.

Details are available at: www.who.int/influenza/surveillance_monitoring/updates/en/.

On February 8, 2016, the WHO published a Risk Assessment on Seasonal Influenza A(H1N1)pdm09, available from: www.who.int/influenza/publications/riskassessment_AH1N1pdm09_201602/en/.
WHO Recommendations for Influenza Vaccines

WHO Recommendations for 2016-17 Northern Hemisphere Influenza Vaccine

On February 25, 2016, the WHO announced recommended strain components for the 2016-17 Northern Hemisphere trivalent influenza vaccine (TIV):*

- an A/California/7/2009 (H1N1)pdm09-like virus;†
- an A/Hong Kong/4801/2014(H3N2)-like virus;‡
- a B/Brisbane/60/2008-like (Victoria-lineage) virus.§

It is recommended that quadrivalent influenza vaccines (QIV) containing two influenza B viruses contain the above three viruses and a B/Phuket/3073/2013-like (Yamagata-lineage) virus.

These recommended components are the same as those recommended for the 2016 Southern Hemisphere vaccine.

* Recommended strains represent a change for two of the three components used for the 2015-16 Northern Hemisphere vaccines.
† 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.
‡ Recommended strain for the A(H3N2) component represents a phylogenetic clade-level change from a clade 3C.3a virus to a clade 3C.2a virus.
§ Recommended strain for the influenza B component represents a lineage-level change from a B/Yamagata-lineage virus to a B/Victoria-lineage virus.


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.§

It is recommended that quadrivalent influenza vaccines (QIV) containing two influenza B viruses contain the above three viruses and a B/Brisbane/60/2008-like (Victoria-lineage) virus.

* These recommended strains are the same as those 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.

For further details: www.who.int/influenza/vaccines/virus/recommendations/2015_16_north/en/.
Additional Information

Explanatory Note:
The surveillance period for the 2015-16 influenza season is defined starting in week 40. Weeks 36-39 of the 2014-15 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
- AMMI Canada Guidelines on the Use of Antiviral Drugs for Influenza: [www.ammi.ca/guidelines](http://www.ammi.ca/guidelines)

Web Sites:
- BCCDC Emerging Respiratory Pathogen Updates: [www.bccdc.ca/health-professionals/data-reports/emerging-respiratory-virus-updates](http://www.bccdc.ca/health-professionals/data-reports/emerging-respiratory-virus-updates)
- Influenza Web Sites
  - European Influenza Surveillance Scheme: [ecdc.europa.eu/EN/HEALTHTOPICS/SEASONAL_INFLUENZA/EPIDEMIOLOGICAL_DATA/Pages/Weekly_Influenza_Surveillance_Overview.aspx](http://ecdc.europa.eu/EN/HEALTHTOPICS/SEASONAL_INFLUENZA/EPIDEMIOLOGICAL_DATA/Pages/Weekly_Influenza_Surveillance_Overview.aspx)
  - WHO – Weekly Epidemiological Record: [www.who.int/wer/en/](http://www.who.int/wer/en/)

Avian Influenza Web Sites
- World Organization for Animal Health: [www.oie.int/eng/en_index.htm](http://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/health-professionals/data-reports/influenza-surveillance-reports](http://www.bccdc.ca/health-professionals/data-reports/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.

## 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)

## 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

<table>
<thead>
<tr>
<th>Numbers to date</th>
<th>Residents/Students</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With ILI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospitalized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Died</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 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

<table>
<thead>
<tr>
<th>Numbers to date</th>
<th>Residents/Students</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With ILI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospitalized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Died</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Laboratory Information
- **Specimen(s) submitted?**
  - [ ] Yes (location: _____________)
  - [ ] No
  - [ ] Don’t know
- **If yes, organism identified?**
  - [ ] Yes (specify: _____________)
  - [ ] No
  - [ ] Don’t know