Declining Influenza Activity in BC but Above Seasonal Norms

During week 11 (March 11 to 17, 2018), influenza activity persisted at above seasonal levels in most regions, despite a declining trend for the past few weeks following the epidemic peak in early-to-mid January 2018.

Influenza positivity at the BCCDC PHL remained elevated at above 35% in week 11, despite an overall downward trend since the epidemic peak. Influenza B comprised more than half of all influenza detections in week 11 with influenza B positivity rates exceeding 20%. Among influenza A detections, A(H3N2) remains the dominant subtype; however, A(H1N1)pdm09 has also been detected.

Since our last bulletin, 4 new lab-confirmed outbreaks were reported with onset in weeks 11 and 12; all from long-term care facilities (LTCFs) and all with influenza B detected.
British Columbia

Sentinel Physicians
The proportion of patients with influenza-like illness (ILI), among those presenting to sentinel sites, was within expected levels for week 11 following two weeks of above average activity. Rates are subject to change as reporting becomes more complete. To date, 45% of sentinel sites have reported data for week 11.

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

BC Children’s Hospital Emergency Room
In week 11, 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.

† 10-year historical average for 2017-18 season based on 2005-06 to 2016-17 seasons, excluding 2008-09 and 2009-10 due to atypical seasonality; CI=confidence interval.
Medical Services Plan
In week 11, BC Medical Services Plan (MSP) general practitioner claims for influenza illness (II), as a proportion of all submitted MSP claims, declined slightly in the province overall but remained above expected seasonal levels with varying trends across the regional health authorities. In week 11, rates for the province overall, FHA, VCHA and VIHA were above the 10-year 75th percentile, while rates in IHA and NHA were at expected levels for this time of year.

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 March 19, 2018.

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

BCCDC Public Health Laboratory

In week 11, 516 patients were tested for respiratory viruses at the BCCDC Public Health Laboratory (PHL). Of these, 192 (37%) tested positive for influenza; 79 (41%) had influenza A detected [41 A(H3N2), 29 A(H1N1)pdm09 and 9 subtype pending] and 113 (59%) had influenza B detected. Influenza positivity at the BCCDC PHL continued an overall downward trend since week 52 when influenza positivity peaked above 50% to less than 30% in week 8, but has remained elevated for the previous 3 weeks above 35%. Influenza B comprised more than half of all influenza detections in week 11 with influenza B positivity rates exceeding 20%. 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), 3,399 (33%) patients tested positive for influenza at the BCCDC PHL, including 1,692 (50%) with influenza A [1,221 A(H3N2), 403 A(H1N1)pdm09, 68 subtype pending], 1,690 (50%) with influenza B and 17 patients with both influenza A [14 with A(H3N2) and three with A(H1N1)pdm09] and B detected. More than half (59%) of A(H3N2) cases have been detected among elderly adults ≥65 years old, with 8% <20 years old, 18% 20-49 years old, and 15% 50-64 years old. Conversely, 38% 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 29% <20 years old, 38% 20-49 years old, and 17% 50-64 years old.

Human metapneumovirus (HMPV) and respiratory syncytial virus (RSV) were the most commonly detected non-influenza respiratory viruses during this period. RSV detections overall have been less frequent to date this season than in the 2016-17 season (486 vs. 1,435, respectively, between weeks 40 and 11).

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 March 21, 2018.
Cumulative number (since week 40) of influenza detections by type subtype and age group,
BCCDC Public Health Laboratory, 2017-18

Source: BCCDC Public Health Laboratory (PHDRW); Data are current to March 21, 2018; figure includes cumulative influenza detections for specimens collected from weeks 40-11.

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 March 21, 2018; figure includes cumulative influenza detections for specimens collected from weeks 40-11.
In week 11, 109 tests for influenza viruses were conducted at the BC Children’s and Women’s Health Centre (CWHC) laboratory. Of these, 6 (6%) were positive for influenza A and 7 (6%) were positive for influenza B. RSV was the most commonly detected respiratory virus during this period.

*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, 4 new lab-confirmed outbreaks were reported; all were from long-term care facilities (LTCFs). Of the 4 newly reported outbreaks, 2 had onset in week 11 (1 in FHA, 1 in IHA) and 2 had onset in FHA in week 12. Of the 4 outbreaks, all 4 had influenza B detected.

Cumulatively during the 2017-18 season (since week 37, starting September 10, 2017), 169 lab-confirmed influenza outbreaks have been reported, including 59 with influenza A detected [33 A(H3N2), 1 A(H1N1)pdm09 and 25 subtype unknown], 98 with influenza B, 3 with influenza A (H3N2) and influenza B, and 9 with influenza A (unspecified subtype) and influenza B; of these, 158 were reported in LTCFs and 11 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 long term care facility outbreaks reported since week 40 (n=156) is lower than the tally for the same period during recent A(H3N2) dominant epidemics in 2014-15 (n=163) and 2016-17 (n=183) but higher than during recent A(H1N1)pdm09 dominant epidemics in 2013-14 (n=9) and 2015-16 (n=23), bearing in mind variation in the timing of seasonal epidemics that may influence final end-of-season comparisons.

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

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<th>LTCF Influenza Outbreaks†</th>
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* 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.
National

FluWatch (week 10, March 4 to 10, 2018)

All indicators of influenza activity decreased from the previous week. Influenza activity remains elevated in many parts of the country. Detections of influenza B continue to be greater than those of influenza A. 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 March 22, 2018, the National Microbiology Laboratory (NML) received 2,514 influenza viruses from Canadian laboratories for antigenic characterization.

Influenza A(H3N2): Of the 1190 influenza A(H3N2) viruses, only 296 (25%) had sufficient haemagglutination titre for antigenic characterization by haemagglutination inhibition (HI) assay. Of the 296 viruses characterized by HI assay, 243 (82%) 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 53 (18%) 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 285 out of 296 viruses that were antigenically characterized with available sequencing information, 210 belonged to genetic clade 3C.2a, 22 belonged to subclade 3C.2a1 and 53 belonged to clade 3C.3a; sequencing is pending for the 11 remaining isolates. Of the 894 viruses genetically characterized, 799 (89%) were reported to belong to genetic clade 3C.2a, which includes the A/Hong Kong/4801/2014 vaccine strain, while 93 (10%) belonged to subclade 3C.2a1 and 2 belonged to clade 3C.3a.

Influenza A(H1N1)pdm09: All of the 164 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 1160 influenza B viruses characterized, 50 (4%) belonged to the B(Victoria) lineage and 1110 (96%) belonged to the B(Yamagata) lineage. Among the 50 B(Victoria) viruses, 10 (20%) 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 40 (80%) viruses showed reduced titre with ferret antisera produced against cell-propagated B/Brisbane/60/2008. Sequence analysis showed that 37 viruses that showed reduced titre had a two-amino acid deletion in the hemagglutinin (HA) gene; sequence is pending for the remaining 3 isolates. Among the 1110 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 March 22, 2018, the NML received influenza viruses from Canadian laboratories for drug susceptibility testing.

Amantadine: Of the 1281 influenza A viruses [1145 A(H3N2) and 136 A(H1N1)pdm09] tested against amantadine, all were resistant except five A(H3N2) viruses which were sensitive.

Oseltamivir: Of the 1041 influenza viruses [463 A(H3N2), 131 A(H1N1)pdm09, and 447 B] tested against oseltamivir, all were sensitive except one A(H1N1)pdm09 virus with a H275Y mutation which was resistant.

Zanamivir: Of the 1037 influenza viruses [459 A(H3N2), 131 A(H1N1)pdm09, and 447 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 10, March 4 to 10, 2018)

During week 10, influenza activity decreased in the United States. Overall, influenza A(H3N2) viruses have predominated this season. However, in recent weeks the proportion of influenza A viruses has declined, and during week 10, the numbers of influenza A and influenza B viruses reported were similar. 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 above the system-specific epidemic threshold in the National Center for Health Statistics (NCHS) Mortality Surveillance System. Nine influenza-associated pediatric deaths were reported. A cumulative rate of 89.9 laboratory-confirmed influenza-associated hospitalizations per 100,000 population was reported. The proportion of outpatient visits for influenza-like illness (ILI) was 3.3%, which is above the national baseline of 2.2%. The geographic spread of influenza in Puerto Rico and 26 states was reported as widespread; Guam and 18 states reported regional activity; the District of Columbia and five states reported local activity; one state reported sporadic activity; and the U.S. Virgin Islands reported no activity. Details are available at: [www.cdc.gov/flu/weekly/](http://www.cdc.gov/flu/weekly/).

WHO (March 19, 2018)

Influenza activity remained high but appeared to have peaked in some countries in the temperate zone of the northern hemisphere. In the temperate zone of the southern hemisphere activity remained at inter-seasonal levels. Worldwide, influenza A and influenza B accounted for a similar proportion of influenza detections.

From February 19, 2018 to March 4, 2018, the WHO GISRS laboratories tested more than 248,161 specimens, of which 72,543 (29%) were positive for influenza viruses: 32,650 (45%) were typed as influenza A and 39,893 (55%) as influenza B. Of the subtyped influenza A viruses, 7,350 (60%) were influenza A(H1N1)pdm09 and 4,817 (40%) were influenza A(H3N2). Of the characterized B viruses, 4,820 (95%) belonged to the B(Yamagata) lineage and 269 (5%) to the B(Victoria) lineage.

WHO Recommendations for Influenza Vaccines

WHO Recommendations for the 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): flunewseurope.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, 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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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>
<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>

D. Laboratory Information
Specimen(s) submitted? □ Yes (location: ________________) □ No □ Don’t know
If yes, organism identified? □ Yes (specify: ________________) □ No □ Don’t know