

# June 2017

## TARRANT VIRAL WATCH

### IN THIS ISSUE

TARRANT & VE Study Program Updates	1
2016/17 Influenza Season Summary	2
Avian Influenza A(H7N9): The Fifth Epidemic	3
The Positive Predictive Value of the TARRANT Influenza Case Definition	4
Vaccinations Reduce Flu Death in Children	

The influenza season is coming to a close in Alberta as most indicators of influenza activity have been decreasing, with a late season influx of influenza B. It was a busy season with over 600 samples collected for the vaccine effectiveness study and over 180,000 patients screened for ILI and LRTI. The TARRANT Team also attended six provincial conferences/CME events to share TARRANT data and new recruit sentinels. This year, fifteen new sentinels have enrolled in the program, many of whom practice in rural communities and help us capture these populations. Our data contributed to two publications in peer reviewed journals, a presentation at an international meeting and the WHO decision on next season's vaccine. Without your support, these accomplishments and developments in cutting edge research would not be possible. Thank you for your contributions and we hope to see your participation continue throughout the summer and next season!



## Preparing for the 2017-18 Season

- AH mandates we maintain a 90% active sentinel rate. We will be contacting you over the next few months to confirm your continued involvement with the program for the upcoming year. Should you be unable to continue with the program, please contact us by phone at 403-220-2750 or by email at [tarrant@ucalgary.ca](mailto:tarrant@ucalgary.ca).
- The influenza vaccine for the coming season varies slightly from the previous season. Instead of the A/California/7/2009 (H1N1)pdm09-like virus, the 17/18 vaccine will include an A/Michigan/45/2015 (H1N1)pdm09-like virus, an A/Hong Kong/4801/2014 (H3N2)-like virus and a B/Brisbane/60/2008-like virus. The quadrivalent vaccine will include a B/Phuket/3073/2013-like virus.
- You will receive new VE requisition forms for the 2017-18 season in late August/early September. Until then, please continue to use the **pink** 2016-17 season forms for the VE study.
- After 2 years as a TARRANT RA, Virginia Goetz will be leaving the team in August and moving onto medical school at the University of Alberta. We wish her the best and look forward to welcoming a new TARRANT RA in the fall.

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## 2016-2017 Flu Season Update

### Alberta

**Influenza:** From the beginning of the season (Aug 30th, 2016) until May 1st, 2017, there have been 4271 laboratory-confirmed cases of influenza in the province. The majority (3782, 89%) of cases were influenza A, with A(H3N2) predominating. The rate for influenza A peaked at week 52 at ~13.0 laboratory confirmed cases per 100,000 persons. Despite lower cumulative numbers for influenza B, this virus comprised the majority of cases towards the end of the season. The rate for influenza B peaked at week 16 at ~5.0 laboratory-confirmed cases per 100,000 persons. There have been 1,524 hospitalization cases to date with the rate of hospitalizations, ICU admissions and fatalities highest in those ages 80+. During the 2016/2017 Seasonal Influenza Immunization Program (Aug 31, 2016– June 4, 2016), over 1.2 million Alberta residents received an annual dose, an overall coverage rate of 30% for the province. The coverage rate for the 2015/2016 seasonal influenza immunization program was 27%.

**Other Respiratory Viruses:** Rhinovirus/enterovirus predominated at the start of the season, reaching a positive rate of just under 40% before dropping to under 10% by week 3. However, since then the positive rate has been steadily increasing, reaching almost 20%. RSV prevailed through the mid season (week 49-week 14), with the positive rate climbing to roughly 25% in week 1. Parainfluenza, adenovirus, coronavirus and mixed infections had low levels of detection throughout the season.

*Data Source: AHS Public Surveillance*

### Canada

Influenza activity was high throughout Canada over the season, with over 26,447 laboratory-confirmed cases identified. Almost 24,000 (90%) of the confirmed cases tested positive for influenza A, and over 2500 (10%) have tested positive for influenza B. Of the influenza A positive specimens, 46% were A (H3N2), 0% were A(H1N1) and 53% were untyped. Over 366 influenza-associated deaths have been reported nationally: 71% in seniors 65+ years, 22% in adults 20-64 years and 7% in children 0-19 years.

Each year the National Microbiology Laboratory (NML) characterizes a proportion of positive influenza lab specimens to compare circulating strains to the seasonal vaccine. This season, 1929 isolates were tested. All but one influenza A virus and 70 influenza B viruses were antigenically or genetically similar to the vaccines strains included in both the trivalent and quadrivalent vaccines. The NML also undertakes antiviral testing of a select number of specimens. Out of 1081 tested A(H3N2) specimens, two were resistant to oseltamivir. Those viruses with oseltamivir resistance showed a H275Y mutation. All influenza A and B were sensitive to zanamivir.

*Data Source: FluWatch*

### International

Internationally, influenza activity continues to decrease to inter-seasonal levels in the temperate northern hemisphere. The temperate southern Hemisphere, South America and South Africa influenza activity has started to increase, with low overall activity in most of Oceania. Over the past season, influenza A(H3N2) dominated in North America and Northern and Eastern Asia. In Europe, North Africa, and the Middle East, however, influenza A(H1N1) predominated. Other key international developments included human infections with avian influenza A(H7N9) in China (See page 3).

*Data Source: WHO*

# Avian Influenza A(H7N9): The Fifth Epidemic

## About H7N9

Avian Influenza A(H7N9) virus is an avian influenza that can rarely cause severe illness in humans, with a case-fatality rate of 40%. Normally, human infections are associated with exposure to live poultry. The most recent epidemic from October 2016 to February 2017 represented the fifth A(H7N9) epidemic since 2013 and saw an increase in human infection compared to the previous four epidemics. Analysis of the A(H7N9) virus shows a divergence into two distinct genetic lineages, the Pearl River Delta and Yangtze River Delta lineage. The Yangtze River Delta lineage accounted for 93% of the gene's sequences with evidence that this lineage is antigenically distinct from earlier A(H7N9) virus resulting in a reduced cross-reactivity with existing candidate vaccine viruses. So hopes of a vaccine are uncertain.

## Human Infections in China

From March 2013 and through February 2017, the annual epidemics in China have resulted in 1463 human infections. The most recent epidemic specifically saw 460 human infections with the A(H7N9) virus, including 453 infections in mainland China. The fourth and fifth epidemics seen in China have shared similar clinical features and characteristics as the previous outbreaks, however these two most recent epidemics have seen infections reported from areas that previously had no reports of the virus, with a higher proportion of infected individuals living in rural areas and a higher percentage of patients requiring hospital admission and ICU admission. Since 2013, China's local governments have implemented preventive and control measures, including temporary live-poultry market closures and disinfection protocols. Although these measures have reduced the reported number of infections, over the past two epidemics a higher number of patients have developed pneumonia and required ICU admission.

### Clinical Features of Patients with Laboratory-Confirmed Influenza A(H7N9) Infection

Median Age of Infected Patients	61 years
Male:Female Infection Ratio	2.4:1
Symptoms at Admission	High fever, non-productive/productive cough, shortness of breath, dyspnea, hypoxia, and lower respiratory tract disease.
Complications	Septic shock, respiratory failure, acute respiratory distress syndrome, refractory hypoxemia, acute renal dysfunction, multiple organ dysfunction, rhabdomyolysis, encephalopathy, bacterial and fungal infections.
Median time from onset to hospital admission	4.5 days
Median time from illness onset to death	11.0 days

## Implications for Clinicians in Canada

In 2015 Canada reported two cases of A(H7N9) in travelers returning from China, marking the first two confirmed cases in North America. While the avian influenza virus is not easily transmitted from person to person, there are still limited cases of transmission between individuals. In cases of severe respiratory illness in patients with recent travel history to China, clinicians are advised to report them to the zone Medical Officer of health, site-based Infection Prevention and Control (IPC), and ProvLab virologist for testing, as the Alberta Provincial Laboratory of Public Health has the capability to detect A(H7N9).

### References

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## **The PPV of the TAARANT Influenza Case Definition**

This year, the TARRANT team wanted to measure the positive predictive value (PPV) of our standard ILI case definition for correctly diagnosing influenza during different times of year. We gathered over 4,500 records from 2009-10 to 2015-16, and evaluated how many patients who had ILI/LRTI according to our case definition, also had laboratory confirmed influenza.

The PPV was determined for both the year as a whole (August-August) and for the peak influenza months defined as months where ILI was  $\geq 0.08\%$ . The PPV of correctly diagnosing influenza ranged from 10.96-34.25%, showing low accuracy when influenza prevalence was low in the community. In periods when influenza was widespread however, the positive predictive values were higher, ranging from 28.48-89.45%. When positive results for other respiratory viruses were included, the accuracy of predicting a laboratory confirmed respiratory infection increased to 50% or higher across most seasons.

Clinicians should use current epidemiologic data to be aware if influenza is circulating in their communities. Practitioners can then use this information to aid decision making and treatment plans. Prescribing neuraminidase inhibitors is likely to be more effective during peak season and is not likely to be beneficial in the absence of a major epidemic.

## **Vaccinations Reduce Flu Deaths in Children**

A new study conducted by the US Centers for Disease Control and Prevention (CDC) indicates that children who have received influenza vaccinations in recent years significantly reduce their chances of dying from influenza.

Data taken from four influenza seasons between 2010 and 2014 found that flu vaccinations reduced mortality associated with influenza by half in individual children who have an underlying medical condition and by close to two-thirds in healthy children.

In the most recent season, the CDC has seen 61 children reportedly dying from influenza, with as many as 171 deaths during the 2012-2013 season, with public health experts knowing that the majority of influenza related deaths occurring in unvaccinated children.

The current study assessed whether influenza vaccination actually reduced the risk of flu related deaths in both children and adolescence. During the four season study period, 358 children were reported to have died due to influenza, with 291 children having known vaccination status. These deaths had been reported from 43 different states, with the children ranging from 6 month to 17 years of age. Looking at the children with known vaccination status, only 1 in 4 children received a vaccine.

With the reported numbers above, it is believed that more death can be prevented in children through increased vaccinations, however cessation of the FluMist nasal vaccine in the US, raises concerns about fewer children being vaccinated, which could then increase mortality associated with influenza.

*Source: Samantha Schmidt. 2017. Vaccinations significantly reduce risk of death from the CDC study finds. The Washington Post.*