September 2017

TARRANT VIRAL WATCH

IN THIS ISSUE

We hope that all of our sentinels had a great summer and are getting prepared for the upcoming influenza season. As the influenza season draws closer, we want to remind everyone that we'll continue both the influenza Vaccine Effectiveness (VE) study and the TARRANT weekly ILI surveillance program in the upcoming year.

Last season we collected over 600 samples for the VE study and screened over 240,000 patients for ILI/LRTI. Alberta was one of the largest contributors to the national VE study and our data played an important role in determining the composition of this season's vaccine.

This work would not be possible without our extensive sentinel network and we thank you all for your ongoing contributions to the TARRANT program. We look forward to our continued collaboration in the upcoming season.

News and Updates

Kim Le has now returned as our Research Administrative Assistant as she continues her fantastic work preparing and setting up for the upcoming influenza season.

In August, we wished farewell to one of our research assistants. Virginia Goetz has completed her Master's in Biomedical Technology and now enters Medical School at the University of Alberta. Dylan Kendrick remains as our sole Research Assistant leading into the new season as we actively seek to add another member to our team. He will also continue his Master's degree in the Cardiovascular and Respiratory Sciences program, hoping to uncover a new vasoactive molecule regulating blood pressure.

Update:

Swab kits and requisition forms for the new 2017-2018 season will be sent out shortly and can be expected to arrive at your clinic for the start of the flu season. This year we will be using **BLUE** requisition forms and we ask that only the new forms are used when submitting samples.

We will not be providing compensation for VE submissions if the forms are not fully completed. Unfortunately, incomplete forms prevent us from using your data in our studies.

Any other information regarding our study can be found at our website.

TARRANT Viral Watch, Department of Family Medicine, University of Calgary
G012Q, Health Sciences Centre, 3330 Hospital Drive NW, Calgary, Alberta, T2N 4N1

Elaine Douglas (Program Coordinator): 403-210-9261 Kim Le (Research Administrative Assistant): 403-220-2750
Dylan Kendrick (Research Assistant): 403-210-7806

Fax: 403.210.9337 tarrant@ucalgary.ca www.calgaryfamilymedicine.ca/tarrant

2017-2018 Influenza Season

In temperate zones of the southern hemisphere, and in some countries of South and South East Asia, high levels of influenza activity continue to be reported. In the northern hemisphere, Influenza activity has remained at low levels, but expected to increase in the coming months. Currently, influenza A(H3N2) viruses are predominating, with a low number of positive A(H1N1) and influenza B viruses co-circulating in the region being reported through the summer. As the previous season was primarily influenza A(H3N2), it is expected that the circulating strain for 2017-2018 will be predominantly A(H1N1).

The 2017-18 Influenza Vaccine

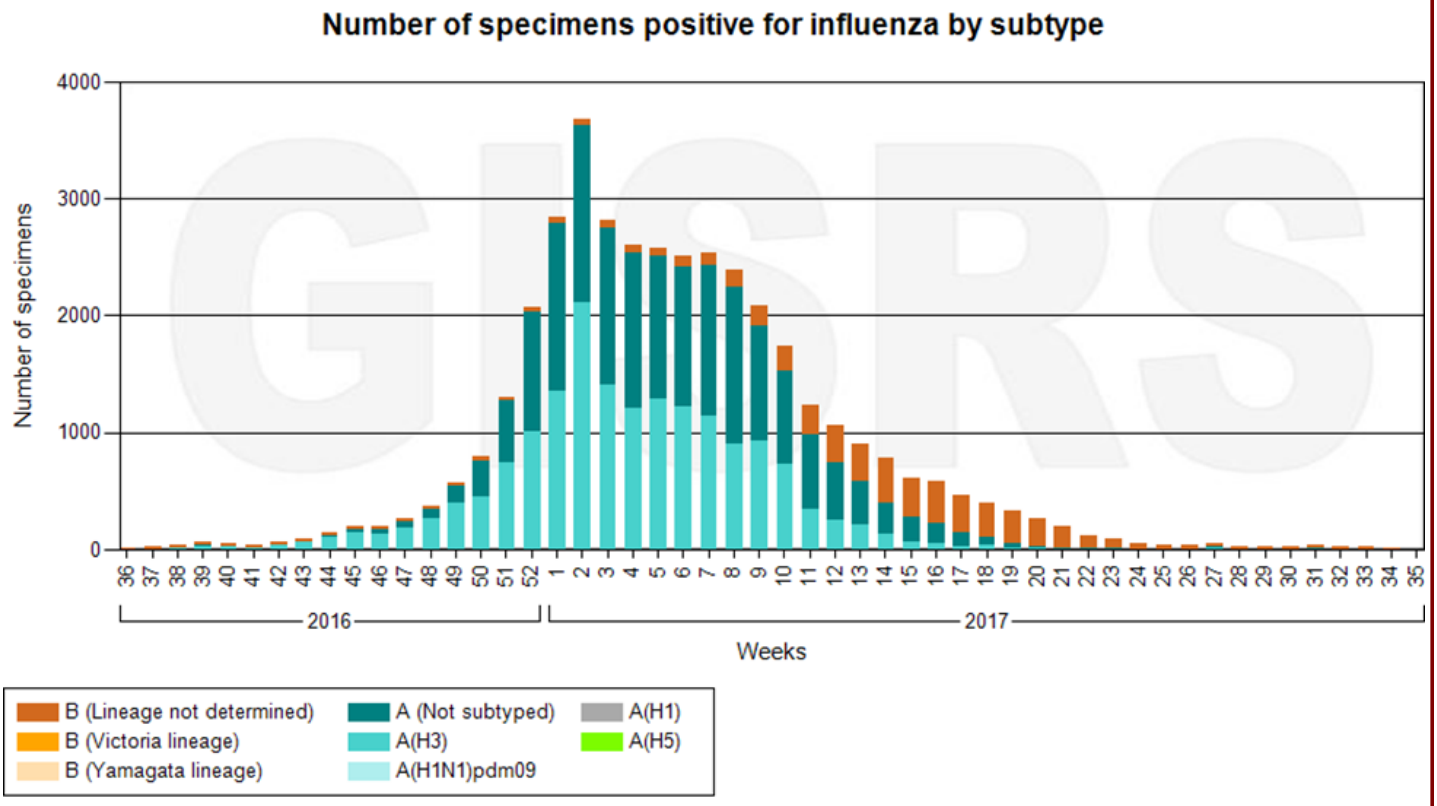
Trivalent vaccines for use in the 2017-2018 northern hemisphere influenza season contain the following:

an A/Michigan/45/2015 (H1N1)pdm09-like virus;
an A/Hong Kong/4801/2014 (H3N2)-like virus;
a B/Brisbane/60/2008-like virus.

And a B/Phuket/3073/2013-like virus is included in the quadrivalent vaccine

Among circulating influenza B viruses, there are two distinct lineages. The B/Brisbane/60/2008-like viruses are from the influenza B/Victoria lineage and represent the predominant circulating influenza B virus. Quadrivalent influenza vaccines contain both a B/Victoria lineage and a B/Yamagata lineage viruses

The graph shows laboratory surveillance information for Canada over the past influenza season:



Source: WHO

Influenza vaccination rates in children

Influenza vaccination rates in children decline when the live attenuated influenza vaccine is not recommended.

In 2016, the Centers for Disease Control and Prevention (CDC) recommended against using the live attenuated influenza vaccine (LAIV) which is administered as a nasal spray for the 2016-2017 influenza season. Previously, the nasal spray vaccine was thought to be more effective in young children than the injectable versions, however this has changed as more recent studies showed the spray to be less effective against the H1N1 strain of influenza.

This recommendation however is potentially important for vaccination rates as perceived effectiveness and ease of administration are among the primary determinants of families deciding whether to vaccinate their children. Parents often preferred the nasal spray vaccine for younger children as it was perceived as painless and convenient.

The current study designed to understand the effect of this on vaccination rates and whether this recommendation against the use of nasal spray vaccines alter people's confidence in the influenza vaccine in general or make them less inclined to receive the influenza vaccine.

The authors examined total vaccination rates, along with early season and end-of-season vaccination rates in patients aged 2-17 years old, dating back to the 2014-2015, 2015-2016 and 2016-2017 influenza seasons. They found that without the option of the nasal spray, total influenza vaccination rates in the pediatric patients were 1.6 percent lower in 2016-2017 than in 2015-2016, while revaccination rates were even lower in children who had received the nasal spray vaccination the year before.

A 1.6 percent decrease may not seem massive, on a national scale, this 1.6 percent decrease would equate to 1.2 million additional unvaccinated children, along with 4,385 additional influenza-related outpatient visits and 30 additional influenza-related hospitalizations among pediatric patients.

Though previous studies on vaccinations show that the single highest predictor of getting a vaccine is whether an individual received the vaccine in prior years, the current study implicated the ease and convenience as a substantial predictor among pediatric patients

The authors hope to do a follow-up intervention, aimed at improving vaccination rates who might not feel strongly about the influenza vaccine, as well as improving vaccination rates among expecting parents. With the recommendation to not use nasal spray vaccinations, the current decline in vaccination rates may continue and combating this trend is very important, ensuring children receive the vaccination and reducing potential increasing in severe influenza outbreaks.

Reference:
Fogel, B., & Hicks, S. (2017). Influenza vaccination rates in children decline when the live attenuated influenza vaccine is not recommended. Vaccine. 2017. Sep 18;35(39):5278-5282. doi: 10.1016/j.vaccine.2017.07.067. Epub 2017 29

Why is the flu vaccine so mediocre?

An article published in Science magazine on 22 September highlighted some of the findings that arise from our work, to understand why the influenza vaccine is so imperfect. Dr. Danuta Skowronski from BC CDC is quoted several times, and describes research data that came from the pan-canadian network that we contribute to. So our data is helping to understand the basic biology behind the success or failure of the vaccines - which should lead to more effective vaccines in future. We have attached a copy of this paper to the newsletter.

Reference:
Cohen, J. (2017). Why is the flu vaccine so mediocre?Science 22 Sep 2017:Vol. 357, Issue 6357, pp.1222-1223. DOI: 10.1126/science.357.6357.1222

Flu shot's impact on pregnant women and their babies

Effectsof prior influenza virus vaccination on maternal antibody responses: Implica-tionsforachieving protection in the newborns

Pregnant women are particularly susceptible to getting severe influenza. Normally, the flu shot helps develop antibodies to protect against the flu virus, however growing evidence shows that those who have received the vaccine in the prior year have lower antibody response to the current vaccine. The question was then how do repeat vaccinations effect immune responses in expecting mothers and how well antibodies are transferred from mother to the baby.

The researchers found that women who had not received the previous year's vaccine had a better initial immune response to the vaccine, whereas those who had received the vaccine a year prior saw weakened peak antibody responses.

The benefits of maternal vaccination for the baby were fortunately unaffected. In other words, mothers who receive the vaccine year after year may see lowered antibody responses, but it does not meaningfully affect protection in their children.

Although prior vaccination may lower clinical protection for the current year, annual vaccinations are still the best defense, and should continue during pregnancy as it is a time of high-risk complications related to the flu. Furthermore, until a child is 6 months old, they cannot receive their own flu shots, so protection for the first months of life can come from the mother receiving the flu shot during pregnancy.

Newly identified genetic marker may help detect high-risk flu patients

Researchers have discovered an inherited genetic variation that may help identify patients with higher risks in developing severe and potentially fatal influenza infections. There is also a link between the gene variant and a mechanism that explains the elevated risk and perhaps may offer insight about the broader anti-viral immune response.

Patients with a particular inherited variation in the gene IFITM3 were twice as likely to develop severe flu symptoms. The investigators showed that the expression of the IFITM3 protein was reduced in Killer T cells of patients with the high-risk variant compared to other patients.

This IFITM3 protein acts as an anti-viral protein that helps block flu infection of lung cells and to promote survival of the killer T cells that help clear flu infection in the airways. Thus, reduction of IFITM3 synthesis may lead to increased severity of the illness.

The identification of a potential genetic marker for increased influenza severity may make a life-saving difference, particularly during severe flu outbreaks by helping prioritize high-risk patients for vaccination, drug therapy and other interventions. While most research focuses on influenza infection, the mechanisms and implications for gene regulation involved in anti-viral activity is less understood and may aid in combating viral infections.

References:

Christian, L. M., Beverly, C., Mitchell, A. M., Karlsson, E., Porter, K., Schultz-Cherry, S., & Ramilo, O. (2017). Effects of prior influenza virus vaccination on maternal antibody responses: Implications for achieving protection in the newborns. Vaccine. 2017 Sep 18;35(39):5283-5290. doi: 10.1016/j.vaccine.2017.05.050. Epub 2017 Aug 1.

Allen, E. K., Randolph, A. G., Bhangale, T., Dogra, P., Ohlson, M., Oshansky, C. M., ... & DeVincenzo, J. (2017). SNP-mediated disruption of CTCF binding at the IFITM3 promoter is associated with risk of severe influenza in humans AOP. Nature Medicine;23(8):975-983. doi: 10.1038/nm.4370. Epub 2017 Jul 17.