International Center for Enterprise Preparedness (INTERCEP)

Flu Season: Current Activity, Prevention Efforts, and Forecast

Web Forum

On February 26, 2018 Dr. Peter Katona, Clinical Professor of Medicine and Adjunct Professor of Public Health at UCLA, presented a web forum titled Flu Season: Current Activity, Prevention Efforts, and Forecast and provided insights on the latest data and on preventive measures. Below is a summary of the web forum.

Introduction

Flu has killed more people over time than any other infectious agent. Its virulence is unpredictable and changes from year to year. As a result, the vaccine used to prevent it has to be reformulated every year. Depending on the severity, terms such as seasonal flu, epidemic flu and pandemic flu may be used, with the latter referring to the large number of cases on a global scale. Thirty-two flu pandemics have been documented since 1580, including seven of the worst pandemics ever recorded.

There are many different strains of flu. The Spanish flu pandemic took place summer 1918-spring 1919 in three waves, and affected people continuously for 10 months. This was an H1N1 specific strain that started in the United States and affected a third of the world’s population. Somewhere between 50 and 100 million people died, which today would be equivalent to about 350 million. This figure is higher than the number of people killed in WWI. There were over 500,000 deaths in the US. The pandemic also caused quarantines, school closures, factory closures, and disrupted the war effort. There were additional outbreaks of a less virulent H1N1 strain in 1976 and 2009.

If the current outbreak of the H2N3 influenza strain stops at this point it wouldn’t be abnormal relative to other years. But we won’t know until the end of the season whether this was an unusual flu season.

Preventing an Outbreak of Flu

What can be done to prevent an outbreak of flu?

- Vaccines are available to prevent the flu or reduce the symptoms of the disease
- Antiviral medications such as Tamiflu and others are available for those with the disease, but these are only effective if they are started within two days after the symptoms begin
- Wearing a mask may help but this is controversial with regard to effectiveness
- Washing hands is crucial and can stop the spread of the virus
Flu Vaccine

Flu is different every year. On a given year there are typically 300,000 to 650,000 global deaths related to seasonal flu. In epidemic years mortality figures rise to 1 million. In pandemic years the figures may be much higher.

This year (2017-2018 flu season), the main formulation used in the flu vaccine includes the following strains:

- A/Michigan/45/2015 (H1N1)pdm09-like virus (updated)
- A/Hong Kong/4801/2014 (H3N2)-like virus
- B/Brisbane/60/2008-like (B/Victoria lineage) virus

The effectiveness of the current vaccine is about 36% overall. In the best of years it is about 70% effective. In most cases it will make the illness less intense so it is important to get vaccinated. Even if a person gets the flu, the symptoms are less severe for those who have been vaccinated, so there are always benefits to the vaccine.

Another advantage of getting vaccinated is that it reduces the spread of flu from person to person. This benefits society overall.

There is an economic benefit to getting vaccinated as well. It is estimated that the costs of the flu on a given season are about $10 billion. Given these costs, public health authorities provide incentives to reduce the spread of the disease. In Los Angeles County, for example, health care providers are required to get vaccinated or wear a very uncomfortable mask for the duration of the flu season.

H3N2 is the strain that is circulating this season and making most people who get flu sick. But there are other strains as well. One of them is the H5N1 strain that originally started in 1996, it is highly pathogenic in poultry and has a mortality rate of 53% in humans. Two labs engineered this strain to be easily transmissible among ferrets. Ferrets are similar to humans in terms of flu transmission. So we changed a strain that was not very pathogenic among humans to one that could be very deadly. There was controversy about whether this research is safe and appropriate. US and WHO committees disagreed about the benefits versus harm of publishing the information. Arguments could go both ways but the decision was made to publish the information.

There is also the H7N9 strain that has caused six outbreaks since 2013, affecting several thousand people. It is immune to the drugs we use and has led to the closure of many markets in Asia.

In 2018, the H7N4 avian flu strain for the first time affected a woman in China. This is something to keep an eye on.

How do we know what is going on with flu?

We rely on many surveillance systems:

- Doctor visits, which now seems to be declining and may be an early marker
• Hospitalization statistics
• Social media hits
• Google trend searches
• CDC’s Pneumonia and Influenza Mortality Surveillance system
• WHO Global Influenza Surveillance and Response System
• Many animal surveillance systems

Unfortunately these systems are not integrated into one system.

**Where are we at this Point in the Flu Season?**

The red line in Figure 1 shows the trend for the current flu season in terms of the percentage of patient visits to health care providers for influenza-like illness reported by the U.S. Outpatient Influenza-like-illness Surveillance Network (ILINet). There was a steep increase in flu cases between December and early February but now it seems to have plateaued and perhaps the number of physician visits may be decreasing.

Figure 1. Percentage of patient visits to health care providers for influenza-like illness reported by the U.S. Outpatient Influenza-like-illness Surveillance Network (ILINet) – Weekly National Summary

Source: U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet)
However, it is important to note that these are aggregate figures for the US and there may be significant geographical variation.

**Closing Remarks and Take Away Points**

It’s important to get a flu shot. Flu shots are not 100% effective. At best they are about 70% effective. But it will help in terms of making the disease less symptomatic and also in terms of halting the spread of the disease. So it is very important to get vaccinated by everybody over 6 months of age as early in the season as possible.

It is also important to remember that a person can get infected with more than one strain of influenza so it’s not too late to get the vaccine even this late in the season.

The strains circulating in the world seem to be similar to what is happening in the US but it varies significantly by geography within the US and also from one country to another.

We are also seeing a decrease in physician visits so there is good evidence that infection rates are declining, but sometimes that can be reversed.

A common mode of transmission for the virus is the hand so washing your hands for at least 20 seconds can be very important in preventing transmission of the flu.

Coughing and sneezing transmit the agent over three-six feet in the air as it is suspended before hitting the ground.

If you are sick it is best if you stay at home to avoid transmitting the disease to others at work or elsewhere. People are contagious from a day before exhibiting symptoms to 5 or 5 days after symptoms begin.

The antiviral medications available are effective but they have to get started within 48 hours of the start of symptoms. After that they are not very effective.

Social distancing can make a difference. Philadelphia had a big parade during the 1918-1919 pandemic. The public health authorities decided to proceed with it. What happened after the parade was that the death rate from influenza shot up from 2.5% (the national average) to 10-12%. This was a significant increase. On the other hand there was a town on Colorado that was off the beaten path. The only way to get to the town was by train. During the outbreak the train was prevented from stopping at the town by the Sheriff. That meant they had no contact with people from the outside, and thus were not affected by the outbreak, so social distancing has significance if done properly.

We won’t know how effective the vaccine was until the end of the season.
Additional Resources:

- **Centers for Disease Control and Prevention (CDC) - Weekly U.S. Influenza Surveillance Report:** https://www.cdc.gov/flu/weekly/index.htm#S2
- **Centers for Disease Control and Prevention (CDC) - Overview of Influenza Surveillance in the United States:** https://www.cdc.gov/flu/weekly/overview.htm
- **World Health Organization (WHO) - Global Influenza Surveillance and Response System (GISRS):** http://www.who.int/influenza/gisrs_laboratory/en/
- **New Jersey Department of Health** – Seasonal Influenza: http://nj.gov/health/cd/topics/flu.shtml
- **New York City** – Seasonal Influenza (Flu): http://www1.nyc.gov/site/doh/health/health-topics/flu-seasonal.page
- **New York State Department of Health** – Seasonal Influenza (Flu): https://www.health.ny.gov/diseases/communicable/influenza/seasonal/