

## Influenza Surveillance and Vaccine Strain Selection

The severity of influenza (flu) varies from year to year and even from individual to individual. In some seasons, circulating influenza viruses will cause more severe, debilitating, and deadly illness. Public health officials track influenza very closely as it circulates around the world in order to select the strains included in US flu vaccines for the upcoming season. However, as the flu virus is unpredictable and constantly evolving, selecting the right strain(s) can be very challenging. Usually, the strains selected for the vaccine will match the flu strains in circulation. On rare occasions, such as last season, the strains may mutate, resulting in decreased vaccine efficacy. However, annual vaccination remains the best form of protection to prevent flu. Even with a less than optimal match, the vaccine can still offer some protection and can make flu illness less severe.

### **Influenza Viruses Change:**

Influenza viruses circulate all across the world and strike different areas at different times. In the US, flu activity can begin as early as October and continue as late as May, but flu activity most commonly peaks between December and February.<sup>1</sup> Influenza viruses regularly change as they circulate across the globe, which is one way the disease evades the body's immune system. These changes can be small (viruses are said to "drift") or more dramatic (viruses "shift"). When these changes occur just before or during the US flu season, they may affect how well available vaccines work.

Most of the influenza A (H3N2) viruses that circulated during the 2014-2015 season were different (drifted) from the H3N2 strain in the vaccine. During the second half of the season, though, an influenza B virus began to circulate more widely that was well-matched to the vaccine.<sup>1</sup>

### **Vaccine Matched to Circulating Strains Every Year:**

The strains in the vaccine are selected each year based on data from a worldwide virus tracking system that helps public health officials predict which virus strains will circulate during the flu season. The flu vaccine for the 2015-2016 season contains protection against three (trivalent) or four strains (quadrivalent) of influenza virus. The three strain vaccine has two type A strains and one type B strain. The four-strain vaccine includes an additional type B strain. In the 2014-2015 season the vaccine was only 23 percent effective. This was due to more than two-thirds of circulating A (H3N2) viruses that were antigenically and genetically different (drifted) from the A (H3N2) vaccine component.<sup>2</sup>

### **2015-2016 Strain Selection<sup>1,3</sup>**

All of the 2015-2016 influenza vaccine is designed to protect against the following three viruses:

- A/California/7/2009 (H1N1) pdm09-like virus (same as 2014-2015)
- A/Switzerland/9715293/2013 (H3N2)-like virus (different from 2014-2015; antigenically similar to the H3N2 drifted virus that circulated last season)<sup>4</sup>
- B/Phuket/3073/2013-like virus (different from 2014-2015)

The 2015-2016 four-strain flu vaccine protects against an additional B virus (B/Brisbane/60/2008-like virus).<sup>1</sup>

In addition, it is important to remember that the flu vaccine contains multiple viruses so that even when there is a less than ideal match or lower effectiveness against one virus, the vaccine may protect against the other viruses.

For these reasons, even during seasons when there is a less than ideal match, the Centers for Disease Control and Prevention (CDC) continues to recommend annual flu vaccination for everyone age 6 months and older. Vaccination is particularly important for those at high risk of serious flu complications and their close contacts.

## References

1. Centers for Disease Control and Prevention. What You Should Know for the 2015-2016 Influenza Season. <http://www.cdc.gov/flu/about/season/flu-season-2015-2016.htm>. Accessed August 28, 2015.
2. Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep*. January 16, 2015 / 64(01);10-15 <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6401a4.htm>. Accessed August 28, 2015.
3. Centers for Disease Control and Prevention. Selecting the Viruses in the Seasonal Influenza (Flu) Vaccine. <http://www.cdc.gov/flu/professionals/vaccination/virusqa.htm>. Accessed August 28, 2015.
4. Centers for Disease Control and Prevention. CDC Health Advisory Regarding the Potential for Circulation of Drifted Influenza A (H3N2) Viruses. <http://emergency.cdc.gov/han/han00374.asp>. Accessed September 2, 2015.

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