# Update on Emerging Infections: News From the Centers for Disease Control and Prevention

**Commentators**

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***Editor's note:*** *This article is part of a regular series on emerging infection from the Centers for Disease Control and Prevention (CDC) and the EMERGEncy ID NET, an emergency department–based and CDC-collaborative surveillance network. Important infectious disease public health information with relevance to emergency physicians is reported. The goal of this series is to advance knowledge about communicable diseases in emergency medicine and foster cooperation between the front line of clinical medicine and public health agencies.*

## Interim Estimates of 2017-18 Seasonal Influenza Vaccine Effectiveness—United States, February 2018

[Flannery B, Chung JR, Belongia EA, et al. Interim estimates of 2017-18 seasonal influenza vaccine effectiveness—United States, February 2018. *MMWR Morb Mortal Wkly Rep*. 2018;67:180-185.]

[Because of the length of the original publication, it has been abridged. Readers are encouraged to read the full original publication, available at https://www.cdc.gov/mmwr/volumes/67/wr/mm6706a2.htm.]

In the United States, annual vaccination against seasonal influenza is recommended for all persons aged 6 months or older.[1] During each influenza season since 2004 to 2005, the Centers for Disease Control and Prevention (CDC) has estimated the effectiveness of seasonal influenza vaccine to prevent laboratory-confirmed influenza associated with medically attended acute respiratory illness (ARI). This report uses data from 4,562 children and adults enrolled in the US Influenza Vaccine Effectiveness Network during November 2, 2017, to February 3, 2018. During this period, overall adjusted vaccine effectiveness (VE) against influenza A and B virus infection associated with medically attended ARI was 36% (95% confidence interval [CI] 27% to 44%). Most influenza infections (69%) were caused by A(H3N2) viruses. VE was estimated to be 25% (95% CI 13% to 36%) against illness caused by influenza A(H3N2) virus, 67% (95% CI 54% to 76%) against A(H1N1)pdm09 viruses, and 42% (95% CI 25% to 56%) against influenza B viruses. These early VE estimates underscore the need for ongoing influenza prevention and treatment measures. CDC continues to recommend influenza vaccination because the vaccine can still prevent some infections with currently circulating influenza viruses, which are expected to continue circulating for several weeks. Even with current VE estimates, vaccination will still prevent influenza illness, including thousands of hospitalizations and deaths. Persons aged 6 months or older who have not yet been vaccinated this season should be vaccinated.

Methods used by the US Influenza Vaccine Effectiveness Network have been published previously.[2] At 5 study sites, patients aged 6 months or older and seeking outpatient medical care for an ARI with cough within 7 days of illness onset were enrolled. Study enrollment began after local surveillance identified increasing weekly influenza activity or one or more laboratory-confirmed cases of influenza per week for 2 consecutive weeks. Patients were eligible for enrollment if they were aged 6 months or older on September 1, 2017, and thus were eligible for vaccination; reported an ARI with cough with onset 7 days earlier or less; and had not been treated with influenza antiviral medication (eg, oseltamivir) during this illness. After informed consent was obtained from patients or from parents or guardians, participants or their proxies were interviewed to collect demographic data, information on general and current health status and symptoms, and 2017 to 2018 influenza vaccination status. Nasal and oropharyngeal swabs (or nasal swabs alone for children younger than 2 years) were collected to obtain respiratory specimens; the swabs were placed together in a single cryovial with viral transport medium. Specimens were tested at US Influenza Vaccine Effectiveness Network laboratories using CDC's real-time reverse transcription–polymerase chain reaction protocol for detection and identification of influenza viruses. Participants (including children younger than 9 years, who require 2 vaccine doses during their first vaccination season) were considered vaccinated if they received greater than or equal to one dose of any seasonal influenza vaccine greater than or equal to 14 days before illness onset, according to medical records and registries (at the Wisconsin site), medical records and self-report (at the Washington site), or self-report only (at the Michigan, Pennsylvania, and Texas

sites). VE against all influenza virus types combined and against viruses by type or subtype was estimated as 100%×(1–odds ratio).* Estimates were adjusted for study site, age group, sex, race or ethnicity, self-rated general health, number of days from illness onset to enrollment, and week of illness (3-week intervals), using logistic regression. Interim VE estimates for the 2017 to 2018 season were based on patients enrolled through February 3, 2018.

Among the 4,562 children and adults with ARI who were enrolled at the 5 study sites from November 2, 2017, through February 3, 2018, a total of 1,712 (38%) tested positive for influenza virus by reverse transcription–polymerase chain reaction, including 1,392 influenza A viruses (81%) and 323 influenza B viruses (19%). Among 1,340 subtyped influenza A viruses, 1,143 (85%) were A(H3N2) viruses and 208 (16%) were A(H1N1)pdm09 viruses. Most influenza B viruses (98%) belonged to the B/Yamagata lineage. The proportion of patients with influenza differed by study site, sex, age group, race or ethnicity, self-rated health status, and interval from illness onset to enrollment. The percentage of patients who were vaccinated ranged from 45% to 59% among study sites and differed by sex, age group, race or ethnicity, and self-rated health status.

Among ARI patient participants, 43% of those with influenza had received the 2017 to 2018 seasonal influenza vaccine compared with 53% of influenza-negative participants. After adjusting for study site, age group, sex, race or ethnicity, self-rated general health, number of days from illness onset to enrollment, and week of illness onset (3-week intervals), VE against medically attended ARI caused by all influenza virus types combined was 36% (95% CI 27% to 44%). VE for all ages was 25% (95% CI 13% to 36%) against medically attended ARI caused by A(H3N2) virus infection, 67% (95% CI 54% to 76%) against influenza A(H1N1)pdm09 virus infection, and 42% (95% CI 25% to 56%) against influenza B virus infection. VE point estimates against medically attended influenza for all virus types varied by age group; statistically significant protection against medically attended influenza was found among children aged 6 months through 8 years (VE=59%; 95% CI 44% to 69%) and adults aged 18 to 49 years (VE=33%; 95% CI 16% to 47%), whereas no statistically significant protection was observed in other age groups.

*Ratio of the odds of being vaccinated among outpatients with influenza-positive test results to the odds of being vaccinated among outpatients with influenza-negative test results.

As of February 3, 2018, a total of 257 influenza A(H3N2) viruses from US Influenza Vaccine Effectiveness Network participants had been characterized by CDC; 240 (93%) belonged to either genetic group 3C.2a (226 viruses) or the related subgroup 3C.2a1 (14), whereas 17 (7%) belonged to group 3C.3a. Genetic group 3C.2a includes the A/Hong Kong/4801/2014 reference virus representing the A(H3N2) component of the 2017 to 2018 Northern Hemisphere influenza vaccines.[3]

## DISCUSSION

Early and widespread influenza activity during the 2017 to 2018 influenza season provided the opportunity to estimate interim VE against several circulating influenza viruses, including the predominant A(H3N2) virus. These interim estimates reflect ongoing challenges with the A(H3N2) vaccine component since the 2011 to 2012 season. The interim estimate of 25% VE against A(H3N2) viruses this season indicates that vaccination provided some protection, in contrast to recently reported, nonsignificant interim estimates of 17% from Canada and 10% from Australia,[4,5] and is similar to final VE estimates (32%) in the United States against A(H3N2) viruses during 2016 to 2017 (https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2017-06/flu-03-ferdinands.pdf.).[6] However, among children aged 6 months through 8 years, the interim estimates against any influenza and A(H3N2) virus infection were higher; the risk for A(H3N2)-associated medically attended influenza illness was reduced by more than half (59%) among vaccinated children. Also, with interim VE estimates of 67% and 42% against influenza A(H1N1) pdm09 and B viruses, respectively, vaccination provided substantial protection against circulating A(H1N1) pdm09 viruses, as well as moderate protection against influenza B viruses predominantly belonging to the B/Yamagata lineage, the second influenza type B component included in quadrivalent vaccines. CDC recommends influenza vaccination while influenza viruses are circulating in the community. Influenza vaccination has prevented thousands of hospitalizations during previous seasons when influenza A(H3N2) viruses were predominant, including during the 2014 to 2015 season, when interim VE estimates were similar to those reported here. Appropriate use of influenza antiviral medications for treatment of severely ill persons or persons at high risk for complications from influenza who develop influenza symptoms is important, especially among older adults, who currently have the highest hospitalization rates.[3]

VE estimates against A(H3N2) viruses have been lower than estimates against A(H1N1)pdm09 and B viruses for