



Ask the Expert: Could 2 pandemic viruses circulate this fall?

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Editor's note: *Ask the Expert* is a column aimed at providing pediatricians information on pressing topics related to COVID-19. Email your questions to ahegland@aap.org.

The influenza vaccines for the 2020-'21 season in the Northern Hemisphere have been updated to match the viral strains expected to be circulating in the United States. Both A strains and one of the two B strains in the quadrivalent influenza vaccines have been replaced for the upcoming season. Influenza viruses are evolving constantly, and it is possible a strain may circulate that is not well-matched by the selected vaccine strains.

The influenza season's onset is difficult to predict, and the timing of outbreaks likely will vary in different parts of the country. Influenza immunization generally is not recommended before September or October, especially for older adults, to increase the likelihood that immunity will last throughout the season.

Influenza vaccine effectiveness (VE) traditionally is not as high as from other routinely administered vaccines. During the 2019-'20 season, the overall VE against medically attended influenza illness was 39% (95% CI:32, 45). Although this VE is less than desired, the reduction in the number of outpatient visits, hospitalizations and deaths from administration of the vaccine is substantial given the tens of millions of children and adults who are infected with influenza virus annually. Increased acceptance of the influenza vaccine could prevent a large number of infections.

Social distancing necessitated by the COVID-19 pandemic may alter the customary arrangements for flu vaccine administration, such as less opportunity to obtain the vaccine at a workplace or in a community setting. Despite the extraordinary effort by the federal government and the pharmaceutical industry, a COVID-19 vaccine is unlikely to be available during the upcoming influenza season. This makes it even more important than usual for every person 6 months of age and older to receive influenza vaccine.

Both influenza and COVID-19 are serious illnesses, although COVID-19 infection appears to be less severe than influenza in children. During the 2019-'20 influenza season, 185 deaths in children and adolescents younger than 19 years associated with influenza were reported to the Centers for Disease Control and Prevention (CDC). As of April 2, 2020, three deaths had been reported in people younger than 18 years who were infected with SARS-CoV-2 (among 2,575 cases in that age group) (*MMWR*. 2020;69(14):422).

The risk of hospitalization in children and adolescents younger than 18 years from COVID-19 is less than one-fifth the risk of hospitalization from influenza during the 2019-'20 season for the same age groups (see table). Although these data may be skewed by school closings and social distancing, SARS-CoV-2 infection generally is considered to be less severe than seasonal influenza infection among children and adolescents.



Laboratory-confirmed hospitalization rates by age group

Age group	COVID-19 cumulative rate per 100,000 population, week ending June 20, 2020	Influenza cumulative rate per 100,000 population for 2019-20' season
0-4 y	8.0	93.7
5-17 y	3.7	24.4
18-49 y	59.2	35.1
50-64 y	148.6	90.5
65+ y	297.6	180.4

Courtesy of the Centers for Disease Control and Prevention

One troubling question is what might happen to pediatric hospitalization rates this fall and winter for children who become infected simultaneously with SARS-CoV-2 and influenza.

It cannot be stated with certainty whether SARS-CoV-2 will continue to circulate during the upcoming influenza season, although the possibility appears likely based on current experience. If this happens, some people likely will be coinfecting with both viruses, based on understanding of respiratory viruses' epidemiology. While data are insufficient to determine if a coinfection with influenza and SARS-CoV-2 will result in more severe disease than one virus alone, preliminary experience from China suggests this could be the case.

Another concern regarding the upcoming influenza season recently was raised by investigators from Beijing, China and the University of Nottingham, U.K. (PNAS.<https://www.pnas.org/content/early/2020/06/23/1921186117>). The authors describe a swine influenza strain (G4 EA H1N1) that contains a reassortment of genes from animals and humans, including several genes from the 2009 pandemic influenza H1N1 virus. Surveillance of symptomatic pigs has shown a marked increase in detection of this G4 genotype. The virus grows rapidly in human respiratory epithelial cells and is transmitted by aerosol among experimental animals. Among swine workers, pre-existing influenza immunity did not provide protection. Serologic studies showed that 10% of exposed workers had been infected by this new strain. All this indicates the new virus has adapted to humans and has the potential to become a human pandemic strain.

Seasonal influenza in humans occurs annually, while pandemic influenza has occurred three times in the 20th century (1918, 1957, 1968) and once in the 21st century (2009). Pandemic influenza occurs when a large segment of the population has little or no immunity to a new strain because previous infection by antigenically similar viruses has not induced immunologic memory in the population. If a novel strain has the capacity to spread easily from person to person and if the virus develops sufficient virulence to cause severe disease, a pandemic of varying severity can develop.

Swine influenza is a respiratory disease of pigs caused by type A influenza viruses that regularly cause outbreaks in pigs. Swine influenza viruses circulate among swine throughout the year, but most outbreaks occur during the late fall and winter months, similar to outbreaks of seasonal influenza in humans.

Ordinarily, swine influenza viruses do not infect humans. When an influenza virus that normally circulates in swine is detected in people, it is called a variant influenza virus (such as H3N2v or H1N1v). To date, human infections with variant viruses are most likely to occur in people exposed to infectious pigs, such as children who are near pigs at an agricultural fair or among workers in the swine industry. Sustained human spread of a variant influenza virus has not been reported, although multiple outbreaks in 2012 resulted in 309 human infections with



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H3N2v. Sixteen people were hospitalized and one died.

If G4 EA H1N1 continues to mutate to enable more efficient person-to-person spread and acquires the ability to cause severe disease, two simultaneous pandemics could occur. At the present time, the best way to protect against severe influenza illness is to adhere to AAP and CDC recommendations for routine administration of the seasonal influenza vaccine.

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