

Analysis of Novel Influenza A (H1N1) and Implications for school dismissal policy, 4 May 2009

Purpose of policy decision analysis

A novel influenza A (H1N1) virus is circulating widely in the United States and Mexico and has been detected in 18 other countries. On May 1, the CDC issued guidance that recommended school dismissal when H1N1 infection was detected in a student. This was done out of an abundance of caution until more information about H1N1 disease in the U.S. could be evaluated. Community Mitigation planning as part of the response to a pandemic recommends school dismissals, together with other targeted layered community measures aimed at social distancing, be considered for a pandemic of high severity. School dismissals were estimated to slow transmission, reducing cases by 13-17% based on available data. The goal of slowing transmission was to reduce the peak demand on the health care system and delay cases in order to have more time for vaccine production. This analysis addresses the issue of school dismissal and whether our current knowledge is sufficient to warrant a change in this policy.

Virus transmissibility

The outbreak strain is spreading rapidly in the United States and globally and the incidence of infection is likely to be high. As of May 4, there are a total of 1014 reported cases (286 confirmed and 728 probable) from 44 states. CDC is aware of at least 50 clusters of disease associated with confirmed or probable cases under investigation in 22 states. As of May 4, WHO reports 18 countries (898 cases) have laboratory confirmed cases, and several have reported outbreaks. The number of countries with reported cases is increasing daily. However, no deaths have yet been reported outside of North America. Most initial cases seen outside of Mexico had traveled to Mexico, indicating that the virus's first widespread circulation in humans occurred in Mexico. The infection incidence in Mexico was likely very high, based on the number of persons infected throughout Mexico and limited data suggesting that >30% of the population in at least one community developed clinical illness. The virus may be transmitting initially in the U.S. among younger persons associated with school, university, and travel.

New York City has reported the largest school cluster to date. Six hundred fifty-nine students reported illness in response to a survey following the initial case detection. Of these, 29% reported illness in at least one household member. Two hundred ten staff members at the affected school also reported illness. No illness led to hospitalization. In response to this outbreak, New York City undertook active surveillance to determine whether severe H1N1 disease was presenting to area hospitals. While some cases of influenza were identified in hospitalized patients, all were due to seasonal flu strains.

Severity of disease

Over the past three days, we have learned much about disease severity. Sufficient information is available to rule out the probability that the novel influenza A (H1N1) virus has extremely high severity. The vast majority of infections detected in the United

States are self-limited respiratory illnesses that do not require medical care or hospitalization. Among confirmed or probable cases in the United States, 3.4% (35 of 1014) have required hospitalization, and one toddler died (case-fatality ratio 0.1%). However, this hospitalization rate is likely inflated due to less testing among milder cases. As the virus circulates further, additional deaths are expected; however, it is very unlikely that the current strain is capable of causing the higher case fatality rate associated with a pandemic severity index of 4 or 5, levels for which aggressive community mitigation is indicated.

Initial reports from Mexico focused on hospitalized patients and deaths related to influenza. Recent epidemiologic investigations are identifying much milder widespread influenza-like illness. This suggests that the initial reports of high severity diseases may have been the result of detection bias. As we learn more, the pattern of disease in Mexico and the United States may be quite similar. The outbreak appears to be tapering in Mexico in the communities where substantial disease has been reported.

Characteristics of the virus

Recent analysis of viral genetic data at CDC has revealed an absence of the known virulence markers associated with either the 1918 H1N1 pandemic influenza virus or the recently circulating strains of H5N1 avian influenza virus. Although there may be other important virulence markers not yet detected related to these viruses, the absence of these markers is reassuring and consistent with the clinical picture we are seeing. While this is reassuring, the ability of influenza viruses to mutate over time requires that we remain vigilant.

Expected progression of disease spread in North America

We expect that this virus is likely to spread across the United States, and given the relatively low proportion of people requiring hospitalizations, the next several weeks are unlikely to lead to severe morbidity that overwhelms the inpatient medical care system. Current surveillance systems are starting to show increases in the proportion of outpatient visits for influenza-like illness. We are seeing slight increases in the proportion of all deaths attributed to pneumonia and influenza; however, wide fluctuation in a single week's data can occur and may not be significant or sustained. We expect that the seasonality of influenza viruses may blunt transmission in the warmer months.

It is too soon to predict what we may see next fall; however, the risk of transmission is substantial. We will gain a better understanding of this as we observe the experience in the Southern Hemisphere, whose populations will soon be entering their flu season. The overall impact of the epidemic in the United States, as reflected by hospitalizations and death, could be considerable – particularly next fall and winter – because so many people are likely to be infected, and so few people appear to be immune.

Role of school dismissals in novel influenza virus transmission mitigation

School dismissal should be considered for pandemics of high severity to mitigate the community impact of a new virus. Because school-aged children are efficient spreaders, reducing spread among this population can theoretically slow the spread of a virus within

a community. Given what we now know about the severity of the current strain, the potential costs of school closure take on added weight in the analysis.

Conversations with many state and local public health leaders indicate that implementation of school closure is quite burdensome. Many children are being dropped at communal sites such as libraries and community centers. Many families have either single parents or both parents who work. Many workers lack sick leave and risk losing their jobs if they stay at home. The social safety net does not exist to ensure that children who receive school breakfast and lunch continue to do so. If school closure is warranted, efforts must be undertaken to allow this to be successful and to decrease congregation of children outside of the school setting.

Implications for policy with respect to school closures

Although the novel virus is highly transmissible, the potential reduction in transmission that might be afforded by major community mitigation interventions such as school dismissal is no longer warranted. We know much more about disease severity and transmission at this point. Over 1000 cases have been detected. Although there may be a delay in recognition of severe cases or deaths particularly among older populations where transmission may not yet be widespread, it is unlikely the severity of this strain is such that school dismissal will lead to substantial benefits. At the same time, hardships for families affected by school dismissals are evident in numerous communities.

Considerations related to spread of disease, severity, and time of year suggest that a continued policy of school closures is no longer appropriate.

The reasons are as follows: 1) disease is already widespread; 2) the proportion of clinical illness that is severe is relatively low, potentially approximating that seen in seasonal influenza; 3) school closure is disruptive and appears to be an excessive intervention given the severity of illness (this intervention was planned to be implemented with mortality rates in the 1% to 2% range; and 4) warm weather may bring relief.

Alternative interventions may be prudent in the place of school dismissals. These policies would encourage sick individuals to stay home, and focus on promoting hand and cough hygiene.

Recommendation: (See full guidance document)