



Unanticipated Consequences of Pandemic Flu – school related issues A preliminary literature review

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Background

In the event of a pandemic flu outbreak, closing schools would be one of the most likely non-pharmaceutical interventions (NPI) considered to contain the outbreak, consistent with social distancing theories (Hodge 2006, Germann 2006). Children in preschool and school-age groups are frequently observed to amplify transmission of many forms of flu (Bell 2006, Germann 2006), and are often the first mechanism for introducing transmission into the home (Cedron 2006). Despite the propensity of influenza epidemics to be amplified in primary schools, data on the effectiveness of school closures are limited (Bell 2006), especially in recent years, and the impact of school closures on illness rates appears to be mixed (Ingelsby 2006).

Earlier Flu Epidemics

By extrapolating from earlier influenza outbreaks, there is some information to suggest that school closures would be an effective measure to control the spread of pandemic influenza. Incidence data from the 1918 flu pandemic suggest that in the cities where schools were closed earlier, transmission tapered off more quickly and the total number of cases never peaked as high as in cities where such precautions were not taken. In St. Louis, where intervention happened early in the course of the outbreak, the attack rate was only 2%, compared to Philadelphia where schools waited longer to intervene and the attack rate was 10% (Matrin Cedron, CDC). A 1959 WHO consultation concluded that, "In the Northern hemisphere at least, the opening of schools after the summer holidays seems to have played an important role in initiating the main epidemic phase" of FN13 (Bell 2006). During a 2-week teachers' strike during an influenza (FN15) epidemic in Israel in 2000, significant decreases were seen in the rates of diagnoses of respiratory infections, medication purchases, and other parameters for children 6-12 years of age; when schools reopened, rates for these parameters rose again. Likewise, in 21 regions of France from 1984 to 2000, a temporal relationship was reported between school holidays and a decrease in the incidence of influenza diagnoses by general practitioners 10-20 days later and the daily death rate 30-40 days later (Bell 2006).

The value of international comparisons is limited because the effects of school closure are likely to be region specific, as geographic variation, local classroom size, and age distribution of students is likely to play a large part in how transmission is impacted (Bell 2006) as is the fraction of time outside the household that school children mix amongst themselves (Becker et al 2005).

School closures would have far reaching impacts on the NYC community. It is estimated that approximately 38% of American adults have children under 18 in their homes (Blendon). As mentioned before, the data surrounding effectiveness of school closures is mixed (Ingelsby 2006), and school closures might be less effective in urban areas than in rural areas because urban children can more easily meet elsewhere. For example, in 1918, more influenza (FN9) cases developed among pupils in a Chicago school after a holiday than when schools were in session. In Connecticut, the 3 largest

cities (Bridgeport, Hartford, and New Haven) kept schools open under "close medical supervision," and their death rates were reportedly lower than those in some Connecticut cities (New London and Waterbury) that closed their schools (FN8) (Bell 2006).

Modeling

Recent modeling and analyses conducted by the CDC also indicate that community-wide school closures are likely to be an effective NPI (Hodge 2006), with the exception of a recent simulated influenza pandemic for a small urban community which suggested that school closings alone would not substantially reduce morbidity and mortality (Haber et al 2006). The findings of this model suggest that in order for school closing to be an effective measure, it would have to be accompanied by other social control measures, such as requiring the ill and their household contacts to withdraw to their homes. Some researchers cite school closures as the only non pharmaceutical intervention likely to both influence rates of transmissibility as well as overall impact (Germann 2006). The public health premise is that closing schools will diminish contacts between students, thereby retarding the epidemic spread by slowing transmissibility so that there is more time to either develop and/or distribute pharmaceutical interventions, producing a "flatter" infection curve. To date, in America, 47 states' jurisdictions recognize school closure as a potential control measure for pandemic flu (Hodge 2006). By limiting exposure, people who are not infected during the first wave will have an increased chance of receiving virus-specific vaccine as it becomes available. In addition, if the virus becomes less virulent over time, persons who fall ill in subsequent waves may have milder illnesses (Bell 2006).

Social Interruptions: Lessons from Previous School Closings

While there are few recent cases of schools in America being closed for an extended period of time, the implications of closing a school for an infectious outbreak pose markedly different consequences than when schools are closed for other reasons. For example, when a number of NYC schools were closed after the WTC attacks, schools that remained open were able to accommodate students from those that closed and improvise with practices such as split schedules. Because such measures could not be taken if schools were closed because of pandemic flu, more academic interruption should be expected. During the time that schools were closed in Singapore, students were able to continue their studies by making use of online learning technology and e-learning portals that provided online discussion forums and downloadable worksheets (Thinkquest). This was important both for academic continuity, as well as for maintaining consistency, and normalcy through a routine, which is often credited with facilitating coping in times of high stress or emergency (Schroeder). At the five Regional Pandemic Preparedness Summits held in May and June of 2006, it was suggested that local planning for pandemic flu focus on the preparation of home study materials that could be used in the event of an extended school closing, such as a reading list, sequential lessons, and possible DVD or VHS learning material. The U.S. Department of Education's Emergency Response and Crisis Management Technical Assistance Center has also highlighted the importance of continuity of instruction, and has suggested that schools and school districts begin considering web based instruction models that could be implemented in the case of a pandemic flu outbreak.

Recently, when schools in Detroit closed for 12 days because of a teacher’s strike, many working parents reported concern about what to do with their children, and anecdotal reports suggest that approximately 20% of the districts 129,000 students reported to school on the first day of the strike and were packed into auditoriums and cafeterias (Gilberti 2006). *(Note- the superintendent told parents that they should send their kids to school.)* In the case of a pandemic flu outbreak, if schools close while other businesses and activities do not, the goals of social distancing will not be realized if working parents send their children to the homes of others. A recent study revealed that 37% of adults said that they would report to work even if public officials advised them not to (Blendon 2006). In order for school closures to be effective, other sites where school children gather would also have to be closed: daycare centers, cinemas, churches, fast-food stores, malls, and athletic arenas (Ingelsby 2006). Reassuringly, in a recent national study, 85% of those parents questioned reported that they thought they could keep children from taking public transportation, attending public events, and gathering outside home while schools were closed for 3 months because of pandemic flu (Blendon 2006). A recent outbreak of encephalitis closed schools in four counties in Rhode Island on January 4, 2007, affecting a total of 20,000 students. Parents were notified through both letters and email notifications, and seemed to respond favorably to the extra precautions taken (Zezima 2007).

Even if school closures do have a positive effect on disease transmissibility, there are a host of possible unintended negative consequences of closing schools that need to be considered. Closing schools will result in social isolation which is likely to contribute to a negative psychosocial response (Bowlby, Koller et al 2006). Most research suggests that juvenile crime rates tend to be higher during unstructured or unsupervised time. A recent paper assessing juvenile crime statistics from 29 jurisdictions collected by the National Bureau of Justice Statistics found that the level of property crime committed by juveniles decreased by 14% on days when school is in session compared to when it is not (Jacob & Lefgren 2003).

On the other hand, violent behavior among youths increases by 28 percent on days when school is in session, as a result of an increased degree of interaction among youth (Jacob & Lefgren 2003). Once again, this suggests that the effects of school closure will differ geographically and will depend on what alternate venues for youth to congregate remain open. During the 1968 NYC Teacher’s Strike, which kept students out of school for 36 school days, police reported no significant rise in juvenile delinquency despite the prolonged period of youth idleness (Time Magazine).

In modern times, the most extensive use of non-pharmaceutical public health interventions to contain a transmissible disease occurred during the SARS epidemic of 2003. While the pathogenicity of SARS and pandemic flu differ, the response to SARS, does allow some predictions for how America would respond to such a scenario, as well as affords some suggestions for steps that can be taken to prepare. When schools reopened in Singapore, each child was given their own thermometer to measure their temperature daily, and students were paired with a buddy to validate the readings. Such provisions are important for both outbreak control by monitoring for incident cases, but are also just as important for the powerful psychological reassurance they provide (Chng et al 2005). Because of the high levels of stress and anxiety measured among students

after the SARS epidemic, stress management training has been recommended as a preventative measure in the case of a future outbreak. Whether or not schools are closed because of pandemic flu, stress management for both students and staff will be important.

During the period of SARS incidence in Beijing all schools in the province were closed, as were all the schools in Singapore. In contrast, in Toronto only two schools that raised suspicion were closed. There were no reports of transmission of SARS in schools in Beijing or Guangdong China (WHO). The choice of whether to close all schools or a selected number has social implications as well as implications for disease transmission. The power to decide whether a particular school is closed, whether an entire district is closed, or whether a certain group of students is refused entry to school may reside in the hands of the governor, the state public health department, the local public health office, depending on the particular state. If only a handful of schools are closed, there is more potential for stigma and for the negative psychosocial feelings related to feelings of isolation. Studies conducted in China on residents of the Amoy apartment complex, the apartment complex where the incident cases of SARS were noted and where quarantine first took place say that pervasive stigma, while it has decreased, still remains to this day (Lee 2005).

Economic Interruptions

School closures could result in high rates of absenteeism from work if parents are forced to stay home, which could stress critical social services (Ingelsby 2006). In a recent national survey of those with school aged children in their households, 60% of those questioned reported that at least one employed adult would have to stay home from work if school was canceled because of pandemic flu (Blendon 2006). However, 93 % of those with school aged children reported that at least one parent would be able to remain in the workforce if schools were closed for one month, suggesting that while the work force would definitely be impacted, most family's with working parents would still have at least one source of income.

When asked about the feasibility of staying home with a sick family member for 7 to 10 days, 48% of respondents said that they or a family member would have concerns about losing pay/money problems, and another 27 % reported concerns about losing their job or business (Blendon 2006), 41% of which were in the < 25,000 per year income bracket, revealing that these burdens are likely fall disproportionately on those of lower socioeconomic status. This could be applied to the need to stay home with a child as well, which would likely be much longer than 7-10 days. In addition, 35 % of those with school age children (between the ages of 5 and 15) reported that they would probably need help to deal with the hardship of having children at home (Blendon 2006).

In 2005, 29.5 million children were fed through the National School Lunch Program. In October of 2006, in NYC alone 1,809,504 students participated in the National School Lunch Program (FNS, USDA). If schools were closed, this could negatively impact the nutrition of many children (Ingelsby 2006). In a recent national survey, 13 % of parents of students who receive free lunch reported that it would be a major problem if students could not receive these meals, and an additional 21% said that it would be somewhat of a problem.

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