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NON-PHARMACEUTICAL DISEASE MITIGATION STRATEGIES
SCHOOLS

INTRODUCTION

Early in an influenza pandemic vaccine will not be immediately available. Most experts expect it to take a minimum of 6 to 8 months after a pandemic begins to manufacture an adequate supply to provide nationwide coverage. In addition, antivirals such as Tamiflu & Relenza are likely to be in short supply and their usefulness in preventing people from becoming infected is limited. For antivirals to be useful for prophylaxis the medication must be taken throughout the period that influenza is present in the community. There is also the possibility that large-scale use of these medications may induce resistance in the pandemic strain of influenza. Therefore, the limited amount of antivirals present early in a pandemic will likely be used for treatment of high-risk sick patients. Treatment will reduce suffering and death, but will only modestly affect community transmission.

For these reasons a menu of mitigation strategies known as non-pharmaceutical interventions (NPI) have been proposed to attempt to slow down the spread of the pandemic strain of influenza until such time that a vaccine becomes available. Examples of NPIs that could be employed include voluntary isolation of cases, voluntary quarantine of household contacts, social distancing measures, cancellation of large public gatherings, school closures, and infection control measures such as hand hygiene, cough etiquette, and the appropriate use of personal protective equipment such as masks. In the past, various combinations of these measures have been used under epidemic and pandemic circumstances in an attempt to control the spread of influenza. Many mitigations strategies could have a serious impact on the ability of the health system to deliver adequate care and could have potentially adverse consequences for the provision of essential services. Others could result in significant disruption of the social functioning of communities and result in possibly serious economic problems. Statewide consistency regarding the use of quarantine and isolation, school closures, use of personal protective equipment, and antivirals in the event of an influenza pandemic is of paramount importance for maintaining social stability, protecting public health, and minimizing economic impacts. The scientific evidence base for these measures is limited, however the recommendations below are based on a thorough review of the evidence that is available, common sense and the practicality of implementation and the ability for people to adhere to the recommendations.

The evidence to support various practices recommended in this section have been assigned a category based on the available scientific evidence supporting or not supporting the practice. The following is a description of the various categories:

> *Category 1 – Sufficient scientific evidence exists to support the practice and it should definitely be implemented.*
> *Category 2 – Sufficient scientific evidence does not exist to categorically state the practice must be implemented but it should be considered.*
> *Category 3 – Scientific evidence does not exist to promote the practice but evidence does exist to recommend against the practice. Category 3 primarily means that a practice should not be considered.*

Social Distancing Measures –Social distancing strategies are non-medical measures intended to reduce the spread of disease from person to person by discouraging or preventing people from coming in close contact with each other. These strategies could include closing schools; closing non-essential agency functions; implementing emergency staffing plans; to increase telecommuting, flex scheduling, keeping student/staff from coming within 3 ft of each other, and other options; and closing public assemblies or after school activities. The actual social distancing measures that will be implemented during various phases of a pandemic will be commensurate with the actual severity of the pandemic and the societal impact.

Schools – School systems represent an important element in pandemic influenza preparedness for several reasons: Children easily transmit infectious diseases to one another due to their close proximity and their general lack of awareness and compliance with basic hygienic measures. Therefore in a pandemic, long term and widespread absenteeism may occur due to the lack of immunity and until a vaccine becomes available, the students, teachers, and staff would be highly susceptible to a novel virus. This type of absenteeism occurs on a smaller basis annually due to seasonal influenza outbreaks, however in a pandemic the impact would be much greater and the longer duration of the outbreak would create unique challenges.

Probably the most controversial mitigation strategy related to schools is the concept of school closure during a pandemic. Currently there is no consensus as to the effectiveness of this strategy. Models have suggested that, if implemented early in a pandemic school closures may slow the spread. However, these models have serious flaws and have no considered the negative impacts of school closures. The mere assumption that it is possible to keep children home for long periods of time in this day and age is naive at best. Historic data is not helpful because there are significant differences in society, health, and healthcare. Population density (nationally, locally, in schools, and even in family homes) for example is very different. The speed of travel has increased dramatically and the ability of adults and children to move about and co-mingle with others changes interaction dynamics from previous pandemics. In addition many historical accounts of the effectiveness of school closures on limiting the spread of infection in previous pandemics have been mixed. The concept of closing schools to limit the transmission of pandemic influenza has profound implications for the education of students and for the economy.

While it may be necessary to eventually close schools, the goal of every community should be to keep schools open and safe whenever feasible. If closures are anticipated, it is important that the negative impacts of the closures on society, students, and staff be minimized by pre-planning for such an event. Communication structures must be enhanced and triggers for both closing and opening schools must be developed. As stated above, in a pandemic it essential that communities across the state be consistent in how school closings are handled and closing decisions should be based on the best science available and in collaboration with all stakeholders (Students, Parents, Teachers, Superintendents, State & local health authorities etc.). The following policies have been developed to assist in this endeavor.

GOAL: To keep schools open and safe whenever possible.

Overview of following policies:

The policies outlined below should be integrated as part of the school district's overall crisis plan. Besides being effective in an n influenza pandemic the same policies will be helpful in averting many other crises.

School districts can take steps prior to a pandemic that will reduce the spread of all communicable diseases. The first step is education. Students, staff and community need to understand how infectious diseases are transmitted. The second step is training, along with being taught how disease is transmitted, staff and students must be taught techniques to reduce the chance of transmission such as proper hand washing, how to cover a cough or sneeze, standard precautions, etc. Staff and students must be encouraged to stay home when ill and maintenance staff must be taught how to properly clean and disinfect.

These policies also cover what the school district should do in case prevention methods fail. Most districts are prepared to deal with short-term school closures. However, in the case of a pandemic, schools may be closed for months at a time. Districts have to be prepared so that they can continue to communicate with staff, students and the community and deliver education and other services to students.

In addition school districts must also be prepared for the psychological impact of a pandemic. People may be fearful but those who have been educated will be less so. Fears will be abated and tensions eased if the students, staff and the community know the district has a plan. The period after a pandemic is important too. A pandemic will create a great social upheaval, everyday life will be interrupted and people will die. Districts must be prepared to deal with the return of grieving students and staff.

Many children receive their only meals or only hot meals at school. In the case of a long-term school closure, these students may not have enough to eat. This policy encourages the district explore the possibility of continuing food service in some manner. It may require bulk purchasing and storage of certain supplies and may not be possible for some districts.

The following information is provided to assist Missouri school districts in planning for an influenza pandemic.

School Closure Trigger Points:

1. Student absenteeism – when it is not economically prudent to keep the school open
2. Teacher/staff absenteeism – when the number of staff available to supervise and instruct students drops below what is necessary to maintain a safe learning environment
3. To protect the public health and safety – when advised to close by state or local health/safety authorities

In a pandemic short term school closures (1 –2 weeks) will occur as a result of absenteeism and the ability to function as a school much like what occurs during normal influenza season. The practicality of closing schools for longer periods of time (up to 12 weeks at a time according to CDC) is questionable and carries serious adverse consequences. For example, for working parents, school serves as a form of day care and, in some areas, a source of meals for children from lower income families. A portion of the state's workforce would be unable to go to work as long as children were out of school. Heightened absentee rates could cripple essential services (healthcare, first responders, utility companies, businesses etc.). Teachers might not be paid and a great number of hourly workers (mall and fast food employees; school janitorial, security, and kitchen staff; bus drivers) would face particular hardship. Prior to considering whether to close it is important that every school district be prepared ahead of time to deal with these adverse consequences.

Authority to close schools:

1. Local public health agencies/Director of the Department of Health and Senior Services in Missouri have the authority to close/open schools for any of the reasons cited above.
2. If local closings affect other jurisdictions such as in a pandemic, schools may be closed /opened by order of the Director of the Missouri Department of Health or his/her designee. (CSR 20.20.40 I) – due to the need for consistency throughout the state it is likely that school closures /openings to protect the public health and safety (#3 above) will be directed at the state level.

Schools may be closed to all staff and students or just students. If schools are closed only to students, staff members are expected work regular schedules or use appropriate leave.

The superintendent may cancel all activities on district property by outside groups even if some schools in the district remain open. When a school is closed, activities scheduled at that school, including use by community groups, will be canceled. Activities held at another location but involving students and staff from a closed school may be canceled at the discretion of the building principal in consultation with local health authorities and the school nurse.

Schools will be reopened by the superintendent but in cases where schools were closed by DHSS, only the Director of DHSS or his/her designee may authorize the reopening of schools. Schools will be reopened only when the situation that caused the schools to be closed are when that situation that cause the schools to be closed has sufficiently abated.

Recommendations:

1. School closings for student or teacher absenteeism should occur as necessary and the local health department and school authorities will direct the closings. (Category 2)
2. School closings for the purpose of protecting the public health and safety will be directed by local public health agencies and local school authorities, however in a pandemic where closures would affect multiple jurisdictions the Director of the Department of Health and Senior Services will direct the closures. (Category 2)
3. As stated in the information above, the effectiveness of closing schools to slow a pandemic is in question and will depend upon specific circumstances. School districts should have plans in place to:

   - close schools as necessary as well as plans for re-opening them.
   - recognize trigger points for both for closing and opening schools
   - understand lines of authority in the community/state for closing and opening schools

Surveillance and Reporting

In a pandemic enhanced surveillance of influenza cases is imperative to track the disease and to assist in making mitigation decisions.

Notice of school closing, reopening or cancellation of activities will be publicized through local media, the district's website and the district's information line.

In Missouri, the school superintendent or designee is charged with monitoring reportable diseases in schools and reporting to health authorities in accordance with law. (19 CSR 20-20.020)

School Restrictions

If incidences of contagious disease are high, the school nurse or designee may recommend that the superintendent impose appropriate social distancing rules such as limiting or prohibiting individuals other than students, staff and contractors providing services to the district from being in district facilities.

Communications

The superintendent or designee will develop a communication system for the exchange of information between the district and staff, students, parents and others when schools are closed. The system will be used to monitor the health of students and staff, deliver instruction and support services and to provide health and other appropriate information.

The system will include a variety of methods such as Internet, digital answering machines, email and traditional mail, fax, etc. and designate individuals responsible for receiving and compiling information received. During a school closing the school nurse will be responsible for compiling data relating to the health of individuals. The nurse will be responsible for appointing and training a staff member to receive and compile this health information in situations where the nurse in unavailable. If possible, another nurse will be selected before any non-medical personnel are used. Other staff members will be involved as necessary to monitor the health and academic progress of students and other staff members.

Confidentiality

Staff health information will be kept confidential and only released in accordance with board policy and law. Student health information will be shared with state and local health officials in accordance with the Family Educational Rights and Privacy Act (FERPA) and state law. Districts may provide individually identifiable student information to local or state health authorities in conjunction with reporting a Category I disease under the health and safety emergency exception of FERPA. (Waiting on a ruling from U.S. Department of Education's Family Policy Compliance Office to verify) Individually identifiable student information received from any source, including state and local health authorities will be maintained and disclose in accordance with FERPA and board policy.

Maintenance

The superintendent or designee will develop a cleaning/disinfecting checklist according to guidance from the Missouri Department of Health and Senior Services to be completed by staff responsible for building maintenance. Staff members are required to follow the checklist and failure to do so will result in discipline.

Materials and Supplies

Hand washing facilities will be available to students, staff and visitors to district facilities. The superintendent will ensure that each district facility is equipped with adequate cleaning and Environmental Protection Agency (EPA) approved disinfecting materials and that each bathroom in the district is equipped with soap, hot water and a system to dry hands. Waterless hand sanitizer may be used only when it is impractical to provide soap and hot water.

The district will provide appropriate personal protective equipment to caregivers and others when necessary according to DHSS recommendations.

The superintendent will investigate whether the district can continue to provide meals to students on free and reduced lunch when schools are closed. To determine if such a program is practically and financially feasible, the superintendent will consult with food service personnel regarding purchasing and supplies, facilities staff to determine storage options and local emergency planners to develop a preparation and delivery system.

Staff Leave

Staff members who are ill or have members of their household ill with pandemic influenza are encouraged to stay home to promote healing and reduce the risk of infecting others. In the case of school closure due to a pandemic or other significant health event, the Board may provide additional paid leave to staff members based on the length of the closure and the financial condition of the district. However, staff members who are not ill may only use available leave in accordance with board policy.

Academics

In case of school closing due to a declared pandemic, every effort will be made to continue instruction through alternative methods. In case contemporaneous instruction is not possible, instructional staff will prepare a grade level or subject area supplemental unit of studies that students and parents can implement with minimal assistance from staff. District administration in cooperation with instructional staff will oversee the development and collection of these units and determine an appropriate delivery system.

In the case of a long-term school closing, the Board may waive local graduation requirements.

Board Meetings

The Board president and superintendent will establish alternative methods for holding meetings that do not require face-to-face contact. Any method must be implemented in accordance with the Missouri Sunshine Law.

Counseling

In the case of a pandemic students and staff will face illness and death of friends and family. District counselors must be prepared to provide support to students and staff when schools reopen after a pandemic. In addition, counselors must develop support programs that can be accessed while schools are closed. These programs will be part of the overall emergency plan and be developed in conjunction with the communication system used to monitor the health of students and staff and deliver instruction and support services.

Facilities

In the case of pandemic influenza or other health event the district's facilities may be used as staging areas, shelters or to otherwise serve the community in accordance with Board policy and law. The superintendent will maintain an accurate inventory of property that may be useful in an emergency situation including but not limited to medical supplies, food, water, ice, vehicles, tools, communication devices, generators, building materials, cleaning supplies and bedding.

Work place policies – One of the primary needs during a pandemic will be to maintain essential governmental, community and business continuity. It is possible that 30% of the workforce may be absent due to illness, and it may be difficult to maintain adequate staffing for many important functions. Many essential services may be disrupted if large numbers of public health, law enforcement, first responders, health care, communications, transportation, and public utility personnel are not able to carry out critical functions due to illness. It is therefore extremely important that continuity of services plans be in place to minimize the impact. (See Business, Government and Life Continuity Annex for details)

Gathering restrictions – The real world effectiveness of canceling public gatherings has not been established. However, it seems prudent that consideration be given to closing any planned public gathering during a pandemic as a method of limiting person-to-person contact. If a public gathering is necessary the following guidelines seem prudent:

1. The facility where the gathering is held should be cleaned thoroughly utilizing normal cleaning products. Use clean water, detergent, and scrub paying special attention to frequently touched and horizontal surfaces.
2. Promote hand hygiene and cough etiquette.
3. Space individuals at least 3 feet apart during large gatherings. Increasing the number of gatherings and limiting the number of attendees is one way of accomplishing this. Use audio/visual technology to broadcast the presentations to other rooms or buildings, allowing the groups to be split into smaller numbers.
4. Encourage sick people to stay home.

Recommendations:

1. Canceling Public gatherings during a pandemic may be recommended when public health authorities feel that such gatherings would lessen the spread of pandemic influenza. (Category 2)
2. If public gatherings are essential during a pandemic the above guidelines should be followed. (Category 2)

REFERENCES

Non-Pharmaceutical Mitigation Strategies

1. Institute of Medicine (IOM). Modeling Community Containment for Pandemic Influenza-A Letter Report. The National Academy Press. (2006) http://www.nap.edu/catalog/11800.html

The IOM reviewed current strategies based on models and historical analysis and concluded that "there is a dearth of strong evidence concerning the efficacy of community containment strategies, which is particularly troublesome given the fact that many of the interventions will carry significant economic, social, ethical, and logistical consequences." " - Given this lack of scientific evidence, it is important to look at multiple sources of information to support community containment interventions." " -…models cannot be depended upon to predict effectiveness of community interventions. History teaches us many things, but, like the modeling, can only paint a broad picture that suggests community-wide intervention is possibly better than no intervention. Neither of these two streams of research can be said to support specific interventions, specific timing of interventions, or to predict the outcomes of the interventions with precision."

2. Inglesby, TV , Nuzzo TO, Henderson DA. Disease Mitigation Measures in the Control of Pandemic Influenza. Biosecurity & Bioterrorism: Biodefense Strategy, Practice, and Science. Vol 4, NO. 4. 2006: Pg 1-10

- "Models are potentially misleading." "Application of deterrent measures involving large numbers have the potential to cause serious secondary effects that are difficult to anticipate and impossible to model." And " that no non-vaccine mitigation strategies have been shown with certainty to be effective

School Closures:

1. Armstrong C, Hopkins R. An epidemiologic study of the 1920 epidemic of influenza in an isolated rural community. Public Health Rep. Vol 36.1921:1671–702

On a small island in the United States in 1920, the single public school was a focal point for the spread of influenza, and a report from that period concluded **that** "prompt closure of the school would probably not have prevented the epidemic, but might have delayed it" .

2. British Royal Society, The Academy of Medical Science. Pandemic Influenza: Science to Policy.November 2006. 24.

Writing about non-pharmaceutical mitigation strategies. pg 24 "…..these measures may be highly effective in theory, but may require rigorous adherence to protocols to be effective, which may be difficult in practice." " …."we recommend that the HPA, and the Department

of Health identify research that should be conducted to identify those non-pharmaceutical interventions likely to have the greatest impact and, where appropriate, commission trials to assess the effectiveness of these interventions."

3. Ferguson N. Imperial College, London Use of epidemic models in planning pandemic mitigation., Oct. 26, 2006 presentation to IOM.

"Stopping 90% of infec. buys 1-2 weeks.99% buys 2-4 weeks. "… School closure – main effect is to reduce peak height by 40% but not total number infected ."

4. Haber M, Shay SH, Davis XM, et al Presentation number 528/104). International Conference on Emerging Infectious Diseases. March 21, 2006. http://www.abstractsonline.com/viewer/view/Abstract.asp? Loney J. School closings may not work in bird flu:study. Reuters. March 21, 2006)

Results of a study presented at the 2006 Emerging Infections Conference in Atlanta suggests that closing schools "would not substantially reduce rates of morbidity & mortality during a pandemic." Haber M, Shay SH, Davis XM, et al.The effectiveness of Interventions to reduce contacts during a simulated influenza pandemic on attack, hospitalization, and mortality rates.

5. .H*eymann A, Chodick G, Reichman B, Kokia E, Laufer J. Influence of school closure on the incidence of viral respiratory diseases among children and on health care utilization. Pediatr Infect Dis J. Vol.23, 2004:675–7*

During a 2-week teachers' strike during an influenza 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 school reopened, rates for these parameters rose again. The study did not report on illness in family members

6. Inglesby, TV , Nuzzo TO, Henderson DA. Disease Mitigation Measures in the Control of Pandemic Influenza. Biosecurity & Bioterrorism: Biodefense Strategy, Practice, and Science. Vol 4, NO. 4, 2006, Pg 1-10

REVIEW ARTICLE ON EFFECTIVENESS AND PRACTICAL FEASIBILITY OF A RANGE OF ACTIONS FOR PAN-FLU MITIGATION: In previous flu epidemics, the impact of school closures has been mixed. They point out that schools are often closed for 1-2 weeks early in the development of seasonal community outbreaks because of high absentee rates, especially in elementary schools, & because of illness amongst teachers. Seems reasonable on practical grounds, "However, to close schools for longer periods is not only impractical but carries the possibility of a serious adverse outcome. Reasons listed are: 1. School serves as daycare for working parents, 2. School lunch and breakfast recipients may not get quality meals for long period of time, 3. Portion of workforce would not be able to work as long as kids are out of school, 4. Heightened absentee rates could cripple essential service industries, 5. Teachers might not be paid and a great many hourly workers would face financial hardship.

The same group reporting to the IOM on Oct. 26, 2006 stated that “Models are potentially misleading.” “Application of deterrent measures involving large numbers have the potential to cause serious secondary effects that are difficult to anticipate and impossible to model.” And “ that no non-vaccine mitigation strategies have been shown with certainty to be effective.”

7. Institute of Biosecurity, St Louis School of Public Health

During the 1918 pandemic influenza outbreak Dr. Max C. Starkloff, Commissioner of Health in St. Louis instituted a number of prevention and response strategies that resulted in a death rate of 1.8 per thousand, compared to Philadelphia (7.4/1000), and Boston (8.3/1000). One of many strategies implemented was closing schools.

8. Jordan EO. Epidemic influenza: a survey. Chicago: American Medical Association; 1927

In the United States, a comprehensive report on the 1918 pandemic concluded that closing schools, churches, and theaters was not demonstrably effective in urban areas but might be effective in smaller towns and rural districts, where group contacts are less numerous.

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.

9. Markel H et al.(272 page report)Univ. of Michigan “A Historical Assessment of Non-Pharmaceutical Disease Containment Strategies Employed by Selected U.S. Communities During the Second Wave of the 1918-1920 Influenza Pandemic”

This group performed a historical evaluation of the NPI as employed by American Communities during the 2nd wave of the 1918-20 pandemic flu. Came to 2 conclusions: 1. Protective sequestration, if enacted early enough, stands best chance of infection against infection. 2. Data fail to show that any other NPI was effective in helping to contain the spread of the virus including school closures.

10. McGinnis JP. The impact of epidemic influenza, Canada, 1918–1919. Hist Pap Can Hist Assoc. 1977;19:120–41. Sattenspiel L, Herring DA. Simulating the effect of quarantine on the spread of the 1918–19 flu in central Canada. Bull Math Biol. 2003;65:1–26

In Edmonton, Canada, isolation and quarantine were instituted; public meetings were banned; schools, churches, colleges, theaters, and other public gathering places were closed; and business hours were restricted without obvious impact on the epidemic .

11. NACCHO/IDSA report Oct.26,2006 to IOM.

"….national guidance should be developed using the best available information regarding community mitigation strategies…" "…Community mitigation strategies should be evidence-based and public health rationale fot r the measures should be strong and explicitly described." "…if the scientific evidence base is inadequate & the public health rationale is not strong (i.e., significant uncertainty and controversy exist among authoratative experts regarding the benefits of such strategies), the argument for widespread adoption and adherence to a standardized approach is not compelling.

12. Neuzil KM, Hohlbein C, Zhu Y. Illness among schoolchildren during influenza season: effect on school absenteeism, parental absenteeism from work, and secondary illness in families. Arch Pediatr Adolesc Med. Vol.156, 2002:986–91)

Despite the propensity of influenza epidemics to be amplified in primary schools data on the effectiveness of school closures are limited. Apparently no data or analyses exist for recommending illness thresholds or rates of change that should lead to considering closing or reopening schools.

13. Patterson KD. The influenza epidemic of 1918–1919 in the Gold Coast. J Afr Hist. Vol.24, 1983:485–502

In Lomé, British-occupied Togo, case-patients, suspected case-patients, and contacts were isolated; traffic was halted; schools and churches were closed; public meetings were banned. Despite these and other measures, influenza was well established in Lomé by October

14. World Health Organization. Expert committee on respiratory virus disease: first report. World Health Organ Tech Rep Ser.Vol. 58, 1959:1–59).

A 1959 WHO consultation concluded, "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".