

# Feasibility of Social Distancing Practices in US Schools to Reduce Influenza Transmission During a Pandemic

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## ABSTRACT

**Background:** Schools are socially dense environments, and school-based outbreaks often predate and fuel community-wide transmission of seasonal and pandemic influenza. While preemptive school closures can effectively reduce influenza transmission, they are disruptive and currently recommended only for pandemics. We assessed the feasibility of implementing other social distancing practices in K-12 schools as a first step in seeking an alternative to preemptive school closures.

**Methods:** We conducted 36 focus groups with education and public health officials across the United States. We identified and characterized themes and compared feasibility of practices by primary versus secondary school and region of the United States.

**Results:** Participants discussed 29 school practices (25 within-school practices implemented as part of the school day and 4 reduced-schedule practices that impact school hours). Participants reported that elementary schools commonly implement several within-school practices as part of routine operations such as homeroom stay, restriction of hall movement, and staggering of recess times. Because of routine implementation and limited use of individualized schedules within elementary schools, within-school practices were generally felt to be more feasible for elementary schools than secondary schools. Of reduced-schedule practices, shortening the school week and the school day was considered the most feasible; however, reduced-schedule practices were generally perceived to be less feasible than within-school practices for all grade levels.

**Conclusions:** Our findings suggest that schools have many options to increase social distance other than closing. Future research should evaluate which of these seemingly *feasible* practices are effective in reducing influenza transmission in schools and surrounding communities.

**KEY WORDS:** pandemic influenza, school planning, social distancing

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RAND's Institutional Review Board approved this study. Focus group participants were promised confidentiality and instructed that their participation was voluntary. They were also instructed that they could skip any questions and terminate participation at any time.

Social distancing refers to actions to reduce the number and duration of contacts and increase the physical distance between individuals to slow the spread of a communicable disease.<sup>1</sup> In an influenza pandemic or other infectious disease outbreak, public health officials may recommend preemptive school closures to disrupt transmission before many students and staff members become ill and thereby decelerate community-wide spread of the disease.

The findings and conclusions in this study are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Interview transcripts are available upon request from study authors. Sharing is contingent on institutional review board approval.

The authors declare that they have no competing interests.

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They may also recommend other social distancing measures in other community congregate settings (eg, workplaces, mass gatherings) to slow the spread of disease and thereby relieve pressure on overburdened health care and public health systems.<sup>2-4</sup>

Schools are important settings for social distancing. Because public schools are socially dense environments where more than 50 million students congregate across the United States each day, schools can fuel community-wide disease transmission.<sup>5-7</sup> In addition to promoting respiratory etiquette and hand hygiene and engaging in frequent environmental cleaning, schools can implement practices that promote social distancing to potentially protect large numbers of vulnerable children, as well as limit secondary transmission to adults within their households and communities.

Over the past decade, research and guidance on social distancing in US schools have mainly focused on school closure as the most impactful, albeit disruptive, social distancing practice.<sup>1</sup> While a substantive evidence base documents that school closure can mitigate influenza pandemics, there may be potentially less disruptive opportunities to increase social distance among students who remain in school.<sup>1-3,8</sup> Nonetheless, feasibility, acceptability, and effectiveness of the full range of school social distancing practices have not been explored.<sup>2-4</sup>

To address this gap, the US Centers for Disease Control and Prevention and RAND Health conducted a large qualitative field study to examine the feasibility of social distancing practices other than school closures in K-12 schools. Through focus groups with senior education administrators across the United States, we aimed to identify potential social distancing practices beyond school closure, describe barriers to and facilitators of implementing these practices for at least 3 weeks to decrease the spread of influenza before many students become ill, and rank practices by feasibility.

## Methods

### Participants

In the summer of 2017, we conducted 36 focus groups with education and public health officials via webinar. Participants were selected from all 10 US Department of Health & Human Services (HHS) regions to explore perspectives that might differ by region of the country. We also recruited participants representing both primary and secondary schools to compare how barriers and facilitators might vary by grade level. We recruited superintendents, principals, teachers, school

nurses, state school nurse consultants, district transportation directors, state health pandemic planners, and school safety representatives.

For each HHS region, we assembled a purposive sample of participants by searching professional association Web sites and LexisNexis and conducting snowball sampling with focus group attendees. Within professional association Web sites, we searched for lists of members, conference attendees, and association leaders. In LexisNexis, we looked for names of school leaders who were quoted in the media about emergency preparedness.

A total of 158 participants, representing all 10 regions, participated in a total of 36 focus groups. The number of participants per focus group ranged from 2 to 7, with a mean of 4. Each participant participated in a single focus group.

### Focus groups

A team of 6 moderators trained in qualitative research conducted the focus groups via webinar. Most of the groups consisted of participants from a single HHS region, but 3 groups included a mix of several HHS regions to accommodate scheduling preferences. Participants were contacted via e-mail and offered a \$50 gift card as an incentive. All focus group discussions were recorded and then transcribed.

Each group followed a semistructured protocol, and participants were asked to identify, mention experience with, and discuss the feasibility of practices within 1 of 2 categories: practices that could be implemented within a normal school schedule (“within-school practices”) and those that would require an altered school schedule (“reduced-schedule practices”). To limit focus group duration to 90 minutes, 23 groups discussed within-school practices (9 focused on elementary schools, 11 focused on secondary schools, and 3 discussed both elementary and secondary schools) and 13 discussed reduced-schedule practices (both elementary and secondary schools). In each group, participants were first presented with a list of practices assembled by the study team and asked to brainstorm any additional practices that could be implemented in K-12 schools. Second, they discussed any direct experiences with listed practices as well as implementation barriers and facilitators of each individual practice. Finally, they selected the most and least feasible practices from among the full list of practices. Feasibility was defined as “ease of implementation” in this context. This study was approved by RAND’s Institutional Review Board, and all participants gave oral consent to participate at the start of each focus group.

## Analysis

Standard qualitative analysis techniques were used to identify and characterize instances of themes arising from the various topics covered in focus group protocols (eg, each identified practice) as well any unanticipated themes that emerged. Two of the authors read each transcript and independently coded. To ensure that different coders were interpreting the data as similarly as possible, we (1) developed descriptive and precise codebooks that gave each code a clear definition and meaning; (2) performed inter-coder agreement checks prior to analyses where all analysts read the same text, coded independently, and discussed areas of disagreement; and (3) performed supervisory reviews of the analysis at regular intervals. We compared themes by HHS region as well as by secondary versus elementary school settings, and we reported any differences identified. Dedoose qualitative research software was used to facilitate data handling, coding, and thematic analyses.

For ranking, participants in within-school practices focus groups could vote for 3 practices they perceived as the most feasible and 3 perceived as the least feasible. For the focus groups on reduced-schedule practices, participants voted for the single most feasible and single least feasible practice. Individual votes were summed.

We first present the full menu of social distancing practices (other than school closure) discussed by focus group participants as well as high-level summaries of perceived barriers, facilitators, and variation by region and/or grade level. We then present details on the barriers and facilitators for the within-school and reduced-schedule practices that (1) were deemed most feasible by participants and (2) could be implemented continuously over at least 3 weeks.

## Results

Participants discussed a total of 29 school practices (25 within-school practices and 4 reduced-schedule practices). While 23 practices were identified by the study team in advance through policy and literature reviews, 6 additional within-school practices were identified by focus group participants. Additional practices included limiting group work, limiting congregation at arrival and dismissal, encouraging solo physical activity, canceling cross-school transfer for special programs such as dual enrollment, reducing congestion in the school health office, and educating students and family members to maintain their distance.

Practices with which participants reported prior experience as part of routine operations or in response to

the 2009 H1N1 pandemic are shown in Table 1. For elementary schools, the more common within-school practices that some schools use as part of routine operations included homeroom stay, restricting hall movement (walking single file, a foot apart), segregating recess area by class, staggering recess times, segregating the cafeteria by class, and staggering lunch periods. Common within-school practices implemented for the first time in response to the 2009 H1N1 influenza pandemic included canceling field trips, canceling assemblies, limiting visitors, and reducing congestion in the health office. Several participants also reported experience with reduced-schedule practices as part of routine operations and in response to emergencies, including operating on a 4-day week because of budget constraints, and shortening the school day (delayed start or early dismissal for severe weather).

The perceived barriers and facilitators for each practice, as well as variability by grade level, are shown in Table 2. Within-school practices were generally perceived to be less feasible for secondary schools than elementary schools for a variety of reasons (eg, lack of homeroom; individualized and complex class schedules, including off-campus education activities; classes have students from multiple grades; need to use lockers to retrieve textbooks and other belongings). Reduced-schedule practices, such as shortening the school week or the school day, were perceived to be less feasible than within-school practices in both elementary and secondary schools because of complexities related to scheduling, transportation, staff work hours, communication to families, food preparation and provision, and a variety of regulatory issues (eg, required in-person instructional hours, union rules requiring duty-free periods for teachers) listed in Table 3. The need to arrange childcare was especially challenging for the parents of elementary school students.

As shown in Tables 4 and 5, the within-school practices most frequently perceived as feasible in both primary and secondary settings included canceling field trips (46 votes), canceling assemblies (41 votes), rearranging desks to increase space between students in the classroom (22 votes), restricting hall movement (elementary only) (20 votes), and limiting nonessential staff and visitors (19 votes). The practices most frequently identified as least feasible included moving class outdoors (41 votes), staggering class start and dismissal times (30 votes), separating classes into smaller groups (24 votes), and shortening and staggering lunch times (19 votes). The reduced-schedule practice considered the most feasible was a shortened school week affecting the entire school (25 votes), and the least feasible was selective dismissal of one class or one grade in a school (23 votes). We did not identify

**TABLE 1**  
**Experience With Practices in Routine Times and in Response to the 2009 H1N1 Pandemic**

Practice	Experience in Routine (Nonemergency) Times	Experience During the H1N1 Pandemic
<i>Classroom practices</i>		
Institute homeroom stay	Keeping one cohort of students together throughout the day is the norm in many elementary schools, though students often leave the classroom for specialty classes such as physical education, music, art.	None
Rearrange desks to increase space	Schools experiment with a range of seating configurations depending on grade level, students' needs, subject area, and available space and furniture.	One participant discussed experience with this practice during the 2009 H1N1 pandemic, noting that he configured students' seats so that they were no longer facing each other in a pod formation.
<i>Hallway and bathroom practices</i>		
Restrict hall movement	Several participants stated walking single file, about a foot or an arm's length apart, is common in elementary schools and leads to orderly transitions between classes. It has also been used successfully during fire drills.	None
Limit bathroom use to reduce congestion in the bathroom	Bathroom use is highly grade level-specific. Elementary school students are more likely to have common bathroom breaks when students use the bathroom in groups, while middle and high school students typically use bathroom passes.	None
Limit congestion during arrival and dismissal	Several participants reported limiting congestion by requiring students to report directly to their first class upon arrival and to remain in their last class until just before departing the campus.	None
Stagger class start and dismissal times to reduce load in hall	A few participants reported experience with staggering the start and end time of the school day, and with staggering the class start and end times throughout the day without changing the overall length of the day (mainly for schoolwide activities such as assemblies). For instance, a participant reported modifying class start and dismissal times to separate the grades, reduce congestion in the halls, and protect the smaller and younger students.	None
<i>Schoolyard and recess practices</i>		
Segregate recess area by class	Some elementary schools segregate the recess area by class (eg, one class is on the field and one is using the playground equipment). It is also common in smaller schools for each class to have its own time slot in the recess area.	None
Stagger recess time	Elementary schools stagger recess times for a variety of purposes (eg, maintain order on the playground, have ample space on the playground).	None
Encourage solo physical activity	Participants had experience encouraging certain solo physical activities (eg, running) in physical education classes.	None
<i>Lunchroom practices</i>		
Shut down cafeteria; eat in the classroom	Several participants representing elementary schools reported that breakfast and snacks are eaten in the classroom.	None
Segregate cafeteria by class	Segregating the cafeteria by class is a common practice in elementary schools.	None
Shorten and stagger meal periods	Many schools already stagger lunch periods because the cafeteria cannot accommodate all students at one time.	None
<i>Other within-school practices</i>		
Cancel field trips	Participants reported experience of canceling field trips because of illness or schedule changes, or as a punishment for poor behavior.	Several participants reported canceling field trips during the 2009 H1N1 influenza pandemic and other infectious disease outbreaks.

(continues)

**TABLE 1****Experience With Practices in Routine Times and in Response to the 2009 H1N1 Pandemic (Continued)**

Practice	Experience in Routine (Nonemergency) Times	Experience During the H1N1 Pandemic
Cancel assemblies	Participants reported experience of canceling assemblies because of schedule changes.	Participants reported numerous experiences canceling assemblies during the 2009 H1N1 influenza pandemic.
Limit nonessential staff and visitors	Schools have established protocols to screen visitors and restrict unauthorized access (eg, office staff must unlock doors, visitors must state their business in the school and sign in).	Participants reported that excluding nonessential visitors was a common practice during the 2009 H1N1 influenza pandemic, and multiple participants reported restricting certain categories of visitors (eg, parents).
Teach students to maintain distance	Participants mentioned developing short lessons (eg, video presentations) for students on the importance of maintaining their distance during school outbreaks such as head lice and mononucleosis.	None
Reduce congestion in the health office	None	Several participants mentioned that schools used several locations in addition to the health office during the 2009 H1N1 influenza pandemic to isolate students with influenza-like illness from other students in need of medical attention (eg, the school nurse saw children with flu-like symptoms in the health office and used a satellite location for first aid).
<i>Reduced schedule practices</i>		
Shortening the school week	Several participants said that their districts were operating on a 4-d week because of budget constraints.	None
Shortening the school day	Several participants described experience with this practice, often due to severe weather (2- or 3-h delay or early dismissal), or for professional development activities for staff.	None
Dismissal of one grade	Several participants described having used this practice, such as dismissing an entire grade for a field trip or for testing purposes.	None

any substantive variation in perceived feasibility by US region; however, moving class outdoors was considered more feasible in locations with mild climates.

**Feasible within-school practice: rearranging desks to increase space**

Moving desks at least 3-ft apart to increase the physical distance between students is a social distancing measure that could be implemented in some classrooms. One participant discussed experience with this practice during the 2009 H1N1 pandemic, noting that he configured students' seats so that they were no longer facing each other in a pod formation and indicated that this required some substantial "geometry." Barriers to this practice did not vary by location in the United States; however, there was variation by grade level because different types of seating arrangements are used for different ages. Barriers to implementing this practice included insufficient classroom space to

spread desks out, inflexible seating arrangements and furniture, and negative impacts on students with special needs (eg, those who need to be located in the front row during instruction).

Participants indicated that flexible seating arrangements, such as desks and chairs that can be moved separately, would facilitate reconfiguring a classroom to create additional space between students during a pandemic. Also, a region 8 participant discussed how schools with limited space could rearrange students (eg, have all students face front, limiting face-to-face contact) without necessarily rearranging furniture. Finally, a region 10 participant discussed encouraging elementary-age students to fully utilize all the spaces in the classroom (eg, rug on the floor, rocking chair) rather than be limited to using desks and chairs at all times. He explained,

They like gathering in a carpet area or ... like a rocker or pillows. So, when they're doing their

**TABLE 2**  
**Perceived Barriers and Facilitators to Implementing Practices**

Practice	Barriers	Facilitators	Variability by Grade Level or Region
<b>Within-school practices</b>			
<i>Classroom</i>			
Rearrange desks to increase space	<ul style="list-style-type: none"> <li>• Insufficient classroom space to spread desks out (especially in older buildings that were designed for smaller class sizes)</li> <li>• Inflexible seating arrangements and furniture (eg, attached desk and chair)</li> <li>• Negative impacts on students with special needs</li> </ul>	<ul style="list-style-type: none"> <li>• Desks and chairs that can be moved separately</li> <li>• Utilize all spaces (eg, rug on floor, rocking chair) (elementary school)</li> <li>• Have all students face front, limiting face-to-face contact without necessarily rearranging furniture</li> </ul>	<ul style="list-style-type: none"> <li>• Variation by grade level because different types of seating arrangements are used for different ages</li> </ul>
Limit group work	<ul style="list-style-type: none"> <li>• Incompatibility with best practices in education depending on the content or intended activity</li> <li>• Need for additional teacher planning time to adjust lessons</li> <li>• Incompatibility with certain group-oriented classes</li> </ul>	<ul style="list-style-type: none"> <li>• Have groups interact through the Internet</li> </ul>	<ul style="list-style-type: none"> <li>• Generally considered feasible, especially for secondary schools</li> </ul>
Institute homeroom stay <sup>a</sup>	<p>Secondary schools:</p> <ul style="list-style-type: none"> <li>• Difficulty managing students' individualized and complex schedules, including off campus education activities</li> <li>• Lack of homeroom in most high schools</li> <li>• Insufficient staff and supplies for specialized courses</li> <li>• Negative impact on social interaction among students</li> </ul>	<ul style="list-style-type: none"> <li>• Carts and organizational supplies to carry books and classroom resources (secondary schools)</li> <li>• Use of technology to connect with other students and teachers virtually (secondary schools)</li> <li>• In elementary schools where this practice is currently the norm, cancel specialty classes for which students leave the classroom (eg, physical education, music, art)</li> </ul>	<ul style="list-style-type: none"> <li>• Currently the norm in many elementary schools</li> <li>• Viewed as very infeasible in secondary schools without heavy reliance on distance learning</li> </ul>
Restrict student movement in class	<ul style="list-style-type: none"> <li>• Challenging to enforce</li> <li>• Potential to create disciplinary problems</li> <li>• Negative impacts on learning</li> <li>• Student stress and anxiety</li> <li>• Disproportionately harms students with special needs</li> </ul>	<ul style="list-style-type: none"> <li>• Shorten class periods and school day</li> <li>• Allow students to stand and stretch beside their chairs</li> <li>• Use solo activities and distractions (eg, tablet computer)</li> <li>• Bring desks into classrooms that do not have them to create natural barriers between students</li> </ul>	<ul style="list-style-type: none"> <li>• Particularly challenging for elementary school students</li> </ul>
Separate classes into smaller groups and repurpose other spaces in school (eg, gymnasium, auditorium, library)	<ul style="list-style-type: none"> <li>• Lack of space</li> <li>• Lack of staff to supervise students</li> <li>• Negative impact on instruction for students assigned a new teacher</li> </ul>	<ul style="list-style-type: none"> <li>• Use alternative spaces within and outside the school (eg, community centers, sports complexes, churches, YMCAs, public libraries)</li> <li>• Bring in additional staff and volunteers to supervise students</li> </ul>	<ul style="list-style-type: none"> <li>• Finding enough qualified teachers to continue high-quality instruction with the smaller groups of students, particularly at the secondary level</li> </ul>
Move class outdoors	<ul style="list-style-type: none"> <li>• Weather</li> <li>• Limited outdoor space</li> <li>• Difficulty keeping students focused on learning</li> <li>• Lack of access to needed equipment and supplies</li> <li>• Challenges for students with special needs</li> <li>• Safety and security</li> </ul>	<ul style="list-style-type: none"> <li>• Install overhead coverings (awning or canopies)</li> <li>• Add more picnic tables, folding tables, chairs</li> <li>• Utilize heat lamps in cold weather</li> <li>• Add staff to monitor and assist students</li> </ul>	<ul style="list-style-type: none"> <li>• Felt not to be practical in the winter in the northern United States</li> </ul>

(continues)

**TABLE 2****Perceived Barriers and Facilitators to Implementing Practices (Continued)**

Practice	Barriers	Facilitators	Variability by Grade Level or Region
<i>Hallway and bathroom</i>			
Restrict hall movement	<ul style="list-style-type: none"> <li>• Need for additional staff to stand in the hall, supervise students, and enforce the practice (eg, walk single file 3 ft apart)</li> <li>• Physical space limitations (schools are crowded, junction points of hallways would be particularly challenging)</li> <li>• Logistical issues (time required to move large numbers of students, coordinate students retrieving belongings from lockers or cubbies)</li> </ul>	<ul style="list-style-type: none"> <li>• Use teachers from nearby colleges or substitute teachers, or enlist student monitors</li> <li>• Allow more time between classes</li> <li>• Have students walk in 2 parallel lines</li> <li>• Open different entrance/exit routes</li> <li>• Use outdoor hallways</li> <li>• Use visual aids such as taped lines on the floor to follow</li> </ul>	<ul style="list-style-type: none"> <li>• Would be feasible in elementary schools where most students are moving as a group from place to place, but not in secondary schools where each student has an individualized schedule</li> </ul>
Limit bathroom use	<ul style="list-style-type: none"> <li>• Logistics of enforcement</li> <li>• Protecting the health and privacy of students with medical conditions requiring unrestricted bathroom use</li> <li>• Challenges with parental buy-in</li> </ul>	<ul style="list-style-type: none"> <li>• Allow students with medical conditions to use bathroom in nurse's office</li> <li>• Prohibit use of bathroom during transition between classes or when coming in from lunch or recess</li> <li>• Place monitors outside bathrooms to prevent crowding in the bathrooms</li> </ul>	<ul style="list-style-type: none"> <li>• Hard to implement in secondary schools because teachers may grant a bathroom pass to one student at a time from a particular class, but students from other classrooms are being dismissed at the same time</li> </ul>
Limit congestion during arrival and dismissal (in lobbies, entryways, halls, and outdoor spaces)	<ul style="list-style-type: none"> <li>• Need for additional staff for enforcement</li> <li>• Variation in how students arrive at or leave from school</li> </ul>	<ul style="list-style-type: none"> <li>• Bring in extra staff to enforce the practice</li> <li>• Suspend use of lockers in secondary schools</li> <li>• Open up more entrances and exits to the school</li> <li>• Alter bus schedules to stagger arrivals and departures</li> </ul>	<ul style="list-style-type: none"> <li>• Challenging in secondary schools as students typically retrieve belongings from lockers</li> <li>• In colder regions, it might be infeasible to expect students to wait outside before being allowed to enter the building for their first class</li> </ul>
Stagger class start and dismissal times to reduce load in hall	<ul style="list-style-type: none"> <li>• Disruption for families</li> <li>• Logistics and scheduling</li> <li>• Potential unintended consequence of both extending the school day and reducing instructional time</li> </ul>	<ul style="list-style-type: none"> <li>• Shorten classes to allow more transition time</li> <li>• Alter bell schedules so that students are dismissed by grade level</li> <li>• Replace bell system with announcements or monitoring of clock by teachers</li> </ul>	<ul style="list-style-type: none"> <li>• Logistical complexities are more pronounced in higher-grade levels in which students have individualized class schedules</li> </ul>
<i>Schoolyard and recess</i>			
Segregate recess area by class	<ul style="list-style-type: none"> <li>• Need for additional monitoring</li> <li>• Need for additional planning/coordination</li> <li>• Size/configuration of the schoolyard/recess space</li> </ul>	<ul style="list-style-type: none"> <li>• Assign aides to help with enforcement</li> <li>• Rotate assigned spaces to ensure equitable access to desirable equipment (eg, the jungle gym)</li> </ul>	<ul style="list-style-type: none"> <li>• More relevant in elementary schools because secondary schools do not generally have a formal recess period</li> </ul>
Stagger recess times	None identified	None identified	<ul style="list-style-type: none"> <li>• Secondary schools do not generally have a formal recess period</li> </ul>

*(continues)*

**TABLE 2**  
**Perceived Barriers and Facilitators to Implementing Practices (Continued)**

Practice	Barriers	Facilitators	Variability by Grade Level or Region
Shorten or cancel recess times	<ul style="list-style-type: none"> <li>Regulatory issues depending on the state and school district</li> <li>Importance of recess to teachers and students</li> <li>Concern that limiting recess is counterproductive for social distancing</li> <li>Need to find an alternative activity for students</li> <li>Need for teachers to remain on duty during the time recess was supposed to occur</li> </ul>	<ul style="list-style-type: none"> <li>Obtain waiver to modify required physical activity minutes</li> </ul>	<ul style="list-style-type: none"> <li>Secondary schools do not generally have a formal recess period</li> </ul>
Encourage solo physical activity	<ul style="list-style-type: none"> <li>Need for additional staff/monitoring</li> <li>Space constraints</li> <li>Lack of predetermined solo activities and corresponding equipment</li> </ul>	<ul style="list-style-type: none"> <li>Develop resources and guidance on how to promote solo physical activity</li> <li>Secure funding to purchase enough equipment to limit the need for sharing</li> </ul>	None identified
<i>Cafeteria</i>			
Shut down cafeteria; eat in the classroom	<ul style="list-style-type: none"> <li>Staffing challenges (eg, need for teacher to supervise students during what was formerly her planning period)</li> <li>Logistics of food delivery and removal</li> <li>Safety concerns for students with food allergies</li> <li>Potentially hazardous classroom spaces (eg, science laboratories)</li> </ul>	<ul style="list-style-type: none"> <li>Forbid all students from bringing in potential allergens</li> <li>Remove potential allergens from meals prepared by kitchen staff</li> <li>Isolate students with allergies within classroom or have one classroom for students with allergies</li> <li>Have brown bag lunches (instead of hot meals)</li> </ul>	<ul style="list-style-type: none"> <li>Some elementary schools allow students to eat breakfast in the classroom</li> </ul>
Segregate cafeteria by class	<ul style="list-style-type: none"> <li>Space constraints</li> <li>Need for extra staff to supervise students if students are allowed to eat in locations other than the cafeteria</li> </ul>	<ul style="list-style-type: none"> <li>Overcome space constraints by utilizing other spaces within the school</li> </ul>	<ul style="list-style-type: none"> <li>Highly feasible for elementary schools because segregating the cafeteria by class is common practice</li> </ul>
Shorten and stagger meal periods (beyond current practice)	<ul style="list-style-type: none"> <li>Insufficient time for students to eat</li> <li>Extends the length of time that lunch staff and teachers are on duty</li> <li>Requires students to eat outside typical lunch hours</li> </ul>	<ul style="list-style-type: none"> <li>Provide “grab-and-go” bag lunches to speed up lunch line</li> </ul>	None identified
<i>Other</i>			
Cancel field trips	<ul style="list-style-type: none"> <li>Pushback from parents</li> <li>Logistics associated with refunding families for field trip costs</li> </ul>	<ul style="list-style-type: none"> <li>Postpone field trips instead of canceling</li> <li>Replace canceled field trips with virtual trips</li> <li>Direct parents to the health department to explain reasons for canceling</li> </ul>	None identified
Cancel assemblies	<ul style="list-style-type: none"> <li>Recouping costs for external speakers/presenters</li> </ul>	<ul style="list-style-type: none"> <li>Postpone rather than cancel</li> <li>Conduct virtual assemblies</li> </ul>	None identified

(continues)



**TABLE 2****Perceived Barriers and Facilitators to Implementing Practices (Continued)**

Practice	Barriers	Facilitators	Variability by Grade Level or Region
Limit nonessential staff and visitors	<ul style="list-style-type: none"> <li>Challenges in defining “essential” staff</li> <li>Disruption to student instruction from denying certain staff access to the building</li> <li>Burden on office staff tasked with enforcing restrictions</li> </ul>	<ul style="list-style-type: none"> <li>Develop clear communication about policy to restrict access</li> </ul>	None identified
Teach students and family to maintain distance	None identified	<ul style="list-style-type: none"> <li>Educate parents and staff at the same time</li> <li>Explain why behavior change is necessary</li> <li>Accompany education with a wider public health campaign on TV and the Internet</li> </ul>	<ul style="list-style-type: none"> <li>Education is likely to be more effective in secondary schools because students are developmentally able to understand the recommendations and modify their behaviors accordingly</li> </ul>
Shut down or restrict use of congregation spaces (eg, library, computer lab)	<ul style="list-style-type: none"> <li>Interference with testing and instruction that rely on these spaces</li> <li>Incompatibility with other social-distancing practices (eg, separate classes into smaller groups)</li> </ul>	<ul style="list-style-type: none"> <li>Send a few students into the library at a time to pick out books rather than going as a class (elementary school)</li> <li>Have the librarian travel to classrooms</li> </ul>	<ul style="list-style-type: none"> <li>Secondary schools would face greater challenges than elementary schools because routine instruction requires more use of the computer lab</li> </ul>
Reduce congestion in health office	<ul style="list-style-type: none"> <li>The need for extra staff and physical space within the school to serve students with influenza-like illnesses, chronic conditions such as diabetes mellitus or asthma, and injuries</li> <li>The need to protect the privacy of students with chronic conditions if the nurse is asked to travel to the student</li> <li>Difficulties in defining who truly needs access when restrictions are imposed</li> </ul>	<ul style="list-style-type: none"> <li>Set up satellite locations to serve students with different medical needs</li> <li>Have the school nurse travel to students in need of maintenance care</li> <li>Have teacher send home a student with a medical need rather than to the health office</li> <li>Change the traditional uses of the health office (eg, do not send healthy students to the health office to discipline them, do not store files or supplies in the health office that teachers may need)</li> </ul>	None identified
Cancel classes with high rates of contact among students	<ul style="list-style-type: none"> <li>State and/or local regulations regarding physical activity hours</li> <li>Extra burden on teachers</li> <li>Need to engage students in an alternative activity for a full class period that may require additional staff and space</li> <li>Reduced time to earn graduation credits</li> <li>Parental pushback</li> <li>Negative impact on morale and academic performance</li> </ul>	<ul style="list-style-type: none"> <li>Hold classes in a different way (eg, in elementary school have physical education teacher come into the classroom to prevent mixing with other students in the gymnasium; have music teacher come to the classroom)</li> </ul>	<ul style="list-style-type: none"> <li>Felt to be infeasible, especially in secondary schools</li> </ul>
Cancel cross-school transfer for special programs	<ul style="list-style-type: none"> <li>Impediment to earning credits and/or certification</li> <li>Lack of an alternative activity for students</li> <li>Failure to adhere to individualized education plans</li> </ul>	<ul style="list-style-type: none"> <li>Use distance learning to deliver the instruction</li> <li>Encourage students in driving themselves or carpooling when busing is suspended</li> </ul>	<ul style="list-style-type: none"> <li>Less relevant to elementary schools as few elementary school students participate in off-site special programs during the school day</li> </ul>

*(continues)*

**TABLE 2**  
**Perceived Barriers and Facilitators to Implementing Practices (Continued)**

Practice	Barriers	Facilitators	Variability by Grade Level or Region
<b>Reduced-schedule practices</b>			
Shorten school week <sup>b</sup>	<ul style="list-style-type: none"> <li>• Childcare challenges</li> <li>• Burden on staff</li> <li>• Reduced access to free or reduced price meals</li> <li>• Need to make up the missed days to meet minimum instructional hours</li> <li>• Challenging communication with parents about complex school schedules</li> <li>• Negative effects on educational quality due to fewer instructional hours</li> </ul>	<ul style="list-style-type: none"> <li>• Implement the same schedule for the entire school or district</li> <li>• Give parents advance notice</li> <li>• Engage key stakeholders</li> <li>• Obtain waiver from the state so that it does not withhold funding for the district</li> <li>• Put an e-learning plan in place and have more state-level policies that address e-learning</li> </ul>	<ul style="list-style-type: none"> <li>• Childcare needs are more pronounced for elementary-aged children</li> </ul>
Shorten school day <sup>c</sup>	<ul style="list-style-type: none"> <li>• Transportation challenges (specifically with busing)</li> <li>• Childcare challenges</li> <li>• Reduced access to free or reduced price meals</li> <li>• Impact on individualized education plans (IEPs) and special education hours</li> <li>• Concern about missing classes that are held only in the morning or afternoon</li> <li>• Safety concerns (eg, unsupervised students)</li> <li>• Difficulty communicating with families to avoid confusion about the school schedule</li> </ul>	<ul style="list-style-type: none"> <li>• Shorten the school day for the entire school rather than an alternating schedule with a morning and an afternoon shift</li> <li>• For an alternating schedule, build in enough transition time to ensure smooth transition between shifts</li> <li>• Relax requirements for minimum instruction hours and obtain waivers for federal mandates around IEPs</li> <li>• Give students bagged lunches</li> <li>• Assign more homework</li> <li>• Hold even class periods on one day and odd class periods the next to avoid consistently missing the same class periods</li> <li>• Use virtual or distance learning</li> </ul>	<ul style="list-style-type: none"> <li>• Could be challenging to arrange childcare for younger students, particularly if an older sibling who typically provides care for a younger one is on a different schedule</li> </ul>
Selective dismissal for one grade	<ul style="list-style-type: none"> <li>• Childcare challenges</li> <li>• Need to make up lost instructional time</li> <li>• Concerns about fairness</li> <li>• Disruption in classes with mixed-grade levels</li> </ul>	<ul style="list-style-type: none"> <li>• Use virtual or distance learning</li> </ul>	<ul style="list-style-type: none"> <li>• Within secondary schools, there is disruption to classes that include students from multiple grades (eg, band, chorus, and even core subjects)</li> </ul>
Selective dismissal for one class	<ul style="list-style-type: none"> <li>• Childcare challenges</li> <li>• Need to make up lost instructional time</li> <li>• Concerns about equity/fairness</li> </ul>	<ul style="list-style-type: none"> <li>• Use blended learning (ie, combine in-person instruction with virtual learning)</li> </ul>	<ul style="list-style-type: none"> <li>• Feasible only in elementary schools where students are likely to stay with the same teacher and classmates for the entire day</li> </ul>

<sup>a</sup>One cohort of students stays together all day, and teachers rotate in and out.

<sup>b</sup>For example, all students attend Monday through Wednesday only (entire school) OR half the students attend Monday and Tuesday and the other half attend Thursday and Friday (alternating).

<sup>c</sup>For example, all students in the school attend 8 AM to 12 noon each day OR half the students attend in the morning only and the other half attend in the afternoon only (alternating).

work, they can move around the room and find a different spot that's not at their table, and so that's a little bit more of a common practice at the elementary level.

**Feasible reduced-schedule practice: shortened school week for the entire school**

With a shortened school week, students do not attend 5 days in a row. This practice can apply to

**TABLE 3**  
**Most Common Legal and Policy Barriers Identified by Participants**

Type	Description
Required instructional time	States typically require a minimum number of instructional hours or school days as a condition for funding. If these requirements are not met, schools, or particular classes, must make up missed time by meeting on holidays or weekends or extending the school day.
Required physical activity (including recess and physical education)	Participants discussed some legal and regulatory challenges in decreasing or eliminating recess time or physical education class as part of a within-school practice or as a result of reduced-schedule practices, including the fact that some communities have requirements about the number of physical activity minutes students must receive.
Required duty-free or planning time for staff	Participants cautioned against asking teachers or other staff to supervise students at times that were previously designated as "duty-free" or reserved as planning periods. To extend duty hours, schools would either need to hire substitutes to supervise students or ask existing staff to assume the extra responsibilities, in some cases violating union terms.
Required time for certification	A variety of practices can harm students' ability to earn credit or fulfill requirements for certification. For example, certain career and technical programs require students to complete a certain number of hours to meet the criteria for certification.
Legal obligation to adhere to individualized education plans (IEP)	A number of practices (eg, movement restriction in class, cancellation of cross-school transfer, reducing school hours) can conflict with the IEPs of special needs students. Federal law obliges schools to adhere to IEPs.
Mandated standardized testing	A number of practices (eg, shut down computer lab, reduce school hours) can interfere with students' preparation for or the actual delivery of mandated standardized testing.
Required staff qualifications	Many communities require that teachers have certain qualifications (eg, be certified, pass a background check) as a condition of employment. Such requirements can be barriers to hiring additional staff in an emergency.

the entire school (eg, all students attend Monday through Wednesday only), or the school can alternate so that some students, for example, attend Monday and Tuesday and the others attend Thursday and Friday. Several focus group participants noted that their districts were already operating on a 4-day week because of budget constraints. The leading barriers to implementation of this practice include burden on parents to find childcare, impact on students who rely on schools for meals, need to make up missed instructional hours, challenging communication with parents about complex school schedules especially with alternating days, lower educational quality, and burden on staff. These barriers did not vary significantly by region of the country or grade level, with the exception of childcare needs being more pronounced for elementary-aged children.

Participants identified several facilitators to this practice. Many felt that a shortened school week would be less of a burden than shortened days on parents and on the bus transportation system because the disruption would be limited to 1 to 2 days per week rather than all 5 school days. Participants recommended having the whole district or at least all schools within the same feeder cluster operate on the same schedule to reduce some of the complexities for families with multiple children. Factors that could increase the feasibility of this practice include giving parents plenty of advance notice, engaging key stake-

holders to explain why and how the new schedule will work, obtaining a waiver from the state so that district funding is not reduced, putting a distance learning plan in place to continue instruction when students are at home, and offering meal programs off the campus for students not attending school on a given day.

## Discussion

Through 36 focus groups in all 10 HHS regions, we identified and reviewed 29 social distancing practices that schools could implement in an influenza pandemic while continuing to operate. Participants reported prior experience with several within-school practices in elementary schools as a part of routine (nonemergency) operations. These practices included homeroom stay, restriction of hall movement, segregation of recess area by class, staggering of recess times, segregation of cafeteria by class, and staggering of lunch periods. Within-school practices were generally perceived to be more feasible for elementary schools than secondary schools. Reduced-schedule practices, such as shortening the school week or the school day, were perceived to be less feasible than within-school practices in both settings.

The practices considered the most feasible were those that involved isolated events like field trips and all-school assemblies or furniture rearrangement that had little to no staffing, curricular, or cost

**TABLE 4**  
**Social Distancing Practices Perceived to Be Most Feasible**

Practice	Rank	Participant Votes <sup>a</sup>
<i>Within-school practices (23 focus groups)</i>		
Cancel field trips	1	46
Cancel assemblies	2	41
Rearrange desks to increase space <sup>b</sup>	3	22
Restrict hall movement <sup>c</sup>	4	20
Limit nonessential staff and visitors	5	19
Shut down cafeteria; eat in classroom	6	16
Limit bathroom use	7	14
Educate students to maintain their distance	8	14
Segregate cafeteria by class	9	13
<i>Reduced-schedule practices (13 focus groups)</i>		
Shortened school week—entire school	1	25
Shortened school day—entire school	2	14
Shortened school week—alternating schedule	3	10

<sup>a</sup>Total votes for within-school and reduced-schedule practices are not equal because 23 focus groups discussed within-school practices and 13 discussed reduced-schedule practices. Also, participants selected the 3 most feasible within-school practices and the one most feasible reduced-schedule practice. Finally, not all participants voted or used all of their votes (eg, some identified only 2 within-school practices as highly feasible).

<sup>b</sup>This practice is perceived to be feasible, but it may not keep students from mixing because limiting student movement in classrooms would be difficult (see Table 4).

<sup>c</sup>Considered feasible for elementary schools only.

implications. In general, the practices considered the least feasible were those that required smaller classes, more staff, more square footage, or staggered start and end times. These were considered less feasible because they require hiring more staff on short notice, rewriting lesson plans, altering parent work schedules on a daily and prolonged basis, or finding more space in already crowded buildings. Within-school practices that do not change the academic calendar in any way are easier to implement than reduced-schedule practices. In addition, reduced-schedule practices that affect the entire school rather than subgroups of students are easier to implement because an alternating schedule presents additional challenges (eg, need for additional bus routes, extra burden on parents with students on different schedules, and need to explain complex scheduling with clear, consistent messages). State and district policies on required instructional time, required physical activity hours, duty-free periods for teachers, professional development hours for teachers, and/or teacher qualifications were frequently mentioned as key barriers to making significant changes to school schedules and supervision of students. Schools can surmount some

**TABLE 5**  
**Social Distancing Practices Perceived to Be Least Feasible**

Practice	Rank	Participant Votes <sup>a</sup>
<i>Within-school practices (23 focus groups)</i>		
Move class outdoors	1	41
Stagger class start and dismissal times	2	30
Separate classes into smaller groups	3	24
Shorten and stagger lunch times (beyond what schools currently implement)	4	19
Institute homeroom stay <sup>b</sup>	5	14
Cancel recess	6	14
Shut down cafeteria; eat in class	7	14
Cancel cross-school transfers during the school day	8	14
Limit student movement in classroom	9	13
<i>Reduced-schedule practices (13 focus groups)</i>		
Cancel school/selective dismissal for 1 class only	1	23
Cancel school/selective dismissal for 1 grade only	2	23
Shortened school day—alternating schedule	3	22

<sup>a</sup>Total votes for within-school and reduced-schedule practices are not equal because 23 focus groups discussed within-school practices and 13 discussed reduced-schedule practices. Also, participants selected the 3 most feasible within-school practices and the one most feasible reduced-schedule practice. Finally, not all participants voted or used all of their votes (eg, some identified only 2 within-school practices as highly feasible).

<sup>b</sup>Considered feasible for elementary school only.

of these regulatory legal and regulatory barriers by seeking waivers and building flexibility into staff contracts.

Our findings indicate that several within-school practices could be implemented in elementary schools to reduce the transmission of influenza (eg, keeping students in their homerooms for the entire school day, restricting hall movement, segregating recess area by class, staggering recess times, segregating the cafeteria by class, staggering lunch periods). These practices might be more effective in reducing disease transmission across classrooms than within a classroom. Practices such as canceling assemblies or field trips might be feasible but might not have a sustained impact on disease transmission because they are one-time events rather than practices that alter the nature of social interactions at school. Implementation of some practices, such as rearranging desks to increase space, might be feasible but might not keep students from mixing, as it would be difficult to limit students' movement in class (eg, require students to stay seated at all times). Students are likely to continue moving

within the room and interacting with their peers. Among the reduced-schedule practices, shortening the school week for the entire school was perceived as the most feasible. Shortening the school week might be an alternative to prolonged school closure.

To our knowledge, our study represents the first one to comprehensively assess the feasibility of social distancing practices in schools. This study builds on our previous review of the literature, which found that neither the peer-reviewed and gray literature nor the pandemic influenza guidance and plans included details on the range of potential practices or on the barriers schools would likely encounter in implementing social distancing practices. Therefore, public health and school leaders had limited evidence to inform decisions about social distancing in schools.<sup>9</sup> Our previous literature review identified 1 epidemiological and 5 modeling studies that assessed the effect of selected school practices on reducing influenza transmission.<sup>9</sup> In addition to school closures, these studies considered limiting use of congregation spaces such as the cafeteria as well as a number of social distancing practices that our study identified as infeasible (eg, class and grade dismissal, classroom movement restrictions, and staggered classroom schedules). An additional modeling study reported that shortening school week may be effective in reducing virus transmission.<sup>10</sup> Hence, further epidemiologic and modeling efforts are needed to explore the range of effects of social distancing practices that our study identified as feasible according to educators.

This study has a number of limitations. First, we did not include parents because we chose to focus on educators' implementation challenges in school settings. While parents are crucial to ensuring compliance, they do not make the decision to implement social distancing measures and are not tasked with enforcing them in schools. Nonetheless, many focus group participants are also parents or report to them, and they commented on how practices would be received by parents. Second, although we engaged numerous stakeholders and achieved thematic saturation, findings represent the perspectives of focus group participants and might not be generalizable. Third, we focused on the United States and did not engage school leaders from other countries, nor assess the implications of this work for an international audience. Future research should explore the feasibility of school social distancing practices in a wide range of developed and developing countries. Fourth, due to time constraints, some focus groups discussed within-school practices and others discussed reduced-schedule practices. Fifth, we explored perceptions of feasibility. More research is needed on the effectiveness of identified practices on reducing disease

## Implications for Policy & Practice

- Schools and public health officials can jointly consider multiple practices to reduce influenza transmission during a pandemic as an alternative to closing.
- These practices can also be considered in other outbreaks of infectious disease that affect school settings.
- Practices vary with respect to feasibility, with practices that can be implemented as part of the school day (vs those that affect school hours) considered the most feasible.

transmission. Before such evaluations are completed, infectious disease transmission experts can consider our data to determine which of the top-rated practices may be helpful in reducing school-based transmission of the disease(s) of interest. The study's strengths included the following: the study was based on a large number of focus groups, included participants from all HHS regions, and assessed feasibility by primary versus secondary school.

## Conclusions

In summary, our findings suggest that schools have options to increase social distance during an influenza pandemic or other infectious disease outbreak as alternatives to closing. Given that influenza pandemics occur in waves and can last for months, it is critical to identify and consider alternatives to extended school closure, which is burdensome to students, parents, and employers.

Future research should evaluate the effects and optimal timing and duration of a set of seemingly *feasible* practices on influenza transmission in schools, given that selecting *effective* social distancing practices is the ultimate goal of policy makers and practitioners. In addition, feasibility and acceptability of the most promising practices will eventually need to be evaluated among other audiences, including parents and students.

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