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Outbreak of Meningococcal Disease Associated with an Elementary School — Oklahoma, March 2010

During March 10–31, 2010, the Oklahoma State Department of Health (OSDH) investigated an outbreak of meningococcal (*Neisseria meningitidis*) disease involving a consolidated school district of 1,850 students in rural northeastern Oklahoma. An OSDH field investigation team and the Rogers County Health Department (RCHD) established operations at the affected elementary school as soon as the outbreak was recognized. Five cases of meningococcal disease (including one probable case) were identified among four elementary school students and one high school student. Two students died; two recovered fully, and one survivor required amputation of all four limbs and facial reconstruction. All *N. meningitidis* isolates were serogroup C with the same multilocus sequence type and an indistinguishable pulsed-field gel electrophoresis pattern. To interrupt the outbreak, mass vaccination and chemoprophylaxis clinics were conducted in the population at risk; 1,459 vaccinations and 1,063 courses of antibiotics were administered. Children eligible for the Vaccines for Children (VFC) program received 1,092 of the vaccine doses, demonstrating that VFC is a feasible funding source for vaccine during an outbreak response.

Outbreak and Response

On the morning of March 10, 2010, OSDH was notified that a boy aged 7 years (student A) had been hospitalized with suspected meningococcal meningitis on the basis of a preliminary cerebrospinal fluid (CSF) culture result (Figure). After *N. meningitidis* confirmation, RCHD conducted a routine contact investigation. Four household members received chemoprophylaxis, and one close contact of the patient was advised to seek chemoprophylaxis.

The next morning, during a 2-hour period, three additional cases of suspected meningococcal disease (in students B, C, and D), including one fatality (student B), were reported to OSDH (Figure). All four patients attended a prekindergarten through 2nd grade lower elementary school in a consolidated school district with a total enrollment of approximately 1,850 students. Four noncontiguous buildings (lower elementary, upper elementary, middle school, and high school) on a single campus provided classrooms and other facilities for children in prekindergarten through 12th grade.

The occurrence of four cases within 48 hours prompted OSDH and RCHD to begin outbreak control measures consisting of providing chemoprophylaxis to children in selected grades and to other patient contacts to provide short-term protection of the population at risk. RCHD mobilized personnel to operate an interim mass chemoprophylaxis clinic onsite at the school. The clinic began operation at noon on March 11 (Figure), after the OSDH field epidemiology team arrived with antibiotics.

Chemoprophylaxis was targeted initially to the 443 students and 50 faculty members in the lower elementary school and to close contacts of the patients. American Academy of Pediatrics guidelines recommend oral rifampin in 4 doses over 2 consecutive days or a single-dose intramuscular ceftriaxone injection for use as chemoprophylaxis against meningococcal disease among children (*1*). Intramuscular ceftriaxone was selected as the agent for children in the lower elementary school to ensure rapid initiation of chemoprophylaxis and to alleviate concerns regarding noncompliance with a 4-dose regimen of an unpalatable medication.

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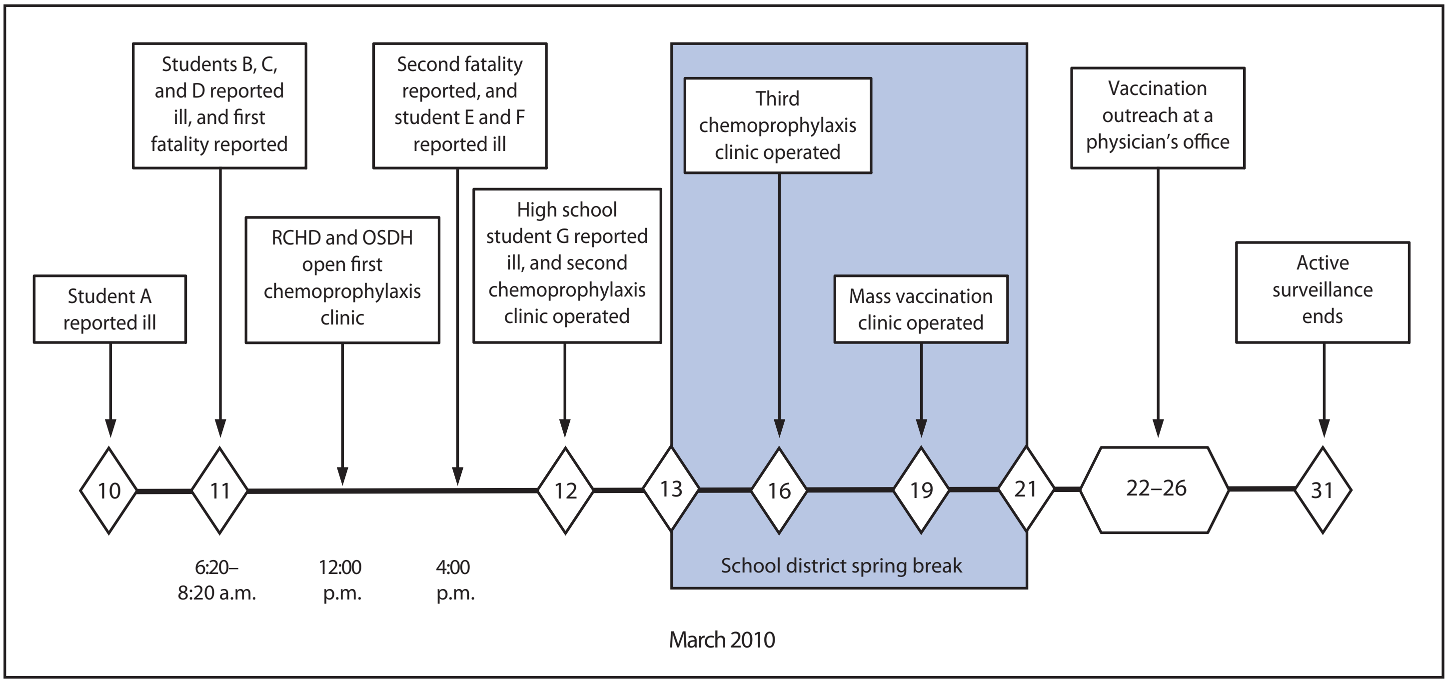
FIGURE. Timeline of major events involving invasive meningococcal disease outbreak based in an elementary school and public health response — Oklahoma, March 2010



Abbreviations: RCHD = Rogers County Health Department, OSDH = Oklahoma State Department of Health.

At approximately 4:00 p.m., OSDH was notified that student D had died and that two additional lower elementary students had been hospitalized with fever and rash (students E and F). Although these two illnesses were eventually found not to be cases of *N. meningitidis* infection on the basis of laboratory and clinical findings, that evidence did not become available until the following week. With the reports of an additional death and additional patients, the OSDH field team expanded

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chemoprophylaxis eligibility to select older students who had participated in reading instruction that placed them in direct contact with younger children in classrooms where cases were identified and to select persons who rode on buses with the patients, a total of approximately 400 additional contacts. During March 11–12, the first two chemoprophylaxis clinics operated for approximately 16 hours and administered 846 chemoprophylaxis doses.

On March 12, suspected meningococcal disease in a high school student in the district (student G) was reported to OSDH on the basis of clinical suspicion (Figure). As an additional precaution and to facilitate the chemoprophylaxis clinics, school district officials, in consultation with OSDH, dismissed all classes and canceled all extracurricular activities 1 day earlier than the scheduled, week-long spring break. Also on March 12, OSDH recommended mass meningococcal vaccination for all students, faculty, and staff members in the affected school district as a definitive outbreak control measure. Culture confirmation of *N. meningitidis* infection in student G was obtained on March 15.

On March 19, RCHD operated a mass meningococcal vaccination clinic at the school gymnasium, followed by vaccination outreach at the community physician's office during March 22–26 (Figure). A total of 1,459 doses of meningococcal vaccine (i.e., 1,426 doses of quadrivalent meningococcal conjugate vaccine, plus 33 doses of quadrivalent meningococcal polysaccharide vaccine [MPSV4] for those aged >55 years) were administered, resulting in vaccination of approximately 68% of students aged 4–18 years. During March 11–31, OSDH conducted active surveillance in six surrounding counties but identified no additional outbreak-linked cases.

Case Characteristics

A confirmed case of invasive meningococcal disease was defined as isolation of *N. meningitidis* from a normally sterile body site. A probable case was defined as *N. meningitidis* DNA detected by polymerase chain reaction without organism isolation in a suspected patient. A suspected case was defined as physician-reported fever and any rash in a person linked epidemiologically to a patient with a confirmed case. Two suspected cases (in students E and F) ultimately were excluded. Four cases (in students A, C, D, and G) were confirmed, and one case (in student B) was classified as probable (Table). The five patients ranged in age from five to 18 years.

All five patients required hospitalization. Meningococcemia was present in four patients, two of whom also had isolation of *N. meningitidis* from cerebrospinal fluid (Table). Formalin-fixed, paraffin-embedded central nervous system tissues were obtained at autopsy from the two decedents, and immunohistochemical and molecular evidence of infection with *N. meningitidis* was observed in the tissues. The four patients with confirmed cases had isolation of *N. meningitidis* serogroup C, further characterized as multilocus sequence type ST-11 with an indistinguishable pulsed-field gel electrophoresis pattern (H46N06.0037).

The five patients were in three different grades. Three of the patients, including the index patient (student A) were in the same 2nd grade classroom. One patient with confirmed meningococcal disease (student C) was in a kindergarten classroom with a younger sibling of the index patient, and the fifth patient (student G) sang in close proximity to an older sibling of the index patient in two school choirs. None of the five patients had received a meningococcal vaccination previously.

What is already known on this topic?

Meningitis caused by *Neisseria meningitidis* is an uncommon, often fatal, infectious disease. Outbreak response can include vaccination, and if vaccination is implemented, postexposure chemoprophylaxis may be administered to protect persons until vaccine-induced immunity develops.

What is added by this report?

In 2010, an outbreak of five cases of meningococcal disease, two fatal, occurred in an Oklahoma prekindergarten through 12th grade school complex. Four patients attended the same lower elementary school, and one was a high school student. All cases were caused by indistinguishable isolates of serogroup C *N. meningitidis*. To stem the outbreak, public health authorities provided chemoprophylaxis to 1,063 persons and vaccination to 1,459. Of 1,250 children aged 4–18 years who received quadrivalent meningococcal conjugate vaccine, 87% were eligible for the federal Vaccines for Children (VFC) program.

What are the implications for public health practice?

During a rapidly progressive meningococcal disease outbreak in a school, a prompt and coordinated public health response following established outbreak guidelines is needed to protect those at risk. VFC is a potential funding source for purchasing vaccine for eligible children aged 9 months–18 years in an outbreak setting.

Reported by

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TABLE. Patient, clinical, and laboratory characteristics involving confirmed and probable cases of meningococcal disease (N = 5) based at an elementary school — Oklahoma, March 2010

							Specimens with positive test results for *Neisseria meningitidis*	
Case	**Classification**	**Grade**	**Disease onset**	**Purpuric rash**	**ICU**	**Died**	**Culture specimen**	**PCR specimen**
A	Confirmed	2nd grade	March 8	Yes	Yes	No	Blood/CSF	Blood/CSF
B	Probable	2nd grade	March 10	Yes	Yes	Yes	None	Blood/Cerebral tissue
C	Confirmed	Kindergarten	March 10	Yes	Yes	No	Blood	Blood
D	Confirmed	2nd grade	March 10	Yes	Yes	Yes	Blood/CSF	Blood/CSF
G	Confirmed	12th grade	March 10	No	No	No	Blood	None

Abbreviations: ICU = intensive-care unit, CSF = cerebrospinal fluid, PCR = polymerase chain reaction.

Editorial Note

School-related meningococcal disease outbreaks generate considerable community anxiety and require rapid, intensive public health response. In the United States, annual incidence of invasive meningococcal infection is approximately 0.5 cases per 100,000 population (*2*) with <1,200 cases of invasive disease reported to CDC in 2008 (*3*). In Oklahoma, during 2005–2009, incidence was 0.5 cases per 100,000 population, the lowest rate since 1978. In both Oklahoma and nationwide, children aged <1 year experience the highest incidence of disease (*3*). Approximately 5% of all cases occur during outbreaks, and elementary schools account for only 25% of school-based outbreaks (*4*). Case-fatality ratios are higher for outbreak-associated cases than for sporadic cases (*5*).

In 2009, estimated meningococcal vaccination coverage among Oklahoma teens was 29.5%, ranking 46th among states; coverage for the United States overall was 53.6% (*6*). During the meningococcal disease outbreak described in this report, the majority of those affected were aged 5–7 years, typically considered an age group at low risk and not recommended for routine immunization against meningococcal disease (*7*). In this outbreak, the rapid succession of reported cases suggested that additional cases were likely, necessitating immediate public health intervention.

Meningococcal vaccination was implemented as the definitive outbreak control measure based on a primary attack rate of 162 per 100,000 population (three primary cases in a school complex population of 1,850) (*8*). Vaccination is the preferred method for establishing long-term protection, and in contrast to polysaccharide vaccine, use of conjugate vaccine can achieve greater impact at lower coverage levels because of herd immunity (*9,10*). However, the immune response to vaccination takes 7–10 days to develop, whereas the majority of cases occur soon after the index case in school-based outbreaks (*4*). One third of cases occur within 2 days and three fourths within 14 days. Close household contacts of patients are at 500- to 1,000-fold increased risk and are recommended to receive chemoprophylaxis. In contrast, the estimated incidence of secondary meningococcal disease among school children is 2.5 per 100,000, or a relative risk of 2.3 (*4*).

If a public health decision is made to implement vaccination as an outbreak control measure after two or more cases are reported in a school, administration of chemoprophylaxis to the population at risk also should be considered, both to offer short-term protection to at-risk persons and potentially to limit transmission. Mass chemoprophylaxis is most likely to be effective when administered quickly and completely to a well-defined or closed cohort. The rapid occurrence of cases in school clusters suggests that transmission occurs rapidly among susceptible children. Each school-based outbreak has unique characteristics, including various case numbers and frequency, serogroup, and physical setting; public health and school officials should tailor their responses accordingly.

When a case in a high school student was identified during this outbreak, the population considered "at risk" was expanded, and the vaccination campaign was extended to all unvaccinated students, faculty members, and administrative personnel at the four district schools. VFC-eligible children aged 11–18 years were able to receive meningococcal vaccine at no charge. Because an outbreak was declared, thereby classifying the children involved in the outbreak as at increased risk for disease, children aged 4–10 years who met federal VFC program eligibility criteria also were able to receive free meningococcal vaccine.

State funds were available to purchase only 25% of the total 1,459 doses of vaccine administered among all age groups, including all vaccine administered to adult school employees. Of the 1,426 quadrivalent meningococcal conjugate vaccine doses administered, 1,250 doses were administered to children aged 4–18 years, of whom 1,092 (87%) were deemed VFC-eligible, illustrating that use of VFC funds can bolster vaccination coverage among eligible children in an outbreak setting. In addition, federal Section 317 funding* was used to purchase vaccine for children ineligible for VFC vaccine. Subsequently, a joint resolution by the Advisory Committee on Immunization Practices and VFC clarified that children aged 9 months–10 years who are associated with an outbreak

* Additional information available at http://www.hhs.gov/recovery/programs/cdc/immunizationgrant.html.

of disease caused by a vaccine-preventable meningococcal serogroup are among those eligible for VFC (*7*).

Early in the outbreak investigation, school officials expeditiously agreed to host the chemoprophylaxis and vaccination clinics. Local emergency medical services were present and assisted in monitoring for adverse events associated with the chemoprophylaxis and vaccination clinics held at the school. The school used its automated parent-calling system to provide details regarding who was being advised to receive preventive chemoprophylaxis and vaccine. In addition to county and state public health agencies, local medical, fire, and law enforcement personnel mobilized quickly to help support the chemoprophylaxis clinics. The rapid, coordinated response was associated with high compliance with vaccination, which likely contributed to outbreak cessation.

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HIV, Other STD, and Pregnancy Prevention Education in Public Secondary Schools — 45 States, 2008–2010

In the United States, 46% of high school students have had sexual intercourse and potentially are at risk for human immunodeficiency virus (HIV) infection, other sexually transmitted diseases (STDs), and pregnancy (*1*). The National HIV/AIDS Strategy for the United States recommends educating young persons about HIV before they begin engaging in behaviors that place them at risk for HIV infection (*2*). The Community Preventive Services Task Force (CPSTF) also recommends risk reduction interventions to prevent HIV, other STDs, and pregnancy among adolescents (*3*). To estimate changes in the percentage of secondary schools that teach specific HIV, other STD, and pregnancy risk reduction topics, a key intervention consistent with those supported by the National HIV/AIDS Strategy and CPSTF (*2,3*), CDC analyzed 2008 and 2010 School Health Profiles data for public secondary schools in 45 states. This report summarizes the results of those analyses, which indicated that in 2010, compared with 2008, the percentage of secondary schools teaching 11 topics on HIV, other STD, and pregnancy prevention in a required course in grades 6, 7, or 8 was significantly lower in 11 states and significantly higher in none; the percentage of secondary schools teaching eight topics in a required course in grades 9, 10, 11, or 12 was significantly lower in one state and significantly higher in two states; and the percentage of secondary schools teaching three condom-related topics in a required course in grades 9, 10, 11, or 12 was significantly lower in eight states and significantly higher in three states. Secondary schools can increase efforts to teach all age-appropriate HIV, other STD, and pregnancy prevention topics to help reduce risk behaviors among students.

School Health Profiles surveys have been conducted biennially since 1996 to assess school health practices in the United States.* States, territories, large urban school districts, and tribal governments participate in the surveys, either selecting systematic, equal-probability samples of their secondary schools (middle schools, junior high schools, and high schools with one or more of grades 6–12),† or selecting all public secondary schools within their jurisdiction.§ Self-administered questionnaires are sent to the principal and lead health education teacher at each selected school and returned to the agency conducting the survey. Lead health education teachers are asked questions regarding the content of required instruction related to HIV, other STD, and pregnancy prevention.¶ Data are included in this report only if the state provided appropriate documentation of methods and had a school response rate ≥70% for both the 2008 and 2010 surveys. Across states included in this report, school response rates ranged from 70% to 93% (median: 73%) in 2008 and from 70% to 86% (median: 73%) in 2010. The number of lead health education teachers who participated, by state, ranged from 71 to 472 (median: 245) in 2008 and from 65 to 677 (median: 249) in 2010. Participation in School Health Profiles is confidential and voluntary. Follow-up telephone calls, e-mails, and written reminders are used to encourage participation. For states that use a sample-based method, results are weighted to reflect the likelihood of schools being selected and to adjust for differing patterns of nonresponse. For states that conduct a census, results are weighted to adjust for differing patterns of nonresponse.

This report includes data from 45 states that provided weighted School Health Profiles data in 2008 and 2010.** For each of these states, three composite measures were created to determine the percentage of schools that taught 1) all 11 topics listed in the questionnaire in a required course in grades 6, 7, or 8; 2) all eight topics listed in the questionnaire in a required course in grades 9, 10, 11, or 12; and 3) all three condom-related topics listed in the questionnaire in a required course in

* Additional information and questionnaires are available at http://www.cdc.gov/healthyyouth/profiles.

† Alabama, Alaska, Arizona, Arkansas, California, Connecticut, Florida, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Virginia, Washington, West Virginia, and Wisconsin.

§ Delaware, Hawaii, Idaho, Maine, Massachusetts, Montana, Nevada, New Hampshire, Rhode Island, South Carolina, Utah, Vermont, and Wyoming.

¶ In 2008, lead health education teachers were asked, "During this school year, did teachers in this school teach each of the following HIV, STD, or pregnancy prevention topics in a required course for students in any of grades 6, 7, or 8?" for a list of 11 topics (Table 1) (e.g., how HIV and other STDs are diagnosed and treated; how to prevent HIV, other STDs, and pregnancy; and the benefits of being sexually abstinent). Respondents were instructed to mark "yes" or "no" for each topic or "not applicable" if their school did not include grades 6, 7, or 8. Teachers also were asked the same question for grades 9–12 for a list of eight topics (Table 2) that repeated some of the 11 topics and added others (e.g., the relationship between alcohol and other drug use and risk for HIV, other STDs, and pregnancy), and three condom-related topics (Table 3). In 2010, lead health education teachers were asked, "During this school year, did teachers in your school teach each of the following HIV, STD, or pregnancy prevention topics in a required course for students in each of the grade spans below?" The topics, grade spans, and possible responses were the same as those specified in 2008.

** Alabama, Alaska, Arizona, Arkansas, California, Connecticut, Delaware, Florida, Hawaii, Idaho, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

grades 9, 10, 11, or 12. These topics reflect the knowledge and skills that are the focus of interventions shown to be effective in reducing risk that CPSTF and others use as a basis for their recommendations about interventions for adolescents (*3–6*). For each state, the percentages of schools that taught individual topics and the composite measurements are reported. Significant (p<0.05) differences between results from 2008 and 2010 were determined by t-test. Statistical software was used to account for the sample design and unequal weights.

Compared with 2008, the percentage of schools in 2010 in which all 11 topics were taught in a required course in grades 6–8 was significantly lower in 11 states and significantly higher in no state (Table 1). The percentage of schools in which all eight topics were taught in a required course in grades 9–12 was significantly lower in one state and significantly higher in two states (Table 2). Additionally, the percentage of schools in which all three condom-related topics were taught in a required course in grades 9–12 was significantly lower in eight states and significantly higher in three states (Table 3). Among the 45 states in 2010, the percentage of schools that taught all 11 topics in grades 6, 7, or 8 ranged from 12.6% (Arizona) to 66.3% (New York) (median: 43.3%), the percentage of schools that taught all eight topics in grades 9–12 ranged from 45.3% (Alaska) to 96.4% (New Jersey) (median: 80.3%), and the percentage of schools that taught all three condom-related topics in grades 9–12 ranged from 11.3% (Utah) to 93.1% (Delaware) (median: 58.1%).

For five of the 11 topics (Table 1), the percentage of schools teaching the topic in a required course in grades 6–8 increased significantly in no state, and for the remaining six topics, the percentage increased significantly in one state. Conversely, the percentage of schools teaching any one topic decreased significantly in one to 10 states. The percentage of schools teaching how HIV and other STDs are diagnosed and treated decreased significantly in 10 states, as did the percentage teaching health consequences of HIV, other STDs, and pregnancy. The percentage of schools teaching how to prevent HIV, other STDs, and pregnancy decreased significantly in nine states.

For five of the eight topics (Table 2), the percentage of schools teaching the topic in a required course in grades 9–12 increased significantly in no state; for two topics, the percentage increased significantly in one state; and for the remaining two topics, the percentage increased significantly in two states. Conversely, the percentage of schools teaching any one topic decreased significantly in one to four states. The relationship among HIV, other STDs, and pregnancy was the one topic that showed significant decreases in the percentage of schools teaching it in four states. No state showed a significant increase, and one to seven states showed a significant decrease in the percentage of schools teaching any of the three condom-related topics in any of grades 9–12 (Table 3). The percentage of schools teaching how to obtain condoms decreased significantly in seven states.

What is already known on this topic?

Schools provide a unique setting for reaching most youths nationwide with information they can use to prevent human immunodeficiency virus (HIV) infection, other sexually transmitted diseases, and pregnancy.

What is added by this report?

In 2010, compared with 2008, the percentage of public secondary schools in 45 states teaching specific HIV, other sexually transmitted disease (STD), and pregnancy prevention topics in required courses generally did not increase, and percentages teaching all topics varied widely across these states.

What are the implications for public health practice?

To help reduce HIV-, other STD-, and pregnancy-related risk behaviors among students, secondary schools can increase efforts to teach all age-appropriate HIV, other STD, and pregnancy prevention topics.

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Editorial Note

CPSTF recommends group-based comprehensive risk reduction interventions delivered to adolescents, in schools or communities, to promote behaviors that prevent or reduce the risk for HIV, other STDs, and pregnancy. This recommendation is based on evidence of effectiveness in reducing engagement in any sexual activity, frequency of sexual activity, number of partners, and frequency of unprotected sexual activity, and in increasing the self-reported use of protection against STDs and pregnancy (*3*).

Although a median of 90% of all public secondary schools across the 45 states in this report taught HIV prevention in a required course during 2010 (*7*), the findings indicate that little progress was made in increasing the number of specific topics covered as part of HIV, other STD, and pregnancy prevention education during 2008–2010. The percentage of secondary schools that taught all HIV, other STD, and pregnancy prevention topics in a required course also varied widely across states. Further research is needed to understand determinants of the number of specific HIV, other STD, and pregnancy prevention topics taught in secondary schools.

TABLE 1. Percentage of public secondary schools in which specific human immunodefiency virus (HIV), sexually transmitted disease (STD), or pregnancy prevention topics were taught in a required course in grades 6, 7, or 8 — 45 states, 2008 and 2010

State	Differences between HIV and AIDS		How HIV and other STDs are transmitted		How HIV and other STDs are diagnosed and treated		Health consequences of HIV, other STDs, and pregnancy		Benefits of being sexually abstinent		How to prevent HIV, other STDs, and pregnancy	
	2008	2010	2008	2010	2008	2010	2008	2010	2008	2010	2008	2010
Alabama	86.4	84.2	86.4	81.5	82.9	72.2[§]	85.1	73.1[§]	81.7	74.1	84.6	75.8
Alaska	58.4	42.7[§]	64.9	43.1[§]	53.0	40.1[§]	61.3	41.6[§]	59.6	44.6[§]	63.6	44.6[§]
Arizona	46.9	32.1[§]	47.6	33.7[§]	37.2	24.6[§]	45.2	31.1[§]	44.5	31.7[§]	44.8	32.3[§]
Arkansas	86.3	81.7	88.4	81.8	81.7	76.4	84.4	79.3	86.1	81.2	86.7	81.9
California	85.2	81.1	86.1	81.6	80.6	72.4[§]	84.6	79.3	81.6	78.9	85.0	76.0[§]
Connecticut	83.2	73.0	85.2	78.8	75.0	66.3	81.6	76.8	79.8	75.8	83.3	74.0
Delaware	74.1	67.7	83.4	70.6	78.1	64.7	78.6	69.7	78.6	73.5	82.9	72.7
Florida	76.8	73.2	77.5	74.6	70.4	68.1	74.8	70.4	78.2	73.5	75.6	70.5
Hawaii	79.9	90.1	84.7	94.8	69.8	83.0	77.5	87.6	83.9	92.4	81.8	90.1
Idaho	79.6	73.4	80.3	74.4	71.8	63.1	78.2	71.9	84.0	77.8	78.1	71.7
Indiana	92.0	90.5	95.1	91.5	89.8	84.5	93.8	90.2	94.3	93.8	91.8	92.0
Iowa	86.2	76.6	88.9	78.4[§]	79.8	68.3[§]	82.8	79.2	86.1	77.7	84.3	78.3
Kansas	74.9	75.4	76.8	77.2	68.4	68.7	74.4	74.1	76.0	78.4	74.3	77.8
Kentucky	86.7	78.6	88.9	81.9	79.6	67.9[§]	86.4	77.8	90.2	79.8[§]	90.2	77.3[§]
Maine	79.2	82.1	80.4	83.9	71.9	69.4	77.7	82.7	77.5	82.3	79.0	80.8
Maryland	89.2	81.4	88.6	81.5	85.4	77.1	87.1	77.5[§]	87.7	79.4	86.3	78.2
Massachusetts	75.6	72.4	76.1	75.1	68.9	69.6	75.3	71.3	75.3	74.4	74.3	72.9
Michigan	77.0	76.2	76.9	75.8	71.1	73.4	73.2	73.0	77.0	77.5	72.1	71.8
Minnesota	82.5	80.2	85.0	82.5	77.6	76.8	86.5	75.5[§]	83.4	87.7	83.2	79.2
Mississippi	59.4	57.0	64.5	56.4	55.1	52.7	62.6	57.2	65.7	56.5	60.3	55.0
Missouri	82.8	76.6	85.0	79.1	79.9	69.4[§]	83.2	79.0	81.1	79.3	79.5	77.8
Montana	83.8	72.8	83.0	77.0	74.6	66.4	82.7	74.0	80.1	77.2	79.1	74.7
Nebraska	77.1	63.6[§]	75.6	68.9	67.5	58.7	78.5	66.7[§]	77.6	70.3	77.9	64.6[§]
Nevada	82.2	93.6	83.2	95.5[§]	77.8	87.7	78.4	95.5[§]	80.2	90.4	81.5	95.5[§]
New Hampshire	83.1	73.6	83.9	77.7	72.8	71.9	78.6	76.6	81.4	78.7	77.7	77.8
New Jersey	90.2	88.5	90.7	89.9	85.9	85.4	90.2	87.3	85.7	88.0	86.7	86.9
New York	94.5	92.8	95.3	93.4	91.8	88.4	93.2	90.9	93.6	90.9	94.2	90.4
North Carolina	87.4	73.8[§]	89.7	75.9[§]	82.9	66.2[§]	88.1	72.9[§]	88.6	77.0[§]	88.2	74.9[§]
North Dakota	76.8	75.4	75.9	77.8	69.3	64.4	73.7	72.1	71.8	75.0	71.7	72.5
Ohio	82.4	71.2[§]	84.8	73.8[§]	79.1	65.5[§]	83.6	70.9[§]	83.7	74.3[§]	82.9	69.9[§]
Oklahoma	62.3	65.5	63.1	65.8	57.9	60.2	59.9	62.6	59.1	61.0	59.1	63.1
Oregon	86.7	81.0	87.5	85.1	79.9	67.4[§]	86.8	79.1	88.1	84.9	87.7	82.5
Pennsylvania	86.5	78.9[§]	86.5	78.3[§]	79.8	72.1	85.5	76.2[§]	84.9	79.2	84.4	75.3[§]
Rhode Island	89.8	92.1	87.4	92.1	77.2	83.9	85.0	87.5	79.7	88.2	87.4	88.2
South Carolina	91.2	90.4	89.2	89.4	82.9	85.8	89.2	86.9	89.2	89.9	87.5	87.5
South Dakota	73.9	63.7	74.9	67.0	62.8	59.2	81.1	60.6[§]	77.8	66.2	80.9	61.8[§]
Tennessee	67.7	63.6	68.4	65.8	59.8	58.5	66.8	63.0	68.4	64.5	65.3	63.2
Texas	75.6	77.9	76.6	78.7	69.6	71.7	74.1	77.8	75.4	80.7	73.1	76.9
Utah	90.7	92.8	91.8	89.7	76.6	81.4	89.0	86.1	91.7	85.6	85.6	83.0
Vermont	68.0	77.1	70.3	80.7	60.3	66.9	60.9	73.8	69.9	80.1	66.4	78.3
Virginia	85.7	83.7	86.8	84.5	80.3	80.2	84.5	82.2	87.3	85.2	84.9	85.0
Washington	90.1	91.9	91.2	91.2	80.0	85.9	88.7	88.6	89.4	86.2	89.5	85.6
West Virginia	88.5	84.2	89.5	86.2	83.9	79.9	85.9	82.9	88.6	90.1	88.6	85.0
Wisconsin	87.1	85.3	88.8	86.9	78.3	79.6	88.8	82.6	88.6	89.9	86.8	84.1
Wyoming	80.8	75.4	84.4	77.6	75.6	71.5	83.0	75.2	82.7	78.7	79.3	75.5
State median	*82.8*	*77.1*	*84.8*	*78.8*	*77.2*	*69.6*	*82.8*	*76.6*	*81.6*	*78.9*	*82.9*	*77.3*
State range	*(46.9–94.5)*	*(32.1–93.6)*	*(47.6–95.3)*	*(33.7–95.5)*	*(37.2–91.8)*	*(24.6–88.4)*	*(45.2–93.8)*	*(31.1–95.5)*	*(44.5–94.3)*	*(31.7–93.8)*	*(44.8–94.2)*	*(32.3–95.5)*

HIV, other STD, and pregnancy prevention education in grades 6–8 is particularly important because most students in those grades are not yet sexually active (*1,2*). HIV, other STD, and pregnancy prevention education that is taught before most young persons engage in risk behaviors, and that includes information on the benefits of abstinence and delaying or limiting sexual activity, can prevent behaviors that might lead to HIV infection, other STDs, and pregnancy (*2*).

Because many students become sexually active during high school (*1*), HIV, other STD, and pregnancy prevention education in these grades also is critically important (*2*). HIV, other STD, and pregnancy prevention education that includes information on condom efficacy, the importance of using condoms consistently and correctly, and how to obtain condoms taught to those who might decide to be or are sexually active also can prevent behaviors that might lead to HIV infection, other STDs, and pregnancy (*4–6*).

TABLE 1. (*Continued*) Percentage of public secondary schools in which specific human immunodefiency virus (HIV), sexually transmitted disease (STD), or pregnancy prevention topics were taught in a required course in grades 6, 7, or 8 — 45 states, 2008 and 2010

State	How to access valid and reliable health information, products, and services*		Influences of media, family, and social and cultural norms on sexual behavior		Communication and negotiation skills[†]		Goal-setting and decision-making skills[†]		Compassion for persons living with HIV or AIDS		All 11 topics	
	2008	2010	2008	2010	2008	2010	2008	2010	2008	2010	2008	2010
Alabama	75.3	64.1	78.8	65.0[§]	79.2	64.8[§]	79.6	67.4[§]	71.2	60.5	63.4	44.8[§]
Alaska	53.3	41.9	53.3	38.5[§]	50.9	39.3	56.7	38.9[§]	43.6	32.6	32.0	23.6
Arizona	35.0	25.8	43.4	28.6[§]	43.1	29.2[§]	40.9	26.5[§]	34.2	19.8[§]	27.7	12.6[§]
Arkansas	79.8	74.2	84.7	74.7	79.2	71.1	82.3	72.4	69.5	64.9	64.5	59.7
California	72.5	67.2	73.9	67.0	70.1	64.0	71.0	66.1	69.7	62.5	54.4	47.5
Connecticut	68.7	59.5	69.1	67.2	68.5	65.4	71.4	59.4[§]	70.0	62.9	47.9	39.0
Delaware	78.6	57.6	76.5	66.7	76.9	63.6	76.4	69.7	52.1	59.4	51.8	45.2
Florida	62.8	60.6	61.5	65.8	70.9	66.2	72.4	68.3	61.2	60.4	52.5	49.0
Hawaii	75.1	80.6	75.1	82.9	72.7	80.6	75.1	87.4	65.1	72.8	57.1	66.3
Idaho	66.5	59.0	73.5	69.1	67.8	67.0	72.9	66.0	67.4	50.9[§]	50.6	40.1
Indiana	76.0	73.0	89.2	86.5	85.6	83.1	87.1	80.1	75.6	66.6	65.9	54.7[§]
Iowa	76.6	66.0	77.4	71.4	71.0	64.8	74.8	67.2	66.8	55.4	51.4	41.4
Kansas	59.5	58.2	69.5	66.8	68.1	66.6	69.3	65.0	57.7	53.0	48.4	39.0
Kentucky	72.9	63.0	83.7	74.9	79.8	69.7	83.3	70.9[§]	69.0	56.3[§]	61.9	44.8[§]
Maine	64.8	68.0	69.8	75.9	67.6	74.9	66.1	72.0	65.2	58.5	44.8	42.2
Maryland	75.0	70.6	82.9	73.9	83.3	73.6[§]	86.9	76.6[§]	76.6	65.0[§]	66.1	57.7
Massachusetts	63.9	59.5	70.0	69.5	64.8	64.2	69.4	65.4	63.0	56.3	44.2	40.8
Michigan	63.1	57.7	67.8	65.3	63.9	63.6	65.4	66.1	63.0	56.1	48.9	39.5
Minnesota	69.8	64.8	75.4	76.3	75.0	68.1	74.3	73.3	63.6	49.7[§]	49.6	36.3[§]
Mississippi	55.2	51.5	57.4	50.7	56.6	49.2	59.4	53.8	51.4	45.6	49.4	36.4
Missouri	71.5	64.9	76.4	70.0	73.2	66.8	75.0	71.3	64.4	58.0	56.6	47.3[§]
Montana	71.9	60.5	72.4	68.8	72.6	62.7	67.8	63.3	67.7	57.1	50.9	41.6
Nebraska	56.7	58.4	74.2	65.9	67.2	63.1	67.7	59.1	55.7	53.7	41.3	35.9
Nevada	63.7	82.3[§]	75.5	82.7	72.7	88.9[§]	75.3	92.6[§]	62.2	70.4	55.6	65.5
New Hampshire	62.6	61.2	68.4	69.9	67.2	71.2	66.6	70.2	58.2	60.0	43.0	43.4
New Jersey	78.2	77.1	84.8	82.6	83.8	80.6	82.6	80.7	77.6	73.8	69.7	64.3
New York	81.6	81.3	87.2	84.7	87.8	84.5	86.8	83.3	83.4	80.2	71.9	66.3
North Carolina	80.4	61.7[§]	84.0	71.5[§]	85.6	69.7[§]	84.5	68.5[§]	73.3	54.6[§]	65.8	44.7[§]
North Dakota	63.5	57.2	71.4	71.5	68.9	64.3	70.5	64.5	60.0	60.8	50.2	39.7
Ohio	68.2	59.3	78.9	69.6	73.2	62.9[§]	77.8	70.8	61.9	57.5	54.9	48.6
Oklahoma	50.3	54.0	47.9	52.1	51.0	53.5	51.4	53.9	51.5	52.5	46.4	43.2
Oregon	70.1	67.6	83.6	77.9	77.8	74.3	80.2	70.7	57.6	57.2	52.7	40.1[§]
Pennsylvania	69.4	64.0	76.8	67.4[§]	74.4	67.2	76.7	72.2	66.9	53.2[§]	55.0	39.9[§]
Rhode Island	77.2	75.1	79.7	79.5	79.7	75.3	84.6	71.8	70.5	70.3	57.0	54.3
South Carolina	73.4	73.7	79.9	85.9	83.4	81.1	84.1	84.6	70.4	67.5	62.0	58.5
South Dakota	64.2	51.5	70.3	60.2	66.4	55.7	68.5	55.0	62.4	41.4[§]	46.0	27.6[§]
Tennessee	58.9	53.6	61.8	58.0	61.9	55.9	62.1	57.8	55.4	45.7	50.7	40.8
Texas	64.9	65.4	73.1	73.7	68.0	69.9	69.0	73.2	58.1	56.1	53.7	49.1
Utah	59.8	59.1	82.3	82.2	80.5	79.2	85.4	84.0	71.2	63.8	47.8	41.6
Vermont	63.4	65.6	64.6	69.6	66.0	67.6	65.1	61.3	53.5	55.6	42.9	39.4
Virginia	73.7	71.6	78.6	81.6	80.7	77.5	81.6	78.6	70.7	62.4	59.3	53.5
Washington	76.2	75.6	75.1	73.1	77.6	74.8	74.2	70.3	73.6	66.0	58.2	43.3[§]
West Virginia	82.3	76.5	85.2	86.1	82.3	77.3	85.0	80.3	77.8	72.4	71.3	62.3
Wisconsin	71.9	71.2	78.7	80.7	78.7	79.7	77.0	78.9	60.4	72.3[§]	50.0	51.3
Wyoming	69.0	60.9	78.2	72.9	77.7	73.1	77.7	71.0	51.9	56.7	49.7	37.8
State median	*69.4*	*64.0*	*75.4*	*71.4*	*72.7*	*67.6*	*74.8*	*70.3*	*64.4*	*58.0*	*51.8*	*43.3*
State range	*(35.0–82.3)*	*(25.8–82.3)*	*(43.4–89.2)*	*(28.6–86.5)*	*(43.1–87.8)*	*(29.2–88.9)*	*(40.9–74.8)*	*(26.5–92.6)*	*(34.2–83.4)*	*(19.8–80.2)*	*(27.7–71.9)*	*(12.6–66.3)*

Abbreviation: AIDS = acquired immunodeficiency syndrome.
* Related to HIV, other STDs, and pregnancy.
[†] Related to eliminating or reducing risk for HIV, other STDs, and pregnancy.
[§] Significant difference between 2008 and 2010 (p<0.05).

HIV prevention education also can address misconceptions about how HIV is transmitted (*2*). A 2011 public opinion poll indicated that 20% of persons aged 18–29 years believe incorrectly that a person can become infected with HIV by sharing a drinking glass, or are unsure whether the statement is true or false (*8*).

The findings in this report are subject to at least three limitations. First, these data apply only to public secondary schools and, therefore, do not reflect practices at private schools or elementary schools. Second, these data were self-reported by lead health education teachers or their designees, and the accuracy of their

TABLE 2. Percentage of public secondary schools in which specific human immunodefiency virus (HIV), sexually transmitted disease (STD), or pregnancy prevention topics were taught in a required course in grades 9, 10, 11, or 12 — 45 states, 2008 and 2010

	Relationship among HIV, other STDs, and pregnancy		Relationship between alcohol and other drug use and risk for HIV, other STDs, and pregnancy		Benefits of being sexually abstinent		How to prevent HIV, other STDs, and pregnancy		How to access valid and reliable health information, products, and services*		Influences of media, family, and social and cultural norms on sexual behavior		Communication and negotiation skills[†]		Goal-setting and decision-making skills[†]		All eight topics	
State	**2008**	**2010**	**2008**	**2010**	**2008**	**2010**	**2008**	**2010**	**2008**	**2010**	**2008**	**2010**	**2008**	**2010**	**2008**	**2010**	**2008**	**2010**
Alabama	97.5	87.9[§]	98.1	86.9[§]	97.6	88.9[§]	98.7	82.7[§]	95.4	85.2[§]	94.7	83.6[§]	93.7	84.1[§]	95.6	86.4[§]	84.7	75.7[§]
Alaska	69.2	56.6[§]	72.5	62.0	66.6	65.1	74.9	65.9	63.9	61.7	65.7	56.7	63.1	58.2	64.1	56.9	48.4	45.3
Arizona	73.4	66.1	67.4	70.3	71.6	69.3	72.9	71.6	66.6	62.6	69.2	62.2	69.0	63.2	68.2	59.5	45.7	50.9
Arkansas	96.2	95.0	98.5	98.7	96.8	96.8	98.4	96.9	92.9	91.0	99.3	93.3[§]	95.3	91.2	96.1	90.0	87.2	84.9
California	95.2	89.7	93.8	91.9	93.7	91.3	94.5	93.3	93.0	89.7	93.8	87.7	91.6	88.5	89.6	89.1	80.1	84.4
Connecticut	95.4	94.2	97.5	95.0	95.0	95.0	97.5	95.2	95.4	93.1	89.7	90.4	87.2	91.6	91.7	89.0	79.6	80.2
Delaware	96.8	96.7	96.8	100.0	96.8	100.0	96.8	100.0	93.7	96.7	96.8	96.7	90.6	100.0	90.6	96.7	84.0	93.3
Florida	86.6	87.0	89.0	85.8	90.3	88.5	88.0	87.1	82.1	83.9	86.2	81.1	82.7	85.8	84.9	84.8	74.1	71.5
Hawaii	100.0	86.0	97.3	91.0	100.0	95.3	100.0	95.3	97.2	93.0	97.2	95.3	97.2	90.7	94.4	93.0	86.7	81.7
Idaho	95.2	94.5	96.0	96.5	98.6	97.8	97.1	97.1	85.9	92.8[§]	94.8	94.5	92.0	93.5	90.3	93.3	73.8	83.2[§]
Indiana	96.2	95.6	96.1	97.5	97.7	99.3	97.6	99.4	94.1	90.0	94.1	96.2	93.9	93.4	92.2	92.6	83.4	84.7
Iowa	84.1	81.9	82.9	82.3	82.6	82.2	82.8	83.8	78.3	74.6	77.8	76.8	74.7	73.6	74.8	72.1	67.6	66.9
Kansas	93.1	92.8	90.7	94.9	94.8	95.6	94.0	94.2	85.3	84.0	85.3	89.9	88.2	91.3	85.9	87.0	68.3	71.2
Kentucky	98.2	96.5	98.2	96.5	98.2	98.3	98.2	97.5	96.0	95.7	98.2	97.5	96.4	96.6	95.6	94.9	89.2	90.6
Maine	96.0	92.0	96.2	95.8	96.1	96.7	97.1	96.9	93.3	94.7	92.3	89.8	90.3	92.1	92.2	86.4	80.8	78.1
Maryland	99.1	98.9	99.1	100.0	99.1	100.0	99.1	100.0	95.3	97.6	97.2	94.8	96.0	100.0	96.2	98.9	88.3	92.1
Massachusetts	87.0	88.1	86.5	90.5	88.1	90.7	87.0	92.0	83.8	87.5	83.1	84.0	84.6	86.2	81.2	82.8	73.7	72.2
Michigan	93.7	90.9	93.7	90.9	93.7	93.1	93.7	92.3	88.3	82.3	88.5	87.8	87.8	86.4	87.7	86.3	73.7	76.3
Minnesota	88.8	89.7	90.4	94.0	88.6	97.1[§]	90.0	96.0[§]	83.0	89.8[§]	86.0	92.1	82.9	88.3	83.1	85.1	72.7	73.5
Mississippi	95.5	95.3	95.5	98.1	95.5	98.1	95.5	98.1	91.9	92.5	91.9	97.1	91.3	90.5	92.0	93.3	79.7	86.3
Missouri	93.9	95.6	92.6	96.9	93.8	97.5	95.3	97.5	87.0	92.5	91.3	92.4	91.5	89.2	88.6	90.4	77.8	84.5
Montana	88.9	86.4	91.4	91.2	89.7	91.4	90.6	91.3	85.3	82.1	84.5	85.4	82.3	82.8	77.5	79.7	63.8	67.9
Nebraska	82.0	82.7	84.3	84.7	83.5	86.1	84.2	85.4	72.4	77.3	78.2	79.5	72.0	70.6	73.7	74.8	64.9	63.6
Nevada	95.8	100.0	97.1	100.0	95.7	98.4	97.1	100.0	90.3	96.1	91.3	97.3	92.9	98.4	93.0	98.4	76.9	94.9[§]
New Hampshire	100.0	95.9	98.4	97.3	98.4	97.3	100.0	97.3	97.0	93.1	95.5	94.5	95.4	90.5	94.0	87.4	88.8	82.9
New Jersey	98.5	100.0	100.0	100.0	98.2	100.0	100.0	100.0	98.4	99.0	99.1	98.1	100.0	97.1	100.0	98.1	91.3	96.4
New York	100.0	99.2	98.7	99.0	99.0	98.9	100.0	99.5	95.3	98.3	97.0	97.9	96.6	96.8	97.3	96.9	90.6	92.0
North Carolina	94.5	86.0[§]	93.6	88.3	94.5	91.9	94.4	90.6	86.0	80.5	92.4	85.1	92.9	81.4[§]	92.0	80.9[§]	79.9	70.9
North Dakota	83.3	83.2	88.4	86.8	88.4	86.6	89.4	86.1	77.6	80.6	82.3	85.9	82.6	79.9	81.5	80.7	63.7	70.5
Ohio	94.8	95.3	97.8	95.2	96.1	95.2	96.1	94.7	92.7	91.2	92.0	90.9	92.0	92.8	93.0	90.6	84.6	80.6
Oklahoma	78.0	65.8[§]	77.8	67.4	74.8	68.2	77.7	68.3	73.3	64.9	70.4	62.4	70.8	64.6	71.5	64.9	58.5	51.1
Oregon	93.2	95.4	96.2	96.1	96.9	95.5	96.9	97.0	90.9	94.1	96.2	91.6	94.5	94.7	93.0	93.8	85.5	84.3
Pennsylvania	97.5	97.0	97.4	95.8	97.5	97.0	97.5	97.0	91.9	91.0	92.1	93.7	90.7	91.6	91.4	92.4	81.2	83.6
Rhode Island	92.1	88.9	92.7	93.2	92.7	93.2	92.5	93.2	91.9	92.9	85.3	87.4	89.6	92.7	94.9	88.4	80.6	81.8
South Carolina	92.3	91.1	92.3	92.3	93.4	93.9	93.3	93.2	88.9	88.9	85.7	90.3	87.5	88.3	87.5	89.0	77.1	83.8
South Dakota	73.5	65.1	77.0	71.8	73.7	66.2	76.7	69.5	69.9	61.3	70.9	63.8	68.8	60.3	66.5	60.6	53.6	48.1
Tennessee	97.8	94.2	98.5	93.4	97.0	96.2	97.7	94.3	95.5	92.4	90.9	90.5	93.9	89.4	94.6	89.3	84.9	82.1
Texas	92.9	91.7	94.9	92.6	95.3	94.0	95.1	92.3	88.0	80.0[§]	91.9	86.5	91.4	83.0[§]	90.7	87.7	76.7	73.5
Utah	93.1	89.6	93.1	92.0	97.2	94.6	94.3	88.1	83.4	81.0	90.4	88.9	90.6	92.3	95.8	84.5[§]	69.4	73.3
Vermont	100.0	91.3	100.0	93.9	100.0	94.0	100.0	94.0	100.0	94.0	97.7	91.5	97.7	85.7	97.7	87.2	91.3	80.3
Virginia	92.6	86.1	95.5	89.6	96.9	92.3	94.8	90.9	89.0	89.0	89.1	85.7	85.3	86.7	90.4	87.2	78.2	78.0
Washington	91.9	96.4	94.5	93.2	94.2	95.6	94.5	97.1	92.1	90.9	88.9	93.1	91.9	91.1	90.1	89.6	76.1	83.4
West Virginia	100.0	96.3	100.0	100.0	100.0	98.1	100.0	98.1	98.6	94.4	98.8	98.1	97.4	94.4	98.6	93.0	95.8	91.1
Wisconsin	94.1	89.7	96.4	90.8	97.1	95.1	96.4	93.9	93.4	87.3	97.1	90.5[§]	92.7	87.7	92.6	87.3	82.7	79.9
Wyoming	89.6	82.2	88.3	85.7	93.2	92.1	89.9	85.5	88.3	74.5	88.0	79.4	86.5	79.0	88.2	80.6	78.3	65.1
State median	*94.1*	*91.3*	*95.5*	*93.2*	*95.5*	*95.1*	*95.3*	*94.2*	*90.9*	*90.0*	*91.3*	*90.4*	*91.3*	*89.4*	*91.4*	*87.7*	*79.6*	*80.3*
State range	*(69.2–100.0)*	*(56.6–100.0)*	*(67.4–100.0)*	*(62.0–100.0)*	*(66.6–100.0)*	*(65.1–100.0)*	*(72.9–100.0)*	*(65.9–100.0)*	*(63.9–100.0)*	*(61.3–99.0)*	*(65.7–99.3)*	*(56.7–98.1)*	*(63.1–100.0)*	*(58.2–100.0)*	*(64.1–100.0)*	*(56.4–98.9)*	*(45.7–95.8)*	*(45.3–96.4)*

* Related to HIV, other STDs, and pregnancy.
[†] Related to eliminating or reducing risk for HIV, other STDs, and pregnancy.
[§] Significant difference between 2008 and 2010 (p<0.05).

description of the HIV, other STD, and pregnancy prevention topics taught in required courses was not verified by other sources. Finally, the effect of changes between 2008 and 2010 in the percentage of secondary schools in a state that taught HIV, other

TABLE 3. Percentage of public secondary schools in which specific condom-related topics were taught in a required course in grades 9, 10, 11, or 12 — 45 states, 2008 and 2010

	Efficacy of condoms		Importance of using condoms consistently and correctly		How to obtain condoms		All three topics	
State	2008	2010	2008	2010	2008	2010	2008	2010
Alabama	79.2	71.8	62.0	59.5	51.1	38.2*	47.3	33.2*
Alaska	61.0	49.0	59.2	47.9	55.8	39.5*	52.2	38.9*
Arizona	56.5	51.0	47.7	45.2	36.4	26.6	31.2	26.1
Arkansas	79.7	85.2	66.9	74.0	62.8	61.9	60.5	61.8
California	89.3	89.2	82.9	85.8	73.7	74.2	66.3	73.0
Connecticut	90.5	91.3	87.6	90.3	83.1	84.4	79.7	83.4
Delaware	90.5	96.7	85.1	96.6	76.3	93.1	69.9	93.1*
Florida	76.7	64.7*	70.8	60.1	66.3	50.1*	59.0	46.0*
Hawaii	91.7	90.7	86.1	86.0	80.6	71.3	78.5	71.3
Idaho	75.2	77.4	64.3	64.0	58.1	47.4	49.7	46.2
Indiana	76.8	77.3	60.6	62.3	40.0	39.8	39.8	37.5
Iowa	75.5	75.0	69.5	67.4	56.3	58.1	56.5	58.1
Kansas	72.3	71.4	63.5	62.3	51.6	53.2	45.4	49.4
Kentucky	85.2	85.8	72.6	81.4	64.8	69.8	56.6	68.8*
Maine	93.1	92.5	95.2	91.6	82.7	87.5	79.8	86.9
Maryland	91.2	94.6	93.2	91.0	83.5	77.9	77.6	76.9
Massachusetts	84.8	85.2	81.5	84.8	74.2	77.5	72.9	75.9
Michigan	78.3	73.3	70.6	69.5	52.6	53.5	49.9	47.9
Minnesota	80.9	87.9	77.6	78.5	64.6	61.8	61.3	60.8
Mississippi	83.0	80.5	74.0	65.1	64.7	55.9	59.4	54.8
Missouri	71.5	73.5	61.4	64.1	47.1	47.3	47.5	48.1
Montana	71.2	73.3	62.3	64.1	52.2	56.3	50.6	48.1
Nebraska	67.8	64.6	54.3	55.7	40.0	41.0	38.0	39.5
Nevada	83.3	86.9	75.8	85.6	65.9	70.7	58.8	71.9
New Hampshire	96.9	94.5	96.9	94.5	87.7	88.9	85.5	90.5
New Jersey	97.6	98.1	96.9	96.2	92.7	94.4	87.0	93.0
New York	95.7	96.2	92.7	94.1	90.2	90.6	86.2	89.2
North Carolina	71.5	61.2	44.8	44.7	37.1	32.0	35.4	31.8
North Dakota	58.2	58.2	47.7	45.3	35.8	30.0	33.2	29.4
Ohio	85.1	84.7	73.7	71.8	57.6	46.4*	57.4	44.9*
Oklahoma	59.3	55.7	58.6	52.0	50.9	39.7	47.1	34.1*
Oregon	91.1	88.2	90.2	85.9	79.3	75.5	76.5	74.7
Pennsylvania	85.5	87.5	77.2	78.3	65.3	62.2	61.1	61.6
Rhode Island	85.0	88.2	85.0	86.5	79.9	73.0	78.5	71.9
South Carolina	78.7	82.9	74.4	80.0	57.9	65.5	49.8	64.2*
South Dakota	49.4	37.4	44.7	33.1	34.9	25.5	32.7	19.4*
Tennessee	83.3	73.3	72.6	62.1	62.5	57.1	59.3	50.9
Texas	74.9	64.3*	61.2	50.9	49.6	33.3*	47.5	34.0*
Utah	50.3	38.5	32.4	26.8	13.5	12.4	10.4	11.3
Vermont	100.0	94.0	100.0	94.0	95.6	90.0	93.6	90.4
Virginia	81.4	72.5	72.9	64.9	60.6	52.0	56.2	50.9
Washington	88.4	89.9	84.3	86.3	77.3	73.9	71.1	73.7
West Virginia	91.1	83.8	87.0	79.2	78.2	60.3*	73.0	58.4
Wisconsin	85.4	86.8	78.0	81.6	66.4	63.9	65.7	62.1
Wyoming	77.9	53.6*	68.8	50.6*	62.5	39.9*	55.4	35.0*
State median	*81.4*	*82.9*	*72.9*	*71.8*	*62.8*	*58.1*	*58.8*	*58.1*
State range	*(49.4–100.0)*	*(37.4–98.1)*	*(32.4–100.0)*	*(26.8–96.6)*	*(13.5–62.8)*	*(12.4–94.4)*	*(10.4–93.6)*	*(11.3–93.1)*

* Significant difference between 2008 and 2010 ($p<0.05$).

STD, and pregnancy prevention topics varies by the number of students attending public schools in the state during those years. States with fewer students would have less of a nationwide impact.

HIV prevention education supports strategies required to achieve the National HIV/AIDS Strategy goal of lowering the annual number of new HIV infections by 25% by 2015 (*2*). Families, the media, and community organizations, including faith-based organizations, can play a role in providing HIV, other STD, and pregnancy prevention education. However, schools are in a unique position to provide HIV, other STD, and pregnancy prevention education to young persons because almost all school-aged youths in the United States attend school (*9*). School policies can provide critical support for implementation of comprehensive HIV, other STD, and pregnancy prevention education in secondary schools (*10*).

Acknowledgment

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Influenza Outbreaks at Two Correctional Facilities — Maine, March 2011

On March 8, 2011, the Maine Center for Disease Control and Prevention (Maine CDC) received a laboratory report of a positive influenza specimen from an intensive-care unit patient who was an inmate at a prison (facility A). That same day, the state medical examiner notified Maine CDC of an inmate death suspected to be have been caused by influenza at another, nearby prison (facility B). On March 9, Correctional Medical Services (CMS), which provides health services to both facilities, notified Maine CDC that additional inmates and staff members from both facilities were ill with influenza-like illness (ILI). CMS reported that influenza vaccination coverage among inmates was very low (<10%), and coverage among staff members was unknown but believed to be low. Maine CDC assisted CMS and the Maine Department of Corrections (DOC) in conducting an epidemiologic investigation to gather more information about the two cases, initiate case finding, and implement control measures, which included emphasizing respiratory hygiene and cough etiquette, closing both facilities to new admissions and transfers, and offering vaccination and antiviral drugs to inmates and staff members. This report describes the public health response and highlights the importance of collaboration between public health and corrections officials to identify quickly and mitigate communicable disease outbreaks in these settings, where influenza can spread rapidly in a large and concentrated population. Correctional facilities should strongly consider implementing the following measures during each influenza season: 1) offering influenza vaccination to all inmates and staff members, 2) conducting education on respiratory etiquette, and 3) making documentation regarding the vaccination status of inmates and staff members accessible.

Case Reports and Outbreak Investigation

Facility A is a medium to maximum security prison that can house up to 916 inmates, employs up to 410 staff members, and is divided into three units with up to six pods per unit (each pod houses up to 112 inmates in either single cells or double cells). Facility B is a minimum security prison that can house up to 222 inmates, employs up to 65 staff members, and is divided into two units. The facilities are located on separate campuses but are under the same organizational structure. Staff members work at either facility to help cover staffing shortages or for overtime, but work hours are not documented by site. On March 8, Maine CDC learned that a male inmate in facility A, aged 55 years, with history of diabetes, congestive heart failure, and chronic obstructive pulmonary disease, was admitted to the intensive-care unit on March 5 with a severe acute respiratory illness and tested positive for influenza A (H1N1)pdm09 by real-time reverse transcriptase–polymerase chain reaction. Chest radiography ruled out pneumonia. Later that day, the state medical examiner notified Maine CDC of a second patient, a previously healthy male inmate in facility B, aged 29 years, with onset of rapidly progressive respiratory symptoms on March 7. The second patient died on March 8. Real-time reverse transcriptase–polymerase chain reaction testing of a nasopharyngeal swab and lung tissue detected influenza B. Autopsy results also revealed methicillin-resistant *Staphylococcus aureus* pneumonia. Neither patient had been vaccinated for influenza.

On March 9, CMS informed Maine CDC that approximately 40 inmates from facility A (from two of the three units and at least six different pods) and several from facility B (from both units) reported for sick call with respiratory symptoms. CMS did not have sufficient internal resources to screen inmates and staff members to determine the extent of illness spread. They also did not have enough staff to assess non-ill inmates and staff members for their degree of contact with the two patients because neither patient was in solitary confinement; either might have interacted with many inmates while ill. CMS reported a high prevalence of comorbid medical conditions among inmates in both facilities, but the lack of electronic medical records (EMRs) made it impractical to determine whether contacts of the ill inmates had high-risk conditions that would be indications for influenza prophylaxis. Without EMRs, it also was extremely difficult to determine which inmates had been vaccinated during the routine influenza clinic. Staff members also had been offered vaccine during the facilities' annual influenza clinics, but whether or not they received it was not documented at the workplace.

Public Health Response

Given the severity of illness in the first two patients, the high prevalence of comorbid medical conditions and low vaccination coverage among inmates reported by CMS, and the congregate living situation, both facilities were closed to new admissions and transfers. On March 10, six Maine CDC public health nurses (PHNs) assisted CMS in establishing temporary clinics at facilities A and B to identify ILI cases (fever ≥100.0°F [≥37.8°C] with cough and/or sore throat) among inmates and staff members and offer vaccination and antiviral drugs. Symptomatic persons received treatment doses (75 mg twice daily for 5 days) of oseltamivir, and all others were offered prophylactic doses (75 mg once daily for 10 days). Both facilities isolated ill inmates and excluded ill staff members from work until afebrile for 24 hours without antipyretics. Staff members collected nasopharyngeal swabs from symptomatic inmates and staff members, and Maine's Health and Environmental Testing Laboratory performed influenza testing. The correctional facilities did not have sufficient supplies of vaccine and antiviral drugs; therefore, Maine CDC supplied vaccine, and the state stockpile supplied antiviral drugs.

Facility A. During March 10–11, CMS and the PHNs screened all 802 inmates for ILI symptoms; 17 (2.1%) with ILI started treatment courses of oseltamivir, and 648 (80.8%) asymptomatic inmates started prophylactic courses (Table). The remaining 137 asympotomatic inmates (17.1%) refused antiviral prophylaxis. CMS and the PHNs vaccinated 333 inmates (33% in the close housing unit and 49% in the medium housing units). Of the 17 ILI patients, nine were tested for influenza (all from the same pod): specimens from six patients were positive for influenza A (five were H1N1pdm09 and one was unsubtypable), and three were negative. The nine inmates tested for influenza ranged in age from 24 to 57 years (mean: 37.3 years), and only one had been vaccinated previously.

CMS and the PHNs screened 184 staff members from facility A and vaccinated 68 (37%). Sixteen (8.7%) staff members with ILI started treatment courses of oseltamivir, and 166 (90.2%) started prophylactic courses. No staff members were tested for influenza.

Facility B. On March 10, CMS and the PHNs screened all 193 inmates at facility B for ILI symptoms; four (2.1%) with ILI started treatment courses of oseltamivir, and 184 (95.3%) asymptomatic inmates started prophylactic courses (Table). The remaining five asymptomatic inmates (2.6%) refused antiviral prophylaxis. CMS and the PHNs vaccinated 88 inmates (46%). Of the four ILI patients, two were tested for influenza; one tested positive for influenza B, and the other was negative. The vaccination status of the inmate who tested positive was unknown; the other inmate tested was unvaccinated.

CMS and the PHNs screened 51 staff members from facility B and vaccinated 13 (25%). Nine (17.6%) staff members with ILI started treatment courses of oseltamivir, and 42 (82.4%) started prophylactic courses. Of the nine symptomatic staff members at facility B, six were tested for influenza. Vaccine status for all six was unknown, and all six were negative for influenza.

On March 13, 2011, both facilities reported no new illnesses, and the facilities reopened to new admissions and transfers. CMS decided to end antiviral prophylaxis after 10 days instead of the recommended minimum of 14 days because they had distributed oseltamivir packages containing 10 doses to inmates to self-administer, and repackaging and distributing 4 more doses was not possible without a major disruption to routine work.

Reported by

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Editorial Note

These outbreaks emphasize the importance of collaboration between public health and correctional officials to overcome the challenges in managing influenza outbreaks in prisons and jails. Correctional facilities face many unique challenges, and infection control is recognized to be difficult (*1*). These facilities often have high turnover of inmates and staff members, which can make routine disease surveillance and early identification of infectious diseases challenging. Some additional challenges encountered during these outbreaks included 1) insufficient staff to handle the medical surge, 2) no easily accessible medical records to establish vaccination status or determine underlying medical conditions, 3) lack of access to sufficient quantities of vaccine and antiviral drugs, and 4) lack of skilled personnel to administer a large volume of vaccine and antiviral drugs in a timely manner. Through collaboration between Maine CDC and Maine DOC, officials were able to

TABLE. Number and percentage of staff members and inmates who were screened for influenza-like illness, vaccinated for influenza, and administered antiviral drugs — correctional facilities A and B, March 2011

				Administered antiviral drugs*			
		Vaccinated		Treatment		Prophylaxis	
Facility	Population screened	No.	(%)	No.	(%)	No.	(%)
Facility A							
Staff members	184	68	(37)	16	(9)	166	(90)
Inmates	802	333	(42)	17	(2)	648	(81)
Facility B							
Staff members	51	13	(25)	9	(18)	42	(82)
Inmates	193	88	(46)	4	(2)	184	(95)

* Persons who screened positive for influenza-like illness were offered treatment doses; all others were offered prophylaxis. A total of 137 inmates and two staff members from facility A and five inmates from facility B refused antiviral prophylaxis.

What is already known on this topic?

Correctional facilities are known to be high-risk settings for infectious diseases, but little information is available regarding influenza outbreaks in these settings.

What is added by this report?

This report describes influenza outbreaks in a correctional setting in Maine resulting in two serious illnesses (one intensive-care unit admission and one death) and a total of 46 ill inmates and staff members. The public health response required the collaboration of the Maine Department of Corrections, Correctional Medical Services, and the Maine Center for Disease Control and Prevention. Through this collaboration, Maine was able to screen and offer vaccination and antiviral drugs to approximately 1,000 inmates and 200 staff members.

What are the implications for public health practice?

Routine surveillance is critical for the timely detection and control of infectious diseases in correctional settings. Influenza can spread rapidly in correctional settings, and a timely public health approach (including vaccination and the use of antiviral drugs) might be required to interrupt transmission. However, correctional facilities should strongly consider implementing the following measures during each influenza season: 1) offering influenza vaccination to all inmates and staff members, 2) conducting education on respiratory etiquette, and 3) making documentation regarding the vaccination status of inmates and staff members accessible.

screen and offer vaccination and antiviral drugs to approximately 1,000 inmates and 200 staff members.

At the end of 2009, approximately 7.2 million adults were under correctional supervision in the United States (*2*). In October 2007, Maine housed 2,161 inmates in state prisons (*3*). Persons in U.S. correctional facilities are likely to be poor, undereducated, and/or homeless before incarceration; they also are more likely to have substance dependency or mental illness and higher rates of infectious and chronic diseases than the general population (*4–7*). A high prevalence of preexisting comorbid conditions, combined with close living conditions, is likely to increase the risk for influenza infection. When inmates work in the community or are released, they can transmit influenza to the rest of the population. Corrections staff who reside in the community also might transmit influenza back into the facility. Published reports of influenza outbreaks in United States correctional settings are lacking.

Correctional facilities might have limited staff to support surges in demand for health care created by outbreaks, or limited access to vaccine (*8*). The facilities in Maine required the assistance of PHNs to complete screening and vaccination promptly. Determining which inmates have underlying conditions without EMRs requires a labor-intensive manual review, thereby delaying the provision of vaccine and antiviral drugs. EMRs would allow inmates' medical histories to travel with them between facilities and might facilitate more efficient outbreak management.

Correctional facilities can play an important role in detecting and preventing influenza transmission within a community (*4*). Transmission of disease between correction staff members, inmates, and the community is an important concern, and improved vaccination coverage in all three settings can reduce disease risk. The U.S. Department of Health and Human Services has issued the *Correctional Facilities Pandemic Influenza Planning Checklist*, which recommends routine influenza surveillance; however, it does not provide suggestions regarding how to accomplish this, or give specific guidance once an outbreak is identified (*9*). CDC offers guidance for use of antiviral drugs in institutions, but not specifically for correctional facilities (*10*). Guidance for routine surveillance as well as outbreak management in correctional facilities would be beneficial in guiding prevention and response activities.

Collaboration between public health and correctional facilities is necessary to identify quickly and mitigate communicable disease outbreaks in these high-risk settings. This collaboration should be established well before any outbreak occurs. Vaccination of inmates and staff members is a critical prevention measure, and vaccine should be provided in correctional settings, along with accessible documentation regarding the vaccination status of inmates and staff members.

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Announcement

STD Awareness Month — April 2012

April is STD Awareness Month, an annual observance to call attention to the impact of sexually transmitted diseases (STDs) in the United States and the importance of discussing sexual health with health-care providers. With adolescents and young adults disproportionately affected by STDs, CDC is calling on health-care providers to initiate conversations about sexual health and deliver the recommended screenings and vaccinations to their young patients.

Estimates suggest that even though young persons make up only 25% of the sexually experienced population, nearly half of new STD cases occur in persons aged 15–24 years (*1*). Stigma, lack of information, lack of access to health care, and a combination of other behavioral and biologic factors contribute to high rates of STDs among teens and young adults.

Undetected and untreated STDs can increase a person's risk for human immunodeficiency virus (HIV) infection and cause other serious health consequences, such as infertility. STD screening can help detect disease early and, when combined with appropriate treatment, is one of the most effective tools available to protect one's health and prevent the spread of STDs to others.

Vaccinations against viral diseases that are sexually transmitted also are important tools for prevention. For example, the human papillomavirus (HPV) vaccine offers the greatest health benefit to persons who receive all 3 doses before they become sexually active.

To facilitate the discussion about sexual health and the delivery of CDC-recommended STD screenings and vaccinations to adolescents and young adults this STD Awareness Month, CDC is highlighting useful resources for health-care providers at its STD Awareness Month website (http://www.cdc.gov/std/sam). Clinics providing recommended STD screenings and vaccinations against hepatitis B and HPV can be located on the National HIV and STD Testing Resource website (http://www.findstdtest.org).

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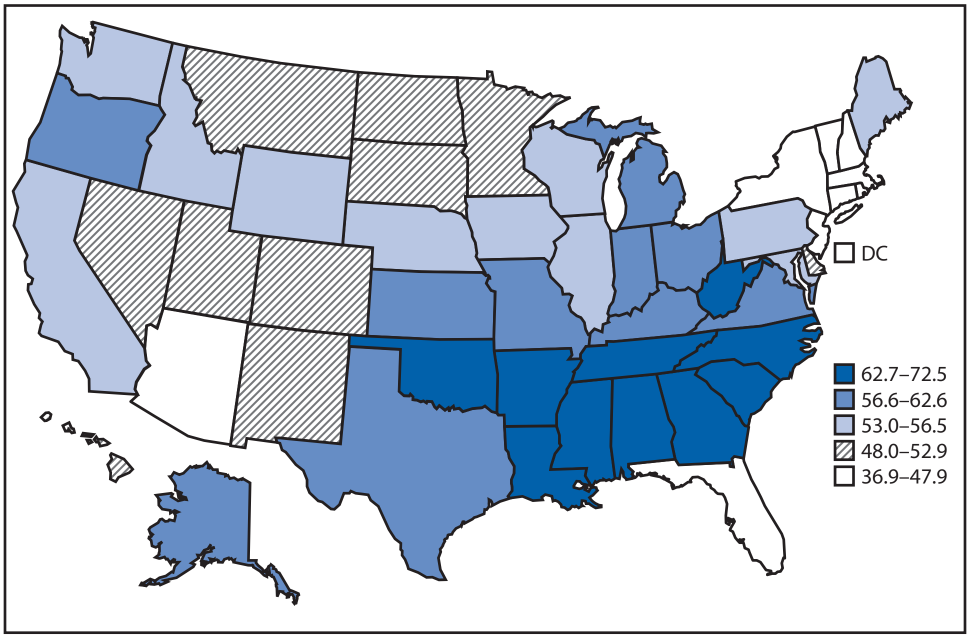
QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Age-Adjusted Death Rates* from Stroke† for Persons Aged ≥18 Years — United States, 2007–2009



* Per 100,000 U.S. standard population.
† Deaths from stroke are those coded I60–I69 in *International Classification of Diseases, 10th Revision*.

During 2007–2009, the age-adjusted death rate from stroke in the United States among persons aged ≥18 years was 54.6 per 100,000 population. Among states, the rate ranged from 36.9 deaths per 100,000 population in New York to 72.5 in Alabama. In general, death rates were higher among states in the South and lower among states in the Northeast census regions.

Sources: National Vital Statistics System. Available at http://www.cdc.gov/nchs/nvss/mortality_public_use_data.htm.
CDC. Health Data Interactive. Available at http://www.cdc.gov/nchs/hdi.htm.

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