



# MMWR™

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### Great American Smokeout — November 19, 2009

Although the United States has made great strides toward reducing the prevalence of smoking, approximately 46 million adults (20.6% of the population) still smoke (1), and every day, another 1,000 young persons become new smokers (2). Annually, smoking results in 440,000 deaths and \$193 billion in health-care costs and lost productivity (3). November 19 marks the 33rd anniversary of the American Cancer Society's Great American Smokeout. This annual event challenges smokers to quit for at least 1 day and provides information resources to help them quit permanently.

Quitting smoking has immediate and long-term benefits, including reduced risk for heart disease and certain cancers. Successful quitting often takes several tries. To improve success, smokers should use proven cessation treatments and services, including health-care guidance, approved medications, and cessation counseling. Combining counseling and medications can more than double cessation success. More information about the Great American Smokeout is available at <http://www.cancer.org>, and free help for quitting smoking is available by calling 800-QUIT-NOW (800-784-8669) or visiting <http://www.smokefree.gov>.

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### Cigarette Smoking Among Adults and Trends in Smoking Cessation — United States, 2008

Cigarette smoking continues to be the leading cause of preventable morbidity and mortality in the United States (1). Full implementation of population-based strategies (2) and clinical interventions can educate adult smokers about the dangers of tobacco use and assist them in quitting (3,4). To assess progress toward the *Healthy People 2010* objective of reducing the prevalence of cigarette smoking among adults to  $\leq 12\%$  (objective 27-1a) (5), CDC analyzed data from the 2008 National Health Interview Survey (NHIS). This report summarizes the results of that analysis, which indicated that during 1998–2008, the proportion of U.S. adults who were current cigarette smokers declined 3.5% (from 24.1% to 20.6%). However, the proportion did not change significantly from 2007 (19.8%) to 2008 (20.6%). In 2008, adults aged  $\geq 25$  years with low educational attainment had the highest prevalence of smoking (41.3% among persons with a General Educational Development certificate [GED] and 27.5% among persons with less than a high school diploma, compared with 5.7% among those with a graduate degree). Adults with education levels at or below the equivalent of a high school diploma, who comprise approximately half of current smokers, had the lowest quit ratios (2008 range: 39.9% to 48.8%). Evidence-

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based programs known to be effective at reducing smoking should be intensified among groups with lower education, and health-care providers should take education level into account when communicating about smoking hazards and cessation to these patients.

The 2008 NHIS adult core questionnaire was administered by in-person interview and included 21,781 persons aged  $\geq 18$  years from among the noninstitutionalized, U.S. civilian population. Respondents were selected by a random probability sample, and the survey included questions on cigarette smoking and cessation attempts. The overall response rate for the 2008 adult core questionnaire was 62.6%. To determine smoking status, respondents were asked, "Have you smoked at least 100 cigarettes in your entire life?" Those who answered "yes" were asked, "Do you now smoke cigarettes every day, some days, or not at all?" Ever smokers were defined as those who reported having smoked at least 100 cigarettes during their lifetime. Current smokers were those who had smoked at least 100 cigarettes during their lifetime and, at the time of interview, reported smoking every day or some days. Former smokers were those who reported smoking at least 100 cigarettes during their lifetime but currently did not smoke. Never smokers were those who reported never having smoked 100 cigarettes during their lifetime. Starting in 2007, income-related follow-up questions were added to NHIS to reduce the number of responses with unknown values.\* For this report, poverty status was defined by using 2006 poverty thresholds published by the U.S. Census Bureau for the 2007 estimates and 2007 poverty thresholds published by the U.S. Census Bureau for the 2008 estimates; family income was reported by the family respondent who might or might not have been the same as the sample adult respondent from whom smoking information was collected.

To measure trends in cigarette smoking cessation in the population, quit ratios were calculated as the ratio of former smokers to ever smokers for each survey year from 1998 to 2008. Quit ratios were analyzed by education level to determine if differing quit ratios accounted for part of the differing prevalence among education groups. Data were adjusted for nonresponse and weighted to provide national estimates of cigarette smoking prevalence; 95% confidence intervals were calculated using statistical analysis software to account for the survey's multistage probability sample design. For year-to-year prevalence comparisons, statistical significance ( $p < 0.05$ ) was determined by using a two-sided t-test. Logistic regression analysis was used to analyze temporal changes in quit ratios during 1998–2008, controlling for sex, age, and race/ethnicity.

\* Additional information available at [http://www.cdc.gov/nchs/nhis/quest\\_data\\_related\\_1997\\_forward.htm](http://www.cdc.gov/nchs/nhis/quest_data_related_1997_forward.htm).

**TABLE. Percentage of persons aged ≥18 years who were current cigarette smokers,\* by sex and selected characteristics — National Health Interview Survey, United States, 2007 and 2008**

Characteristic	Men		Women		Total							
	2007 (n = 10,173)	2008 (n = 9,387)	2007 (n = 12,817)	2008 (n = 12,138)	2007 (n = 22,990)	2008 (n = 21,525)						
	%	(95% CI) <sup>†</sup>	%	(95% CI)	%	(95% CI)						
<b>Race/Ethnicity<sup>§</sup></b>												
White, non-Hispanic	23.1	(21.6–24.6)	23.5	(22.2–24.9)	19.8	(18.7–20.9)	20.6	(19.3–21.9)	21.4	(20.4–22.4)	22.0	(21.1–23.0)
Black, non-Hispanic	24.8	(22.0–27.6)	25.6	(22.5–28.6)	15.8	(13.7–17.9)	17.8	(15.5–20.0)	19.8	(18.2–21.4)	21.3	(19.5–23.1)
Hispanic	18.0	(15.5–20.5)	20.7	(17.9–23.5)	8.3	(6.7–9.9)	10.7	(9.1–12.2)	13.3	(11.7–14.9)	15.8	(14.3–17.5)
American Indian/Alaska Native, non-Hispanic <sup>¶</sup>	36.7	(18.9–54.5)	42.3	(27.4–57.2)	36.0	(20.2–51.8)	22.4	(12.5–32.3)	36.4	(22.9–49.9)	32.4	(24.4–41.6)
Asian, non-Hispanic <sup>**</sup>	15.9	(12.8–19.0)	15.7	(11.3–20.0)	4.0	(2.4–5.6)	4.7	(3.0–6.5)	9.6	(8.0–11.2)	9.9	(7.8–12.6)
<b>Education<sup>††</sup></b>												
0–12 yrs (no diploma)	29.5	(26.9–32.1)	31.3	(27.9–34.8)	20.2	(18.0–22.4)	23.9	(21.5–26.3)	24.8	(23.1–26.5)	27.5	(25.5–29.6)
≤8 yrs	20.4	(17.0–23.8)	24.2	(19.3–29.1)	10.0	(7.7–12.3)	13.0	(9.9–16.0)	15.4	(13.2–17.6)	19.0	(16.2–22.0)
9–11 yrs	36.9	(32.4–41.4)	38.1	(33.5–42.7)	30.0	(26.1–33.9)	33.6	(29.8–37.4)	33.3	(30.4–36.2)	35.7	(32.7–38.7)
12 yrs (no diploma)	33.1	(25.2–41.4)	33.8	(24.3–43.3)	14.8	(10.3–19.3)	19.0	(12.1–25.8)	22.7	(18.1–27.3)	26.4	(20.8–32.8)
GED <sup>§§</sup>	49.6	(42.0–57.2)	45.2	(37.3–53.2)	38.9	(31.8–46.0)	37.5	(30.6–44.4)	44.0	(39.0–49.0)	41.3	(36.4–46.4)
High school graduate	27.4	(24.9–29.9)	30.0	(27.7–32.3)	20.4	(18.3–22.5)	21.5	(19.5–23.4)	23.7	(22.0–25.4)	25.5	(24.0–27.0)
Associate degree	21.2	(18.1–24.3)	21.8	(18.5–25.0)	18.9	(16.4–21.4)	17.3	(14.6–20.0)	19.9	(17.8–22.0)	19.3	(17.3–21.6)
Some college	22.5	(20.2–24.8)	25.5	(23.4–27.6)	19.5	(18.0–21.0)	20.4	(18.5–22.3)	20.9	(19.5–22.3)	22.7	(21.3–24.2)
Undergraduate degree	13.4	(10.7–16.1)	11.5	(9.69–13.4)	9.4	(8.0–10.8)	9.7	(8.1–11.3)	11.4	(9.9–12.9)	10.6	(9.5–11.8)
Graduate degree	6.4	(4.7–8.1)	5.6	(4.1–7.0)	6.0	(4.5–7.5)	5.9	(3.8–8.04)	6.2	(5.1–7.3)	5.7	(4.6–7.1)
<b>Age group (yrs)</b>												
18–24	25.4	(22.1–28.7)	23.7	(20.3–27.1)	19.1	(16.2–22.0)	19.0	(16.2–21.8)	22.2	(19.9–24.5)	21.4	(19.3–23.6)
25–44	26.0	(24.1–27.9)	26.4	(24.5–28.2)	19.6	(18.1–21.1)	21.1	(19.5–22.7)	22.8	(21.5–24.1)	23.7	(22.5–25.0)
45–64	22.6	(20.8–24.4)	24.8	(22.8–26.7)	19.5	(18.0–21.0)	20.5	(18.9–22.1)	21.0	(19.7–22.3)	22.6	(21.3–23.8)
≥65	9.3	(7.8–10.8)	10.6	(8.8–12.3)	7.6	(6.3–8.9)	8.4	(7.1–9.6)	8.3	(7.3–9.3)	9.3	(8.3–10.4)
<b>Poverty status<sup>¶¶</sup></b>												
At or above poverty level	21.9	(20.6–23.2)	22.3	(21.1–23.5)	16.8	(15.8–17.8)	17.0	(15.9–18.1)	19.4	(18.4–20.3)	19.6	(18.8–20.4)
Below poverty level	32.3	(28.6–36.0)	31.3	(27.4–35.2)	25.7	(22.8–28.5)	31.7	(28.8–34.5)	28.4	(25.9–30.9)	31.5	(29.3–33.8)
Unknown	17.6	(15.1–20.1)	21.8	(18.7–24.9)	13.4	(11.2–15.5)	13.8	(12.0–15.7)	15.2	(13.6–16.9)	17.5	(15.6–19.4)
<b>Total</b>	<b>22.3</b>	<b>(21.1–23.5)</b>	<b>23.1</b>	<b>(22.0–24.2)</b>	<b>17.4</b>	<b>(16.5–18.3)</b>	<b>18.3</b>	<b>(17.3–19.3)</b>	<b>19.8</b>	<b>(19.0–20.6)</b>	<b>20.6</b>	<b>(19.9–21.4)</b>

\* Persons who reported smoking at least 100 cigarettes during their lifetimes and who, at the time of interview, reported smoking every day or some days. Excludes 256 respondents whose smoking status was unknown.

† Confidence interval.

§ Includes persons who reported only a single race. Excludes 268 respondents of unknown race or multiple racial categories.

¶ Wide variances in estimates reflect small sample sizes.

\*\* Does not include Native Hawaiians or Other Pacific Islanders.

†† Among persons aged ≥25 years. Excludes 142 persons whose educational level was unknown.

§§ General Educational Development certificate.

¶¶ Family income is reported by the family respondent who might or might not be the same as the sample adult respondent from whom smoking information is collected; 2007 estimates are based on reported family income and 2006 poverty thresholds published by the U.S. Census Bureau, and 2008 estimates are based on reported family income and 2007 poverty thresholds published by the U.S. Census Bureau.

Overall smoking prevalence did not change significantly from 2007 to 2008 (Table). In 2008, an estimated 20.6% (46.0 million) of U.S. adults were current cigarette smokers; of these, 79.8% (36.7 million) smoked every day, and 20.2% (9.3 million) smoked some days. Among current cigarette smokers, an estimated 45.3% (20.8 million) had stopped smoking for 1 day or more during the preceding 12 months because they were trying to quit. Of the estimated 94 million persons who had smoked at least 100 cigarettes during their lifetime (ever smokers), 51.1% (48.1 million) were no longer smoking at the time of interview (former smoker).

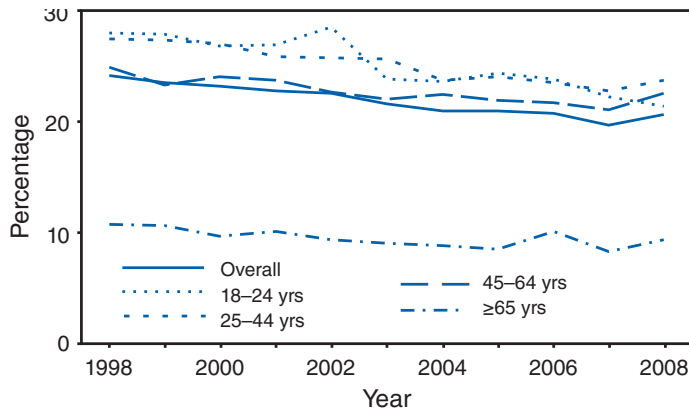
In 2008, smoking prevalence was higher among men (23.1%) than women (18.3%) (Table). Among racial/ethnic groups, Asians had the lowest prevalence (9.9%), and Hispanics had a lower prevalence of smoking (15.8%) than non-Hispanic blacks (21.3%) and non-Hispanic whites (22.0%). American Indians/Alaska Natives had higher prevalence of

current smoking compared with the other racial/ethnic groups (32.4%).

Variations in smoking prevalence in 2008 also were observed by education level (Table). Smoking prevalence was highest among adults who had earned a General Education Development certificate (GED). Smoking prevalence was lowest among adults with a graduate degree (5.7%). The prevalence of current smoking was higher among adults living below the federal poverty level (31.5%) than among those at or above this level (19.6%). Smoking prevalence did not vary significantly for adults aged 18–24 years (21.4%), 25–44 years (23.7%), and 45–64 years (22.6%); however, smoking prevalence was lower for adults aged ≥65 years (9.3%) (Table, Figure 1).

During 1998–2008, the proportion of U.S. adults who were current cigarette smokers declined 3.5% (from 24.1% to 20.6% [ $p<0.05$ ]), and a statistically significant downward trend was observed ( $p<0.05$ ). In 2008, quit ratios were lower

**FIGURE 1. Percentage of adults aged  $\geq 18$  years who were current smokers,\* by age group — National Health Interview Survey, United States, 1998–2008**



\* Persons who reported smoking at least 100 cigarettes during their lifetimes and who, at the time of interview, reported smoking every day or some days. Excludes 256 respondents whose smoking status was unknown.

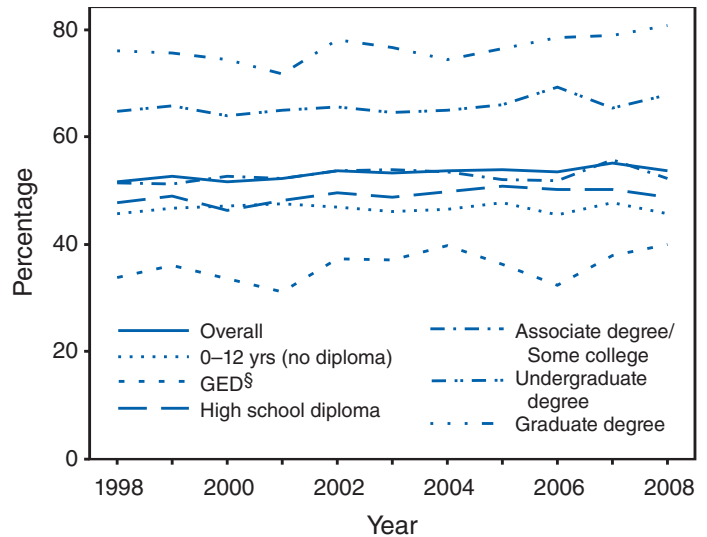
for adults aged  $\geq 25$  years with a GED (39.9%), adults with no high school diploma (45.7%), and adults with a high school diploma (48.8%), compared with quit ratios observed overall for adults aged  $\geq 25$  years (53.8%) (Figure 2). During 1998–2008, the overall quit ratio was stable (or varied little) and ranged from 48.7% (1998) to 51.1% (2008). Persons with an undergraduate degree and persons with a graduate degree had quit ratios consistently higher than 60.0%. The only group with a significant upward linear trend in cessation was persons with a graduate degree; in 2008, the quit ratio was 80.7%, compared with 76.0% in 1998. Adults with a GED had the lowest quit ratio; during 1998–2008, their quit ratios ranged from 31.2% (2001) to 39.9% (2008).

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**Editorial Note:** The prevalence of current cigarette smoking among adults has declined (from 24.1% in 1998 [6] to 20.6% in 2008) since the 1998 Master Settlement Agreement (MSA),<sup>†</sup> which stipulated that seven tobacco companies would change their marketing of tobacco products and pay an estimated \$206 billion to states as compensation for tobacco-related health-care costs. Significant year-to-year decreases in smoking prevalence have been observed only sporadically. For example, a decrease occurred from 2006 to 2007 (3) but not from 2007 to 2008; during the past 5 years, rates have shown virtually no change. Some population subgroups (e.g., Hispanic and Asian women, persons with higher levels of education, and older adults) continue to meet the *Healthy People 2010* target of  $\leq 12\%$  prevalence of smoking.

<sup>†</sup> Additional information available at <http://www.naag.org/backpages/naag/tobacco/msa/msa-pdf>.

**FIGURE 2. Quit ratios\* among former smokers<sup>†</sup> aged  $\geq 25$  years, by education — National Health Interview Survey, United States, 1998–2008**



\* Quit ratios were calculated as the ratio of former smokers to ever smokers for each survey year from 1998 to 2008.

<sup>†</sup> Persons who reported smoking at least 100 cigarettes during their lifetime but currently did not smoke.

<sup>§</sup> General Educational Development certificate.

The causes of differences in smoking prevalence among population subgroups are complex and multifactorial. Cultural factors might explain lower prevalence among certain population groups (e.g., social disapproval among Asian women) (7). Prevalence variations by education level are likely related to differences in understanding of the health hazards of smoking and differences in receptivity to smoking-related health messages (3). Moreover, persons with higher levels of education might have a better understanding of the health hazards of smoking and might be more receptive to health messaging about the dangers of smoking (3). However, the majority of subgroups, including those with low education levels, likely will not meet the *Healthy People 2010* target.

In 1998, the percentage of current smokers in the United States (24.1%) was greater than that of former smokers (22.9%). Since 2002, former smokers have outnumbered current smokers. However, increases in the proportion of former smokers have not been consistent among education groups.

The findings in this report are subject to at least five limitations. First, the estimates of cigarette smoking were self-reported and were not validated by biochemical tests. However, studies have indicated that self-reported smoking status is validated by measured serum cotinine levels, which yield similar prevalence estimates (8). Second, the NHIS questionnaire is administered only in English and Spanish; therefore, estimates for certain racial/ethnic populations

might be underestimated if English and Spanish are not the primary languages spoken. Moreover, race/ethnicity was not adjusted for by socioeconomic status. Third, because NHIS does not include institutionalized populations and persons in the military, these results might not be generalizable to these groups. Fourth, information on former smokers is limited because no information is available regarding when persons actually quit smoking. Finally, because of small samples sizes for certain population groups (e.g., American Indians/Alaska Natives), single-year estimates might have resulted in imprecise estimates.

The 2008 NHIS mean prevalence of 20.6% for current smoking among adults aged  $\geq 18$  years differs from the median of 18.4% calculated for the prevalence of current smoking for the 50 states and the District of Columbia (9) by the Behavioral Risk Factor Surveillance System (BRFSS). The national mean from BRFSS was not reported because the focus of BRFSS is on state-level estimates. In contrast, NHIS mean prevalence serves as the national measure for tracking progress toward *Healthy People 2010* objectives (5). For BRFSS analyses, each state draws its own independent sample to produce a state-level estimate. A number of differences between the two surveys exist, including survey type (telephone versus household), variations in response rates, and sampling and weighting procedures.

Although comprehensive tobacco control programs have been effective in decreasing tobacco use in the United States, they remain underfunded.<sup>§</sup> During 2000–2009, total tobacco-generated funds that states have received included \$203.5 billion in tobacco revenue (\$79.2 billion from MSA and \$124.3 billion from tobacco taxes). However, currently less than 3.0% of these funds are dedicated to tobacco prevention and cessation programs in the states. Only 15% of the \$24.6 billion in MSA funds and excise tax revenue that states receive annually would be needed to fully fund state tobacco control programs at CDC-recommended levels (i.e., at a per capita annual expenditure of \$9.23 to \$18.03) (2). In fiscal year 2009, no state was funding these programs at CDC-recommended levels. Funding at CDC-recommended levels is needed to continue and improve state comprehensive tobacco control programs, especially when reaching populations that have disproportionately high rates of smoking.

Effective population-based strategies for preventing tobacco use and encouraging tobacco use cessation (including enforcing bans on advertisement) are outlined in the World Health Organization's MPOWER package.<sup>¶</sup> Despite partial bans on

#### What is already known on this topic?

Approximately one in five U.S. adults smoke cigarettes, and certain subpopulations have disproportionately higher prevalences of smoking.

#### What is added by this report?

Although the percentage of adults who are current smokers trended downward during 1998–2008, the proportion did not change from 2007 to 2008; smoking cessation over a 10-year period for adults with low educational attainment did not change and has remained lowest among all education subgroups.

#### What are the implications for public health practice?

Because persons with lower educational attainment generally have higher rates of smoking and are less likely to quit, evidence-based programs known to reduce smoking should be intensified among these groups. Health-care providers should take education level into account when communicating about cessation and smoking hazards to these patients.

some forms of advertisement, the tobacco industry continues to conduct targeted marketing toward socially disadvantaged subgroups and vulnerable populations, such as persons with low socioeconomic status and youths (10).

Offering and providing effective cessation counseling and treatments are integral to reducing the smoking epidemic, especially in subpopulations with high rates of smoking. Because persons with lower educational attainment generally have higher rates of smoking, are less likely to quit, and have less knowledge about the health effects of smoking but are interested in quitting, health-care providers should take education level into account when communicating with such patients (3,4).

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<sup>§</sup> Additional information available at <http://tobaccofreekids.org/reports/settlements/2009/fullreport.pdf>.

<sup>¶</sup> Available at [http://www.who.int/tobacco/mpower/mpower\\_report\\_full\\_2008.pdf](http://www.who.int/tobacco/mpower/mpower_report_full_2008.pdf).

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## State-Specific Secondhand Smoke Exposure and Current Cigarette Smoking Among Adults — United States, 2008

Secondhand smoke (SHS) causes immediate and long-term adverse health effects in nonsmoking adults and children, including heart disease and lung cancer, and SHS exposure occurs primarily in homes and workplaces (1). Smoke-free policies, including not allowing smoking anywhere inside the home (i.e., having a smoke-free home rule), are the best way to provide protection from exposure to SHS. To assess SHS exposure in homes and indoor workplaces and the prevalence of smoke-free home rules, CDC analyzed 2008 Behavioral Risk Factor Surveillance System (BRFSS) data from 11 states and the U.S. Virgin Islands (USVI). This report summarizes the results, which showed wide variation among states in exposure to SHS in homes (from 3.2% [Arizona] to 10.6% [West Virginia]) and indoor workplaces (from 6.0% [Tennessee] to 17.3% [USVI]). The majority of persons surveyed in the 11 states and USVI reported having smoke-free home rules (from 68.8% [West Virginia] to 85.7% [USVI]). This report also provides the 2008 results for CDC's annual BRFSS-based state-specific estimates of current smoking in 50 states, the District of Columbia (DC), and three territories (Guam, Puerto Rico, and USVI). As in previous years, the results showed substantial variation in self-reported cigarette smoking prevalence (range: 6.5%–27.4%; median for 50 states and DC = 18.4%). Additional legislation is needed to increase the number of smoke-free workplaces and other public places.

Health-care providers should continue to encourage persons to make their homes completely smoke-free.

BRFSS\* conducts state-based, random-digit-dialed telephone surveys of the noninstitutionalized U.S. population aged ≥18 years to collect data on health conditions and health risk behaviors. The 2008 BRFSS included data from 414,509 respondents, which were used to assess current smoking prevalence.† The questions to assess SHS exposure and home smoking rules‡ were offered to states as an optional module and were used by 11 states and USVI, which combined represented approximately 19% of the U.S. adult population in 2008.

BRFSS estimates were weighted to the respondent's probability of being selected and the age-, sex-, and race/ethnicity-specific populations from 2008 estimates projected from the 2000 Census for each state, DC, and the U.S. territories. These sampling weights were used to calculate all estimates and 95% confidence intervals. Response rates for BRFSS are calculated using Council of American Survey and Research Organizations (CASRO) guidelines.‡ Median survey response rates were 53.3% and median cooperation rates were 75.0%. For comparisons of prevalence between males and females and smokers and nonsmokers statistical significance ( $p \leq 0.05$ ) was determined using a two-sided z-test.

### Secondhand Smoke Exposure and Smoke-Free Home Rules

In the 11 states and USVI, the percentage of persons who reported being exposed to SHS inside their home ranged from 3.2% (Arizona) to 10.6% (West Virginia) (median: 7.8%), and SHS exposure in indoor workplaces ranged from 6.0% (Tennessee) to 17.3% (USVI) (median: 8.6%) (Table 1).

\* BRFSS survey data information available at [http://www.cdc.gov/brfss/technical\\_infodata/surveydata/2008.htm](http://www.cdc.gov/brfss/technical_infodata/surveydata/2008.htm).

† Those respondents who answered "yes" to the question "Have you smoked at least 100 cigarettes in your entire life?" and answered "every day" or "some days" to the question "Do you now smoke cigarettes every day, some days, or not at all?" were classified as current cigarette smokers. Persons who reported either never having smoked 100 cigarettes (never smokers) in their life or those who had smoked but were not current smokers (former smokers) together were classified as nonsmokers.

‡ Exposure to SHS at home was determined by asking, "On how many of the past 7 days, did anyone smoke in your home while you were there?" Exposure to SHS in indoor workplaces was determined by asking the respondents, "On how many of the past 7 days, did someone smoke in your indoor workplace while you were there?" Nonsmokers who reported ≥1 day of exposure were classified as being exposed to SHS. To assess rules about smoking in their home, respondents were asked "Which statement best describes the rules about smoking inside your home? Do not include decks, garages, or porches (Smoking is not allowed anywhere inside my home, Smoking is allowed in some places or at some times, Smoking is allowed anywhere inside my home, or There are no rules about smoking inside my home)."

§ The response rate is the percentage of persons who completed interviews among all eligible persons, including those who were not successfully contacted. The cooperation rate is the percentage of persons who completed interviews among all eligible persons who were contacted.

**TABLE 1. Proportion of nonsmoking adults\* who reported secondhand smoke exposure inside their indoor workplace† or home,§ and the percentage of adults with complete smoking restrictions inside their homes,¶ by smoking status — Behavioral Risk Factor Surveillance System, 11 states and the U.S. Virgin Islands, 2008**

State/Area	Secondhand smoke exposure				Complete smoking restriction inside home					
	Indoor workplace exposure		Home exposure		Current smoker††		Nonsmoker		Total	
	%	(95% CI**)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Arizona	7.4	(4.9–9.9)	3.2	(2.3–4.1)	66.0	(59.7–72.3)	89.3	(87.6–91.0)	<b>85.6</b>	<b>(83.9–87.3)</b>
Connecticut	6.4	(5.1–7.7)	5.0	(3.9–6.1)	54.8	(49.7–59.9)	83.7	(82.0–85.4)	<b>79.1</b>	<b>(77.5–80.7)</b>
Indiana	10.5	(8.4–12.6)	8.9	(7.4–10.4)	37.8	(32.9–42.7)	81.1	(79.2–83.0)	<b>69.9</b>	<b>(67.8–72.0)</b>
Kansas	8.6	(7.0–10.2)	4.5	(3.6–5.4)	53.9	(49.1–58.7)	86.1	(84.7–87.5)	<b>80.1</b>	<b>(78.6–81.6)</b>
Louisiana	10.7	(9.0–12.4)	9.0	(7.7–10.3)	56.0	(52.0–60.0)	87.7	(86.4–89.0)	<b>81.3</b>	<b>(79.9–82.7)</b>
Mississippi	15.8	(13.7–17.9)	10.1	(8.8–11.4)	40.6	(37.0–44.2)	81.7	(80.2–83.2)	<b>72.6</b>	<b>(71.1–74.1)</b>
New Jersey	7.1	(5.7–8.5)	5.8	(4.8–6.8)	45.0	(39.9–50.1)	85.8	(84.4–87.2)	<b>79.8</b>	<b>(78.3–81.3)</b>
North Carolina	11.4	(10.1–12.7)	7.8	(6.9–8.7)	47.4	(44.5–50.3)	84.7	(83.7–85.7)	<b>77.0</b>	<b>(76.0–78.4)</b>
Tennessee	6.0	(4.0–8.0)	9.7	(8.0–11.4)	36.1	(31.2–41.0)	83.4	(81.3–85.5)	<b>72.2</b>	<b>(70.0–74.4)</b>
Virginia	7.5	(5.9–9.1)	5.7	(4.6–6.8)	42.8	(37.3–48.3)	85.0	(83.4–86.6)	<b>78.1</b>	<b>(76.4–79.8)</b>
West Virginia	9.6	(7.7–11.5)	10.6	(9.2–12.0)	36.4	(32.4–40.4)	80.4	(78.7–82.1)	<b>68.8</b>	<b>(67.0–70.6)</b>
<b>Median§§</b>	<b>8.6</b>		<b>7.8</b>		<b>45.0</b>		<b>84.7</b>		<b>78.1</b>	
U.S. Virgin Islands	17.3	(14.5–20.1)	4.5	(3.3–5.7)	55.3	(45.6–65.0)	87.7	(85.8–89.6)	<b>85.7</b>	<b>(83.8–87.6)</b>

\* Persons aged ≥18 years who either never smoked 100 cigarettes in their life or reported no current smoking.

† Someone smoked in their indoor workplace on ≥1 day in the past 7 days while they were there.

§ Someone smoked in their home on ≥1 day in the past 7 days while they were there.

¶ Smoking is not allowed anywhere inside their home.

\*\* Confidence interval.

†† Persons who reported having smoked ≥100 cigarettes during their life and currently smoke every day or some days.

§§ Calculation of median values excluded the U.S. Virgin Islands.

The percentage of persons who reported that smoking was not allowed anywhere inside their home ranged from 68.8% (West Virginia) to 85.7% (USVI) (median: 78.1%). In all states, nonsmokers (range: 80.4% [West Virginia] to 89.3% [Arizona]; median: 84.7%) were more likely to report having a smoke-free home than smokers (range: 36.4% [West Virginia] to 66.0% [Arizona]; median: 45.0%).

## Current Cigarette Smoking Prevalence

In 2008, the median prevalence of adult current smoking in the 50 states and DC was 18.4% (Table 2). Among states, current smoking prevalence was highest in West Virginia (26.6%), Indiana (26.1%), and Kentucky (25.3%); and lowest in Utah (9.2%), California (14.0%), and New Jersey (14.8%). Smoking prevalence was 6.5% in USVI, 11.6% in Puerto Rico and 27.4% in Guam. Median smoking prevalence for the 50 states and DC was 20.4% for men and 16.7% for women. Men had a statistically higher prevalence of smoking than women in 35 states, DC, and the three territories.

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**Editorial Note:** Millions of persons in the United States are still exposed to SHS in their homes and workplaces (1). The results of this analysis indicate that, in 2008, across the 11 states and USVI, prevalence of exposure to SHS varied by

more than threefold at home, and more than twofold at work. These variations in SHS exposures are related to differences in state smoking prevalence; state smoking restrictions for private-sector worksites, restaurants, and bars; the prevalence of smoke-free home rules; and the level of enforcement of these restrictions and home rules (1). The prevalence of smoke-free households and the number and restrictiveness of state laws regulating smoking in private-sector worksites, restaurants, and bars has increased substantially over time (1–3). For example, during December 31, 2004–December 31, 2007, the level of smoking restrictions became more protective for private-sector worksites in 18 states, for restaurants in 18 states, and for bars in 12 states (3). Nevertheless, state tobacco control programs need to continue to encourage the public to make their homes smoke-free and more states need to enact legislation that eliminates smoking in private-sector worksites, restaurants, and bars (1).

The most recent national estimates to which the state-specific SHS home exposure results can be compared are from the 1999–2004 National Health and Nutrition Examination Survey (NHANES), which consists of a series of cross-sectional surveys that include a household interview and standardized physical examinations (4). The NHANES measure of nonsmokers' SHS exposure at home was based on the self-reported presence of at least one household member who smokes in the home. The NHANES data indicate that among nonsmokers aged ≥4 years, self-reported SHS exposure within the home

**TABLE 2. Estimated prevalence of current cigarette smoking among adults,\* by sex and state/area — Behavioral Risk Factor Surveillance System (BRFSS), United States, 2008**

State/Area	Total		Men		Women	
	%	(95% CI)	%	(95% CI) <sup>†</sup>	%	(95% CI)
Utah	9.2	(8.2–10.3)	10.6	(8.9–12.2)	7.9	(6.6–9.3)
California	14.0	(13.1–15.0)	17.8	(16.2–19.4)	10.3	(9.3–11.3)
New Jersey	14.8	(13.8–15.9)	17.4	(15.6–19.2)	12.4	(11.4–13.5)
Maryland	14.9	(13.8–16.0)	16.1	(14.3–17.9)	13.9	(12.6–15.2)
Hawaii	15.4	(14.1–16.8)	18.2	(16.0–20.4)	12.7	(11.3–14.2)
Washington	15.7	(15.0–16.5)	17.0	(15.8–18.3)	14.4	(13.6–15.3)
Arizona	15.9	(13.8–18.1)	18.2	(14.5–21.9)	13.7	(11.4–16.0)
Connecticut	16.0	(14.5–17.5)	17.3	(14.8–19.8)	14.8	(13.2–16.4)
Massachusetts	16.1	(15.2–17.0)	16.9	(15.5–18.4)	15.4	(14.3–16.5)
Oregon	16.3	(14.8–17.9)	17.4	(15.0–19.8)	15.3	(13.4–17.2)
District of Columbia	16.4	(14.7–18.1)	19.4	(16.4–22.4)	13.8	(12.1–15.6)
Virginia	16.5	(14.8–18.1)	17.1	(14.6–19.6)	15.9	(13.7–18.0)
New York	16.8	(15.7–18.0)	17.9	(16.0–19.9)	15.8	(14.5–17.2)
Vermont	16.8	(15.6–18.0)	18.4	(16.4–20.4)	15.2	(13.8–16.7)
Idaho	16.9	(15.4–18.4)	18.4	(15.8–20.9)	15.4	(13.8–17.1)
New Hampshire	17.0	(15.8–18.3)	18.1	(16.0–20.2)	16.0	(14.5–17.5)
Rhode Island	17.4	(15.7–19.1)	17.9	(15.1–20.7)	16.9	(15.0–18.8)
Florida	17.5	(16.1–18.9)	18.7	(16.4–20.9)	16.4	(14.8–18.1)
Colorado	17.6	(16.6–18.7)	19.8	(18.1–21.4)	15.5	(14.3–16.7)
Minnesota	17.6	(15.9–19.2)	19.3	(16.6–22.0)	15.8	(14.0–17.7)
South Dakota	17.6	(16.2–19.0)	19.0	(16.7–21.3)	16.2	(14.5–17.8)
Delaware	17.8	(16.0–19.6)	20.4	(17.4–23.4)	15.4	(13.3–17.5)
Kansas	17.9	(16.7–19.1)	19.8	(17.9–21.8)	16.1	(14.8–17.4)
Maine	18.2	(16.9–19.5)	21.6	(19.5–23.8)	15.0	(13.6–16.4)
North Dakota	18.2	(16.3–19.7)	20.4	(17.9–22.9)	15.9	(13.9–17.9)
Nebraska	18.4	(17.0–19.8)	20.1	(17.8–22.3)	16.8	(15.1–18.5)
Montana	18.5	(17.1–20.0)	18.7	(16.5–21.0)	18.4	(16.5–20.2)
Texas	18.6	(17.3–20.0)	22.5	(20.1–24.9)	14.9	(13.5–16.2)
Iowa	18.8	(17.4–20.2)	21.0	(18.7–23.3)	16.7	(15.1–18.4)
New Mexico	19.4	(17.9–20.9)	22.0	(19.6–24.5)	16.9	(15.1–18.6)
Wyoming	19.4	(18.2–20.7)	20.0	(18.0–21.9)	18.9	(17.4–20.4)
Georgia	19.5	(17.8–21.2)	21.7	(18.9–24.6)	17.4	(15.5–19.2)
Wisconsin	19.9	(18.3–21.5)	21.7	(19.1–24.2)	18.2	(16.3–20.2)
South Carolina	20.1	(18.7–21.5)	21.6	(19.3–23.9)	18.7	(17.0–20.3)
Ohio	20.2	(19.0–21.4)	21.5	(19.6–23.4)	19.0	(17.6–20.4)
Michigan	20.4	(19.2–21.6)	22.5	(20.6–24.5)	18.4	(17.0–19.8)
Louisiana	20.5	(19.0–21.9)	23.4	(21.0–25.9)	17.7	(16.2–19.3)
North Carolina	20.9	(19.9–22.0)	23.7	(22.0–25.5)	18.3	(17.0–19.5)
Illinois	21.3	(19.6–23.1)	25.4	(22.5–28.3)	17.5	(15.7–19.3)
Pennsylvania	21.4	(20.1–22.7)	23.4	(21.2–25.6)	19.6	(18.1–21.0)
Alaska	21.7	(19.2–24.2)	23.9	(20.1–27.8)	19.3	(16.0–22.6)
Alabama	22.2	(20.3–24.0)	25.2	(22.1–28.4)	19.4	(17.4–21.3)
Nevada	22.3	(20.2–24.4)	24.5	(21.0–28.0)	20.0	(17.7–22.3)
Arkansas	22.4	(20.7–24.1)	24.4	(21.7–27.2)	20.4	(18.4–22.5)
Mississippi	22.7	(21.3–24.1)	25.4	(23.1–27.7)	20.3	(18.7–21.9)
Tennessee	23.2	(21.1–25.3)	26.7	(23.0–30.3)	20.0	(18.1–21.9)
Oklahoma	24.8	(23.4–26.2)	26.5	(24.2–28.8)	23.1	(21.6–24.7)
Missouri	25.0	(23.2–26.9)	27.3	(24.3–30.3)	22.9	(20.6–25.2)
Kentucky	25.3	(23.6–27.0)	26.3	(23.5–29.2)	24.3	(22.3–26.2)
Indiana	26.1	(24.1–28.2)	28.5	(25.2–31.7)	23.9	(21.3–26.5)
West Virginia	26.6	(24.8–28.4)	26.1	(23.3–28.9)	27.1	(24.8–29.4)
<b>Median<sup>§</sup></b>	<b>18.4</b>		<b>20.4</b>		<b>16.7</b>	
U.S. Virgin Islands	6.5	(5.3–7.8)	9.5	(7.0–11.9)	3.9	(2.9–4.9)
Puerto Rico	11.6	(10.3–12.9)	15.7	(13.4–18.1)	8.0	(6.6–9.3)
Guam	27.4	(23.6–31.2)	33.6	(27.6–39.6)	21.1	(16.5–25.7)

\* Persons aged  $\geq 18$  years who reported having smoked  $\geq 100$  cigarettes during their life and currently smoke every day or some days. Data were weighted to be representative of the state/area population.

<sup>†</sup> Confidence interval.

<sup>§</sup> The number of territories that have conducted the BRFSS has varied over time; calculation of median values excluded territories (i.e., Guam, Puerto Rico, and U.S. Virgin Islands), consistent with previous reports.

declined significantly from 1988–1994 (20.9%) to 1999–2004 (10.2%) (4). These declines are reflected in serum cotinine measurements from NHANES nonsmokers' blood samples (serum cotinine levels are an objective measure of exposure to nicotine during the past 3–4 days). The percentage of non-smokers aged  $\geq 4$  years with detectable serum cotinine ( $\geq 0.05$  ng/mL) declined from 83.9% in 1988–1994 to 46.4% in 1999–2004 (4).

The percentage of persons who report that their home has a smoke-free rule has increased substantially over time (1,2). For example, data from BRFSS indicate that, among the five states and USVI that assessed smoke-free home rules in both the 2005 and 2008 BRFSS, four states (New Jersey, North Carolina, Virginia, and West Virginia) had a statistically significant ( $p < 0.05$ ) increase in prevalence of smoke-free homes, ranging from a percentage point increase of 1.9% to 3.5% (5).\*\* In general, the prevalence of exposure to smoke in the home is higher in homes with less restrictive smoking rules (1).

SHS exposure at work is related to the level of restrictions states and communities place on smoking in worksites (including private-sector sites, restaurants, and bars) and levels of enforcement of those restrictions (1). State laws varied across the 11 states included in this analysis and ranged from no statewide smoking restrictions in any venue (Indiana, Mississippi, North Carolina, and West Virginia) to states that are 100% smoke-free in private-sector worksites, restaurants, and bars (Arizona and New Jersey) (3).<sup>††</sup> Two of the 11 states, North Carolina and Virginia, enacted more restrictive laws during 2009. North Carolina's law<sup>§§</sup> will require restaurants and bars to be 100% smoke-free, effective January 2, 2010. Virginia's law,<sup>¶¶</sup> which will take effect on December 1, 2009, sets limited restrictions and will allow separate ventilated smoking rooms in restaurants and bars. As of October 1, 2009, only 21 states and DC have laws that make indoor public places and worksites completely smoke-free, and although most laws are adequately complied with, enforcement remains an issue in some settings (1,3). Separating smokers from nonsmokers, use of air cleaning technologies, and ventilating buildings cannot eliminate exposure to SHS (1). According to the U.S. Surgeon General, smoke-free policies that prohibit smoking in all indoor areas

\*\* The 2005 question was "Which statement best describes the rules about smoking inside your home?" with response options "Smoking is not allowed anywhere inside your home," "Smoking is allowed in some places or at some times," "Smoking is allowed anywhere inside your home," and "There are no rules about smoking inside your home."

<sup>††</sup> The CDC State Tobacco Activities Tracking and Evaluation (STATE) System. Atlanta, GA: US Department of Health and Human Services, CDC; 2009. Available at <http://apps.nccd.cdc.gov/statesystem> contains information on state smoke-free laws.

<sup>§§</sup> NC H.B. 2, Session Law 2009-27.

<sup>¶¶</sup> VA H.B. 1703, Chapter 153.



are the only effective approach to ensure that SHS exposure does not occur in workplaces and other public places (1).

The analysis of 2008 current smoking prevalence indicated that state levels and trends continued to vary substantially (6). In 2008, Utah and USVI continued to meet the *Healthy People 2010* objective (27-1a) to reduce cigarette smoking by adults to  $\leq 12\%$  (met since 2003 in Utah and since 2001 in USVI) (6,7). Puerto Rico met this objective for the first time in 2008. Trends since 1998 indicate that few other states are likely to meet the *Healthy People* target by 2010 (6).

The BRFSS median for the prevalence of current smoking across the 50 states and DC (18.4%) differs from the mean prevalence of current smoking among adults aged  $\geq 18$  years from the 2008 National Health Interview Survey (NHIS) (20.6%). The national mean from BRFSS was not reported because the focus of BRFSS is on state-level estimates. In contrast, NHIS mean prevalence serves as the national measure for tracking progress toward *Healthy People 2010* objectives (7). For BRFSS analyses, each state draws its own independent sample to produce a state-level estimate. A number of differences between the two surveys exist, including survey type (telephone versus household), variations in response rates, and sampling and weighting procedures.

The findings in this report are subject to at least four limitations. First, BRFSS does not sample persons in households without any telephone service (1.9%) or with only wireless telephones (20.2%), and adults with only wireless service are more likely (26.5%) than the rest of the U.S. population to be current smokers; therefore, current smoking prevalence might be underestimated (8). Second, estimates for cigarette smoking are based on self-report and are not validated by biochemical tests. However, self-reported data on current smoking status have high validity (9). Similarly, estimates of exposure to SHS at home and in the workplace also were assessed by self-report, which might underestimate the proportion exposed when compared with serum cotinine measurement (1). Third, the median response rate in all states and DC was 53.3% (range: 35.8%–65.9%). Low response rates might indicate a potential for response bias such that smoking prevalence might be underestimated if smokers are less likely to respond to a survey. Finally, SHS exposure at home and in the workplace was assessed for the 7 days preceding the survey. This might underestimate exposure if a person who usually smoked in these locations was absent during that week.

Enacting legislation that eliminates smoking in indoor work spaces and public places and encouraging persons to implement smoke-free home rules will protect persons from exposure to SHS (1). The Institute of Medicine recently concluded that SHS exposure can cause acute myocardial infarction (AMI)

#### What is already known on this topic?

State variation exists in the prevalence of current smoking, in nonsmoker exposure to secondhand smoke, and in the prevalence of persons who have completely smoke-free rules for their homes.

#### What is added by this report?

Among 11 states and the U.S. Virgin Islands (USVI), nonsmoker exposure to secondhand smoke in their homes ranged from 3.2% (Arizona) to 10.6% (West Virginia), exposure in their indoor workplaces ranged from 6.0% (Tennessee) to 17.3% (USVI), and the percentage of the population with smoke-free home rules ranged from 68.8% (West Virginia) to 85.7% (USVI).

#### What are the implications for public health practice?

Establishing smoke-free workplaces and promotion of smoke-free home rules should be continued and expanded to protect nonsmokers from secondhand smoke and reduce smoking prevalence.

and that communities that enact smoke-free policies realize a reduction in hospitalization for AMI among the general population (10). All persons, including those with an increased risk for heart disease, can protect themselves from SHS exposure by avoiding indoor areas that allow smoking.

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## Update: Influenza Activity – United States, August 30–October 31, 2009

The 2009 pandemic influenza A (H1N1) virus emerged in the United States in April 2009 (1) and has since spread worldwide. Influenza activity resulting from this virus occurred throughout the summer and, by late August, activity had begun to increase in the southeastern United States (2). Since August, activity has increased in all regions of the United States. As of the week ending October 31, nearly all states were reporting widespread disease. Since April 2009, pandemic H1N1 has remained the dominant circulating influenza strain. This report summarizes U.S. influenza activity\* from August 30, 2009, defined as the beginning of the 2009–10 influenza season, through October 31, 2009.

### Viral Surveillance

During August 30–October 31, World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories in the United States tested 163,123 respiratory specimens for influenza viruses, 48,585 (30%) of which were positive (Figure 1). Of the 48,483 (99.8%) specimens positive for influenza A, 32,867 (68%) were subtyped by real-time reverse transcription–polymerase chain reaction (rRT-PCR) or by virus culture. A total of 32,814 (99.8%) of these were 2009 pandemic influenza A (H1N1) viruses, 18 (0.1%) were seasonal influenza A (H1), and 35 (0.1%) were influenza A (H3) viruses.

CDC has antigenically characterized 239 pandemic influenza A (H1N1) viruses collected since September 1. A total of 238 (99.6%) of the 239 pandemic influenza A (H1N1) viruses tested were antigenically related to the A/California/7/2009 (H1N1)pdm reference virus selected by WHO as the 2009 pandemic influenza A (H1N1) vaccine virus; one virus (0.4%) tested showed reduced titers with antisera produced against A/California/7/2009.

### Antiviral Resistance of Influenza Virus Isolates

CDC conducts surveillance for resistance of circulating influenza viruses to influenza antiviral medications: adamantanes (amantadine and rimantadine) and neuraminidase inhibitors

(zanamivir and oseltamivir). Since September 1, a total of 256 pandemic influenza A (H1N1) virus isolates collected in the United States have been tested for resistance to the neuraminidase inhibitors. All but four were susceptible to oseltamivir, bringing the total number of such resistant isolates to 14 since April 2009. Twelve of the 14 patients from whom the resistant isolates were collected had documented exposure to oseltamivir through treatment or chemoprophylaxis. Exposure to oseltamivir has yet to be determined for one patient, and another patient had no documented oseltamivir exposure. All 256 tested viruses were sensitive to the neuraminidase inhibitor zanamivir. Since September 1, one influenza A (H3N2) virus isolate and 152 pandemic influenza A (H1N1) virus isolates also have been tested for resistance to adamantanes (amantadine and rimantadine); all of these virus isolates were resistant to the adamantanes.

### State-Specific Activity Levels

During the first week of the influenza season (August 30–September 5), 11 states, clustered mainly in the South, reported widespread activity. By the following week, that number had more than doubled to 26 states. In subsequent weeks, more states reported increased activity. As of the week ending October 31, widespread influenza activity<sup>†</sup> was reported by all but two states (Mississippi and Hawaii). In contrast, during the 2008–09 influenza season, no state reported widespread influenza activity before the week ending January 10, 2009.

### Outpatient Illness Surveillance

The weekly percentage of outpatient visits for influenza-like illness (ILI)<sup>§</sup> reported by the U.S. Outpatient ILI Surveillance Network (ILINet) increased from 3.5% in the week ending September 5 to 7.7% in the week ending October 31 (Figure 2). ILI activity has remained above the national baseline of 2.3% during this entire period.<sup>¶</sup> Since the week ending October 3, all

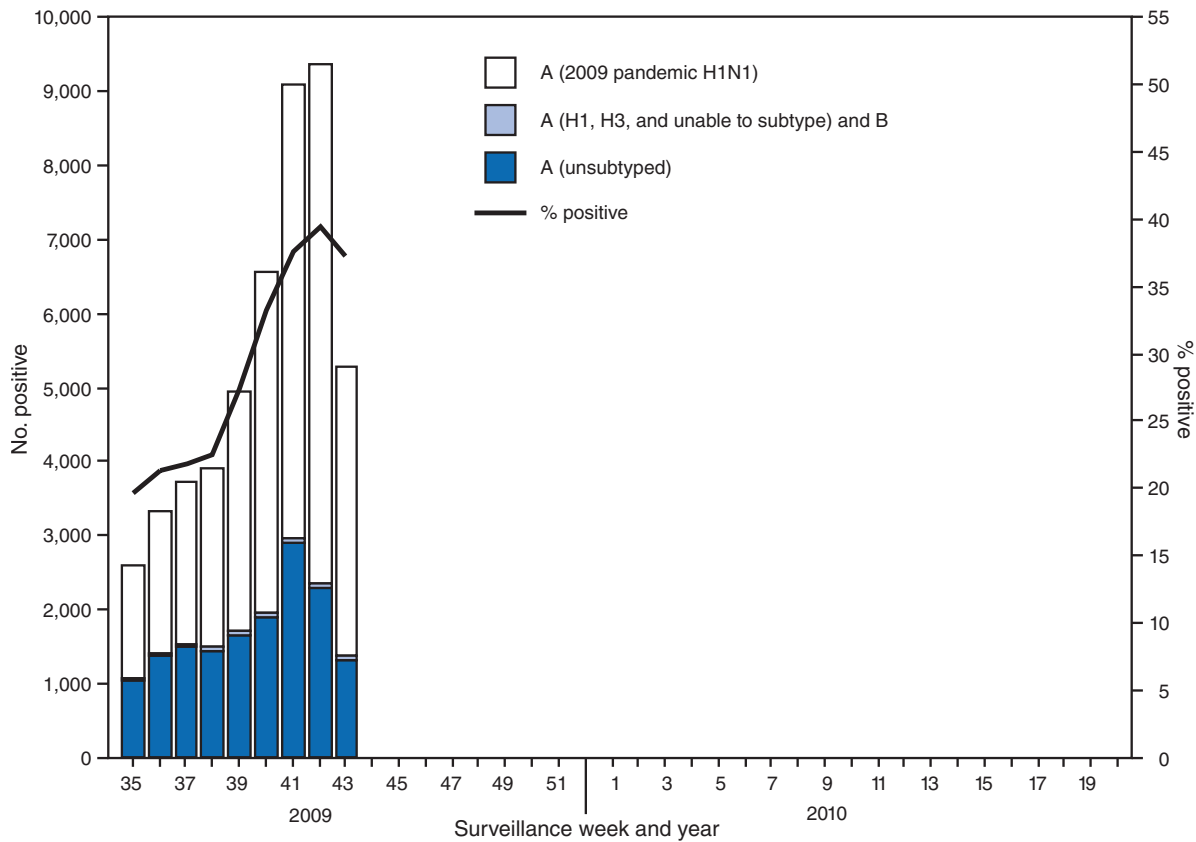
<sup>†</sup> Levels of activity are 1) no activity; 2) sporadic: isolated laboratory-confirmed influenza cases or a laboratory-confirmed outbreak in one institution, with no increase in influenza-like illness (ILI) activity; 3) local: increased ILI, or at least two institutional outbreaks (ILI or laboratory-confirmed influenza) in one region with recent laboratory evidence of influenza in that region; virus activity no greater than sporadic in other regions; 4) regional: increased ILI activity or institutional outbreaks (ILI or laboratory-confirmed influenza) in at least two but less than half of the regions in the state with recent laboratory evidence of influenza in those regions; and 5) widespread: increased ILI activity or institutional outbreaks (ILI or laboratory-confirmed influenza) in at least half the regions in the state with recent laboratory evidence of influenza in the state.

<sup>§</sup> Defined as a temperature of  $\geq 100.0^{\circ}\text{F}$  ( $\geq 37.8^{\circ}\text{C}$ ), oral or equivalent, and cough and/or sore throat, in the absence of a known cause other than influenza.

<sup>¶</sup> The national and regional baselines are the mean percentage of visits for ILI during noninfluenza weeks for the previous three seasons plus two standard deviations. A noninfluenza week is a week during which  $<10\%$  of specimens tested positive for influenza. National and regional percentages of patient visits for ILI are weighted on the basis of state population. Use of the national baseline for regional data is not appropriate. Additional information available at <http://www.cdc.gov/flu/weekly/fluactivity.htm>.

\*The CDC influenza surveillance system collects five categories of information from eight data sources: 1) viral surveillance (World Health Organization collaborating U.S. laboratories, the National Respiratory and Enteric Virus Surveillance System, and novel influenza A virus case reporting), 2) outpatient illness surveillance (U.S. Outpatient ILI Surveillance Network), 3) mortality (122 Cities Mortality Reporting System and influenza-associated pediatric mortality reports), 4) hospitalizations (Emerging Infections Program) and 5) summary of geographic spread of influenza (state and territorial epidemiologist reports).

**FIGURE 1. Number and percentage of respiratory specimens testing positive for influenza reported by World Health Organization and National Respiratory and Enteric Virus Surveillance System collaborating laboratories, by type and subtype, and surveillance week — United States, 2009–10 influenza season**



10 surveillance regions have reported a percentage of outpatient visits for ILI at or above their region-specific baseline levels. These percentages are all substantially elevated compared with data recorded in previous years over the same period.

## Influenza-Associated Hospitalizations

Laboratory-confirmed influenza-associated hospitalizations are monitored using a population-based surveillance network that includes the 10 Emerging Infections Program (EIP) sites and six new sites.\*\* During September–October, cumulative influenza hospitalization rates for persons aged <65 years were substantially elevated for this time of year and exceeded or were approaching the end-of-season cumulative rates for the last three seasons. Preliminary cumulative rates of laboratory-

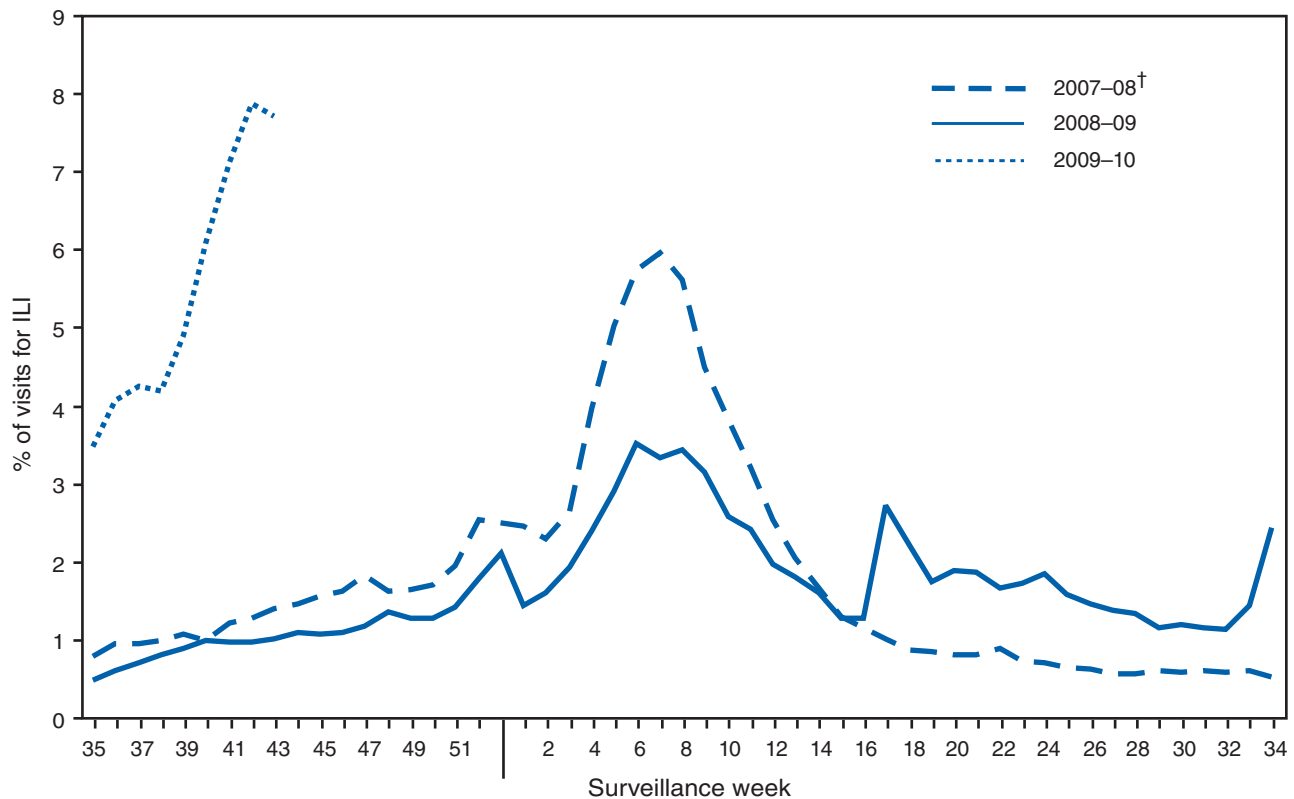
confirmed, influenza-associated hospitalizations reported for children aged 0–4 years were 3.1 per 10,000 population by EIP and 7.3 per 10,000 population by the new sites (Figure 3). Rates for other age groups were as follows: 5–17 years, 1.5 by EIP and 2.9 by the new sites; 18–49 years, 1.2 by EIP and 1.2 by the new sites; 50–64 years, 1.3 by EIP and 1.2 by the new sites; and ≥65 years, 1.0 by EIP and 1.1 by the new sites.

On August 30, CDC and the Council of State and Territorial Epidemiologists (CSTE) instituted modified case definitions for aggregate reporting of influenza-associated hospitalizations and deaths. This cumulative state-level reporting is referred to as the Aggregate Hospitalization and Death Reporting Activity (AHDRA).†† During August 30–October 31, a total of 17,838 hospitalizations associated with laboratory-confirmed influenza virus infections were reported to CDC through AHDRA. On

\*\* EIP currently conducts surveillance for laboratory-confirmed, influenza-related hospitalizations in 61 counties and Baltimore, Maryland. The EIP catchment area includes 13 metropolitan areas located in 10 states. Beginning in September 2009, six new EIP sites covering 40 counties began reporting influenza-related hospitalization surveillance. Hospital laboratory, admission, and discharge databases, and infection-control logs are reviewed to identify persons with a positive influenza test (i.e., viral culture, direct fluorescent antibody assays, rRT-PCR, serology, or a commercial rapid antigen test) from testing conducted as part of their routine care.

†† States report weekly to CDC either 1) laboratory-confirmed influenza hospitalizations and deaths or 2) pneumonia and influenza syndrome-based cases of hospitalization and death resulting from all types or subtypes of influenza. Although only the laboratory-confirmed cases are included in this report, CDC continues to analyze data both from laboratory-confirmed and syndromic hospitalizations and deaths.

**FIGURE 2. Percentage of outpatient visits for influenza-like illness (ILI),\* by surveillance week — U.S. Outpatient Influenza-Like Illness Surveillance Network (ILINet), United States, 2009–10, 2008–09, and 2007–08 influenza seasons**



\* Defined as a temperature of  $\geq 100.0^{\circ}\text{F}$  ( $\geq 37.8^{\circ}\text{C}$ ), oral or equivalent, and cough and/or sore throat, in the absence of a known cause other than influenza.

† No week 53 occurred during the 2007–08 influenza season; therefore, the week 53 data point for that season is an average of weeks 52 and 1.

average, 31 states each week reported laboratory-confirmed hospitalizations during that period.

## Pneumonia- and Influenza-Related Mortality

Influenza-associated deaths are monitored by the 122 Cities Mortality Reporting System and AHDRA. For the week ending October 31, pneumonia or influenza was reported as an underlying or contributing cause of death for 7.4% of all deaths reported through the 122 Cities Mortality Reporting System, above the week-specific epidemic threshold of 6.7%<sup>§§</sup> and the fifth consecutive week above the epidemic threshold.

During August 30–October 31, 672 deaths associated with laboratory-confirmed influenza virus infections were reported to CDC through AHDRA. On average, 29 states reported laboratory-confirmed deaths each week during that period. The

672 laboratory-confirmed deaths are in addition to the 593 laboratory-confirmed deaths from 2009 pandemic influenza A (H1N1) that were reported to CDC from April through August 30, 2009.

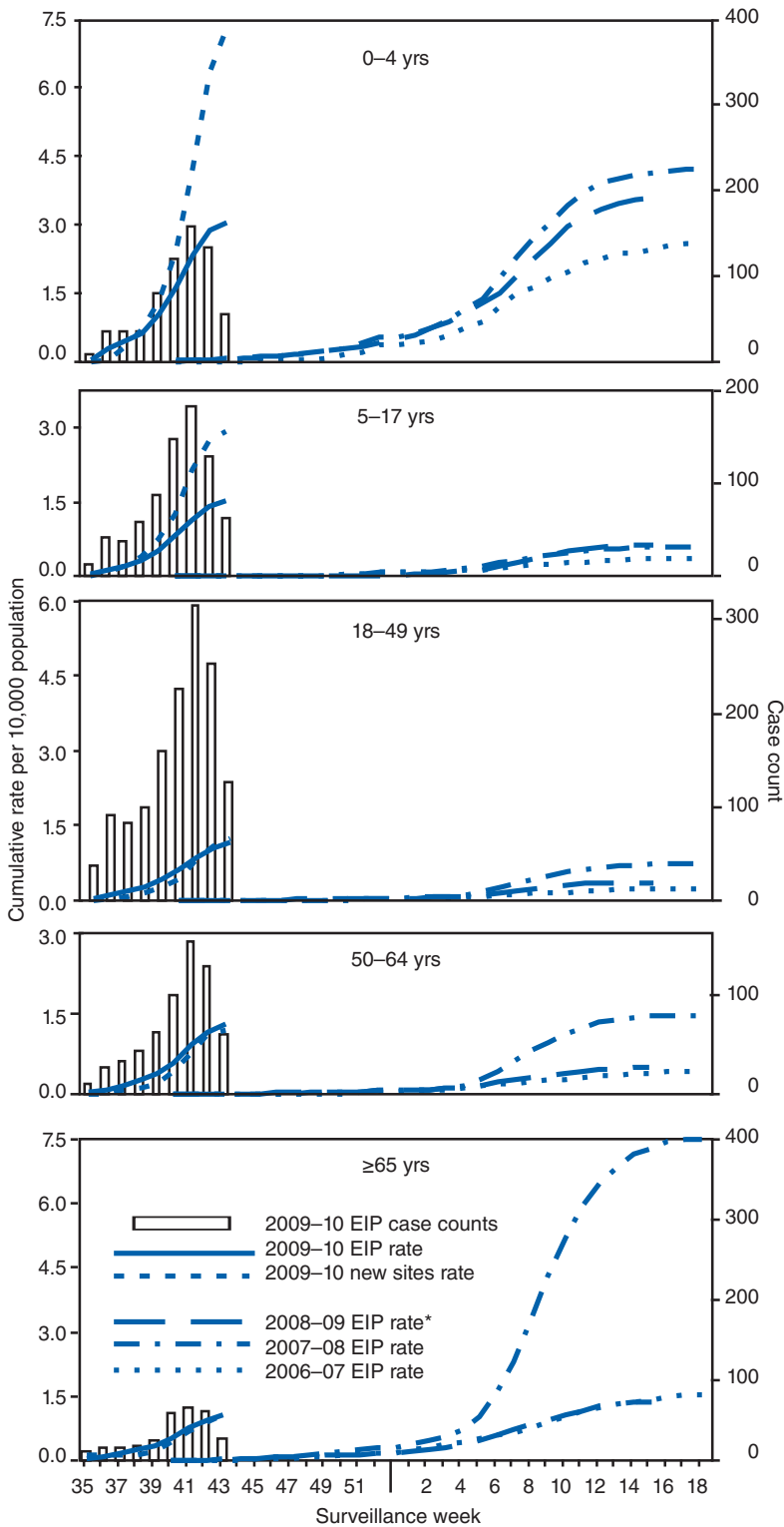
## Influenza-Associated Pediatric Mortality

During August 30–October 31, CDC received 85 reports of pediatric deaths associated with influenza infection (Figure 4). Seventy-three of these cases were associated with laboratory-confirmed 2009 pandemic influenza A (H1N1) virus. The remaining 12 pediatric deaths were associated with an influenza A infection for which the subtype was undetermined.

Of the 85 pediatric deaths reported since August 30, a total of 12 (14%) were among children aged <2 years, nine (11%) were among children aged 2–4 years, 30 (35%) were among children aged 5–11 years, and 34 (40%) were among children aged 12–17 years. Seventy-eight (92%) of the 85 decedents had a medical history reported. Of the 78, 56 (72%) had one or more medical conditions associated with an increased risk for influenza-related complications (3).

<sup>§§</sup> The seasonal baseline proportion of pneumonia and influenza deaths is projected using a robust regression procedure in which a periodic regression model is applied to the observed percentage of deaths from pneumonia and influenza that were reported by the 122 Cities Mortality Reporting System during the preceding 5 years. The epidemic threshold is 1.645 standard deviations above the seasonal baseline.

**FIGURE 3. Laboratory-confirmed influenza hospitalization rates per 10,000 population, by age group and surveillance week — Emerging Infections Program (EIP), United States, 2009–10, 2008–09, 2007–08, and 2006–07 influenza seasons**



\* The 2008–09 EIP rate ended as of April 14, 2009, with onset of the 2009 pandemic influenza A (H1N1) season.

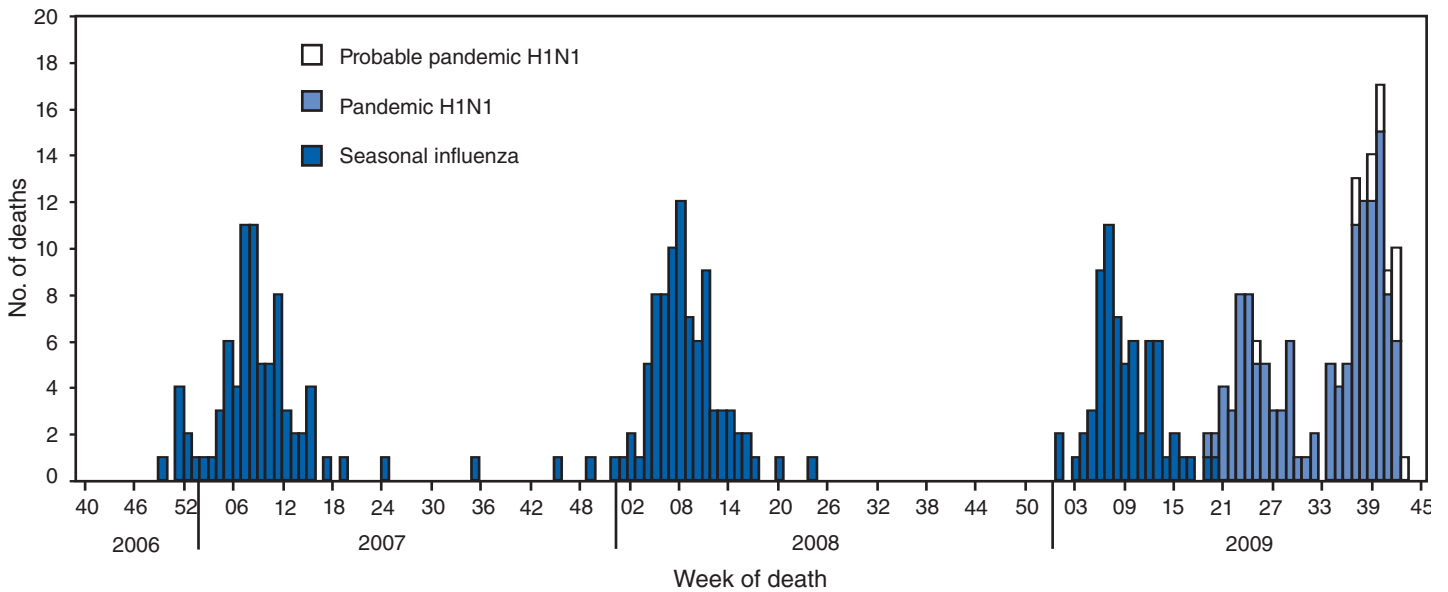
Since April 26, CDC has received 145 reports of pediatric deaths associated with influenza infection. Of these, 129 (89%) cases were associated with laboratory-confirmed 2009 pandemic influenza A (H1N1) virus. The remaining 16 pediatric deaths were associated with seasonal influenza or an influenza A virus for which the subtype was undetermined. In comparison, during the preceding five influenza seasons, the total number of reported pediatric influenza deaths ranged from 46 to 153, with an average of 82 deaths each year.

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**Editorial Note:** During August 30–October 31, influenza activity was substantially above historic levels in all U.S. surveillance systems. By mid-October, nearly all states reported geographically widespread influenza activity. Nationwide, the percentage of visits to health-care providers for ILI was higher than that observed at the peak of any seasonal influenza season since ILINet was implemented in its current form in 1997. Influenza-associated hospitalization rates continued to trend upward in all age groups, substantially above historical rates from the same time period during previous years. The widespread occurrence of pandemic H1N1 influenza in the United States highlights the importance of understanding and appropriately using available tools for prevention and treatment of influenza. Particularly important in reducing the impact of pandemic H1N1 infections are recommendations for the use of influenza A (H1N1) 2009 monovalent vaccines and a continued emphasis on early, empiric antiviral treatment of hospitalized patients and others who are ill and at greater risk for influenza-related complications.

Severe outcomes among children, continue to be prominent during the 2009 influenza A (H1N1) pandemic. A total of 145 pediatric deaths associated with influenza infection have been reported since April 26. In comparison, 82 deaths were reported on average during the previous five influenza seasons. Pediatric hospitalization rates are higher than those of any other age group and are particularly high among children aged <5 years. These epidemiologic data provide support for ACIP recommendations that include persons aged 6 months–24 years in the initial target groups for vaccination using the influenza A (H1N1) 2009

**FIGURE 4. Number of influenza-associated pediatric deaths, by week of death and influenza status — United States, 2009–10, 2008–09, 2007–08, and 2006–07 influenza seasons**



monovalent vaccine now available (3). In addition, vaccination providers should vaccinate persons who live with or care for infants aged <6 months because young infants themselves cannot be vaccinated. Other target groups for initial supplies of influenza A (H1N1) 2009 monovalent vaccine include pregnant women, health-care and emergency medical services personnel, and persons aged 25–64 years who are at higher risk for more severe disease because of chronic health disorders or compromised immune systems (3).

The supply of influenza A (H1N1) 2009 monovalent vaccines will continue to increase rapidly through November and December.<sup>¶¶</sup> However, these vaccines are not yet available to all persons who might benefit from vaccination. In the absence of widespread immunity based on vaccination, early empiric antiviral treatment of persons who are severely ill or at high risk for influenza-related complications can reduce the number of severe illnesses from pandemic H1N1. Observational studies of hospitalized patients with seasonal influenza and pandemic H1N1 influenza have suggested that mortality is reduced among hospitalized patients who received antiviral medications (4–5). However, the use of antiviral treatment for hospitalized patients remains suboptimal, as highlighted in recent studies indicating that 21%–25% of hospitalized patients with laboratory-confirmed pandemic H1N1 did not receive antiviral medications and, among those who did, treatment was often delayed until 1–2 days after admission (6–7). Antiviral medications active against influenza are

widely available, and early empiric treatment with oseltamivir or zanamivir of hospitalized persons and others who are severely ill or at high risk for influenza-related complications is recommended (8). In addition, peramivir, an investigational intravenous neuraminidase inhibitor medication, has recently been made available under an Emergency Use Authorization by the Food and Drug Administration. Peramivir is available for treatment of certain adult and pediatric patients with suspected or laboratory-confirmed pandemic H1N1 (9,10).

The current dominant influenza virus by far is 2009 pandemic influenza A (H1N1); seasonal influenza viruses continue to circulate at low levels in the United States and elsewhere. However, influenza circulation patterns remain unpredictable, and seasonal influenza viruses might circulate more widely later in the influenza season. CDC will continue to monitor changes in geographic spread, type, and severity of 2009 pandemic influenza A (H1N1) and will issue weekly online FluView reports.<sup>\*\*\*</sup> Additional detailed information regarding 2009 pandemic influenza A (H1N1) also is available online.<sup>†††</sup>

#### Acknowledgments

This report is based, in part, on data contributed by participating state and territorial health departments and state public health laboratories, World Health Organization collaborating laboratories, National Respiratory and Enteric Virus Surveillance System collaborating laboratories, the U.S. Outpatient ILI Surveillance Network, the Emerging Infections Program, the Aggregate Hospitalization

<sup>¶¶</sup> Available at <http://www.cdc.gov/h1n1flu/vaccination/vaccinesupply.htm>.

<sup>\*\*\*</sup> Available at <http://www.cdc.gov/flu/weekly>.

<sup>†††</sup> Available at <http://www.cdc.gov/h1n1flu>.

#### What is already known on this topic?

The 2009 pandemic influenza A (H1N1) virus emerged in the United States in April 2009 and continues to cause significant disease.

#### What is added by this report?

Pediatric hospitalization rates related to pandemic H1N1 are higher than all other age groups, and influenza-related pediatric deaths continue to rise.

#### What are the implications for public health practice?

Current epidemiologic data support key actions by public health agencies, including vigorous vaccination campaigns for target groups recommended by Advisory Committee on Immunization Practices (ACIP), especially persons aged 6 months–24 years; 2) early empiric antiviral treatment of hospitalized persons and others who are severely ill or at high risk for influenza-related complications; and 3) continued emphasis of nonpharmaceutical strategies to limit the spread of influenza, such as frequent hand washing and staying home when ill.

and Death Reporting Activity, the Influenza Associated Pediatric Mortality Surveillance System, and the 122 Cities Mortality Reporting System.

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## Effectiveness of 2008–09 Trivalent Influenza Vaccine Against 2009 Pandemic Influenza A (H1N1) – United States, May–June 2009

Since first reports in April 2009 (1), the 2009 pandemic influenza A (H1N1) virus has spread around the world (2). The pandemic virus is antigenically distinct from seasonal influenza A (H1N1) viruses targeted by seasonal influenza vaccines. Results from recent serologic studies have suggested that seasonal influenza vaccines are unlikely to provide substantial cross-protection against infection with the pandemic H1N1 virus (3). However, how serologic results correlate with the complex immune responses that confer clinical protection remains uncertain. To complement the serologic studies and evaluate the effectiveness of 2008–09 trivalent seasonal influenza vaccine against laboratory-confirmed pandemic influenza A (H1N1) illness, CDC used available data to conduct a case-cohort analysis. The analysis used surveillance reports from eight states of persons aged  $\geq 18$  years with confirmed pandemic H1N1 illness during May–June 2009. Influenza vaccination coverage estimates for these states during the 2008–09 influenza season (September 2008–February 2009) were estimated for the population cohort by using preliminary Behavioral Risk Factor Surveillance Survey (BRFSS) data (4). The overall vaccine effectiveness (VE) against pandemic virus illness after adjustment for age group and presence of chronic medical conditions that increase the risk for complications from influenza was -10% (95% confidence interval [CI] = -43%–15%). Current evidence from this study and other studies does not suggest that seasonal influenza vaccination either decreases or increases the risk for acquiring pandemic H1N1 illness. To prevent seasonal and pandemic influenza, CDC recommends vaccination with seasonal and pandemic influenza vaccines.

The case-cohort method produces a vaccine exposure odds ratio, which for this analysis was an estimate of the relative risk (RR) for 2009 pandemic influenza A (H1N1) illness given seasonal influenza vaccination versus no seasonal vaccination. To obtain the vaccine exposure odds ratio, the odds of vaccination among pandemic H1N1 cases was divided by the odds of vaccination among the population as estimated from BRFSS data. Pandemic H1N1 cases were reported to CDC as part of national outbreak surveillance. The percentage of persons with self-reported seasonal influenza vaccination (receipt of vaccine during September 2008–March 2009) among patients with laboratory-confirmed 2009 pandemic influenza A (H1N1) whose cases were identified in eight states during May–June 2009 was compared with population estimates of vaccination

coverage in these states. Only cases of pandemic H1N1 diagnosed in persons aged  $\geq 18$  years in a state providing greater than five reports and with complete patient information on date of birth, illness onset date, presence of a chronic medical condition that increases the risk of influenza complications, and vaccination status were eligible for inclusion in this study. Out of 941 cases in this convenience sample, 356 (38%) had all necessary data available. The 356 case-patients resided in eight states: Arizona (55 patients), Colorado (11), Connecticut (19), Delaware (27), Kentucky (13), Pennsylvania (30), Texas (187), and Virginia (14). For this analysis, laboratory-confirmed 2009 pandemic influenza A (H1N1) infection was defined as a positive test result at state public health laboratories or at CDC by using real-time reverse transcription-polymerase chain (rRT-PCR) protocols, probes, primers, and reagents approved by CDC.

Vaccination coverage for persons aged 18–29 years, 30–39 years, 40–49 years, and  $\geq 50$  years was estimated for the eight selected states by using preliminary 2009 BRFSS data from a telephone survey of 20,689 respondents. Previous BRFSS estimates of vaccine coverage demonstrate that  $>98\%$  of influenza vaccination occurs before March of the influenza season (CDC, unpublished data, 2009). BRFSS respondents were considered vaccinated if they 1) said “yes” to either having an influenza shot or nasal spray during the past 12 months, and 2) indicated a month and year of vaccination during September 2008–February 2009. Five percent of respondents had unknown influenza vaccination status (i.e., don’t know, refused, missing, blank, or incomplete date of vaccination). Because BRFSS does not routinely collect vaccination status on children aged  $<18$  years and uses residential landline telephone numbers, analyses were limited to noninstitutionalized adults aged  $\geq 18$  years (4).

Vaccination coverage estimates were adjusted by four age groups and by the presence of a chronic medical condition that increases the risk for complications from influenza. For all states except Texas, the case surveillance forms recorded whether the patient had any of the following conditions: asthma, chronic heart or circulatory disease, metabolic disease including diabetes, or cancer in the last 12 months. In Texas, the surveillance forms recorded whether the patient had any chronic health condition. The chronic medical conditions for cases were selected to be consistent with those measured by BRFSS, in which survey respondents are asked whether they have ever been told by a doctor, nurse, or other health professional that they have or still have asthma, heart attack, angina, coronary heart disease, stroke, diabetes, or cancer.

Among pandemic H1N1 patients in the analysis, 28% had a chronic medical condition as defined by case surveillance forms, whereas an estimated 22% of the adult population in

the BRFSS data from the eight states had at least one of the indicated chronic medical conditions. Within age groups, case and cohort vaccination coverage estimates were adjusted for chronic medical conditions that increase the risk for complications from influenza (“yes” response versus “no”) by weighting the stratum-specific estimates by number of cases. Vaccine effectiveness was calculated as  $1 - RR$ , where RR was the estimated adjusted relative risk for pandemic H1N1 illness as a function of seasonal vaccination coverage. Relative risks were weighted according to the inverse variances of the stratum-specific log RRs. Appropriate statistical software was used to estimate the 2009 BRFSS stratum-specific vaccination coverage for these eight states.

The overall adjusted VE against pandemic virus illness was  $-10$  (CI =  $-43\%$ – $15\%$ ). Estimates of VE varied by age group, ranging from  $-57\%$  to  $15\%$  (Table); the CIs for each age group-specific VE estimate were wider than for the overall VE because of reduced sample sizes within age strata.

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**Editorial Note:** These results, taken together with other studies, do not support an effect of seasonal 2008–09 trivalent influenza vaccine in either decreasing or increasing the risk for pandemic influenza A (H1N1). The results are consistent with U.S. serologic and immunologic data (3) and with findings from a recently published study from Australia (5). In the immunologic analyses, prevaccination and postvaccination sera from recipients of seasonal influenza vaccines during 2005–2009 were tested by microneutralization methods for levels of cross-reactive antibody to 2009 pandemic influenza A (H1N1) virus. After seasonal vaccination during the 2005–06, 2006–07, and 2008–09 influenza seasons, children aged  $<10$  years lacked detectable neutralizing cross-reactive antibody to the 2009 pandemic influenza A (H1N1) virus. Among adults aged  $\geq 18$  years, vaccination with the 2007–08 or 2008–09 trivalent inactivated vaccine provided little or no increase in cross-reactive antibody levels (3).

In Australia, investigators conducted a case-control study using data from sentinel influenza surveillance practices to assess the effect of seasonal vaccine (5). In-house rRT-PCR assays were used to identify 212 patients with pandemic H1N1 influenza and 365 control patients who tested negative for influenza virus infection. The investigators found no evidence that receipt of seasonal influenza vaccine influenced the risk for being diagnosed with 2009 pandemic influenza A (H1N1)



**TABLE. Effectiveness of 2008–09 seasonal influenza vaccine against laboratory-confirmed 2009 pandemic influenza A (H1N1) illness, by age group — selected states,\* May–June 2009**

Age group (yrs)	No. H1N1 patients	H1N1 patients vaccinated (%)†§	Population cohort vaccinated§¶		Vaccine effectiveness**	
			%	(95% CI††)	%	(95% CI)
18–29	192	21	20	(16–24)	-8	(-66–30)
30–39	59	36	26	(23–30)	-57	(-176–11)
40–49	60	32	36	(32–39)	15	(-49–51)
≥50	45	58	57	(55–59)	-2	(-86–44)
<b>Overall</b>	<b>356</b>	<b>30</b>	<b>29</b>	<b>(26–31)</b>	<b>-10</b>	<b>(-43–15)</b>

\* Arizona, Colorado, Connecticut, Delaware, Kentucky, Pennsylvania, Texas, and Virginia.

† Vaccination status was assessed by asking whether the patient had received influenza vaccine during September 2008–March 2009.

§ Within age groups, patient and cohort vaccination coverage estimates were adjusted for having a chronic medical conditions that increases the risk for complications from influenza (presence versus absence) by weighting the age group–specific estimates by number of cases. Overall estimates were adjusted in the same manner.

¶ Population cohort vaccination coverage was estimated for eight selected states from preliminary data from the Behavioral Risk Factor Surveillance Survey (BRFSS), using a sample of 20,689 respondents (5). Household telephone interviews conducted during March–June 2009 to collect information regarding influenza vaccinations administered during September 2008–February 2009. BRFSS respondents were considered vaccinated if they answered “yes” to either 1) “During the past 12 months, have you had a flu shot?” or 2) “During the past 12 months, have you had a flu vaccine that was sprayed in your nose?”

\*\*Vaccine effectiveness (VE) was calculated as  $VE = 1 - \text{relative risk (RR)}$ , where RR is the overall RR of 2009 pandemic influenza A (H1N1) illness by seasonal vaccination status. Within age groups, RR estimates were adjusted for chronic medical conditions by weighting the risk-specific estimates according to inverse variances of the stratum-specific log RRs. Overall estimates were adjusted for age group and the presence of a chronic medical condition.

†† Confidence interval.

virus infection in any age group (0–4, 5–19, 20–49, 50–64, and ≥65 years). The overall age-adjusted VE against pandemic virus illness was 3% (CI = -56%–40%).

Findings from other studies examining the effects of 2008–09 influenza vaccine on the risk for pandemic H1N1 virus infection are available. Investigators recently reported results from a hospital-based case-control study conducted in Mexico (6). They reported protection from the 2008–09 trivalent inactivated vaccine against 2009 pandemic influenza A (H1N1) illness. In this study, 60 patients with rRT-PCR–confirmed 2009 pandemic influenza A (H1N1) were frequency matched by age and socioeconomic status to 180 controls examined at the same respiratory disease medical institution (6). The authors reported a vaccine effectiveness of 73% (CI = 34%–89%). However, the authors noted that controls had a higher prevalence of chronic conditions compared with population estimates, thereby likely resulting in a higher vaccination coverage level than the source population. In addition, a series of five studies conducted in four Canadian provinces reportedly found that receipt of seasonal 2008–09 influenza vaccine was associated with a 1.5- to 2-fold greater risk for medically attended 2009 pandemic influenza A (H1N1) illness (7); however, these studies have not yet been published.

Another unpublished study used influenza-like illness (ILI) for its case definition in examining the effect of receipt of 2008–09 seasonal influenza vaccine on the risk for 2009 pandemic influenza A (H1N1). After a large secondary school in New York City experienced an outbreak of ILI, defined as fever (temperature unspecified) with sore throat or cough in April 2009, all students were asked to participate in an online survey assessing ILI and history of influenza vaccination after

October 1, 2008. A total of 2,008 (75%) of 2,686 students completed the survey, and 1,607 (60%) students provided both ILI and vaccination status information. Females represented 55% of survey respondents; mean age for both females and males was 15.9 years. Crude, sex-specific, and sex-adjusted relative risks for infection were similar among vaccinated and unvaccinated students, and the overall adjusted RR was 1.05 (CI = 0.91–1.20) (S. Balter, MD, New York City Department of Health and Mental Hygiene, personal communication, 2009).

A case-cohort design was used for the study described in this report. This study design also is known as case-base: vaccination coverage among persons with illness is compared with an estimate of vaccination coverage in the base or source population. This design is similar to the screening method often used to quickly estimate VE in outbreak situations, except that vaccination status is sampled in the population rather than using an assumed true value of the proportion of the population vaccinated (8). A strength of this approach is that it permits rapid estimation of VE after case investigations when existing data on vaccination coverage for the source population is available. A general advantage is that estimating vaccination coverage using a sample from the population rather than from a sample of controls enables dispensing with the rare disease assumption often needed in case-control studies to interpret odds ratios as RRs (9,10). A disadvantage of the stratified case-cohort method used here is that often estimates of population vaccination coverage can be stratified by only a few variables. For example, in this analysis, VE estimates could be stratified only by four age groups, based on the age distribution of the patients and by the presence of a chronic underlying

medical condition that increases the risk for complications from influenza. The VE estimates might not have been fully adjusted for age or for the presence of specific conditions, and residual confounding by these factors might be reflected in the results. Also, no adjustment could be done for other possible confounders, such as state of residence, which also might have affected the results.

The findings in this report are subject to at least five other limitations. First, no analysis for children aged <18 years could be performed because limited data were available to determine coverage among children in the 2009 BRFSS. Second, the 2009 pandemic influenza A (H1N1) cases are not necessarily representative of U.S. pandemic influenza cases because they were identified through surveillance in eight states; different levels of case ascertainment also could introduce bias to the extent that vaccination coverage differed among states. Case ascertainment also might be associated with health-seeking behavior and therefore higher levels of vaccination coverage that could have biased these results in the direction of negative VE. Third, the representativeness of the results was affected by using BRFSS coverage estimates, because they are obtained from a landline telephone-only survey of noninstitutionalized persons. Fourth, as with any survey based on self-report of past behavior, a potential for recall bias exists (4). Without record verification of self-reported vaccination status by patients in the study, assessment of recall bias or overreporting bias is difficult, and how such bias might have affected the results is uncertain. Finally, although more than 350 cases were used to estimate the overall VE, the overall CIs are wide, and the CIs for the age group-specific VE estimates are particularly wide, reflecting the smaller sample sizes for these subgroup analyses. Therefore, point estimates, especially the age group-specific estimates, should be interpreted with caution.

This study is part of a growing body of literature examining the effects of seasonal trivalent influenza vaccines on the risk for pandemic H1N1 illness. Taken together, the current evidence does not support a significant effect of 2008–09 trivalent influenza vaccine in either decreasing or increasing the risk for 2009 pandemic influenza A (H1N1) illness. The results from additional studies using more rigorous study designs and methods currently under way in the United States and other countries will further define seasonal influenza VE against pandemic influenza A (H1N1). Studies evaluating the effects of seasonal vaccination on infection with 2009 H1N1 viruses in established animal models for influenza (e.g., ferrets) also are under way at CDC and elsewhere.

CDC and the Advisory Committee on Immunization Practices continue to recommend vaccination with both seasonal and pandemic influenza vaccines to prevent influenza illness during the 2009–10 influenza season in the United

#### What is already known on this topic?

Previous studies of the effectiveness of seasonal influenza vaccine on the risk for 2009 pandemic influenza A (H1N1) from Australia and Mexico showed no effect and a protective effect from the seasonal vaccine, respectively.

#### What is added by this report?

Findings from this case-cohort study, taken together with other published studies, do not support an effect of 2008–09 seasonal influenza vaccine in either decreasing or increasing the risk for 2009 pandemic influenza A (H1N1) virus illness.

#### What are the implications for public health practice?

CDC recommends vaccination with both seasonal and pandemic influenza vaccines to prevent influenza illness during the 2009–10 influenza season in the United States.

States. CDC will continue to monitor the effectiveness of seasonal and pandemic influenza vaccines.

#### Acknowledgments

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### Announcement

## **World COPD Day – November 18, 2009**

Chronic obstructive pulmonary disease (COPD) is becoming a global public health problem and an economic burden. The World Health Organization estimates that, by 2030, COPD will be the third leading cause of death worldwide (1). The Global Initiative for Chronic Obstructive Lung Disease, in collaboration with health-care professionals and COPD patient groups throughout the world, is sponsoring World COPD Day on November 18, 2009. The aim of World COPD Day is to raise awareness about COPD and improve COPD care throughout the world.

Tobacco smoking is the most important risk factor for the development and progression of COPD. Additional risk factors include asthma, exposure to ambient pollutants in the home and workplace, and respiratory infections (2). Smokers should be encouraged to seek support to quit, and all persons should be protected from exposure to secondhand smoke. Many resources are available to help smokers quit. Additional information about smoking cessation is available online (at <http://www.smokefree.gov> and [http://www.cdc.gov/tobacco/quit\\_smoking](http://www.cdc.gov/tobacco/quit_smoking)) or by telephone (800-QUITNOW [800-784-8669]).

COPD is treatable, and early diagnosis is important. Health-care providers should evaluate persons at risk for COPD who have cough, sputum production, or shortness of breath, and use spirometry to determine the severity of the disease (3). Additional information on COPD is available at <http://www.nhlbi.nih.gov/health/public/lung/copd/lmbb-campaign>.

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### Announcement

## **Environmental Microbiology: Control of Foodborne and Waterborne Diseases Course**

CDC and Emory University's Rollins School of Public Health will cosponsor Environmental Microbiology: Control of Foodborne and Waterborne Diseases, on January 8, 9, and 11–13, 2010, at Emory University, Rollins School of Public Health, in Atlanta, Georgia. The 5-day course is designed for public health practitioners and other students interested in food and water safety.

Participants will learn about microorganisms and chemical agents responsible for food- and water-transmitted diseases, the diseases they cause, clinical manifestations, modes of transmission, methods for removal and inactivation, and surveillance systems. The course also will describe how information from surveillance is used to improve food and water safety policies and practices and will highlight examples of effective programs in industrialized and developing countries.

This course is offered to public health professionals and to matriculating students at Emory University. Continuing education credit is pending. Tuition will be charged. The application deadline is January 3, 2010, or until all slots have been filled.

Additional information and applications are available by mail (Emory University, Hubert Department Global Health [Attn: Pia], 1518 Clifton Rd. NE, Rm. 746, Atlanta, GA 30322), by telephone (404-727-3485), by fax (404-727-4590), online (<http://www.sph.emory.edu/epicourses>), or by e-mail ([pvaleri@emory.edu](mailto:pvaleri@emory.edu)).

**TABLE I. Provisional cases of infrequently reported notifiable diseases (<1,000 cases reported during the preceding year) — United States, week ending November 7, 2009 (44th week)\***

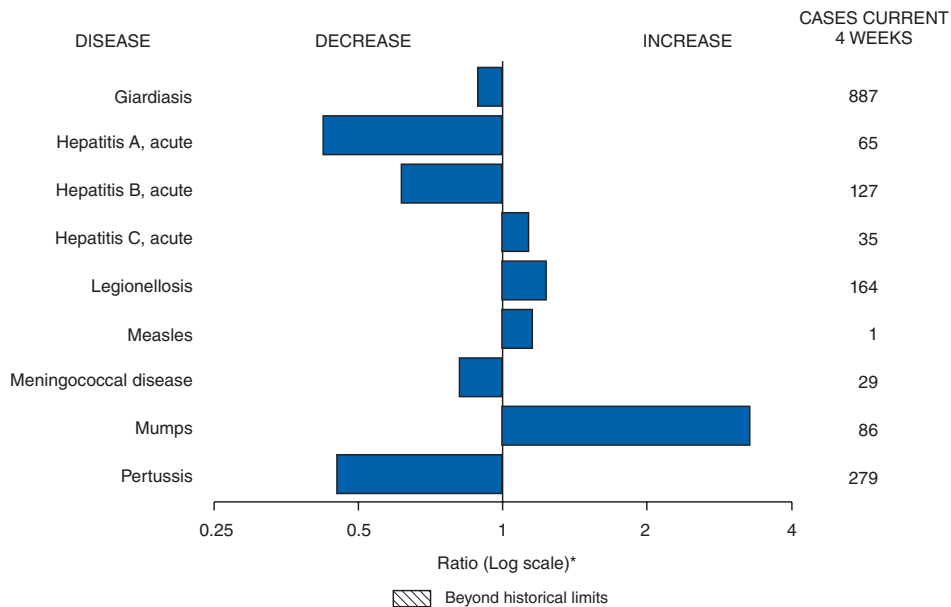
Disease	Current week	Cum 2009	5-year weekly average†	Total cases reported for previous years					States reporting cases during current week (No.)
				2008	2007	2006	2005	2004	
Anthrax	—	—	—	—	1	1	—	—	
Botulism:									
foodborne	—	12	0	17	32	20	19	16	
infant	—	42	1	109	85	97	85	87	
other (wound and unspecified)	1	19	0	19	27	48	31	30	CA (1)
Brucellosis	1	84	3	80	131	121	120	114	CA (1)
Chancroid	—	21	1	25	23	33	17	30	
Cholera	—	10	0	5	7	9	8	6	
Cyclosporiasis§	—	114	1	139	93	137	543	160	
Diphtheria	—	—	—	—	—	—	—	—	
Domestic arboviral diseases§,¶:									
California serogroup	—	33	1	62	55	67	80	112	
eastern equine	—	4	0	4	4	8	21	6	
Powassan	—	1	0	2	7	1	1	1	
St. Louis	—	8	0	13	9	10	13	12	
western equine	—	—	—	—	—	—	—	—	
Ehrlichiosis/Anaplasmosis§,**:									
<i>Ehrlichia chaffeensis</i>	7	682	11	1,137	828	578	506	338	ME (1), RI (1), NY (1), FL (1), TN (3)
<i>Ehrlichia ewingii</i>	—	6	0	9	—	—	—	—	
<i>Anaplasma phagocytophilum</i>	6	548	15	1,026	834	646	786	537	RI (2), NY (1), MN (3)
undetermined	—	103	2	180	337	231	112	59	
<i>Haemophilus influenzae</i> ††									
invasive disease (age <5 yrs):									
serotype b	—	23	0	30	22	29	9	19	
nonserotype b	1	157	3	244	199	175	135	135	FL (1)
unknown serotype	2	195	3	163	180	179	217	177	NY (1), OH (1)
Hansen disease§	—	51	2	80	101	66	87	105	
Hantavirus pulmonary syndrome§	—	10	0	18	32	40	26	24	
Hemolytic uremic syndrome, postdiarrheal§	2	171	4	330	292	288	221	200	OK (1), TX (1)
Hepatitis C viral, acute	8	1,673	14	878	845	766	652	720	NY (2), MN (2), FL (1), KY (1), TX (1), ID (1)
HIV infection, pediatric (age <13 years)§§	—	—	4	—	—	—	380	436	
Influenza-associated pediatric mortality§,¶¶	35	245	0	90	77	43	45	—	AL (1), AR (2), AZ (1), CA (8), DE (1), GA (1), IL (1), MI (2), MO (1), NJ (1), OH (2), OK (3), TN (2), TX (6), UT (1), VA (1), WA (1)
Listeriosis	6	632	19	759	808	884	896	753	NY (1), PA (1), FL (1), CO (1), CA (2)
Measles***	—	59	0	140	43	55	66	37	
Meningococcal disease, invasive†††:									
A, C, Y, and W-135	1	215	4	330	325	318	297	—	TX (1)
serogroup B	2	115	3	188	167	193	156	—	IA (1), OK (1)
other serogroup	—	22	1	38	35	32	27	—	
unknown serogroup	10	377	10	616	550	651	765	—	OH (1), NE (1), MD (1), NC (1), TN (1), OR (2), CA (3)
Mumps	39	434	11	454	800	6,584	314	258	NY (13), NYC (25), OH (1)
Novel influenza A virus infections	—	§§§	0	2	4	N	N	N	
Plague	—	7	0	3	7	17	8	3	
Poliomyelitis, paralytic	—	—	—	—	—	—	1	—	
Polio virus infection, nonparalytic§	—	—	—	—	—	N	N	N	
Psittacosis§	—	7	0	8	12	21	16	12	
Q fever total§,¶¶¶:	—	73	2	124	171	169	136	70	
acute	—	62	1	110	—	—	—	—	
chronic	—	11	0	14	—	—	—	—	
Rabies, human	—	2	0	2	1	3	2	7	
Rubella****	—	4	0	16	12	11	11	10	
Rubella, congenital syndrome	—	1	—	—	—	1	1	—	
SARS-CoV§,††††	—	—	—	—	—	—	—	—	
Smallpox§	—	—	—	—	—	—	—	—	
Streptococcal toxic-shock syndrome§	1	116	2	157	132	125	129	132	CT (1)
Syphilis, congenital (age <1 yr)	—	195	8	434	430	349	329	353	
Tetanus	—	10	0	19	28	41	27	34	
Toxic-shock syndrome (staphylococcal)§	2	71	2	71	92	101	90	95	CA (2)
Trichinellosis	—	12	0	39	5	15	16	5	
Tularemia	2	70	1	123	137	95	154	134	MN (1), AR (1)
Typhoid fever	1	296	6	449	434	353	324	322	FL (1)
Vancomycin-intermediate <i>Staphylococcus aureus</i> §	—	63	1	63	37	6	2	—	
Vancomycin-resistant <i>Staphylococcus aureus</i> §	—	—	0	—	2	1	3	1	
Vibriosis (noncholera <i>Vibrio</i> species infections)§	18	525	7	492	549	N	N	N	MD (2), GA (3), FL (7), WA (1), CA (5)
Yellow fever	—	—	—	—	—	—	—	—	

See Table I footnotes on next page.

**TABLE I. (Continued) Provisional cases of infrequently reported notifiable diseases (<1,000 cases reported during the preceding year) — United States, week ending November 7, 2009 (44th week)\***

—: No reported cases. N: Not reportable. Cum: Cumulative year-to-date counts.  
 \* Incidence data for reporting year 2009 is provisional, whereas data for 2004 through 2008 are finalized.  
 † Calculated by summing the incidence counts for the current week, the 2 weeks preceding the current week, and the 2 weeks following the current week, for a total of 5 preceding years. The total sum of incident cases is then divided by 25 weeks. Additional information is available at <http://www.cdc.gov/epo/dphsi/phs/files/5yearweeklyaverage.pdf>.  
 § Not reportable in all states. Data from states where the condition is not reportable are excluded from this table, except starting in 2007 for the domestic arboviral diseases and influenza-associated pediatric mortality, and in 2003 for SARS-CoV. Reporting exceptions are available at <http://www.cdc.gov/epo/dphsi/phs/infdis.htm>.  
 ¶ Includes both neuroinvasive and nonneuroinvasive. Updated weekly from reports to the Division of Vector-Borne Infectious Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases (ArboNET Surveillance). Data for West Nile virus are available in Table II.  
 \*\* The names of the reporting categories changed in 2008 as a result of revisions to the case definitions. Cases reported prior to 2008 were reported in the categories: Ehrlichiosis, human monocytic (analogous to *E. chaffeensis*); Ehrlichiosis, human granulocytic (analogous to *Anaplasma phagocytophilum*), and Ehrlichiosis, unspecified, or other agent (which included cases unable to be clearly placed in other categories, as well as possible cases of *E. ewingii*).  
 †† Data for *H. influenzae* (all ages, all serotypes) are available in Table II.  
 §§ Updated monthly from reports to the Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Implementation of HIV reporting influences the number of cases reported. Updates of pediatric HIV data have been temporarily suspended until upgrading of the national HIV/AIDS surveillance data management system is completed. Data for HIV/AIDS, when available, are displayed in Table IV, which appears quarterly.  
 ¶¶ Updated weekly from reports to the Influenza Division, National Center for Immunization and Respiratory Diseases. Since April 26, 2009, a total of 154 influenza-associated pediatric deaths associated with 2009 pandemic influenza A (H1N1) virus infection have been reported. Since August 30, 2009, a total of 117 influenza-associated pediatric deaths occurring during the 2009–10 influenza season have been reported. A total of 127 influenza-associated pediatric death occurring during the 2008–09 influenza season have been reported.  
 \*\*\* No measles cases were reported for the current week.  
 ††† Data for meningococcal disease (all serogroups) are available in Table II.  
 §§§ CDC discontinued reporting of individual confirmed and probable cases of novel influenza A (H1N1) viruses infections on July 24, 2009. CDC will report the total number of novel influenza A (H1N1) hospitalizations and deaths weekly on the CDC H1N1 influenza website (<http://www.cdc.gov/h1n1flu>).  
 ¶¶¶ In 2008, Q fever acute and chronic reporting categories were recognized as a result of revisions to the Q fever case definition. Prior to that time, case counts were not differentiated with respect to acute and chronic Q fever cases.  
 \*\*\*\* No rubella cases were reported for the current week.  
 †††† Updated weekly from reports to the Division of Viral and Rickettsial Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases.

**FIGURE I. Selected notifiable disease reports, United States, comparison of provisional 4-week totals November 7, 2009, with historical data**



\* Ratio of current 4-week total to mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

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TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending November 7, 2009, and November 1, 2008 (44th week)\*

Reporting area	Lyme disease					Malaria					Meningococcal disease, invasive† All groups				
	Current week	Previous 52 weeks		Cum 2009	Cum 2008	Current week	Previous 52 weeks		Cum 2009	Cum 2008	Current week	Previous 52 weeks		Cum 2009	Cum 2008
		Med	Max				Med	Max				Med	Max		
<b>United States</b>	169	443	1,860	25,870	29,512	14	22	44	989	1,048	13	16	48	729	996
<b>New England</b>	—	66	417	4,988	10,715	—	1	5	38	48	—	0	4	26	29
Connecticut	—	0	50	—	3,648	—	0	4	5	10	—	0	1	2	1
Maine§	—	10	76	787	748	—	0	1	2	1	—	0	1	4	5
Massachusetts	—	22	282	2,789	4,337	—	0	3	22	27	—	0	3	12	18
New Hampshire	—	10	82	898	1,504	—	0	1	3	4	—	0	1	3	4
Rhode Island§	—	0	78	188	121	—	0	1	4	2	—	0	1	4	1
Vermont§	—	4	38	326	357	—	0	1	2	4	—	0	1	1	—
<b>Mid. Atlantic</b>	138	245	1,401	15,103	11,683	3	6	13	247	284	—	2	6	75	110
New Jersey	—	37	370	3,905	3,251	—	0	1	1	62	—	0	2	8	14
New York (Upstate)	51	76	1,368	3,687	4,203	2	1	10	43	28	—	0	2	18	27
New York City	—	2	23	184	734	—	3	11	157	157	—	0	2	13	24
Pennsylvania	87	54	627	7,327	3,495	1	1	4	46	37	—	1	4	36	45
<b>E.N. Central</b>	1	17	207	2,023	2,207	1	3	10	131	137	1	3	9	123	175
Illinois	—	1	11	115	104	—	1	4	51	71	—	1	6	30	69
Indiana	—	1	6	55	40	—	0	3	15	5	—	0	3	30	23
Michigan	—	1	10	101	80	—	0	3	25	14	—	0	5	18	31
Ohio	—	0	5	50	44	1	1	6	33	28	1	1	3	35	33
Wisconsin	1	15	190	1,702	1,939	—	0	1	7	19	—	0	2	10	19
<b>W.N. Central</b>	1	4	336	218	866	1	1	8	58	64	2	1	9	60	87
Iowa	—	1	14	86	105	—	0	1	10	11	1	0	1	8	18
Kansas	—	0	2	14	15	—	0	1	4	9	—	0	2	8	5
Minnesota	—	0	326	90	726	—	0	8	24	23	—	0	4	11	22
Missouri	—	0	2	10	6	1	0	2	12	13	—	0	3	22	24
Nebraska§	1	0	3	17	11	—	0	1	7	8	1	0	1	8	12
North Dakota	—	0	10	—	—	—	0	0	—	—	—	0	3	1	3
South Dakota	—	0	1	1	3	—	0	1	1	—	—	0	1	2	3
<b>S. Atlantic</b>	22	62	230	3,251	3,733	2	6	17	287	252	2	2	9	133	140
Delaware	2	12	64	856	695	—	0	1	5	2	—	0	1	4	2
District of Columbia	—	0	5	19	66	—	0	2	5	4	—	0	0	—	—
Florida	7	1	13	103	70	—	2	7	82	49	—	1	4	45	48
Georgia	—	0	6	46	34	1	1	5	63	50	—	0	2	28	16
Maryland§	6	26	120	1,509	1,948	—	1	5	58	71	1	0	1	9	16
North Carolina	2	0	14	58	32	—	0	5	21	24	1	0	5	19	12
South Carolina§	2	0	3	30	25	—	0	1	4	9	—	0	1	11	20
Virginia§	3	11	61	488	741	1	1	5	47	41	—	0	2	12	21
West Virginia	—	0	33	142	122	—	0	1	2	2	—	0	2	5	5
<b>E.S. Central</b>	1	0	2	28	43	—	0	3	26	18	1	0	3	26	48
Alabama§	—	0	1	2	9	—	0	3	7	4	—	0	1	7	9
Kentucky	—	0	1	1	5	—	0	2	9	5	—	0	1	4	8
Mississippi	—	0	0	—	1	—	0	1	1	1	—	0	1	3	11
Tennessee§	1	0	2	25	28	—	0	3	9	8	1	0	1	12	20
<b>W.S. Central</b>	—	1	21	40	106	—	1	10	42	73	2	1	12	72	103
Arkansas§	—	0	0	—	—	—	0	1	4	—	—	0	2	8	13
Louisiana	—	0	0	—	3	—	0	1	3	3	—	0	3	11	22
Oklahoma	—	0	2	—	—	—	0	2	2	2	1	0	3	12	13
Texas§	—	1	21	40	103	—	0	9	33	68	1	1	9	41	55
<b>Mountain</b>	—	1	13	48	48	—	0	5	26	32	—	1	4	55	55
Arizona	—	0	2	5	8	—	0	2	8	14	—	0	2	13	9
Colorado	—	0	1	6	3	—	0	3	8	4	—	0	2	18	12
Idaho§	—	0	2	11	9	—	0	1	1	3	—	0	1	7	5
Montana§	—	0	13	3	4	—	0	3	5	—	—	0	2	4	4
Nevada§	—	0	2	12	11	—	0	1	—	4	—	0	2	4	7
New Mexico§	—	0	1	5	8	—	0	0	—	3	—	0	1	3	8
Utah	—	0	1	4	3	—	0	2	4	4	—	0	1	2	8
Wyoming§	—	0	1	2	2	—	0	0	—	—	—	0	2	4	2
<b>Pacific</b>	6	3	13	171	111	7	3	9	134	140	5	3	14	159	249
Alaska	—	0	1	2	6	—	0	1	2	5	—	0	2	6	8
California	6	2	10	144	63	5	2	6	99	103	3	2	8	103	180
Hawaii	N	0	0	N	N	—	0	1	1	3	—	0	1	4	5
Oregon§	—	0	3	15	32	—	0	2	11	4	2	0	6	33	32
Washington	—	0	12	10	10	2	0	3	21	25	—	0	6	13	24
American Samoa	N	0	0	N	N	—	0	0	—	—	—	0	0	—	—
C.N.M.I.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Guam	—	0	0	—	—	—	0	0	—	3	—	0	0	—	—
Puerto Rico	N	0	0	N	N	—	0	1	3	2	—	0	0	—	3
U.S. Virgin Islands	N	0	0	N	N	—	0	0	—	—	—	0	0	—	—

C.N.M.I.: Commonwealth of Northern Mariana Islands.  
U: Unavailable. —: No reported cases. N: Not reportable. Cum: Cumulative year-to-date counts. Med: Median. Max: Maximum.  
\* Incidence data for reporting year 2009 is provisional.  
† Data for meningococcal disease, invasive caused by serogroups A, C, Y, and W-135; serogroup B; other serogroup; and unknown serogroup are available in Table I.  
§ Contains data reported through the National Electronic Disease Surveillance System (NEDSS).





TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending November 7, 2009, and November 1, 2008 (44th week)\*

Reporting area	Streptococcal diseases, invasive, group A					<i>Streptococcus pneumoniae</i> , invasive disease, nondrug resistant† Age <5 years				
	Current week	Previous 52 weeks		Cum 2009	Cum 2008	Current week	Previous 52 weeks		Cum 2009	Cum 2008
		Med	Max				Med	Max		
<b>United States</b>	26	102	239	4,329	4,663	15	35	122	1,422	1,501
<b>New England</b>	5	4	28	254	332	—	1	12	51	74
Connecticut	5	0	21	68	91	—	0	11	—	—
Maine§	—	0	2	16	25	—	0	1	5	1
Massachusetts	—	2	10	107	155	—	0	4	30	52
New Hampshire	—	0	4	34	24	—	0	2	11	11
Rhode Island§	—	0	2	11	24	—	0	1	1	10
Vermont§	—	0	3	18	13	—	0	1	4	—
<b>Mid. Atlantic</b>	4	20	43	868	930	2	5	33	206	186
New Jersey	—	3	7	124	167	—	1	4	38	59
New York (Upstate)	2	7	25	283	293	2	2	17	101	84
New York City	—	4	12	162	170	—	0	31	67	43
Pennsylvania	2	6	18	299	300	N	0	2	N	N
<b>E.N. Central</b>	—	17	42	780	868	2	5	18	217	279
Illinois	—	5	12	219	229	—	0	5	23	82
Indiana	—	2	23	124	115	—	0	13	31	30
Michigan	—	3	11	124	159	—	1	5	56	66
Ohio	—	4	13	191	236	1	1	6	63	52
Wisconsin	—	2	11	122	129	1	1	3	44	49
<b>W.N. Central</b>	2	6	37	350	340	1	2	11	126	86
Iowa	—	0	0	—	—	—	0	0	—	—
Kansas	—	0	5	37	35	N	0	1	N	N
Minnesota	—	0	34	161	154	—	0	10	74	28
Missouri	1	1	8	76	82	1	0	4	31	33
Nebraska§	1	1	3	40	37	—	0	1	11	7
North Dakota	—	0	4	15	10	—	0	3	4	9
South Dakota	—	0	3	21	22	—	0	2	6	9
<b>S. Atlantic</b>	9	22	49	996	973	2	7	18	265	289
Delaware	—	0	1	10	7	—	0	0	—	—
District of Columbia	—	0	3	12	14	N	0	0	N	N
Florida	7	6	12	245	225	2	1	6	60	55
Georgia	—	6	13	240	216	—	2	6	67	82
Maryland§	1	3	12	166	168	—	1	7	64	49
North Carolina	—	2	12	86	125	N	0	0	N	N
South Carolina§	—	1	5	63	65	—	1	6	39	53
Virginia§	1	3	9	138	118	—	0	4	23	40
West Virginia	—	1	4	36	35	—	0	3	12	10
<b>E.S. Central</b>	1	3	10	164	164	2	2	7	83	78
Alabama§	N	0	0	N	N	N	0	0	N	N
Kentucky	1	1	5	33	35	N	0	0	N	N
Mississippi	N	0	0	N	N	—	0	2	18	9
Tennessee§	—	3	9	131	129	2	1	6	65	69
<b>W.S. Central</b>	5	8	79	388	425	6	5	46	250	238
Arkansas§	—	0	3	17	11	1	0	4	23	12
Louisiana	—	0	3	11	17	—	0	3	13	13
Oklahoma	2	3	20	123	97	—	1	7	52	60
Texas§	3	5	59	237	300	5	3	34	162	153
<b>Mountain</b>	—	10	22	387	489	—	4	16	195	228
Arizona	—	3	7	127	175	—	2	10	97	99
Colorado	—	3	7	120	122	—	0	4	40	53
Idaho§	—	0	2	10	14	—	0	2	7	5
Montana§	N	0	0	N	N	N	0	0	N	N
Nevada§	—	0	1	5	11	—	0	1	—	3
New Mexico§	—	2	7	72	114	—	0	4	21	31
Utah	—	1	6	52	47	—	0	5	30	35
Wyoming§	—	0	1	1	6	—	0	0	—	2
<b>Pacific</b>	—	3	9	142	142	—	0	4	29	43
Alaska	—	1	4	31	32	—	0	3	22	26
California	N	0	0	N	N	N	0	0	N	N
Hawaii	—	3	8	111	110	—	0	2	7	17
Oregon§	N	0	0	N	N	N	0	0	N	N
Washington	N	0	0	N	N	N	0	0	N	N
American Samoa	—	0	0	—	30	N	0	0	N	N
C.N.M.I.	—	—	—	—	—	—	—	—	—	—
Guam	—	0	0	—	—	—	0	0	—	—
Puerto Rico	N	0	0	N	N	N	0	0	N	N
U.S. Virgin Islands	—	0	0	—	—	N	0	0	N	N

C.N.M.I.: Commonwealth of Northern Mariana Islands.

U: Unavailable. —: No reported cases. N: Not reportable. Cum: Cumulative year-to-date counts. Med: Median. Max: Maximum.

\* Incidence data for reporting year 2009 is provisional.

† Includes cases of invasive pneumococcal disease, in children aged <5 years, caused by *S. pneumoniae*, which is susceptible or for which susceptibility testing is not available (NNDS event code 11717).

§ Contains data reported through the National Electronic Disease Surveillance System (NEDSS).







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