



# MMWR™

## Morbidity and Mortality Weekly Report

[www.cdc.gov/mmwr](http://www.cdc.gov/mmwr)

Weekly

January 2, 2009 / Vol. 57 / No. 51 & 52

### Reduced Hospitalizations for Acute Myocardial Infarction After Implementation of a Smoke-Free Ordinance — City of Pueblo, Colorado, 2002–2006

Exposure to secondhand smoke (SHS) has immediate adverse cardiovascular effects, and prolonged exposure can cause coronary heart disease (1). Nine studies have reported that laws making indoor workplaces and public places smoke-free were associated with rapid, sizeable reductions in hospitalizations for acute myocardial infarction (AMI) (2–7). However, most studies examined hospitalizations for 1 year or less after laws were implemented; thus, whether the observed effect was sustained over time was unknown. The Pueblo Heart Study examined the impact of a municipal smoke-free ordinance in the city of Pueblo, Colorado, that took effect on July 1, 2003 (3). The rate of AMI hospitalizations for city residents decreased 27%, from 257 per 100,000 person-years during the 18 months before the ordinance's implementation to 187 during the 18 months after it (the Phase I post-implementation period).\* This report extends that analysis for an additional 18 months through June 30, 2006 (the Phase II post-implementation period). The rate of AMI hospitalizations among city residents continued to decrease to 152 per 100,000 person-years, a decline of 19% and 41% from the Phase I post-implementation and pre-implementation period, respectively. No significant changes were observed in two comparison areas. These findings suggest that smoke-free policies can result in reductions in AMI hospitalizations that are sustained over a 3-year period and that these policies are important in preventing morbidity and mortality associated with heart disease. This effect likely is mediated through reduced SHS exposure among

nonsmokers and reduced smoking, with the former making the larger contribution (4,6,7).

Two control sites were selected for comparison with the city of Pueblo: 1) the area of Pueblo County outside the city of Pueblo limits and 2) El Paso County, including Colorado Springs, the most populous city in this county. The city of Pueblo and Colorado Springs are located approximately 45 miles apart (Figure 1). Neither of the control sites had smoke-free laws in place before or during the study periods. Based on data from the Behavioral Risk Factor Surveillance System, the adult smoking prevalence for Pueblo County (including the city of Pueblo) and El Paso County during 2002–2003 was 25.9% (95% confidence interval [CI] = 20.2%–31.6%) and 17.4% (CI = 14.5%–20.2%), respectively. The corresponding prevalences for 2004–2005 were 20.6% (CI = 15.4%–25.8%) and 22.3% (CI = 19.3%–25.4%). Separate smoking prevalence estimates were not available for the city of Pueblo.

Persons with recognized AMIs that occur in the city of Pueblo and Pueblo County receive care at two hospitals, Parkview

\*Some of the AMI hospitalization admission figures, AMI hospitalization admission rates, relative rates, and relative rate confidence intervals calculated for this analysis differ from those previously published (3) because of receipt of routinely amended coding data from the Colorado Hospital Association.

#### INSIDE



#### Recommended Immunization Schedules for Persons Aged 0 Through 18 Years — United States, 2009

- 1377 *Campylobacter jejuni* Infection Associated with Unpasteurized Milk and Cheese — Kansas, 2007
- 1379 Underground Coal Mining Disasters and Fatalities — United States, 1900–2006
- 1383 QuickStats

The *MMWR* series of publications is published by the Coordinating Center for Health Information and Service, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30333.

**Suggested Citation:** Centers for Disease Control and Prevention. [Article title]. *MMWR* 2008;57:[inclusive page numbers].

### Centers for Disease Control and Prevention

Julie L. Gerberding, MD, MPH  
*Director*

Tanja Popovic, MD, PhD  
*Chief Science Officer*

James W. Stephens, PhD  
*Associate Director for Science*

Steven L. Solomon, MD  
*Director, Coordinating Center for Health Information and Service*

Jay M. Bernhardt, PhD, MPH  
*Director, National Center for Health Marketing*

Katherine L. Daniel, PhD  
*Deputy Director, National Center for Health Marketing*

### Editorial and Production Staff

Frederic E. Shaw, MD, JD  
*Editor, MMWR Series*

Susan F. Davis, MD  
*(Acting) Assistant Editor, MMWR Series*

Robert A. Gunn, MD, MPH  
*Associate Editor, MMWR Series*

Teresa F. Rutledge  
*Managing Editor, MMWR Series*

Douglas W. Weatherwax  
*Lead Technical Writer-Editor*

Donald G. Meadows, MA  
Jude C. Rutledge  
*Writers-Editors*

Martha F. Boyd  
*Lead Visual Information Specialist*

Malbea A. LaPete  
Stephen R. Spriggs  
*Visual Information Specialists*

Kim L. Bright, MBA  
Quang M. Doan, MBA

Phyllis H. King  
*Information Technology Specialists*

### Editorial Board

William L. Roper, MD, MPH, Chapel Hill, NC, Chairman

Virginia A. Caine, MD, Indianapolis, IN

David W. Fleming, MD, Seattle, WA

William E. Halperin, MD, DrPH, MPH, Newark, NJ

Margaret A. Hamburg, MD, Washington, DC

King K. Holmes, MD, PhD, Seattle, WA

Deborah Holtzman, PhD, Atlanta, GA

John K. Iglehart, Bethesda, MD

Dennis G. Maki, MD, Madison, WI

Sue Mallonee, MPH, Oklahoma City, OK

Patricia Quinlisk, MD, MPH, Des Moines, IA

Patrick L. Remington, MD, MPH, Madison, WI

Barbara K. Rimer, DrPH, Chapel Hill, NC

John V. Rullan, MD, MPH, San Juan, PR

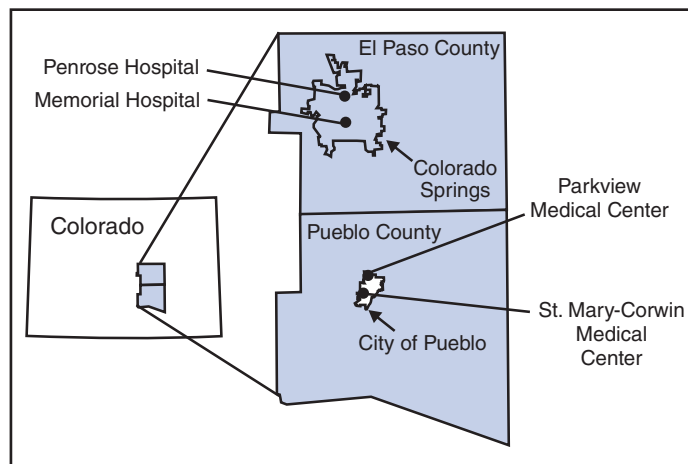
William Schaffner, MD, Nashville, TN

Anne Schuchat, MD, Atlanta, GA

Dixie E. Snider, MD, MPH, Atlanta, GA

John W. Ward, MD, Atlanta, GA

**FIGURE 1. Pueblo smoke-free area, comparison areas, and hospitals treating acute myocardial infarction patients — Pueblo Heart Study, January 2002–June 2006**



Medical Center and St. Mary-Corwin Medical Center, both located within the city of Pueblo. Persons with recognized AMIs that occur in El Paso County receive care at two other hospitals, Penrose Hospital and Memorial Hospital, both located in Colorado Springs. Data on AMI hospitalizations were drawn from electronic Colorado Hospital Association administrative data. These data included admission date, primary diagnosis code (based on *International Classification of Diseases, Ninth Revision* codes 410.0–410.9), sex, age, postal code of residence, and hospital name. No other patient-level data, including smoking status, were available. U.S. Census Bureau population data for 2006 were used as denominators in calculating AMI hospitalization rates. A more extensive description of the study's methodology has been published previously (3). AMI hospitalization rates among residents of the city of Pueblo, the area of Pueblo County outside the city of Pueblo limits, and El Paso County were compared across three periods: 0–18 months before the smoke-free law took effect (pre-implementation period), 0–18 months after this date (Phase I, post-implementation period), and 19–36 months after this date (Phase II, post-implementation period), for a total of 54 months. Rates were compared between periods using a chi-square test. Relative rates (RRs) were calculated as the ratios of AMI rates between two periods. Data presented in this report were not adjusted for seasonality because a season-adjusted analysis of Phase I versus the pre-implementation period found that the adjustment did not significantly change the findings (3).

During Phase II, AMI hospitalizations among residents of the city of Pueblo continued to decrease (Figure 2). AMI hospitalization rates differed significantly across all three periods within the city of Pueblo ( $p < 0.001$ ). The rate of AMI hospitalization among residents in the city of Pueblo in the

Phase II post-implementation period was 152 per 100,000 person-years, compared with 187 per 100,000 person-years in the Phase I post-implementation period, for an RR of 0.81 (CI = 0.67–0.96) (Table). In contrast, no significant change was observed for residents of the area of Pueblo County outside the city of Pueblo limits (139 per 100,000 person-years versus 115 per 100,000 person-years; RR = 1.21 [CI = 0.80–1.62]) or for residents of El Paso County (149 per 100,000 person-years versus 150 per 100,000 person-years; RR = 0.99 [CI = 0.91–1.08]) during the same period. The RR for AMI hospitalizations in the city of Pueblo in the Phase II post-implementation period compared with the pre-implementation period (rate = 257 per 100,000 person-years) was 0.59 (CI = 0.49–0.70). In contrast, RRs for the area of Pueblo County outside the city of Pueblo limits and for El Paso County for the same period were 1.03 (CI = 0.68–1.39) and 0.95 (CI = 0.87–1.03), respectively; the pre-implementation period rates were 135 per 100,000 person-years and 157 per 100,000 person-years, respectively. Within each site, the distribution of AMI patients by age and sex was unchanged over time.

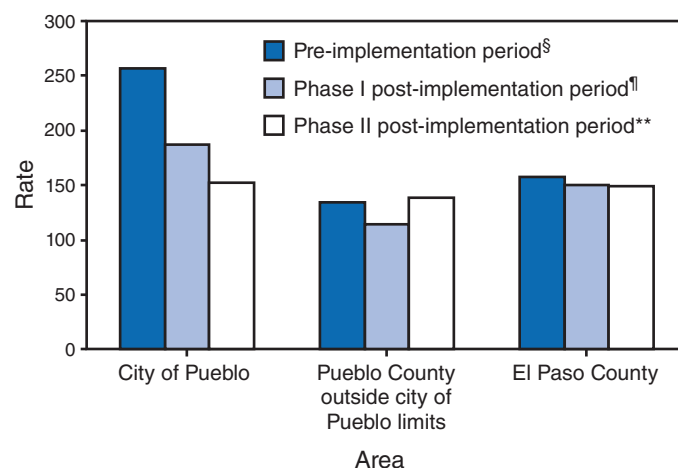
To further examine whether the change in AMI rates could be attributed to pre-existing secular trends, AMI rates were examined for all three sites for three 18-month periods immediately preceding the pre-implementation phase. No statistically significant secular trend occurred in any of the three sites before July 1, 2003.

To ensure that the observed change in the city of Pueblo was not attributable to undercounting fatal AMIs post-implementation, the number of AMI deaths for the city of Pueblo were obtained from the Health Statistics Section of the Colorado Department of Public Health and Environment. After accounting for AMI deaths in a conservative manner (by assuming that all fatal AMIs occurred in patients who failed to reach the hospital) and adding these numbers to the hospital AMI admission data, the RR for the city of Pueblo remained statistically significant at 0.82 (CI = 0.64–0.97) from the Phase II to Phase I post-implementation periods and at 0.66 (CI = 0.55–0.77) from Phase II post-implementation to the pre-implementation period.

**Reported by:** RN Alsever, MD, Parkview Medical Center; WM Thomas, PhD, St. Mary-Corwin Medical Center; C Nevin-Woods, DO, R Beauvais, S Dennison, R Bueno, Pueblo City-County Health Dept; L Chang, PhD, Colorado State Univ-Pueblo; CE Bartecchi, MD, Univ of Colorado School of Medicine. S Babb, MPH, A Trosclair, MS, M Engstrom, MS, T Pechacek, PhD, R Kaufmann, PhD, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC.

**Editorial Note:** Evidence from animal and human studies indicates that SHS exposure can produce rapid adverse effects on the functioning of the heart, blood, and vascular systems that increase the risk for a cardiac event (1). Relevant mechanisms

**FIGURE 2. Rate\* of hospitalizations for acute myocardial infarction before and after smoking ordinance, by area and period — city of Pueblo, Pueblo County outside city of Pueblo limits, and El Paso County, Pueblo Heart Study, January 2002–June 2006†**



\* Per 100,000 person-years. Based on U.S. Census Bureau population data for 2006.

† Because of receipt of routinely amended coding data from the Colorado Hospital Association, certain data points for the pre-implementation and Phase I post-implementation periods differ from those published previously (Bartecchi C, Alsever RN, Nevin-Woods C, et al. Reduction in the incidence of acute myocardial infarction associated with a citywide smoking ordinance. *Circulation* 2006;114:1490–6).

§ January 2002–June 2003.

¶ July 2003–December 2004.

\*\* January 2005–June 2006.

include effects on platelet function, endothelial function, and inflammation. Epidemiologic and laboratory data indicate that the risk for heart disease and AMI increase rapidly with relatively small doses of tobacco smoke, such as those received from SHS, and then continue to increase more slowly with larger doses (1,8,9). Evidence also suggests that the acute effects of SHS exposure might be rapidly reversible (8,9).

Eliminating smoking in indoor spaces is the only way to fully protect nonsmokers from SHS (1). Previous studies have found that SHS exposure decreases substantially among non-smoking employees of restaurants and bars and among non-smoking adults in the general public after implementation of smoke-free laws (1,5,7,10). Compliance with smoke-free laws typically reaches high levels rapidly and then increases further over time (1,5). In addition, smoke-free laws are associated with increased adoption of no-smoking rules in private homes (1,10). Smoke-free policies have been found to prompt some smokers to quit smoking (1); because active smoking is a major risk factor for heart disease and AMI, this effect also would be expected to reduce heart disease and AMI rates at a population level. The continued decrease in AMI hospitalizations observed in this study might be a result of a combination of 1) the immediate reduction in SHS exposure among nonsmokers

**TABLE. Number and rate\* of hospitalizations for acute myocardial infarction (AMI) before and after smoking ordinance, by sex and area — city of Pueblo, Pueblo County outside city of Pueblo limits, and El Paso County, Pueblo Heart Study, January 2002–June 2006†**

Area	Pre-implementation period§		Phase I post-implementation period¶		Phase II post-implementation period**		Relative rate (RR) for AMI (Phase I vs. pre-implementation)	Relative rate for AMI (Phase II vs. Phase I)	Relative rate for AMI (Phase II vs. pre-implementation)
	No.	Rate	No.	Rate	No.	Rate	RR (95% CI††)	RR (95% CI)	RR (95% CI)
<b>City of Pueblo (intervention area)</b>									
Male	233	150	175	113	157	101	0.75 (0.61–0.90)	0.90 (0.69–1.10)	0.67 (0.52–0.82)
Female	166	107	116	75	80	51	0.70 (0.53–0.87)	0.69 (0.51–0.87)	0.48 (0.36–0.60)
<b>Total</b>	<b>399</b>	<b>257</b>	<b>291</b>	<b>187</b>	<b>237</b>	<b>152</b>	<b>0.73 (0.64–0.82)</b>	<b>0.81 (0.67–0.96)</b>	<b>0.59 (0.49–0.70)</b>
<b>Pueblo County outside city of Pueblo limits (comparison area)</b>									
Male	55	83	55	83	63	95	1.00 (0.58–1.42)	1.15 (0.64–1.65)	1.15 (0.59–1.70)
Female	34	51	21	32	29	44	0.62 (0.28–0.95)	1.38 (0.70–2.06)	0.85 (0.38–1.32)
<b>Total</b>	<b>89</b>	<b>135</b>	<b>76</b>	<b>115</b>	<b>92</b>	<b>139</b>	<b>0.85 (0.56–1.14)</b>	<b>1.21 (0.80–1.62)</b>	<b>1.03 (0.68–1.39)</b>
<b>El Paso County (comparison area)</b>									
Male	872	106	849	103	815	99	0.97 (0.87–1.08)	0.96 (0.84–1.08)	0.93 (0.84–1.03)
Female	427	52	392	47	415	50	0.92 (0.78–1.05)	1.06 (0.90–1.21)	0.97 (0.84–1.10)
<b>Total</b>	<b>1,299</b>	<b>157</b>	<b>1,241</b>	<b>150</b>	<b>1,230</b>	<b>149</b>	<b>0.96 (0.87–1.04)</b>	<b>0.99 (0.91–1.08)</b>	<b>0.95 (0.87–1.03)</b>

\* Per 100,000 person-years. Based on U.S. Census Bureau population data for 2006.

† Because of receipt of routinely amended coding data from the Colorado Hospital Association, certain data points for the pre-implementation and Phase I post-implementation periods differ from those published previously (Bartecchi C, Alsever RN, Nevin-Woods C, et al. Reduction in the incidence of acute myocardial infarction associated with a citywide smoking ordinance. *Circulation* 2006;114:1490–6).

§ January 2002–June 2003.

¶ July 2003–December 2004.

\*\* January 2005–June 2006.

†† Confidence interval.

that occurred when the city of Pueblo smoke-free ordinance was implemented, 2) further reductions in this exposure that occurred because of increased compliance with the ordinance and increased adoption of smoke-free home rules over time, and 3) increased quitting among smokers as a result of the ordinance and associated changes in social norms.

In addition to the previous study conducted in the city of Pueblo (3), eight other published studies have reported that smoke-free laws were associated with rapid, sizeable reductions in hospitalizations for AMI (2,4–7). The current study adds to the previous evidence by documenting this effect in a relatively large population and by demonstrating that the effect was sustained over an extended period. A meta-analysis of seven of the previous eight studies and one unpublished study yielded a pooled estimate of a 19% (CI = 14%–24%) reduction in AMI hospitalization rates after implementation of smoke-free laws (2). Three studies have suggested that these reductions are more pronounced among nonsmokers than among smokers (4,6,7). For example, one study that included objective confirmation of patients' smoking status reported reductions of 21%, 19%, and 14% in the number of hospitalizations for acute coronary syndrome among never smokers, former smokers, and current smokers, respectively, in the year after implementation of a comprehensive national smoke-free law, with the decrease in hospitalizations among nonsmokers accounting for 67% of the total decrease (7).

The findings in this report are subject to at least four limitations. First, because no data were available on whether study subjects were nonsmokers or smokers, determining what portion of the observed decrease in hospitalizations was attributable to reduced SHS exposure among nonsmokers and what portion was attributable to increased quitting among smokers was not possible. The prevalence of smoking decreased in Pueblo County as a whole, but the difference over time was not statistically significant. Second, the study did not directly document reductions in SHS exposure among nonsmokers after the city of Pueblo smoke-free law took effect, although studies elsewhere have reported such reductions (1,5,7,10). Third, individual residences were assigned based on postal codes, which might have resulted in a small amount of misclassification (3); however, misclassifying residents' exposure to the city of Pueblo smoke-free ordinance would result in underestimating the effect of this ordinance. In addition, residents of the area of Pueblo County outside the city of Pueblo limits might work in workplaces or patronize restaurants or bars in the city of Pueblo, or vice versa; again, this would bias findings toward the null. Finally, the ecologic nature of this study precludes definite conclusions about the extent to which the observed decline in AMI hospitalizations in the city of Pueblo was attributable to the smoke-free ordinance. To the extent that any unmeasured factors influenced rates, the findings described in this report might overestimate or underestimate the actual

effect. AMI hospitalization rates initially were substantially higher in the city of Pueblo than in the two comparison areas, suggesting that these areas might not be fully comparable to the intervention site because of demographic and other differences. However, no significant changes in the manner in which AMI patients were diagnosed, treated, or transported occurred in the three study sites during the study period. Future studies could further expand the evidence base by including information on the smoking status of AMI patients and biomarkers (e.g., cotinine and troponin) for objective measurement of SHS exposure and case ascertainment, as was done in one recent study (7).

The Phase I study findings suggested that the city of Pueblo's smoke-free ordinance led to a rapid decrease in AMI hospitalizations. The findings described in this report suggest that the initial decrease in AMI hospitalizations observed immediately after the implementation of comprehensive smoke-free laws continued over time. These findings provide support for considering smoke-free policies an important component of interventions to prevent heart disease morbidity and mortality.

### Acknowledgments

This report is based, in part, on contributions by MJ Krantz, MD, B Bucher Bartelson, PhD, and RO Estacio, MD, Colorado Prevention Center, Denver, Colorado.

### References

1. US Department of Health and Human Services. The health consequences of involuntary exposure to tobacco smoke: a report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, CDC; 2006. Available at <http://www.surgeongeneral.gov/library/secondhandsmoke/report/fullreport.pdf>.
2. Glantz S. Meta-analysis of the effects of smokefree laws on acute myocardial infarction: an update. *Prev Med* 2008;47:452–3.
3. Bartecchi C, Alsever RN, Nevin-Woods C, et al. Reduction in the incidence of acute myocardial infarction associated with a citywide smoking ordinance. *Circulation* 2006;114:1490–6.
4. Barone-Adesi F, Vizzini L, Merletti F, Richiardi L. Short-term effects of Italian smoking regulation on rates of hospital admission for acute myocardial infarction. *Eur Heart J* 2006;20:2468–72.
5. Juster HR, Loomis BR, Hinman TM, et al. Declines in hospital admissions for acute myocardial infarction in New York State after implementation of a comprehensive smoking ban. *Am J Public Health* 2007;97:2035–9.
6. Seo D-C, Torabi MR. Reduced admissions for acute myocardial infarction associated with a public smoking ban: matched controlled study. *J Drug Educ* 2007;37:217–26.
7. Pell JP, Haw S, Cobbe S, et al. Smoke-free legislation and hospitalizations for acute coronary syndrome. *N Engl J Med* 2008;359:482–91.
8. Pechacek TF, Babb S. Commentary: how acute and reversible are the cardiovascular risks of secondhand smoke? *BMJ* 2004;328:980–3.
9. Barnoya J, Glantz SA. Cardiovascular effects of secondhand smoke nearly as large as smoking. *Circulation* 2005;111:2684–98.
10. Haw SJ, Gruer L. Changes in exposure of adult non-smokers to second-hand smoke after implementation of smoke-free legislation in Scotland: national cross sectional survey. *BMJ* 2007;335:549–52.

## ***Campylobacter jejuni* Infection Associated with Unpasteurized Milk and Cheese – Kansas, 2007**

On October 26, 2007, a family health clinic nurse informed the Kansas Department of Health and Environment (KDHE) that *Campylobacter jejuni* had been isolated from two ill persons from different families who were members of a closed community in a rural Kansas county. By October 29, 17 additional members of the community had reported gastrointestinal illness and visited the clinic within a week. All 19 persons reported consuming fresh cheese\* on October 20 that was made the same day at a community fair from unpasteurized milk obtained from a local dairy. This report summarizes the findings of an investigation by KDHE and the local health department to determine the source and extent of the outbreak. Eating fresh cheese at the fair was the only exposure associated with illness (relative risk [RR] = 13.9). Of 101 persons who ate the cheese, 67 (66%) became ill. *C. jejuni* isolates from two ill persons had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns, and the isolate from a third ill person was nearly identical to the other two. Although all samples of cheese tested negative for *Campylobacter*, results of the epidemiologic investigation found an association between illness and consumption of fresh cheese made from unpasteurized milk. To minimize the risk for illness associated with milkborne pathogens, unpasteurized milk and milk products should not be consumed.

The outbreak occurred in an insular religious community (population approximately 150) consisting nearly exclusively of agricultural workers who practice small-scale and traditional farming techniques. On October 20, 2007, members held a community fair celebrating their pioneer heritage. During the fair, unpasteurized cheese was made at an activity station by adding rennet extract to unpasteurized milk donated by a local dairy, producing soft cheese in 5–6 hours. Butter also was made, but from pasteurized milk. Adults and children were encouraged to participate in these activities. Hand-washing stations were available at the food preparation stations. The cheese was served at a banquet that evening. Foods made at other activity stations, including buffalo stew and chili, and potluck meals brought from community member homes also were served at the banquet.

As part of the investigation, a self-administered questionnaire was distributed at a community meeting on November 4, 2007, to collect information regarding demographics, illness status

\* Fresh cheeses, such as cottage cheese and Neufchâtel, are made by curdling milk and draining the whey, with little additional processing, and also are referred to as soft or unripened cheeses.

and characteristics, food history, and other possible exposures. A case was defined as diarrhea (three or more loose stools in a 24-hour period) in a member of the community, with onset during October 20–30, 2007. Of the 150 community members, 130 (87%) completed the questionnaire, and 68 (52%) persons met the case definition. Among ill persons, 66 (97%) reported watery diarrhea, 18 (27%) reported bloody diarrhea, and 16 (24%) reported vomiting and diarrhea. None of the respondents had diarrhea immediately before the fair; illness onset occurred during October 21–29 (Figure). Two patients were hospitalized for dehydration. One was released the next day; the other, a pregnant woman, remained in the hospital for 5 days. No deaths were reported. Median age of ill persons was 25 years (range: 1–75 years); 41 (60%) were aged  $\leq 15$  years, and 37 (54%) were female.

In a cohort analysis, consuming the fresh cheese was significantly associated with illness (RR = 13.9). Factors not significantly associated with illness included making cheese (RR = 1.3), making (RR = 1.2) or consuming butter made from pasteurized milk (RR = 1.4), and drinking well water (RR = 2.1) (Table). Of the 101 persons who reported consuming fresh cheese made from unpasteurized milk, 67 (66%) met the case definition. One apparent case of secondary transmission occurred in a person who did not consume the fresh cheese, but became ill on October 29, 6 days after her child became ill.

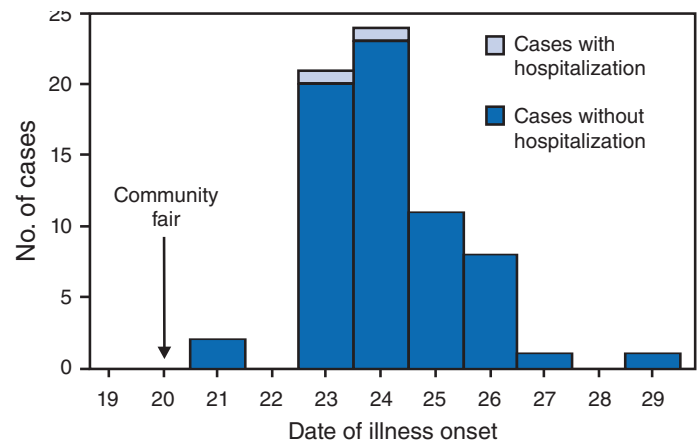
Stool specimens were collected from three persons who met the case definition and sent to the KDHE laboratory. *C. jejuni* was isolated from all three specimens. Isolates from two of the samples had indistinguishable PFGE patterns (PulseNet pattern number DBRS16.1150) and the third isolate differed by only two bands (PulseNet pattern number DBRS16.0024).

On November 3, KDHE collected six slabs of leftover cheese from the freezer of the community church for laboratory testing and advised community leaders to discard all other cheese remaining from the community fair. On November 6, the Kansas Department of Agriculture inspected the dairy floor, roof, and ceiling; milk tank; equipment; and animal housing for cleanliness and rodent control but did not find any regulatory violations. Milk samples also were examined for bacterial content, antibiotic residue, and presence of added water. Samples of fresh cheese remaining from the event and milk from the dairy were sent for laboratory analysis. *C. jejuni* was not isolated from the samples of leftover fresh cheese or unpasteurized milk.

**Reported by:** DC Hunt, MPH, MC Bañez Ocfemia, MPH, D Neises, MPH, G Hansen, DVM, Kansas Dept of Health and Environment, ST Aghoghobia, MSc, EIS Officer, CDC.

**Editorial Note:** Unpasteurized milk products have been a documented source of infection with *Campylobacter*, *Salmonella*, *Escherichia coli* O157:H7, *Listeria*, *Brucella*, *Mycobacterium*

**FIGURE. Number of cases of diarrheal illness (N = 68) among persons who attended a community fair, by day of illness onset — Kansas, October 2007**



*bovis*, and other pathogens (1). Milk can become contaminated with *Campylobacter* from cow feces or colonized cow teats (2,3). This investigation produced evidence that unpasteurized cheese was the source of the outbreak of diarrheal illness among persons who attended a community fair in Kansas. However, investigators could not establish definitively when in the manufacturing process the cheese was contaminated. The cheese could have been contaminated at any point in its manufacture, including at the fair when community members directly participated in making the cheese. Although the causative organism was not found in dairy samples taken after the event, contamination of the milk during transit to the fair cannot be ruled out.

Although unpasteurized milk could not be identified definitively as the source of the outbreak described in this report, it has been the source of numerous other *Campylobacter* outbreaks. In 2006, unpasteurized milk or unpasteurized milk products were the vehicle of infection identified in six outbreaks of *Campylobacter* spp. in the United States. In those outbreaks, 95 persons were infected, and seven of those persons were hospitalized (CDC, unpublished data, 2008). Kansas has had previous outbreaks of campylobacteriosis associated with unpasteurized milk. In April 2002, KDHE and a local health department investigated a campylobacteriosis outbreak among 86 preschoolers and adults who visited a local dairy. Of the 86 persons, 65 (76%) reported consuming raw milk when they visited the dairy; no illness was reported among those who did not consume raw milk. *C. jejuni* isolates from six children had indistinguishable PFGE patterns. Laboratory tests of samples from the dairy's bulk tank were inconclusive. During August–December 2007, in a separate incident, KDHE and two local health departments identified 25 persons who had diarrheal

**TABLE. Association between reported exposures and diarrheal illness among 130 respondents who attended a community fair — Kansas, October 2007**

Exposure	Exposed			Not exposed			RR*	(95% CI)†
	Ill	Total	Ill (%)	Ill	Total	Ill (%)		
Drank well water	61	101	(60)	2	7	(29)	2.1	(0.6–6.9)
Made butter	24	38	(63)	41	79	(52)	1.2	(0.9–1.7)
Made cheese	21	31	(68)	42	83	(51)	1.3	(0.9–1.6)
Ate butter	37	55	(67)	29	61	(48)	1.4	(1.0–1.9)
Ate cheese	67	101	(66)	1	21	(5)	13.9	(2.0–94.8)
Ate chili	60	106	(57)	6	14	(43)	1.3	(0.7–2.4)
Ate biscuits	42	62	(68)	25	56	(45)	1.5	(1.0–2.1)
Shoed horses	26	42	(62)	39	74	(53)	1.2	(0.9–1.6)

\* Relative risk.

† Confidence interval.

illness after consuming raw milk or products made with raw milk purchased from another local dairy. Seven (28%) patients had *C. jejuni* isolated from stool specimens; three of the isolates had indistinguishable PFGE patterns. *Campylobacter* was not isolated from any of the milk or cheese samples. Unpasteurized milk legally can be sold or donated at dairies in Kansas. Dairy farms in Kansas that sell unpasteurized milk on-site are not required to display notices regarding the potential hazards of consuming unpasteurized milk.†

When Scotland banned the sale of unpasteurized milk in 1983, milkborne infection decreased markedly in that country. Before the ban, an average of 14 outbreaks annually affected an average of 1,090 persons per year; after the ban, an average of eight outbreaks annually affected an average of 46 persons per year in dairy farming communities. None of the outbreaks in the postban period occurred in the general community (4).

Required permits and point-of-sale signage warning of the potential dangers of unpasteurized milk and unpasteurized milk products have not demonstrably decreased outbreaks of gastrointestinal illness in other states (5–7). Stricter laws prohibiting the sale or donation of unpasteurized milk might better protect the public, especially members of certain groups that are at increased risk for infection-related complications (e.g., young and elderly persons and pregnant women) (8). To prevent milkborne infections, unpasteurized milk and unpasteurized milk products should not be consumed.

#### Acknowledgments

This report is based, in part, on contributions by ME Vajnar, Kansas Department of Health and Environment; L Johnson and C Brehman, Minnesota Dept of Agriculture Laboratories; the Kansas Dept of Agriculture; local health department staff members, and K Bisgard, Office of Workforce and Career Development, CDC.

† The Kansas Dairy Law. Kansas Statute K.S.A. 65-789 Ch. 65 Art. 7(d). Available at [http://www.ksda.gov/includes/statute\\_regulations/dairy/06dairylaw.pdf](http://www.ksda.gov/includes/statute_regulations/dairy/06dairylaw.pdf).

#### References

- Gillespie IA, Adak GK, O'Brien SJ, Bolton FJ. Milkborne general outbreaks of infectious intestinal disease, England and Wales, 1992–2000. *Epidemiol Infect* 2003;103:461–8.
- Warner DP, Bryner JH, Beran GW. Epidemiologic study of campylobacteriosis and the possible role of unpasteurized milk as a vehicle of infection. *Am J Vet Res* 1986;47:254–8.
- Hutchinson DN, Bolton FJ, Hinchliffe PM, et al. Evidence of udder excretion of *Campylobacter jejuni* as the cause of milk-borne *Campylobacter* outbreak. *J Hyg* 1985;94:205–15.
- Sharp JC, Patterson GM, Barrett NJ. Pasteurization and the control of milkborne infection in Britain. *Br Med J* 1985;291:463–4.
- CDC. *Salmonella* Typhimurium infection associated with raw milk and cheese consumption—Pennsylvania, 2007. *MMWR* 2007;56:1161–4.
- Potter ME, Blaser MJ, Sikes RK. Human *Campylobacter* infection associated with certified raw milk. *Am J Epidemiol* 1983;117:475–83.
- CDC. Multistate outbreak of *Salmonella* serotype Typhimurium infections associated with drinking unpasteurized milk—Illinois, Indiana, Ohio, and Tennessee, 2002–2003. *MMWR* 2003;52:613–5.
- Allos BM. *Campylobacter jejuni* infections: update on emerging issues and trends. *Clin Inf Dis* 2001;32:1201–6.

## Underground Coal Mining Disasters and Fatalities — United States, 1900–2006

During a 5-month period in 2006, three underground coal mining incidents in the United States resulted in the deaths of 19 miners. All three incidents received nationwide attention, particularly the Sago Mine disaster, which occurred on January 2 and resulted in the deaths of 12 miners. The other two incidents, which occurred at the Alma No. 1 Mine on January 19 and the Darby No. 1 Mine on May 20, resulted in the deaths of two miners and five miners, respectively. The occurrence of three fatal incidents in 5 months was a departure from recent trends in underground coal mining safety. Before 2006, the number of mining disasters had decreased from a high of 20 in 1909 to an average of one every 4 years during 1985–2005. Deaths resulting from the three incidents were the stimulus for

the Mine Improvement and New Emergency Response Act of 2006 (MINER Act) (1), which amended the Mine Safety and Health Act of 1977 to improve safety, health, preparedness, and emergency response in U.S. mining. This report briefly describes the three 2006 mining incidents, reviews mining disasters in the United States during 1900–2006, and traces the effect of the disasters and the 2006 incidents on mining health and safety regulations.

Federal law mandates reporting of mining-related incidents that can result in loss of life, such as an explosion or fire in an underground coal mine. The Mine Safety and Health Administration (MSHA) determines whether investigation of such incidents is required and, if so, initiates the investigation within 24 hours. MSHA teams evaluate the scene, interview witnesses and experts, and with the aid of researchers from CDC's National Institute for Occupational Safety and Health (NIOSH) and other technical specialists, recreate specific conditions to measure and evaluate outcomes. The three 2006 incidents were investigated at both the state and federal level. Of the three incidents, two were classified by MSHA as disasters, which are defined as incidents with five or more fatalities (2–4).

To better understand the context of these events, NIOSH researchers reviewed mining fatality surveillance data from the period 1900–2006 published by MSHA (5–6) and the U.S. Bureau of Mines (7). Underground mine disasters are classified by cause as follows: 1) explosion, 2) fire, 3) haulage (i.e., transportation of personnel, material, or equipment), 4) ground fall/bump (i.e., fall of roof rock or outward bursting of walls in an underground work area), 5) inundation (i.e., usually an inrush of toxic gases or water from old mine workings), and 6) other (8). Using MSHA reports, NIOSH researchers collected additional data on the deaths and circumstances associated with the Sago, Alma, and Darby incidents. Researchers reviewed published materials and traced how events during these 2006 incidents led to the MINER Act.

## 2006 Mining Incidents

In 2006, a total of 14,885 mines were operating in the United States, representing every state and multiple mining commodities (e.g., coal, metal, nonmetal, stone, and sand and gravel). These mines included 2,113 active coal mines (1,438 surface mines and 675 underground mines). Most underground coal mines were concentrated in Kentucky, West Virginia, and Pennsylvania. In 2006, the two incidents in West Virginia and one in Kentucky resulted in the deaths of 19 workers, accounting for 26% of the 73 U.S. mine worker fatalities in that year.

**Sago Mine.** The first 2006 incident occurred on January 2 at the Sago Mine near Tallmansville, West Virginia. At approximately 6:30 a.m., 30 minutes after the 13 members of the No. 1 production crew entered the mine (2), a methane gas explosion occurred underground near a worked-out area approximately 2 miles from the mine entrance. MSHA investigators determined that lightning was the most likely ignition source for the explosion (2). The force of the explosion broke foam concrete block walls and propelled dust, dirt, and debris toward the mine entrance, killing one miner instantly and cutting communication wires. The other 12 miners in the No. 1 production crew, who had arrived at their work area approximately 1,000 feet beyond the site of the explosion, donned their 1-hour self-contained breathing apparatus and attempted to escape. After encountering smoke, dust, and debris, and with no information regarding the condition of the mine, the miners returned to their work area, erected a barricade, and awaited rescue. Eleven of the 12 died of carbon monoxide poisoning before rescuers reached them 41 hours later; the twelfth trapped miner survived. Because communications were cut off by the explosion, rescuers were unsure where the miners were located and whether any had survived. As a result, the trapped miners could not be told they were 700 feet from fresh air and could walk out of the mine. The deceased miners ranged in age from 28 to 61 years; average age was 49.4 years. They ranged in experience from 1.6 to 37 years and averaged 23.6 years of experience.

**Alma No. 1 Mine.** The second 2006 incident occurred on January 19 at the Alma No. 1 Mine near Stollings, West Virginia. A conveyor belt that removed coal from the mine caught on fire. A total of 29 miners were in the mine at the time, and two miners became separated when the others escaped in heavy smoke. Several unsuccessful attempts were made to locate the missing workers. After the fire had been extinguished, the two bodies were found by mine rescue teams 46 hours later (4).

**Darby No. 1 Mine.** The third 2006 incident occurred on May 20 at the Darby No. 1 Mine in Holmes Mill, Kentucky (3). At the end of the afternoon shift, the crew foreman and another miner had remained to finish some construction work when the four-member night shift crew entered the mine. An underground explosion destroyed several mine seals, which MSHA later attributed to improper construction of the seals and inappropriate use of cutting and welding equipment in an attempt to correct the deficient mine seal construction (3). The two miners who were finishing construction work died of blunt force trauma near one of the destroyed mine seals. Three other miners died of carbon monoxide poisoning while trying to escape from the mine through smoke and toxic gases.



The sixth miner was able to navigate part way out of the mine through smoke, rock, and debris by wearing his 1-hour breathing apparatus; he was found by mine rescue teams within 2 hours. The bodies of the five victims were removed from the mine 10 hours later.

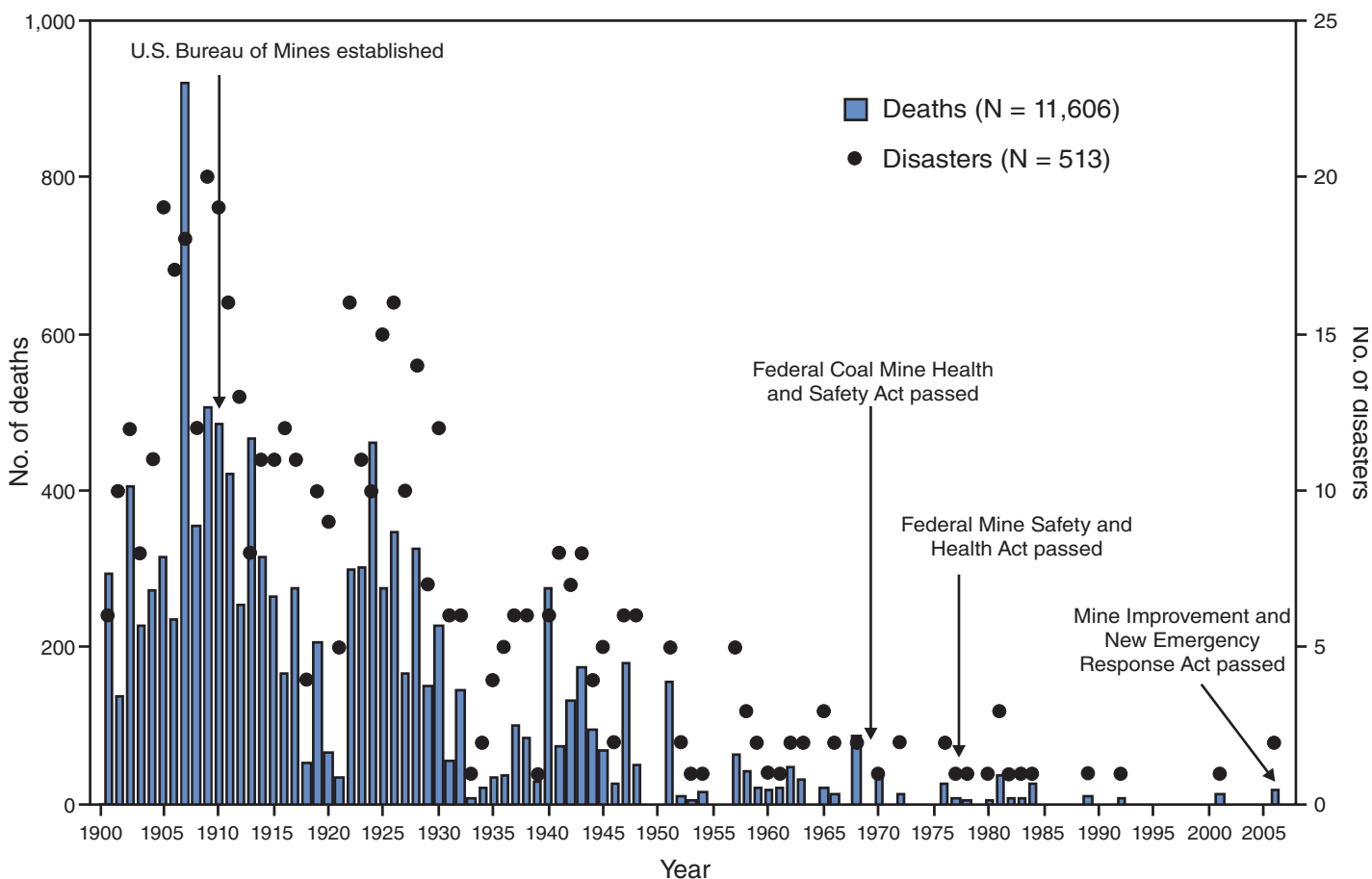
### Coal Mining Disasters, 1900–2006

During 1900–2006, a total of 11,606 underground coal mine workers died in 513 U.S. underground coal mining disasters\* (Figure), with most disasters resulting from explosion or fire (Table). In 1907 alone, 692 miners died in four mine explosions in West Virginia, Pennsylvania, and Alabama (6). However, the frequency and severity of underground coal mining disasters and the number of deaths of miners decreased substantially during 1970–2005. Until the 2006 incidents, underground coal mine disasters with multiple fatalities were thought to be permanently on the decline.

\*Reliable data on fatalities in coal mining nondisasters (i.e., incidents with four or fewer deaths) are not available for the early 1900s.

Many of the disasters during 1900–2006 led to new legislation (Figure) (5,6). The 1907 explosions led to establishment in 1910 of the U.S. Bureau of Mines, an agency specifically authorized to conduct mine safety and health research. A 1968 explosion at the Farmington No. 9 Mine in West Virginia resulted in the deaths of 78 miners and led to 1) passage of the Federal Coal Mine Health and Safety Act of 1969 (1969 Act), the most sweeping mine safety and health legislation ever adopted in the United States, and 2) creation of the Mining Enforcement and Safety Administration (MESA), a separate agency from the Bureau of Mines, to enforce mine safety and health requirements. The 1969 Act strengthened numerous mine safety and health regulations, including those relating to explosion prevention, fire prevention and protection, and ventilation. In 1976, two explosions at the Scotia Mine in Kentucky resulted in the deaths of 26 miners and rescuers and led to passage of the Federal Mine Safety and Health Act of 1977 (1977 Act). This legislation strengthened provisions of the 1969 Act and also incorporated new mandates for all

**FIGURE. Number of worker deaths in underground coal mining disasters\* and key mining safety milestones — United States, 1900–2006**



\* Disasters are defined by the Mine Safety and Health Administration as incidents resulting in five or more deaths.

**TABLE. Number of worker deaths in underground coal mining disasters,\* by causal classification — United States, 1900–2006**

Causal classification	No. of disasters	No. of deaths
Explosion	420	10,390
Fire	35	727
Haulage†	21	145
Ground fall/Bump‡	13	83
Inundation¶	7	62
Other	17	199
<b>Total</b>	<b>513</b>	<b>11,606</b>

\* Disasters are defined by the Mine Safety and Health Administration as incidents resulting in five or more deaths.

† Transportation of personnel, material, or equipment.

‡ Fall of roof rock or outward bursting of walls in an underground work area.

¶ Usually an inrush of toxic gases or water from old mine workings.

noncoal mines. The 1977 Act also renamed MESA as MSHA and moved the agency from the U.S. Department of the Interior to the U.S. Department of Labor.

## The MINER Act of 2006

The 2006 coal mine disasters were the stimulus for the MINER Act (1). This legislation contains provisions to improve safety, health, preparedness, and emergency response in U.S. mines. After the explosion at the Sago Mine, delays occurred in incident reporting and emergency response. The MINER Act requires mine operators to develop and maintain a preparedness and response plan to reduce the delays and improve the quality of the response.

Under the MINER Act, mine operators must provide caches of self-contained breathing apparatus along escapeways; the breathing apparatus must supply at least 2 hours of oxygen per miner and must be spaced no more than 30 minutes travel time apart to enable miners to make their way through the entire escapeway. Before the Sago disaster, mines were only required to provide miners with a single self-contained breathing apparatus, providing 1 hour of oxygen. The sole survivor of the group of Sago miners told rescuers that some miners thought their self-contained breathing apparatus was not working properly. Regulators felt miners needed to be provided with sufficient quantities of breathing apparatus to give them at least 2 hours of protection in the event of a prolonged escape. The MINER Act also calls for installation and maintenance of directional lifelines‡ in escapeways, a direct response to NIOSH research findings (9). In addition, the inability of trapped miners to communicate with rescuers during the Sago disaster led to another feature in the MINER Act. By July 2009, mine operators must install wireless two-way communications and

‡ A rope with cones spaced at regular intervals along its length. If a miner's hand slides over the cone, the miner is going in the correct direction. If the hand is blocked by the cone, the miner is headed in the wrong direction.

tracking systems that will link surface rescuers with underground workers. Congress subsequently passed an emergency supplemental appropriation to accelerate implementation of 1) emergency oxygen supplies, 2) refuge chambers, and 3) communications and tracking systems.

As a result of the three 2006 incidents, the National Mining Association created an independent commission of mining and safety experts, which concluded that more research was needed in rescue and escape training and communications, realistic training, professional emergency response and rescue capability, and development of a safety culture in mining organizations. These safety improvements will require more attention to human behavior and comprehensive risk management (10).

Coal mining disasters have decreased substantially in frequency and number of fatalities since 1900. The 2006 underground coal mine incidents and their 19 fatalities marked a reversal of that trend. However, the incidents also drew critical attention to mine safety in the United States, engaging the public, industry, and government and resulting in legislative and regulatory action.

**Reported by:** KM Kowalski-Trakofler, PhD, DW Alexander, PhD, MJ Brnich Jr, LJ McWilliams, MS, Office of Mine Safety and Health Research, Pittsburgh Research Laboratory; DB Reissman, MD, Office of the Director, National Institute for Occupational Safety and Health, CDC.

## Acknowledgment

This report is based, in part, on contributions by A Podlesny and PJ Lenart, National Institute for Occupational Safety and Health, CDC.

## References

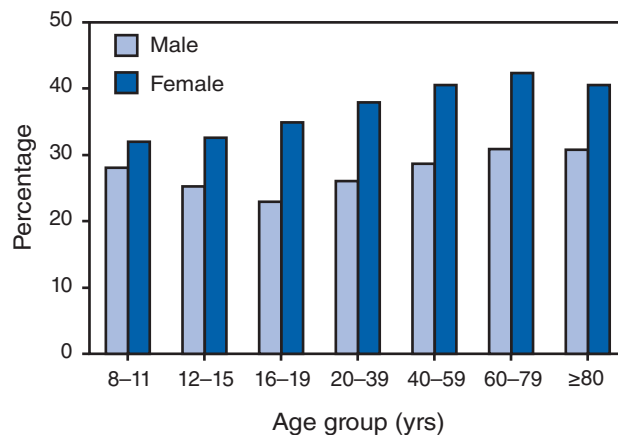
1. Mine Improvement and New Emergency Response Act of 2006 (MINER Act), Pub. L. No. 109-236 (S 2803). Available at <http://www.msha.gov/mineract/mineractsinglesource.asp>.
2. Gates RA, Phillips RL, Urosek JE, et al. Report of investigation: fatal underground coal mine explosion, January 2, 2006. Sago Mine, Wolf Run Mining Company, Tallmansville, Upshur County, West Virginia, ID No. 46-08791. Arlington, VA: US Department of Labor, Mine Safety and Health Administration; 2007. Available at <http://www.msha.gov/sagomine/sagomine.asp>.
3. Light TE, Herndon RC, Guley AR, et al. Report of investigation: fatal underground coal mine explosion, May 20, 2006. Darby No. 1 Mine, Kentucky Darby LLC, Holmes Mill, Harlan County, Kentucky. ID No. 15-18185. Arlington, VA: US Department of Labor, Mine Safety and Health Administration; 2007. Available at <http://www.msha.gov/fatals/2006/darby/ftl06c2731.pdf>.
4. Murray KA, Pogue CW, Stahlhut RW, et al. Report of investigation: fatal underground coal mine fire, January 19, 2006. Aracoma Alma Mine No. 1, Aracoma Coal Company, Inc., Stollings, Logan County, West Virginia. ID No. 46-08801. Arlington, VA: US Department of Labor, Mine Safety and Health Administration; 2007. Available at <http://www.msha.gov/fatals/2006/aracoma/ftl06c1415.pdf>.
5. DeMarchi J. Historical mining disasters. Beckley, WV: US Department of Labor, Mine Safety and Health Administration, National Mine Health and Safety Academy; 1997:34–44.

6. Mine Safety and Health Administration. Historical summary of mine disasters in the United States. Volume II: coal mines, 1959–1998. Beckley, West Virginia: US Department of Labor, Mine Safety and Health Administration, National Mine Health and Safety Academy; 1998.
7. Humphrey HB. Historical summary of coal-mine explosions in the United States, 1810–1958. Bulletin 586. Washington, DC: US Department of the Interior, Bureau of Mines; 1960.
8. Mine Safety and Health Administration. Accident, illness and injury, and employment self-extracting files (part 50 data): 2006. Denver, CO: US Department of Labor, Mine Safety and Health Administration, Office of Injury and Employment Information. Available at <http://www.msha.gov/stats/part50/p50y2k/p50y2k.htm>.
9. Conti R, Chasko L, Wiehagen W, Lazzara C. Fire response preparedness for underground mines. DHHS IC 9481. Washington, DC: US Department of Health and Human Services; 2005. Available at <http://www.cdc.gov/niosh/mining/pubs/pdfs/2006-105.pdf>.
10. Mine Safety Technology and Training Commission. Improving mine safety technology and training: establishing U.S. global leadership. Available at [http://www.coalminingsafety.org/documents/msttc\\_report.pdf](http://www.coalminingsafety.org/documents/msttc_report.pdf).

## QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

### Mean Percentage Body Fat,\* by Age Group and Sex — National Health and Nutrition Examination Survey, United States, 1999–2004†



\* Based on whole body, dual energy, x-ray absorptiometry (DXA) scans.

† Estimates are based on DXA scans acquired from a sample (N = 22,010) of the civilian, noninstitutionalized U.S. population.

During 1999–2004, females had higher mean percentage body fat than males at all ages. Male/female differences were smallest at age 8–11 years (3.9 percentage points) but increased to 12.0 percentage points at age 16–19 years. In males, mean percentage body fat ranged from 22.9% at age 16–19 years to 30.9% at age 60–79 years. In females, mean percentage body fat ranged from 32.0% at age 8–11 years to 42.4% at age 60–79 years.

**SOURCE:** National Health and Nutrition Examination Survey, 1999–2004. Available at <http://www.cdc.gov/nchs/nhanes.htm>.

**TABLE I. Provisional cases of infrequently reported notifiable diseases (<1,000 cases reported during the preceding year) — United States, week ending December 20, 2008 (51st week)\***

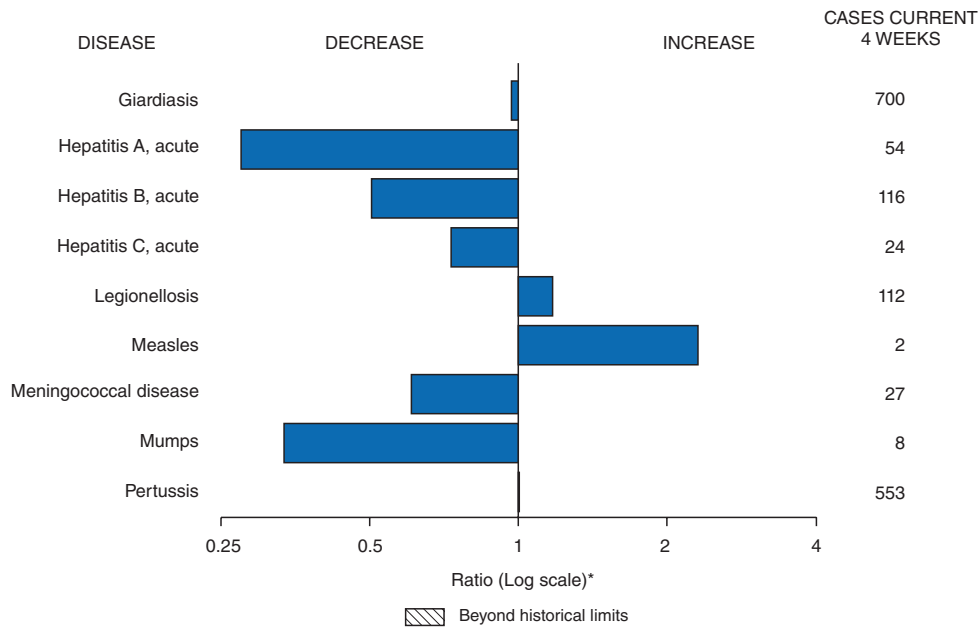
Disease	Current week	Cum 2008	5-year weekly average†	Total cases reported for previous years					States reporting cases during current week (No.)
				2007	2006	2005	2004	2003	
Anthrax	—	—	—	1	1	—	—	—	
Botulism:									
foodborne	—	12	1	32	20	19	16	20	
infant	2	97	2	85	97	85	87	76	CT (1), AZ (1)
other (wound & unspecified)	—	22	1	27	48	31	30	33	
Brucellosis	1	84	3	131	121	120	114	104	NE (1)
Chancroid	—	31	1	23	33	17	30	54	
Cholera	—	2	0	7	9	8	6	2	
Cyclosporiasis§	1	123	2	93	137	543	160	75	NC (1)
Diphtheria	—	—	—	—	—	—	—	1	
Domestic arboviral diseases§,¶:									
California serogroup	—	43	0	55	67	80	112	108	
eastern equine	—	2	0	4	8	21	6	14	
Powassan	—	1	—	7	1	1	1	—	
St. Louis	—	8	—	9	10	13	12	41	
western equine	—	—	—	—	—	—	—	—	
Ehrlichiosis/Anaplasmosis§,**:									
<i>Ehrlichia chaffeensis</i>	4	835	19	828	578	506	338	321	NY (1), MN (1), NC (2)
<i>Ehrlichia ewingii</i>	—	9	—	—	—	—	—	—	
<i>Anaplasma phagocytophilum</i>	10	456	30	834	646	786	537	362	NY (2), MN (7), NC (1)
undetermined	—	67	2	337	231	112	59	44	
<i>Haemophilus influenzae</i> ,††									
invasive disease (age <5 yrs):									
serotype b	1	28	1	22	29	9	19	32	IN (1)
nonserotype b	1	163	4	199	175	135	135	117	FL (1)
unknown serotype	3	176	5	180	179	217	177	227	MO (1), FL (1), UT (1)
Hansen disease§	—	69	2	101	66	87	105	95	
Hantavirus pulmonary syndrome§	—	14	1	32	40	26	24	26	
Hemolytic uremic syndrome, postdiarrheal§	—	222	7	292	288	221	200	178	
Hepatitis C viral, acute	5	788	26	849	766	652	720	1,102	PA (1), IN (1), MN (1), FL (2)
HIV infection, pediatric (age <13 years)§§	—	—	3	—	—	380	436	504	
Influenza-associated pediatric mortality§,¶¶	—	90	0	77	43	45	—	N	
Listeriosis	2	628	20	808	884	896	753	696	NY (1), NC (1)
Measles***	1	132	1	43	55	66	37	56	FL (1)
Meningococcal disease, invasive†††:									
A, C, Y, & W-135	1	262	8	325	318	297	—	—	PA (1)
serogroup B	1	147	6	167	193	156	—	—	MN (1)
other serogroup	—	30	1	35	32	27	—	—	
unknown serogroup	3	584	20	550	651	765	—	—	MN (1), NC (1), KY (1)
Mumps	4	367	18	800	6,584	314	258	231	PA (1), IN (1), NE (1), CO (1)
Novel influenza A virus infections	—	1	—	4	N	N	N	N	
Plague	—	1	0	7	17	8	3	1	
Poliomyelitis, paralytic	—	—	—	—	—	1	—	—	
Polio virus infection, nonparalytic§	—	—	—	—	N	N	N	N	
Psittacosis§	—	12	0	12	21	16	12	12	
Qfever total§,§§§:	—	112	3	171	169	136	70	71	
acute	—	100	—	—	—	—	—	—	
chronic	—	12	—	—	—	—	—	—	
Rabies, human	—	1	0	1	3	2	7	2	
Rubella¶¶¶	—	16	0	12	11	11	10	7	
Rubella, congenital syndrome	—	—	—	—	1	1	—	1	
SARS-CoV§,****	—	—	—	—	—	—	—	8	
Smallpox§	—	—	—	—	—	—	—	—	
Streptococcal toxic-shock syndrome§	—	125	4	132	125	129	132	161	
Syphilis, congenital (age <1 yr)	—	227	9	430	349	329	353	413	
Tetanus	—	15	1	28	41	27	34	20	
Toxic-shock syndrome (staphylococcal)§	1	67	3	92	101	90	95	133	IN (1)
Trichinellosis	—	7	0	5	15	16	5	6	
Tularemia	—	102	3	137	95	154	134	129	
Typhoid fever	—	371	8	434	353	324	322	356	
Vancomycin-intermediate <i>Staphylococcus aureus</i> §	—	33	0	37	6	2	—	N	
Vancomycin-resistant <i>Staphylococcus aureus</i> §	—	—	0	2	1	3	1	N	
Vibriosis (noncholera <i>Vibrio</i> species infections)§	5	435	5	447	N	N	N	N	NC (3), FL (2)
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 December 20, 2008 (51st week)\***

—: No reported cases. N: Not notifiable. Cum: Cumulative year-to-date counts.  
 \* Incidence data for reporting year 2008 are provisional, whereas data for 2003, 2004, 2005, 2006, and 2007 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. Additional information is available at <http://www.cdc.gov/epo/dphsi/phs/files/5yearweeklyaverage.pdf>.  
 § Not notifiable in all states. Data from states where the condition is not notifiable are excluded from this table, except in 2007 and 2008 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. There are no reports of confirmed influenza-associated pediatric deaths for the current 2008-09 season.  
 \*\*\* The one measles case reported for the current week was imported.  
 ††† Data for meningococcal disease (all serogroups) are available in Table II.  
 §§§ 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 December 20, 2008, 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.

**Notifiable Disease Data Team and 122 Cities Mortality Data Team**  
 Patsy A. Hall  
 Deborah A. Adams      Rosaline Dhara  
 Willie J. Anderson      Michael S. Wodajo  
 Lenee Blanton      Pearl C. Sharp









TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending December 20, 2008, and December 22, 2007 (51st week)\*

Reporting area	Lyme disease					Malaria					Meningococcal disease, invasive† All serotypes				
	Current week	Previous 52 weeks		Cum 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007
		Med	Max				Med	Max				Med	Max		
<b>United States</b>	391	405	1,447	25,998	26,069	11	21	136	1,038	1,272	5	20	53	1,023	1,024
<b>New England</b>	19	43	259	3,637	7,771	1	0	35	36	59	—	0	3	22	43
Connecticut	—	0	8	—	3,054	—	0	27	11	3	—	0	1	1	6
Maine§	16	2	72	860	528	—	0	1	1	8	—	0	1	6	7
Massachusetts	—	12	114	1,039	2,982	—	0	2	14	34	—	0	3	15	20
New Hampshire	—	11	139	1,381	893	—	0	1	4	9	—	0	0	—	3
Rhode Island§	—	0	0	—	177	—	0	8	1	—	—	0	0	—	3
Vermont§	3	3	40	357	137	1	0	1	5	5	—	0	1	—	4
<b>Mid. Atlantic</b>	331	235	1,003	15,247	10,793	2	4	14	240	392	1	2	6	117	123
New Jersey	—	31	209	2,743	3,119	—	0	1	—	71	—	0	2	10	18
New York (Upstate)	303	89	453	5,590	3,295	2	0	7	32	71	—	0	3	31	35
New York City	—	0	4	51	416	—	3	10	169	207	—	0	2	27	21
Pennsylvania	28	81	531	6,863	3,963	—	1	3	39	43	1	1	5	49	49
<b>E.N. Central</b>	1	10	143	1,344	2,094	—	3	7	138	136	—	3	9	173	160
Illinois	—	0	11	95	149	—	1	6	68	62	—	1	4	62	59
Indiana	—	0	8	41	52	—	0	2	5	10	—	0	4	27	28
Michigan	1	1	10	96	51	—	0	2	18	20	—	0	3	30	26
Ohio	—	1	5	49	33	—	0	3	29	27	—	1	4	40	35
Wisconsin	—	8	127	1,063	1,809	—	0	3	18	17	—	0	2	14	12
<b>W.N. Central</b>	27	7	740	1,305	658	—	1	10	68	56	2	2	8	94	69
Iowa	—	1	8	95	123	—	0	3	9	3	—	0	3	19	15
Kansas	—	0	1	5	8	—	0	2	9	4	—	0	1	5	5
Minnesota	27	2	731	1,179	507	—	0	8	28	29	2	0	7	26	22
Missouri	—	0	1	8	10	—	0	3	14	8	—	0	3	26	17
Nebraska§	—	0	2	14	7	—	0	2	8	7	—	0	1	12	5
North Dakota	—	0	9	1	3	—	0	1	—	4	—	0	1	3	2
South Dakota	—	0	1	3	—	—	0	0	—	1	—	0	1	3	3
<b>S. Atlantic</b>	13	67	215	4,020	4,479	7	5	15	266	260	1	2	10	148	175
Delaware	—	12	37	746	710	—	0	1	3	4	—	0	1	2	1
District of Columbia	—	2	11	158	116	—	0	2	4	3	—	0	0	—	—
Florida	1	2	10	113	30	4	1	7	62	55	—	1	3	50	66
Georgia	—	0	3	23	11	—	1	5	51	37	—	0	2	16	24
Maryland§	11	30	156	2,055	2,562	1	1	6	67	74	—	0	4	17	21
North Carolina	1	0	7	51	50	2	0	7	30	21	1	0	3	14	22
South Carolina§	—	0	2	24	30	—	0	1	9	7	—	0	3	22	16
Virginia§	—	11	68	776	891	—	1	7	40	58	—	0	2	22	23
West Virginia	—	0	11	74	79	—	0	0	—	1	—	0	1	5	2
<b>E.S. Central</b>	—	0	5	46	51	—	0	2	21	39	1	1	6	53	52
Alabama§	—	0	3	10	13	—	0	1	4	7	—	0	2	10	9
Kentucky	—	0	2	5	6	—	0	1	5	9	1	0	2	10	13
Mississippi	—	0	1	1	1	—	0	1	1	2	—	0	2	12	12
Tennessee§	—	0	3	30	31	—	0	2	11	21	—	0	3	21	18
<b>W.S. Central</b>	—	2	11	98	80	—	1	64	76	92	—	2	13	110	102
Arkansas§	—	0	0	—	1	—	0	0	—	2	—	0	2	14	9
Louisiana	—	0	1	3	2	—	0	1	3	14	—	0	3	22	28
Oklahoma	—	0	1	—	—	—	0	4	4	6	—	0	5	18	17
Texas§	—	2	10	95	77	—	1	60	69	70	—	1	7	56	48
<b>Mountain</b>	—	0	4	46	45	—	1	3	32	65	—	1	4	55	67
Arizona	—	0	2	8	2	—	0	2	14	12	—	0	2	9	13
Colorado	—	0	2	7	—	—	0	1	4	23	—	0	1	15	21
Idaho§	—	0	2	9	9	—	0	1	3	6	—	0	1	4	8
Montana§	—	0	1	4	4	—	0	0	—	3	—	0	1	5	2
Nevada§	—	0	2	5	15	—	0	3	3	3	—	0	1	4	6
New Mexico§	—	0	2	6	5	—	0	1	3	5	—	0	1	7	3
Utah	—	0	1	4	7	—	0	1	5	13	—	0	3	9	12
Wyoming§	—	0	1	3	3	—	0	0	—	—	—	0	1	2	2
<b>Pacific</b>	—	5	10	255	98	1	2	10	161	173	—	5	19	251	233
Alaska	—	0	2	5	10	—	0	2	6	2	—	0	2	5	2
California	—	3	10	195	72	—	2	8	120	123	—	3	19	179	167
Hawaii	N	0	0	N	N	—	0	1	3	2	—	0	1	5	10
Oregon§	—	1	4	44	6	—	0	2	4	18	—	1	3	38	31
Washington	—	0	4	11	10	1	0	3	28	28	—	0	5	24	23
American Samoa	N	0	0	N	N	—	0	0	—	—	—	0	0	—	—
C.N.M.I.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Guam	—	0	0	—	—	—	0	2	3	1	—	0	0	—	—
Puerto Rico	N	0	0	N	N	—	0	1	1	3	—	0	1	3	8
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 notifiable. Cum: Cumulative year-to-date counts. Med: Median. Max: Maximum.

\* Incidence data for reporting year 2008 are provisional.

† Data for meningococcal disease, invasive caused by serogroups A, C, Y, &amp; 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 December 20, 2008, and December 22, 2007 (51st week)\*

Reporting area	Pertussis					Rabies, animal					Rocky Mountain spotted fever				
	Current week	Previous 52 weeks		Cum 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007
		Med	Max				Med	Max				Med	Max		
<b>United States</b>	158	181	849	9,239	9,605	19	102	164	4,816	5,870	18	41	195	2,238	2,026
<b>New England</b>	1	12	49	608	1,503	9	7	20	361	513	—	0	2	4	10
Connecticut	—	0	4	34	88	7	4	17	199	212	—	0	0	—	—
Maine†	1	0	5	45	81	2	1	5	60	86	N	0	0	N	N
Massachusetts	—	9	32	420	1,161	N	0	0	N	N	—	0	1	1	9
New Hampshire	—	0	4	38	80	—	0	3	35	53	—	0	1	1	1
Rhode Island†	—	1	25	59	34	N	0	0	N	N	—	0	2	2	—
Vermont†	—	0	4	12	59	—	1	6	67	162	—	0	0	—	—
<b>Mid. Atlantic</b>	37	18	43	1,011	1,271	3	28	63	1,528	988	—	1	5	80	84
New Jersey	—	1	9	54	220	—	0	0	—	—	—	0	2	12	32
New York (Upstate)	7	7	24	420	526	3	9	20	492	507	—	0	2	17	6
New York City	—	0	5	46	148	—	0	2	19	44	—	0	2	24	28
Pennsylvania	30	9	25	491	377	—	18	48	1,017	437	—	0	2	27	18
<b>E.N. Central</b>	46	29	189	1,724	1,473	—	3	28	247	411	—	1	15	147	59
Illinois	—	6	32	437	196	—	1	21	103	113	—	1	10	102	39
Indiana	9	1	15	112	56	—	0	2	10	12	—	0	3	8	5
Michigan	3	5	14	281	290	—	1	8	73	202	—	0	1	3	4
Ohio	34	9	176	782	604	—	1	7	61	84	—	0	4	33	10
Wisconsin	—	2	7	112	327	N	0	0	N	N	—	0	1	1	1
<b>W.N. Central</b>	26	17	142	1,194	767	—	4	12	195	264	1	4	32	453	364
Iowa	—	1	12	104	149	—	0	5	29	31	—	0	2	7	17
Kansas	—	1	13	66	104	—	0	7	—	107	—	0	0	—	12
Minnesota	—	2	131	224	262	—	0	10	65	39	—	0	4	—	2
Missouri	13	5	49	485	115	—	1	8	65	38	1	3	31	423	314
Nebraska†	13	2	35	271	69	—	0	0	—	—	—	0	4	20	14
North Dakota	—	0	5	1	9	—	0	8	24	22	—	0	0	—	—
South Dakota	—	0	5	43	59	—	0	2	12	27	—	0	1	3	5
<b>S. Atlantic</b>	19	16	50	883	928	7	36	101	1,962	2,153	13	12	71	908	987
Delaware	—	0	3	18	11	—	0	0	—	—	—	0	5	32	17
District of Columbia	—	0	1	7	9	—	0	0	—	—	—	0	2	8	3
Florida	11	5	20	302	208	—	0	77	139	128	—	0	3	18	19
Georgia	—	1	6	77	37	—	5	42	298	292	—	1	8	73	60
Maryland†	7	2	8	126	117	—	8	17	409	429	—	1	7	71	63
North Carolina	—	0	38	79	292	7	9	16	448	470	13	3	55	499	637
South Carolina†	1	2	8	122	100	—	0	0	—	46	—	1	9	54	64
Virginia†	—	3	10	143	124	—	11	24	591	711	—	2	15	146	119
West Virginia	—	0	2	9	30	—	1	9	77	77	—	0	1	7	5
<b>E.S. Central</b>	8	7	25	378	458	—	3	7	165	155	—	3	23	314	274
Alabama†	—	1	5	54	90	—	0	0	—	—	—	1	8	88	95
Kentucky	2	1	11	130	32	—	0	4	45	21	—	0	1	1	5
Mississippi	—	2	5	89	255	—	0	1	2	3	—	0	1	6	20
Tennessee†	6	1	14	105	81	—	2	6	118	131	—	2	19	219	154
<b>W.S. Central</b>	—	26	198	1,465	1,105	—	1	40	92	1,046	3	2	153	285	208
Arkansas†	—	1	18	82	162	—	0	6	48	32	3	0	14	68	109
Louisiana	—	1	7	70	21	—	0	0	—	6	—	0	1	5	4
Oklahoma	—	0	21	53	50	—	0	32	42	46	—	0	132	170	54
Texas†	—	22	179	1,260	872	—	0	12	2	962	—	1	8	42	41
<b>Mountain</b>	6	15	37	775	1,100	—	1	8	77	97	1	1	3	43	37
Arizona	—	3	10	189	209	N	0	0	N	N	1	0	2	17	10
Colorado	3	3	8	148	302	—	0	0	—	—	—	0	1	1	3
Idaho†	—	0	5	35	45	—	0	0	—	12	—	0	1	1	4
Montana†	—	1	11	83	49	—	0	2	9	21	—	0	1	3	1
Nevada†	—	0	7	19	37	—	0	4	5	13	—	0	2	2	—
New Mexico†	—	1	8	61	74	—	0	3	25	15	—	0	1	2	6
Utah	3	4	27	224	360	—	0	6	14	16	—	0	1	7	—
Wyoming†	—	0	2	16	24	—	0	3	24	20	—	0	2	10	13
<b>Pacific</b>	15	23	303	1,201	1,000	—	3	13	189	243	—	0	1	4	3
Alaska	8	3	21	246	88	—	0	4	14	45	N	0	0	N	N
California	—	7	129	382	461	—	3	12	161	186	—	0	1	1	1
Hawaii	—	0	2	16	18	—	0	0	—	—	N	0	0	N	N
Oregon†	—	3	10	164	120	—	0	4	14	12	—	0	1	3	2
Washington	7	5	169	393	313	—	0	0	—	—	N	0	0	N	N
American Samoa	—	0	0	—	—	N	0	0	N	N	N	0	0	N	N
C.N.M.I.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Guam	—	0	0	—	—	—	0	0	—	—	N	0	0	N	N
Puerto Rico	—	0	0	—	—	—	1	5	59	47	N	0	0	N	N
U.S. Virgin Islands	—	0	0	—	—	N	0	0	N	N	N	0	0	N	N

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

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

\* Incidence data for reporting year 2008 are provisional.

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



TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending December 20, 2008, and December 22, 2007 (51st 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 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007
		Med	Max				Med	Max		
<b>United States</b>	47	95	259	4,976	5,035	22	33	166	1,591	1,866
<b>New England</b>	2	6	31	323	378	—	1	14	71	127
Connecticut	1	0	26	101	113	—	0	11	11	13
Maine§	1	0	3	27	27	—	0	1	2	4
Massachusetts	—	2	8	138	185	—	0	5	39	87
New Hampshire	—	0	2	27	27	—	0	1	11	13
Rhode Island§	—	0	9	18	8	—	0	2	7	8
Vermont§	—	0	2	12	18	—	0	1	1	2
<b>Mid. Atlantic</b>	10	18	43	973	915	2	4	19	203	333
New Jersey	—	2	11	138	168	—	1	6	62	72
New York (Upstate)	5	6	17	321	278	2	2	14	100	109
New York City	—	3	10	184	223	—	0	8	41	152
Pennsylvania	5	7	16	330	246	N	0	0	N	N
<b>E.N. Central</b>	5	18	42	901	951	2	5	23	258	311
Illinois	—	4	16	242	283	—	0	5	48	83
Indiana	3	2	11	130	117	—	0	14	35	23
Michigan	1	3	10	168	199	—	1	5	77	82
Ohio	1	5	14	254	230	2	1	5	61	64
Wisconsin	—	1	10	107	122	—	1	4	37	59
<b>W.N. Central</b>	8	5	39	375	332	4	2	16	154	100
Iowa	—	0	0	—	—	—	0	0	—	—
Kansas	—	0	5	36	32	—	0	3	19	2
Minnesota	6	0	35	172	160	2	0	13	71	53
Missouri	—	2	10	89	84	2	1	2	37	26
Nebraska§	2	1	3	43	25	—	0	2	9	17
North Dakota	—	0	5	12	19	—	0	2	8	1
South Dakota	—	0	2	23	12	—	0	1	10	1
<b>S. Atlantic</b>	9	21	37	1,068	1,230	4	6	16	292	338
Delaware	—	0	2	9	10	—	0	0	—	—
District of Columbia	—	0	4	23	17	—	0	1	2	3
Florida	4	5	10	263	304	3	1	4	68	69
Georgia	—	4	14	230	253	—	1	5	66	83
Maryland§	2	4	8	175	207	—	1	5	58	70
North Carolina	2	3	10	136	161	N	0	0	N	N
South Carolina§	1	1	5	73	101	1	1	4	51	55
Virginia§	—	3	12	126	150	—	0	6	39	50
West Virginia	—	0	3	33	27	—	0	1	8	8
<b>E.S. Central</b>	3	3	9	171	208	1	2	11	98	108
Alabama§	N	0	0	N	N	N	0	0	N	N
Kentucky	2	1	3	41	39	N	0	0	N	N
Mississippi	N	0	0	N	N	—	0	3	20	11
Tennessee§	1	3	6	130	169	1	1	9	78	97
<b>W.S. Central</b>	5	9	85	462	316	7	5	66	271	284
Arkansas§	—	0	2	5	18	—	0	2	7	19
Louisiana	—	0	2	16	16	—	0	2	10	38
Oklahoma	—	2	19	114	66	—	1	7	61	58
Texas§	5	6	65	327	216	7	3	58	193	169
<b>Mountain</b>	4	10	22	535	558	2	4	13	225	252
Arizona	1	3	9	191	205	1	2	8	111	123
Colorado	1	3	8	145	140	1	1	4	58	51
Idaho§	—	0	2	15	18	—	0	1	5	2
Montana§	N	0	0	N	N	—	0	1	4	1
Nevada§	—	0	1	12	2	N	0	0	N	N
New Mexico§	1	2	8	97	104	—	0	3	18	43
Utah	1	1	5	68	84	—	0	4	28	32
Wyoming§	—	0	2	7	5	—	0	1	1	—
<b>Pacific</b>	1	3	8	168	147	—	0	2	19	13
Alaska	—	1	4	40	25	N	0	0	N	N
California	—	0	0	—	—	N	0	0	N	N
Hawaii	1	2	8	128	122	—	0	2	19	13
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	12	30	4	N	0	0	N	N
C.N.M.I.	—	—	—	—	—	—	—	—	—	—
Guam	—	0	0	—	14	—	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 notifiable. Cum: Cumulative year-to-date counts. Med: Median. Max: Maximum.

\* Incidence data for reporting year 2008 are 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 (NNDSS event code 11717).

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

TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending December 20, 2008, and December 22, 2007 (51st week)\*

Reporting area	Streptococcus pneumoniae, invasive disease, drug resistant†														
	All ages					Aged <5 years					Syphilis, primary and secondary				
	Current week	Previous 52 weeks		Cum 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007
		Med	Max				Med	Max				Med	Max		
<b>United States</b>	48	56	307	2,853	3,022	8	8	43	428	520	44	238	351	11,611	11,115
<b>New England</b>	1	1	49	102	107	—	0	8	13	13	2	5	13	290	268
Connecticut	—	0	48	55	55	—	0	7	5	4	—	0	6	31	33
Maine§	—	0	2	17	12	—	0	1	2	2	—	0	2	10	9
Massachusetts	—	0	0	—	2	—	0	0	—	2	—	4	11	210	153
New Hampshire	—	0	0	—	—	—	0	0	—	—	—	0	2	19	29
Rhode Island§	—	0	3	16	21	—	0	1	4	3	—	0	5	13	35
Vermont§	1	0	2	14	17	—	0	1	2	2	—	0	5	7	9
<b>Mid. Atlantic</b>	3	4	13	232	159	—	0	2	22	29	3	33	51	1,620	1,524
New Jersey	—	0	0	—	—	—	0	0	—	—	—	4	10	195	220
New York (Upstate)	1	1	6	62	52	—	0	2	7	10	1	3	13	136	142
New York City	—	1	6	71	—	—	0	0	—	—	—	20	36	1,029	900
Pennsylvania	2	2	9	99	107	—	0	2	15	19	2	5	12	260	262
<b>E.N. Central</b>	13	12	64	679	783	—	1	14	90	125	13	20	34	1,005	890
Illinois	—	0	17	71	208	—	0	3	14	47	—	5	14	251	459
Indiana	6	2	39	205	164	—	0	11	21	25	—	2	10	132	53
Michigan	—	0	3	17	3	—	0	1	2	2	2	3	21	227	122
Ohio	7	8	17	386	408	—	1	4	53	51	11	6	15	339	192
Wisconsin	—	0	0	—	—	—	0	0	—	—	—	1	4	56	64
<b>W.N. Central</b>	—	3	115	151	245	—	0	9	10	44	—	8	14	372	354
Iowa	—	0	0	—	—	—	0	0	—	—	—	0	2	15	21
Kansas	—	0	5	59	90	—	0	1	4	10	—	0	5	30	28
Minnesota	—	0	114	—	72	—	0	9	—	26	—	2	5	100	57
Missouri	—	1	8	85	64	—	0	1	3	3	—	4	10	218	236
Nebraska§	—	0	0	—	2	—	0	0	—	—	—	0	1	8	4
North Dakota	—	0	0	—	—	—	0	0	—	—	—	0	0	—	1
South Dakota	—	0	2	7	17	—	0	1	3	5	—	0	1	1	7
<b>S. Atlantic</b>	25	22	53	1,223	1,305	6	4	12	217	242	13	52	215	2,656	2,569
Delaware	—	0	1	3	11	—	0	0	—	2	—	0	4	15	17
District of Columbia	—	0	3	19	21	—	0	1	1	1	1	2	9	135	176
Florida	25	14	30	746	710	6	3	12	149	130	3	19	37	980	905
Georgia	—	7	23	360	490	—	1	5	56	101	—	12	175	581	505
Maryland§	—	0	2	6	1	—	0	1	1	—	—	6	14	320	337
North Carolina	N	0	0	N	N	N	0	0	N	N	9	5	19	278	305
South Carolina§	—	0	0	—	—	—	0	0	—	—	—	2	6	87	91
Virginia§	N	0	0	N	N	N	0	0	N	N	—	5	17	258	227
West Virginia	—	1	9	89	72	—	0	2	10	8	—	0	1	2	6
<b>E.S. Central</b>	4	5	15	264	267	2	1	4	44	37	7	21	37	1,083	912
Alabama§	N	0	0	N	N	N	0	0	N	N	—	8	17	424	376
Kentucky	—	1	6	73	28	—	0	2	11	3	1	1	7	81	56
Mississippi	—	0	2	4	59	—	0	1	1	—	—	3	19	170	118
Tennessee§	4	3	13	187	180	2	0	3	32	34	6	8	19	408	362
<b>W.S. Central</b>	—	2	7	87	92	—	0	2	14	13	4	41	60	2,088	1,863
Arkansas§	—	0	4	20	6	—	0	1	4	2	3	2	19	167	121
Louisiana	—	1	6	66	86	—	0	2	9	11	1	10	30	531	530
Oklahoma	N	0	0	N	N	N	0	0	N	N	—	1	5	54	65
Texas§	—	0	1	1	—	—	0	1	1	—	—	26	47	1,336	1,147
<b>Mountain</b>	2	2	15	113	61	—	0	4	16	14	2	8	16	415	533
Arizona	—	0	0	—	—	—	0	0	—	—	—	4	12	200	291
Colorado	—	0	0	—	—	—	0	0	—	—	—	2	7	92	57
Idaho§	N	0	0	N	N	N	0	0	N	N	—	0	2	6	1
Montana§	—	0	1	1	—	—	0	0	—	—	—	0	0	—	8
Nevada§	N	0	0	N	N	N	0	0	N	N	2	1	6	73	108
New Mexico§	—	0	1	2	—	—	0	0	—	—	—	1	4	40	46
Utah	2	1	14	106	44	—	0	4	16	11	—	0	2	1	18
Wyoming§	—	0	1	4	17	—	0	0	—	3	—	0	1	3	4
<b>Pacific</b>	—	0	1	2	3	—	0	1	2	3	—	44	64	2,082	2,202
Alaska	N	0	0	N	N	N	0	0	N	N	—	0	1	—	7
California	N	0	0	N	N	N	0	0	N	N	—	38	58	1,877	2,017
Hawaii	—	0	1	2	3	—	0	1	2	3	—	0	2	20	9
Oregon§	N	0	0	N	N	N	0	0	N	N	—	0	3	24	18
Washington	N	0	0	N	N	N	0	0	N	N	—	3	9	160	151
American Samoa	N	0	0	N	N	N	0	0	N	N	—	0	0	—	4
C.N.M.I.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Guam	—	0	0	—	—	—	0	0	—	—	—	0	0	—	—
Puerto Rico	—	0	0	—	—	—	0	0	—	—	5	3	11	163	159
U.S. Virgin Islands	—	0	0	—	—	—	0	0	—	—	—	0	0	—	—

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

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

\* Incidence data for reporting year 2008 are provisional.

† Includes cases of invasive pneumococcal disease caused by drug-resistant *S. pneumoniae* (DRSP) (NNDSS event code 11720).

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





**TABLE I. Provisional cases of infrequently reported notifiable diseases (<1,000 cases reported during the preceding year) — United States, week ending December 27, 2008 (52nd week)\***

Disease	Current week	Cum 2008	5-year weekly average†	Total cases reported for previous years					States reporting cases during current week (No.)
				2007	2006	2005	2004	2003	
Anthrax	—	—	—	1	1	—	—	—	
Botulism:									
foodborne	—	12	0	32	20	19	16	20	
infant	—	97	2	85	97	85	87	76	
other (wound & unspecified)	—	22	1	27	48	31	30	33	
Brucellosis	1	86	3	131	121	120	114	104	FL (1)
Chancroid	—	31	0	23	33	17	30	54	
Cholera	—	2	0	7	9	8	6	2	
Cyclosporiasis§	3	126	2	93	137	543	160	75	FL (3)
Diphtheria	—	—	—	—	—	—	—	1	
Domestic arboviral diseases§,¶:									
California serogroup	—	40	0	55	67	80	112	108	
eastern equine	—	2	—	4	8	21	6	14	
Powassan	—	1	—	7	1	1	1	—	
St. Louis	—	8	—	9	10	13	12	41	
western equine	—	—	—	—	—	—	—	—	
Ehrlichiosis/Anaplasmosis§,**:									
<i>Ehrlichia chaffeensis</i>	2	837	17	828	578	506	338	321	FL (2)
<i>Ehrlichia ewingii</i>	—	9	—	—	—	—	—	—	
<i>Anaplasma phagocytophilum</i>	6	462	27	834	646	786	537	362	NY (5), FL (1)
undetermined	1	69	2	337	231	112	59	44	NY (1)
<i>Haemophilus influenzae</i> ,††									
invasive disease (age <5 yrs):									
serotype b	—	28	1	22	29	9	19	32	
nonserotype b	1	167	4	199	175	135	135	117	FL (1)
unknown serotype	1	177	5	180	179	217	177	227	GA (1)
Hansen disease§	—	69	2	101	66	87	105	95	
Hantavirus pulmonary syndrome§	—	14	1	32	40	26	24	26	
Hemolytic uremic syndrome, postdiarrheal§	1	226	7	292	288	221	200	178	TN (1)
Hepatitis C viral, acute	3	806	25	849	766	652	720	1,102	MI (1), WA (2)
HIV infection, pediatric (age <13 years)§§	—	—	3	—	—	380	436	504	
Influenza-associated pediatric mortality§,¶¶	1	91	1	77	43	45	—	N	MN (1)
Listeriosis	5	636	19	808	884	896	753	696	NY (1), PA (1), FL (1), WA (2)
Measles***	—	132	1	43	55	66	37	56	
Meningococcal disease, invasive†††:									
A, C, Y, & W-135	2	269	7	325	318	297	—	—	CO (1), WA (1)
serogroup B	—	149	6	167	193	156	—	—	
other serogroup	—	30	1	35	32	27	—	—	
unknown serogroup	1	581	22	550	651	765	—	—	ID (1)
Mumps	2	376	17	800	6,584	314	258	231	WA (2)
Novel influenza A virus infections	—	1	—	4	N	N	N	N	
Plague	—	1	0	7	17	8	3	1	
Poliomyelitis, paralytic	—	—	—	—	—	1	—	—	
Polio virus infection, nonparalytic§	—	—	—	—	N	N	N	N	
Psittacosis§	—	12	0	12	21	16	12	12	
Qfever total§,§§§:	—	114	3	171	169	136	70	71	
acute	—	102	—	—	—	—	—	—	
chronic	—	12	—	—	—	—	—	—	
Rabies, human	—	1	0	1	3	2	7	2	
Rubella¶¶¶	1	17	0	12	11	11	10	7	WA (1)
Rubella, congenital syndrome	—	—	—	—	1	1	—	1	
SARS-CoV§,****	—	—	—	—	—	—	—	8	
Smallpox§	—	—	—	—	—	—	—	—	
Streptococcal toxic-shock syndrome§	1	126	4	132	125	129	132	161	OH (1)
Syphilis, congenital (age <1 yr)	—	227	9	430	349	329	353	413	
Tetanus	—	15	1	28	41	27	34	20	
Toxic-shock syndrome (staphylococcal)§	—	67	3	92	101	90	95	133	
Trichinellosis	—	7	0	5	15	16	5	6	
Tularemia	1	104	3	137	95	154	134	129	WA (1)
Typhoid fever	1	376	8	434	353	324	322	356	WA (1)
Vancomycin-intermediate <i>Staphylococcus aureus</i> §	—	33	0	37	6	2	—	N	
Vancomycin-resistant <i>Staphylococcus aureus</i> §	—	—	0	2	1	3	1	N	
Vibriosis (noncholera <i>Vibrio</i> species infections)§	4	442	5	447	N	N	N	N	FL (4)
Yellow fever	—	—	—	—	—	—	—	—	

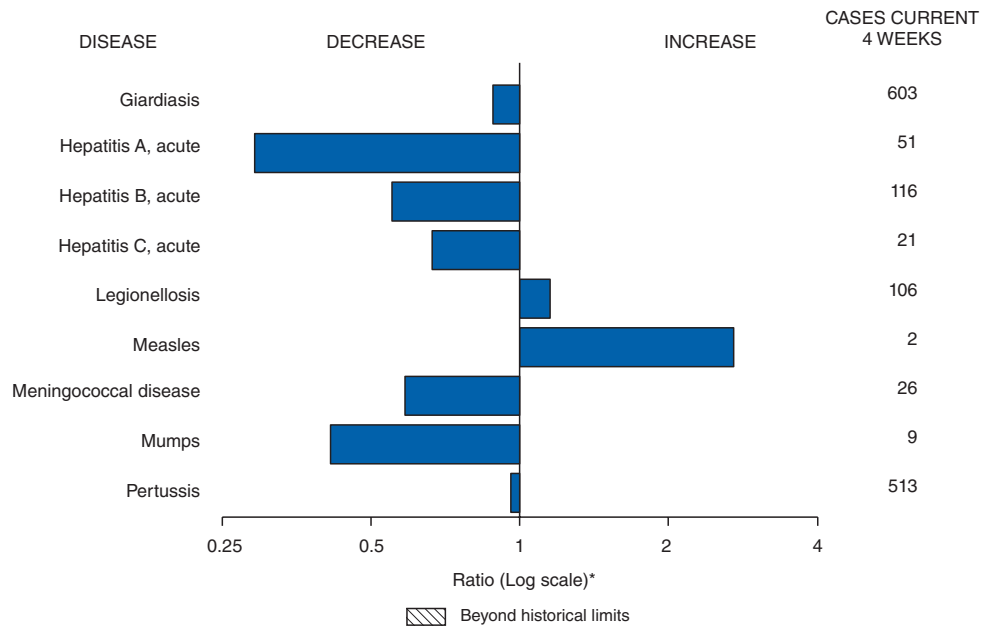
See Table I footnotes on next page.



**TABLE I. (Continued) Provisional cases of infrequently reported notifiable diseases (<1,000 cases reported during the preceding year) — United States, week ending December 27, 2008 (52nd week)\***

—: No reported cases. N: Not notifiable. Cum: Cumulative year-to-date counts.  
 \* Incidence data for reporting year 2008 are provisional, whereas data for 2003, 2004, 2005, 2006, and 2007 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. Additional information is available at <http://www.cdc.gov/epo/dphsi/phs/files/5yearweeklyaverage.pdf>.  
 § Not notifiable in all states. Data from states where the condition is not notifiable are excluded from this table, except in 2007 and 2008 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. One influenza-associated pediatric death was reported for the current 2008-09 season.  
 \*\*\* No measles cases were reported for the current week.  
 ††† Data for meningococcal disease (all serogroups) are available in Table II.  
 §§§ 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.  
 ¶¶¶ The one rubella case reported for the current week was unknown.  
 \*\*\*\* 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 December 27, 2008, 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.

**Notifiable Disease Data Team and 122 Cities Mortality Data Team**  
 Patsy A. Hall  
 Deborah A. Adams      Rosaline Dhara  
 Willie J. Anderson      Michael S. Wodajo  
 Lenee Blanton      Pearl C. Sharp













TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending December 27, 2008, and December 29, 2007 (52nd 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 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007
		Med	Max				Med	Max		
<b>United States</b>	60	89	259	5,066	5,294	20	33	166	1,629	2,032
<b>New England</b>	1	6	31	324	409	—	1	14	71	141
Connecticut	—	0	26	101	132	—	0	11	11	24
Maine§	1	0	3	28	28	—	0	1	2	4
Massachusetts	—	2	8	138	190	—	0	5	39	89
New Hampshire	—	0	2	27	27	—	0	1	11	13
Rhode Island§	—	0	9	18	14	—	0	2	7	9
Vermont§	—	0	2	12	18	—	0	1	1	2
<b>Mid. Atlantic</b>	13	18	43	1,002	946	5	3	17	210	350
New Jersey	—	2	11	153	173	—	1	4	63	75
New York (Upstate)	4	6	17	325	295	5	2	14	106	123
New York City	—	3	10	185	226	—	0	6	41	152
Pennsylvania	9	7	16	339	252	N	0	0	N	N
<b>E.N. Central</b>	7	16	42	909	987	4	5	23	262	334
Illinois	—	4	16	243	293	—	0	5	48	84
Indiana	—	2	11	130	128	—	0	14	35	37
Michigan	3	3	10	171	201	—	1	5	77	84
Ohio	4	5	14	258	239	4	1	5	65	69
Wisconsin	—	1	10	107	126	—	1	4	37	60
<b>W.N. Central</b>	2	5	39	377	351	—	2	16	154	116
Iowa	—	0	0	—	—	—	0	0	—	—
Kansas	—	0	5	36	32	—	0	3	19	3
Minnesota	—	0	35	172	173	—	0	13	71	66
Missouri	—	2	10	89	85	—	1	2	37	27
Nebraska§	2	1	3	45	25	—	0	2	9	18
North Dakota	—	0	5	12	24	—	0	2	8	1
South Dakota	—	0	2	23	12	—	0	1	10	1
<b>S. Atlantic</b>	16	21	37	1,091	1,264	3	5	16	296	349
Delaware	—	0	2	9	10	—	0	0	—	—
District of Columbia	—	0	4	23	17	—	0	1	2	3
Florida	3	5	10	266	309	1	1	4	70	71
Georgia	5	4	14	237	259	1	1	4	67	85
Maryland§	8	4	8	183	212	1	1	5	59	72
North Carolina	—	2	10	136	167	N	0	0	N	N
South Carolina§	—	1	5	73	101	—	1	4	51	58
Virginia§	—	3	12	131	162	—	0	6	39	52
West Virginia	—	0	3	33	27	—	0	1	8	8
<b>E.S. Central</b>	1	3	9	174	213	1	2	11	102	119
Alabama§	N	0	0	N	N	N	0	0	N	N
Kentucky	—	1	3	41	41	N	0	0	N	N
Mississippi	N	0	0	N	N	—	0	3	20	13
Tennessee§	1	3	6	133	172	1	2	9	82	106
<b>W.S. Central</b>	12	9	85	477	401	6	5	66	287	350
Arkansas§	—	0	2	5	19	—	0	2	7	19
Louisiana	—	0	2	16	16	—	0	2	13	39
Oklahoma	5	2	19	122	85	1	1	7	69	65
Texas§	7	6	65	334	281	5	3	58	198	227
<b>Mountain</b>	6	10	22	542	574	1	4	13	228	259
Arizona	1	3	9	192	208	1	2	8	113	128
Colorado	5	3	8	150	145	—	1	4	58	52
Idaho§	—	0	2	15	18	—	0	1	5	2
Montana§	N	0	0	N	N	—	0	1	4	1
Nevada§	—	0	1	12	2	N	0	0	N	N
New Mexico§	—	1	8	98	107	—	0	3	18	44
Utah	—	1	5	68	89	—	0	4	29	32
Wyoming§	—	0	2	7	5	—	0	1	1	—
<b>Pacific</b>	2	3	8	170	149	—	0	2	19	14
Alaska	—	1	4	40	25	N	0	0	N	N
California	—	0	0	—	—	N	0	0	N	N
Hawaii	2	2	8	130	124	—	0	2	19	14
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	12	30	4	N	0	0	N	N
C.N.M.I.	—	—	—	—	—	—	—	—	—	—
Guam	—	0	0	—	14	—	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 notifiable. Cum: Cumulative year-to-date counts. Med: Median. Max: Maximum.

\* Incidence data for reporting year 2008 are 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 (NNDSS event code 11717).

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



TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending December 27, 2008, and December 29, 2007 (52nd week)\*

Streptococcus pneumoniae, invasive disease, drug resistant†															
Reporting area	All ages					Aged <5 years					Syphilis, primary and secondary				
	Current week	Previous 52 weeks		Cum 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007
		Med	Max				Med	Max				Med	Max		
<b>United States</b>	32	54	307	2,896	3,329	4	8	43	430	563	25	237	351	11,755	11,466
<b>New England</b>	1	1	49	103	156	—	0	8	13	21	1	5	13	292	279
Connecticut	—	0	48	55	99	—	0	7	5	11	—	0	6	31	39
Maine§	—	0	2	17	13	—	0	1	2	3	—	0	2	10	9
Massachusetts	—	0	0	—	2	—	0	0	—	2	—	4	11	210	155
New Hampshire	—	0	0	—	—	—	0	0	—	—	1	0	2	20	30
Rhode Island§	—	0	3	16	24	—	0	1	4	3	—	0	5	13	36
Vermont§	1	0	2	15	18	—	0	1	2	2	—	0	2	8	10
<b>Mid. Atlantic</b>	1	4	13	236	168	—	0	2	23	31	6	33	51	1,646	1,558
New Jersey	—	0	0	—	—	—	0	0	—	—	2	4	10	208	227
New York (Upstate)	—	1	6	65	58	—	0	2	8	12	3	2	13	140	155
New York City	—	1	6	72	—	—	0	0	—	—	—	20	36	1,029	913
Pennsylvania	1	2	9	99	110	—	0	2	15	19	1	5	12	269	263
<b>E.N. Central</b>	1	12	64	682	847	—	1	14	90	139	8	20	35	1,047	901
Illinois	—	0	17	71	225	—	0	3	14	49	—	5	15	275	464
Indiana	—	2	39	205	203	—	0	11	21	36	2	2	10	140	54
Michigan	—	0	3	19	3	—	0	1	2	2	1	2	21	228	123
Ohio	1	8	17	387	416	—	1	4	53	52	5	6	15	345	194
Wisconsin	—	0	0	—	—	—	0	0	—	—	—	1	4	59	66
<b>W.N. Central</b>	—	2	115	151	360	—	0	9	10	53	—	8	14	376	359
Iowa	—	0	0	—	—	—	0	0	—	—	—	0	2	15	21
Kansas	—	0	5	59	90	—	0	1	4	10	—	0	5	30	28
Minnesota	—	0	114	—	186	—	0	9	—	35	—	2	5	100	59
Missouri	—	1	8	85	65	—	0	1	3	3	—	4	10	222	239
Nebraska§	—	0	0	—	2	—	0	0	—	—	—	0	1	8	4
North Dakota	—	0	0	—	—	—	0	0	—	—	—	0	0	—	1
South Dakota	—	0	1	7	17	—	0	1	3	5	—	0	1	1	7
<b>S. Atlantic</b>	25	22	53	1,251	1,349	3	4	12	219	249	6	51	215	2,695	2,784
Delaware	—	0	1	3	11	—	0	0	—	2	—	0	4	15	18
District of Columbia	—	0	3	19	21	—	0	1	1	1	—	2	9	135	178
Florida	23	14	30	770	726	2	3	12	150	134	5	19	37	996	913
Georgia	2	7	23	363	510	1	1	5	57	103	—	11	175	603	680
Maryland§	—	0	2	7	1	—	0	1	1	—	—	6	14	320	345
North Carolina	N	0	0	N	N	N	0	0	N	N	—	6	19	278	323
South Carolina§	—	0	0	—	—	—	0	0	—	—	—	2	6	87	91
Virginia§	N	0	0	N	N	N	0	0	N	N	1	5	16	259	230
West Virginia	—	1	9	89	80	—	0	2	10	9	—	0	1	2	6
<b>E.S. Central</b>	3	5	15	268	282	—	1	4	44	38	2	21	37	1,111	936
Alabama§	N	0	0	N	N	N	0	0	N	N	—	8	17	448	380
Kentucky	2	1	6	75	28	—	0	2	11	3	—	1	7	81	56
Mississippi	—	0	2	4	61	—	0	1	1	—	—	3	19	172	133
Tennessee§	1	3	13	189	193	—	0	3	32	35	2	8	19	410	367
<b>W.S. Central</b>	—	2	7	92	96	—	0	2	13	14	2	41	60	2,091	1,880
Arkansas§	—	0	4	20	6	—	0	1	4	2	2	2	19	169	122
Louisiana	—	1	6	72	90	—	0	2	9	12	—	10	30	531	533
Oklahoma	N	0	0	N	N	N	0	0	N	N	—	1	5	55	65
Texas§	—	0	0	—	—	—	0	0	—	—	—	26	47	1,336	1,160
<b>Mountain</b>	1	2	15	111	68	1	0	4	16	15	—	8	16	415	543
Arizona	—	0	0	—	—	—	0	0	—	—	—	4	12	200	296
Colorado	—	0	0	—	—	—	0	0	—	—	—	1	7	92	57
Idaho§	N	0	0	N	N	N	0	0	N	N	—	0	2	6	1
Montana§	—	0	1	1	—	—	0	0	—	—	—	0	0	—	8
Nevada§	N	0	0	N	N	N	0	0	N	N	—	1	6	73	111
New Mexico§	—	0	1	2	—	—	0	0	—	—	—	1	4	40	46
Utah	1	1	14	104	51	1	0	4	16	12	—	0	2	1	20
Wyoming§	—	0	1	4	17	—	0	0	—	3	—	0	1	3	4
<b>Pacific</b>	—	0	1	2	3	—	0	1	2	3	—	44	64	2,082	2,226
Alaska	N	0	0	N	N	N	0	0	N	N	—	0	1	1	7
California	N	0	0	N	N	N	0	0	N	N	—	38	58	1,877	2,038
Hawaii	—	0	1	2	3	—	0	1	2	3	—	0	2	20	9
Oregon§	N	0	0	N	N	N	0	0	N	N	—	0	3	24	18
Washington	N	0	0	N	N	N	0	0	N	N	—	3	9	160	154
American Samoa	N	0	0	N	N	N	0	0	N	N	—	0	0	—	4
C.N.M.I.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Guam	—	0	0	—	—	—	0	0	—	—	—	0	0	—	—
Puerto Rico	—	0	0	—	—	—	0	0	—	—	—	3	11	163	169
U.S. Virgin Islands	—	0	0	—	—	—	0	0	—	—	—	0	0	—	—

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

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

\* Incidence data for reporting year 2008 are provisional.

† Includes cases of invasive pneumococcal disease caused by drug-resistant *S. pneumoniae* (DRSP) (NNDSS event code 11720).

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

**TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending December 27, 2008, and December 29, 2007 (52nd week)\***

Reporting area	West Nile virus disease†														
	Varicella (chickenpox)					Neuroinvasive					Nonneuroinvasive§				
	Current week	Previous 52 weeks		Cum 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007
	Med	Max				Med	Max				Med	Max			
<b>United States</b>	194	499	1,660	26,628	40,146	—	1	76	628	1,227	—	1	77	694	2,403
<b>New England</b>	5	11	46	518	2,551	—	0	2	6	5	—	0	1	3	6
Connecticut	—	0	28	—	1,440	—	0	2	5	2	—	0	1	3	2
Maine¶	—	0	1	—	357	—	0	0	—	—	—	0	0	—	—
Massachusetts	—	0	1	1	—	—	0	0	—	3	—	0	0	—	3
New Hampshire	—	5	13	238	374	—	0	0	—	—	—	0	0	—	—
Rhode Island¶	—	0	0	—	—	—	0	1	1	—	—	0	0	—	1
Vermont¶	5	5	17	279	380	—	0	0	—	—	—	0	0	—	—
<b>Mid. Atlantic</b>	55	45	81	2,253	4,680	—	0	8	46	22	—	0	5	19	11
New Jersey	N	0	0	N	N	—	0	1	3	1	—	0	1	4	—
New York (Upstate)	N	0	0	N	N	—	0	5	23	3	—	0	2	7	1
New York City	N	0	0	N	N	—	0	2	8	13	—	0	2	6	5
Pennsylvania	55	45	81	2,253	4,680	—	0	2	12	5	—	0	1	2	5
<b>E.N. Central</b>	49	140	336	7,004	11,309	—	0	8	41	113	—	0	3	20	65
Illinois	1	22	63	1,344	1,091	—	0	4	11	63	—	0	2	8	38
Indiana	—	0	222	—	444	—	0	1	2	14	—	0	1	1	10
Michigan	18	58	116	2,807	4,187	—	0	4	11	16	—	0	2	6	1
Ohio	30	47	106	2,369	4,536	—	0	3	14	13	—	0	1	1	10
Wisconsin	—	4	50	484	1,051	—	0	1	3	7	—	0	1	4	6
<b>W.N. Central</b>	—	21	145	1,269	1,733	—	0	6	43	249	—	0	22	161	739
Iowa	N	0	0	N	N	—	0	2	3	12	—	0	1	3	18
Kansas	—	6	40	444	586	—	0	2	8	14	—	0	4	30	26
Minnesota	—	0	0	—	—	—	0	2	2	44	—	0	4	8	57
Missouri	—	10	51	756	923	—	0	3	12	61	—	0	1	7	16
Nebraska¶	N	0	0	N	N	—	0	1	5	21	—	0	8	44	142
North Dakota	—	0	140	49	140	—	0	2	2	49	—	0	12	41	320
South Dakota	—	0	5	20	84	—	0	5	11	48	—	0	6	28	160
<b>S. Atlantic</b>	22	88	173	4,561	5,296	—	0	3	14	43	—	0	3	14	39
Delaware	—	1	5	44	49	—	0	0	—	1	—	0	1	1	—
District of Columbia	—	0	3	23	32	—	0	0	—	—	—	0	0	—	—
Florida	22	29	87	1,708	1,321	—	0	2	2	3	—	0	0	—	—
Georgia	N	0	0	N	N	—	0	1	4	23	—	0	1	4	27
Maryland¶	N	0	0	N	N	—	0	2	7	6	—	0	2	7	4
North Carolina	N	0	0	N	N	—	0	0	—	4	—	0	0	—	4
South Carolina¶	—	14	67	833	1,103	—	0	0	—	3	—	0	1	1	2
Virginia¶	—	21	81	1,295	1,582	—	0	0	—	3	—	0	1	1	2
West Virginia	—	12	36	658	1,209	—	0	1	1	—	—	0	0	—	—
<b>E.S. Central</b>	—	17	101	1,091	701	—	0	7	46	76	—	0	8	58	99
Alabama¶	—	17	101	1,078	699	—	0	3	11	17	—	0	3	10	7
Kentucky	N	0	0	N	N	—	0	1	3	4	—	0	0	—	—
Mississippi	—	0	2	13	2	—	0	4	22	50	—	0	7	41	86
Tennessee¶	N	0	0	N	N	—	0	1	10	5	—	0	3	7	6
<b>W.S. Central</b>	62	113	886	7,663	10,992	—	0	7	56	269	—	0	8	58	158
Arkansas¶	—	8	38	514	808	—	0	1	7	13	—	0	1	2	7
Louisiana	—	1	10	70	123	—	0	2	9	27	—	0	6	27	13
Oklahoma	N	0	0	N	N	—	0	1	2	59	—	0	1	5	48
Texas¶	62	108	852	7,079	10,061	—	0	6	38	170	—	0	4	24	90
<b>Mountain</b>	1	40	90	2,131	2,798	—	0	12	102	289	—	0	24	201	1,041
Arizona	—	0	0	—	—	—	0	10	61	50	—	0	8	50	47
Colorado	1	14	43	838	1,089	—	0	4	17	99	—	0	13	78	477
Idaho¶	N	0	0	N	N	—	0	1	3	11	—	0	6	30	121
Montana¶	—	5	27	335	424	—	0	0	—	37	—	0	2	5	165
Nevada¶	N	0	0	N	N	—	0	2	9	2	—	0	3	7	10
New Mexico¶	—	3	18	208	422	—	0	2	6	39	—	0	1	3	21
Utah	—	13	55	740	828	—	0	2	6	28	—	0	5	20	42
Wyoming¶	—	0	4	10	35	—	0	0	—	23	—	0	2	8	158
<b>Pacific</b>	—	2	8	138	86	—	0	38	274	161	—	0	24	160	245
Alaska	—	1	6	74	43	—	0	0	—	—	—	0	0	—	—
California	—	0	0	—	—	—	0	38	270	154	—	0	19	146	226
Hawaii	—	1	6	64	43	—	0	0	—	—	—	0	0	—	—
Oregon¶	N	0	0	N	N	—	0	2	3	7	—	0	4	13	19
Washington	N	0	0	N	N	—	0	1	1	—	—	0	1	1	—
American Samoa	N	0	0	N	N	—	0	0	—	—	—	0	0	—	—
C.N.M.I.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Guam	—	1	17	63	239	—	0	0	—	—	—	0	0	—	—
Puerto Rico	—	7	20	402	727	—	0	0	—	—	—	0	0	—	—
U.S. Virgin Islands	—	0	0	—	—	—	0	0	—	—	—	0	0	—	—

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

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

\* Incidence data for reporting year 2008 are provisional.

† 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 California serogroup, eastern equine, Powassan, St. Louis, and western equine diseases are available in Table I.

§ Not notifiable in all states. Data from states where the condition is not notifiable are excluded from this table, except 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/pht/infdis.htm>.

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



The *Morbidity and Mortality Weekly Report (MMWR)* Series is prepared by the Centers for Disease Control and Prevention (CDC) and is available free of charge in electronic format. To receive an electronic copy each week, send an e-mail message to [listserv@listserv.cdc.gov](mailto:listserv@listserv.cdc.gov). The body content should read *SUBscribe mmwr-toc*. Electronic copy also is available from CDC's Internet server at <http://www.cdc.gov/mmwr> or from CDC's file transfer protocol server at <ftp://ftp.cdc.gov/pub/publications/mmwr>. Paper copy subscriptions are available through the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone 202-512-1800.

Data in the weekly *MMWR* are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the following Friday. Data are compiled in the National Center for Public Health Informatics, Division of Integrated Surveillance Systems and Services. Address all inquiries about the *MMWR* Series, including material to be considered for publication, to Editor, *MMWR* Series, Mailstop E-90, CDC, 1600 Clifton Rd., N.E., Atlanta, GA 30333 or to [mmwrq@cdc.gov](mailto:mmwrq@cdc.gov).

All material in the *MMWR* Series is in the public domain and may be used and reprinted without permission; citation as to source, however, is appreciated.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

References to non-CDC sites on the Internet are provided as a service to *MMWR* readers and do not constitute or imply endorsement of these organizations or their programs by CDC or the U.S. Department of Health and Human Services. CDC is not responsible for the content of these sites. URL addresses listed in *MMWR* were current as of the date of publication.

# Recommended Immunization Schedules for Persons Aged 0 Through 18 Years — United States, 2009

**MMWR**<sup>TM</sup>  
**QuickGuide**

Weekly

January 2, 2009 / Vol. 57 / Nos. 51 & 52

The Advisory Committee on Immunization Practices (ACIP) annually publishes immunization schedules that summarize recommendations for currently licensed vaccines for children aged 18 years and younger. Changes to the previous schedule (1) are as follows:

- Recommendations for rotavirus vaccines include changes for the maximum age for the first dose (14 weeks 6 days) and the maximum age for any dose (15 months 0 days). The rotavirus footnote also indicates that if RV1 (Rotarix<sup>®</sup>) is administered at ages 2 and 4 months, a dose at 6 months is not indicated (2).
- Routine annual influenza vaccination is recommended for all children aged 6 months through 18 years. Children aged younger than 9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time during the previous season but only received 1 dose should receive 2 doses of influenza vaccine at least 4 weeks apart. Healthy nonpregnant persons aged 2 through 49 years may receive either live attenuated influenza vaccine or inactivated influenza vaccine (3).
- The minimum interval between tetanus and diphtheria toxoids (Td) and tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap) for persons aged 10 through 18 years is addressed. An interval less than 5 years may be used if pertussis immunity is needed (4).
- Information about the use of *Haemophilus influenzae* type b (Hib) conjugate vaccine among persons aged 5 years and older at increased risk for invasive Hib disease has been added. Use of Hib vaccine for these persons is not contraindicated.
- Catch-up vaccination with human papillomavirus (HPV) vaccine is clarified. Routine dosing intervals should be used for series catch-up (i.e., the second and third doses should be administered 2 and 6 months after the first

dose). The third dose should be given at least 24 weeks after the first dose.

- Abbreviations for rotavirus, pneumococcal polysaccharide and meningococcal polysaccharide vaccines have been changed.

The National Childhood Vaccine Injury Act requires that health-care providers provide parents or patients with copies of Vaccine Information Statements before administering each dose of the vaccines listed in the schedules. Additional information is available from state health departments and from CDC at <http://www.cdc.gov/vaccines/pubs/vis/default.htm>.

Detailed recommendations for using vaccines are available from ACIP statements (available at <http://www.cdc.gov/vaccines/pubs/acip-list.htm>), and the *2006 Red Book* (6). Guidance regarding the Vaccine Adverse Event Reporting System form is available at <http://www.vaers.hhs.gov> or by telephone, 800-822-7967.

## References

1. CDC. Recommended immunization schedules for persons aged 0–18 years—United States 2008. *MMWR* 2008;57(1).
2. CDC. ACIP provisional recommendations for the prevention of rotavirus gastroenteritis among infants and children. Atlanta, GA: US Department of Health and Human Services, CDC; 2008. Available at <http://www.cdc.gov/vaccines/recs/provisional/default.htm#acip>.
3. CDC. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP), 2008. *MMWR* 2008;57(No. RR-7).
4. CDC. Preventing tetanus, diphtheria, and pertussis among adolescents: use of tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccines. Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 2006;55 (No. RR-3).
5. American Academy of Pediatrics. Active and passive immunization. In: Pickering LK, Baker CJ, Long SS, McMillan JA, eds. *2006 red book: report of the Committee on Infectious Diseases*. 27th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2006.

The recommended immunization schedules for persons aged 0 through 18 years and the catch-up immunization schedule for 2009 have been approved by the Advisory Committee on Immunization Practices, the American Academy of Pediatrics, and the American Academy of Family Physicians.

Suggested citation: Centers for Disease Control and Prevention. Recommended immunization schedules for persons aged 0 through 18 years—United States, 2009. *MMWR* 2008;57(51&52).

**FIGURE 1. Recommended immunization schedule for persons aged 0 through 6 years — United States, 2009**  
(for those who fall behind or start late, see the catch-up schedule [Table])

Vaccine ▼	Age ►	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19–23 months	2–3 years	4–6 years	
Hepatitis B <sup>1</sup>	HepB	HepB	HepB	see footnote 1	HepB								Range of recommended ages
Rotavirus <sup>2</sup>			RV	RV	RV <sup>2</sup>								
Diphtheria, Tetanus, Pertussis <sup>3</sup>			DTaP	DTaP	DTaP	see footnote 3	DTaP						Certain high-risk groups
Haemophilus influenzae type b <sup>4</sup>			Hib	Hib	Hib <sup>4</sup>	Hib							
Pneumococcal <sup>5</sup>			PCV	PCV	PCV	PCV					PPSV		
Inactivated Poliovirus			IPV	IPV	IPV	IPV						IPV	
Influenza <sup>6</sup>						Influenza (Yearly)							
Measles, Mumps, Rubella <sup>7</sup>						MMR			see footnote 7			MMR	
Varicella <sup>8</sup>						Varicella			see footnote 8			Varicella	
Hepatitis A <sup>9</sup>							HepA (2 doses)					HepA Series	
Meningococcal <sup>10</sup>												MCV	

This schedule indicates the recommended ages for routine administration of currently licensed vaccines, as of December 17, 2008, for children aged 0 through 6 years. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. Licensed combination vaccines may be used whenever any component of the combination is indicated and other components are not contraindicated and if approved by the Food and Drug Administration for that dose of the series. Providers should consult

the relevant Advisory Committee on Immunization Practices statement for detailed recommendations, including high-risk conditions: <http://www.cdc.gov/vaccines/pubs/acip-list.htm>. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form is available at <http://www.vaers.hhs.gov> or by telephone, 800-822-7967.

#### 1. Hepatitis B vaccine (HepB). (Minimum age: birth)

##### At birth:

- Administer monovalent HepB to all newborns before hospital discharge.
- If mother is hepatitis B surface antigen (HBsAg)-positive, administer HepB and 0.5 mL of hepatitis B immune globulin (HBIG) within 12 hours of birth.
- If mother's HBsAg status is unknown, administer HepB within 12 hours of birth. Determine mother's HBsAg status as soon as possible and, if HBsAg-positive, administer HBIG (no later than age 1 week).

##### After the birth dose:

- The HepB series should be completed with either monovalent HepB or a combination vaccine containing HepB. The second dose should be administered at age 1 or 2 months. The final dose should be administered no earlier than age 24 weeks.
- Infants born to HBsAg-positive mothers should be tested for HBsAg and antibody to HBsAg (anti-HBs) after completion of at least 3 doses of the HepB series, at age 9 through 18 months (generally at the next well-child visit).

##### 4-month dose:

- Administration of 4 doses of HepB to infants is permissible when combination vaccines containing HepB are administered after the birth dose.

#### 2. Rotavirus vaccine (RV). (Minimum age: 6 weeks)

- Administer the first dose at age 6 through 14 weeks (maximum age: 14 weeks 6 days). Vaccination should not be initiated for infants aged 15 weeks or older (i.e., 15 weeks 0 days or older).
- Administer the final dose in the series by age 8 months 0 days.
- If Rotarix<sup>®</sup> is administered at ages 2 and 4 months, a dose at 6 months is not indicated.

#### 3. Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP). (Minimum age: 6 weeks)

- The fourth dose may be administered as early as age 12 months, provided at least 6 months have elapsed since the third dose.
- Administer the final dose in the series at age 4 through 6 years.

#### 4. Haemophilus influenzae type b conjugate vaccine (Hib). (Minimum age: 6 weeks)

- If PRP-OMP (PedvaxHIB<sup>®</sup> or Comvax<sup>®</sup> [HepB-Hib]) is administered at ages 2 and 4 months, a dose at age 6 months is not indicated.
- TriHibit<sup>®</sup> (DTaP/Hib) should not be used for doses at ages 2, 4, or 6 months but can be used as the final dose in children aged 12 months or older.

#### 5. Pneumococcal vaccine. (Minimum age: 6 weeks for pneumococcal conjugate vaccine [PCV]; 2 years for pneumococcal polysaccharide vaccine [PPSV])

- PCV is recommended for all children aged younger than 5 years. Administer 1 dose of PCV to all healthy children aged 24 through 59 months who are not completely vaccinated for their age.

- Administer PPSV to children aged 2 years or older with certain underlying medical conditions (see *MMWR* 2000;49[No. RR-9]), including a cochlear implant.

#### 6. Influenza vaccine. (Minimum age: 6 months for trivalent inactivated influenza vaccine [TIV]; 2 years for live, attenuated influenza vaccine [LAIV])

- Administer annually to children aged 6 months through 18 years.
- For healthy nonpregnant persons (i.e., those who do not have underlying medical conditions that predispose them to influenza complications) aged 2 through 49 years, either LAIV or TIV may be used.
- Children receiving TIV should receive 0.25 mL if aged 6 through 35 months or 0.5 mL if aged 3 years or older.
- Administer 2 doses (separated by at least 4 weeks) to children aged younger than 9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time during the previous influenza season but only received 1 dose.

#### 7. Measles, mumps, and rubella vaccine (MMR). (Minimum age: 12 months)

- Administer the second dose at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 28 days have elapsed since the first dose.

#### 8. Varicella vaccine. (Minimum age: 12 months)

- Administer the second dose at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 3 months have elapsed since the first dose.
- For children aged 12 months through 12 years the minimum interval between doses is 3 months. However, if the second dose was administered at least 28 days after the first dose, it can be accepted as valid.

#### 9. Hepatitis A vaccine (HepA). (Minimum age: 12 months)


- Administer to all children aged 1 year (i.e., aged 12 through 23 months). Administer 2 doses at least 6 months apart.
- Children not fully vaccinated by age 2 years can be vaccinated at subsequent visits.
- HepA also is recommended for children older than 1 year who live in areas where vaccination programs target older children or who are at increased risk of infection. See *MMWR* 2006;55(No. RR-7).


#### 10. Meningococcal vaccine. (Minimum age: 2 years for meningococcal conjugate vaccine [MCV] and for meningococcal polysaccharide vaccine [MPSV])


- Administer MCV to children aged 2 through 10 years with terminal complement component deficiency, anatomic or functional asplenia, and certain other high-risk groups. See *MMWR* 2005;54(No. RR-7).
- Persons who received MPSV 3 or more years previously and who remain at increased risk for meningococcal disease should be revaccinated with MCV.

**FIGURE 2. Recommended immunization schedule for persons aged 7 through 18 years — United States, 2009**  
(for those who fall behind or start late, see the schedule below and the catch-up schedule [Table])

Vaccine ▼	Age ►	7–10 years	11–12 years	13–18 years
Tetanus, Diphtheria, Pertussis <sup>1</sup>		<i>see footnote 1</i>	<b>Tdap</b>	<b>Tdap</b>
Human Papillomavirus <sup>2</sup>		<i>see footnote 2</i>	<b>HPV (3 doses)</b>	<b>HPV Series</b>
Meningococcal <sup>3</sup>		<b>MCV</b>	<b>MCV</b>	<b>MCV</b>
Influenza <sup>4</sup>		<b>Influenza (Yearly)</b>		
Pneumococcal <sup>5</sup>		<b>PPSV</b>		
Hepatitis A <sup>6</sup>		<b>HepA Series</b>		
Hepatitis B <sup>7</sup>		<b>HepB Series</b>		
Inactivated Poliovirus <sup>8</sup>		<b>IPV Series</b>		
Measles, Mumps, Rubella <sup>9</sup>		<b>MMR Series</b>		
Varicella <sup>10</sup>		<b>Varicella Series</b>		

 Range of recommended ages

 Catch-up immunization

 Certain high-risk groups

This schedule indicates the recommended ages for routine administration of currently licensed vaccines, as of December 17, 2008, for children aged 7 through 18 years. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. Licensed combination vaccines may be used whenever any component of the combination is indicated and other components are not contraindicated and if approved by the Food and Drug Administration for that dose of the series. Providers should consult

the relevant Advisory Committee on Immunization Practices statement for detailed recommendations, including high-risk conditions: <http://www.cdc.gov/vaccines/pubs/acip-list.htm>. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form is available at <http://www.vaers.hhs.gov> or by telephone, 800-822-7967.

**1. Tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap). (Minimum age: 10 years for BOOSTRIX® and 11 years for ADACEL®)**

- Administer at age 11 or 12 years for those who have completed the recommended childhood DTP/DaP vaccination series and have not received a tetanus and diphtheria toxoid (Td) booster dose.
- Persons aged 13 through 18 years who have not received Tdap should receive a dose.
- A 5-year interval from the last Td dose is encouraged when Tdap is used as a booster dose; however, a shorter interval may be used if pertussis immunity is needed.

**2. Human papillomavirus vaccine (HPV). (Minimum age: 9 years)**

- Administer the first dose to females at age 11 or 12 years.
- Administer the second dose 2 months after the first dose and the third dose 6 months after the first dose (at least 24 weeks after the first dose).
- Administer the series to females at age 13 through 18 years if not previously vaccinated.

**3. Meningococcal conjugate vaccine (MCV).**

- Administer at age 11 or 12 years, or at age 13 through 18 years if not previously vaccinated.
- Administer to previously unvaccinated college freshmen living in a dormitory.
- MCV is recommended for children aged 2 through 10 years with terminal complement component deficiency, anatomic or functional asplenia, and certain other groups at high risk. See *MMWR* 2005;54(No. RR-7).
- Persons who received MPSV 5 or more years previously and remain at increased risk for meningococcal disease should be revaccinated with MCV.

**4. Influenza vaccine.**

- Administer annually to children aged 6 months through 18 years.
- For healthy nonpregnant persons (i.e., those who do not have underlying medical conditions that predispose them to influenza complications) aged 2 through 49 years, either LAIV or TIV may be used.
- Administer 2 doses (separated by at least 4 weeks) to children aged younger than 9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time during the previous influenza season but only received 1 dose.

**5. Pneumococcal polysaccharide vaccine (PPSV).**

- Administer to children with certain underlying medical conditions (see *MMWR* 1997;46[No. RR-8]), including a cochlear implant. A single revaccination should be administered to children with functional or anatomic asplenia or other immunocompromising condition after 5 years.

**6. Hepatitis A vaccine (HepA).**

- Administer 2 doses at least 6 months apart.
- HepA is recommended for children older than 1 year who live in areas where vaccination programs target older children or who are at increased risk of infection. See *MMWR* 2006;55(No. RR-7).

**7. Hepatitis B vaccine (HepB).**

- Administer the 3-dose series to those not previously vaccinated.
- A 2-dose series (separated by at least 4 months) of adult formulation Recombivax HB® is licensed for children aged 11 through 15 years.

**8. Inactivated poliovirus vaccine (IPV).**

- For children who received an all-IPV or all-oral poliovirus (OPV) series, a fourth dose is not necessary if the third dose was administered at age 4 years or older.
- If both OPV and IPV were administered as part of a series, a total of 4 doses should be administered, regardless of the child's current age.

**9. Measles, mumps, and rubella vaccine (MMR).**

- If not previously vaccinated, administer 2 doses or the second dose for those who have received only 1 dose, with at least 28 days between doses.

**10. Varicella vaccine.**

- For persons aged 7 through 18 years without evidence of immunity (see *MMWR* 2007;56[No. RR-4]), administer 2 doses if not previously vaccinated or the second dose if they have received only 1 dose.
- For persons aged 7 through 12 years, the minimum interval between doses is 3 months. However, if the second dose was administered at least 28 days after the first dose, it can be accepted as valid.
- For persons aged 13 years and older, the minimum interval between doses is 28 days.

**TABLE. Catch-up immunization schedule for persons aged 4 months through 18 years who start late or who are more than 1 month behind—United States, 2009**

The table below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child's age.

CATCH-UP SCHEDULE FOR PERSONS AGED 4 MONTHS THROUGH 6 YEARS					
Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses			
		Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5
Hepatitis B <sup>1</sup>	Birth	4 weeks	8 weeks (and at least 16 weeks after the first dose)		
Rotavirus <sup>2</sup>	6 wks	4 weeks	4 weeks <sup>2</sup>		
Diphtheria, Tetanus, Pertussis <sup>3</sup>	6 wks	4 weeks	4 weeks	6 months	6 months <sup>3</sup>
<i>Haemophilus influenzae</i> type b <sup>4</sup>	6 wks	4 weeks if first dose administered at younger than age 12 months 8 weeks (as final dose) if first dose administered at age 12-14 months No further doses needed if first dose administered at age 15 months or older	4 weeks <sup>4</sup> if current age is younger than 12 months 8 weeks (as final dose) <sup>4</sup> if current age is 12 months or older and second dose administered at younger than age 15 months No further doses needed if previous dose administered at age 15 months or older	8 weeks (as final dose) This dose only necessary for children aged 12 months through 59 months who received 3 doses before age 12 months	
Pneumococcal <sup>5</sup>	6 wks	4 weeks if first dose administered at younger than age 12 months 8 weeks (as final dose for healthy children) if first dose administered at age 12 months or older or current age 24 through 59 months No further doses needed for healthy children if first dose administered at age 24 months or older	4 weeks if current age is younger than 12 months 8 weeks (as final dose for healthy children) if current age is 12 months or older No further doses needed for healthy children if previous dose administered at age 24 months or older	8 weeks (as final dose) This dose only necessary for children aged 12 months through 59 months who received 3 doses before age 12 months or for high-risk children who received 3 doses at any age	
Inactivated Poliovirus <sup>6</sup>	6 wks	4 weeks	4 weeks	4 weeks <sup>6</sup>	
Measles, Mumps, Rubella <sup>7</sup>	12 mos	4 weeks			
Varicella <sup>8</sup>	12 mos	3 months			
Hepatitis A <sup>9</sup>	12 mos	6 months			
CATCH-UP SCHEDULE FOR PERSONS AGED 7 THROUGH 18 YEARS					
Tetanus, Diphtheria/ Tetanus, Diphtheria, Pertussis <sup>10</sup>	7 yrs <sup>10</sup>	4 weeks	4 weeks if first dose administered at younger than age 12 months 6 months if first dose administered at age 12 months or older	6 months if first dose administered at younger than age 12 months	
Human Papillomavirus <sup>11</sup>	9 yrs		Routine dosing intervals are recommended <sup>11</sup>		
Hepatitis A <sup>9</sup>	12 mos	6 months			
Hepatitis B <sup>1</sup>	Birth	4 weeks	8 weeks (and at least 16 weeks after first dose)		
Inactivated Poliovirus <sup>6</sup>	6 wks	4 weeks	4 weeks	4 weeks <sup>6</sup>	
Measles, Mumps, Rubella <sup>7</sup>	12 mos	4 weeks			
Varicella <sup>8</sup>	12 mos	3 months if the person is younger than age 13 years 4 weeks if the person is aged 13 years or older			

#### 1. Hepatitis B vaccine (HepB).

- Administer the 3-dose series to those not previously vaccinated.
- A 2-dose series (separated by at least 4 months) of adult formulation Recombivax HB<sup>®</sup> is licensed for children aged 11 through 15 years.

#### 2. Rotavirus vaccine (RV).

- The maximum age for the first dose is 14 weeks 6 days. Vaccination should not be initiated for infants aged 15 weeks or older (i.e., 15 weeks 0 days or older).
- Administer the final dose in the series by age 8 months 0 days.
- If Rotarix<sup>®</sup> was administered for the first and second doses, a third dose is not indicated.

#### 3. Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP).

- The fifth dose is not necessary if the fourth dose was administered at age 4 years or older.

#### 4. *Haemophilus influenzae* type b conjugate vaccine (Hib).

- Hib vaccine is not generally recommended for persons aged 5 years or older. No efficacy data are available on which to base a recommendation concerning use of Hib vaccine for older children and adults. However, studies suggest good immunogenicity in persons who have sickle cell disease, leukemia, or HIV infection, or who have had a splenectomy; administering 1 dose of Hib vaccine to these persons is not contraindicated.
- If the first 2 doses were PRP-OMP (PedvaxHIB<sup>®</sup> or Comvax<sup>®</sup>), and administered at age 11 months or younger, the third (and final) dose should be administered at age 12 through 15 months and at least 8 weeks after the second dose.
- If the first dose was administered at age 7 through 11 months, administer 2 doses separated by 4 weeks and a final dose at age 12 through 15 months.

#### 5. Pneumococcal vaccine.

- Administer 1 dose of pneumococcal conjugate vaccine (PCV) to all healthy children aged 24 through 59 months who have not received at least 1 dose of PCV on or after age 12 months.
- For children aged 24 through 59 months with underlying medical conditions, administer 1 dose of PCV if 3 doses were received previously or administer 2 doses of PCV at least 8 weeks apart if fewer than 3 doses were received previously.
- Administer pneumococcal polysaccharide vaccine (PPSV) to children aged 2 years or older with certain underlying medical conditions (see *MMWR* 2000;49 [No. RR-9]), including a cochlear implant, at least 8 weeks after the last dose of PCV.

#### 6. Inactivated poliovirus vaccine (IPV).

- For children who received an all-IPV or all-oral poliovirus (OPV) series, a fourth dose is not necessary if the third dose was administered at age 4 years or older.
- If both OPV and IPV were administered as part of a series, a total of 4 doses should be administered, regardless of the child's current age.

#### 7. Measles, mumps, and rubella vaccine (MMR).

- Administer the second dose at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 28 days have elapsed since the first dose.
- If not previously vaccinated, administer 2 doses with at least 28 days between doses.

#### 8. Varicella vaccine.

- Administer the second dose at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 3 months have elapsed since the first dose.
- For persons aged 12 months through 12 years, the minimum interval between doses is 3 months. However, if the second dose was administered at least 28 days after the first dose, it can be accepted as valid.
- For persons aged 13 years and older, the minimum interval between doses is 28 days.

#### 9. Hepatitis A vaccine (HepA).

- HepA is recommended for children older than 1 year who live in areas where vaccination programs target older children or who are at increased risk of infection. See *MMWR* 2006;55(No. RR-7).

#### 10. Tetanus and diphtheria toxoids vaccine (Td) and tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap).

- Doses of DTaP are counted as part of the Td/Tdap series
- Tdap should be substituted for a single dose of Td in the catch-up series or as a booster for children aged 10 through 18 years; use Td for other doses.

#### 11. Human papillomavirus vaccine (HPV).

- Administer the series to females at age 13 through 18 years if not previously vaccinated.
- Use recommended routine dosing intervals for series catch-up (i.e., the second and third doses should be administered at 2 and 6 months after the first dose). However, the minimum interval between the first and second doses is 4 weeks. The minimum interval between the second and third doses is 12 weeks, and the third dose should be given at least 24 weeks after the first dose.