

Multiple-Serotype *Salmonella* Gastroenteritis Outbreak After a Reception — Connecticut, 2009

In September 2009, the Connecticut Department of Public Health (DPH) identified an outbreak of *Salmonella* gastroenteritis among attendees at a reception. A case-control study and environmental and laboratory investigations were conducted. Nine case-patients and 14 control subjects were identified. Potato salad consumption was strongly associated with illness (odds ratio [OR] = 84.0). During the investigation, food service workers were observed to have bare-handed contact with ready-to-eat food. Five case-patients and one asymptomatic food service worker had stool samples positive for *Salmonella* species. Two *Salmonella* serotypes were identified, *Salmonella enterica* serovar Schwarzengrund and *Salmonella enterica* serovar Typhimurium variant O:5–, including coinfection in one case-patient and one food service worker. The isolates of each respective serotype (*S.* Schwarzengrund and *S.* Typhimurium variant O:5–) had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. Potato salad was the likely source of the outbreak but the contamination mechanism is unclear. Control measures included exclusion of the food service worker with *Salmonella*-positive stool from the restaurant until two consecutive stool samples yielded no bacterial growth. Standard public health laboratory practices in Connecticut and testing techniques used specifically during this investigation led to the rapid identification of the two serotypes. Multiple-serotype *Salmonella* outbreaks might occur more frequently than recognized; knowledge of all *Salmonella* serotypes involved in an outbreak might help implicate the outbreak source, define the scope of the outbreak, and determine the selection of appropriate control measures.

On September 18, 2009, a physician notified the DPH Epidemiology and Emerging Infections Program of a laboratory-confirmed *Salmonella* infection in a person who had attended a reception at a banquet hall on September 6. Preliminary information indicated that other attendees became symptomatic with gastrointestinal illness after the reception. Food served at

the reception was prepared at an off-site licensed restaurant, delivered to the banquet hall by restaurant staff, and set up as a self-serve buffet. DPH and the local health department conducted an investigation to determine the source and extent of the illnesses and to recommend control measures.

A case-control study was conducted among attendees. A case was defined as diarrhea (three or more loose stools during a 24-hour period) in a reception attendee within 5 days after the reception. A control subject was defined as an attendee who did not experience gastrointestinal illness. Because no guest list existed, contact information for ill attendees was provided by the reception host; control subjects and additional case-patients were recruited by asking known attendees to identify and provide contact information for other attendees. Contact information was obtained for 25 (17%) of the approximately 150 attendees. DPH conducted telephone interviews during September 21–25 regarding illness history and food consumed at the reception; an itemized list of foods served at the reception was used to obtain food consumption histories. Of the 25 interviewed attendees, nine (36%) met the case definition, 14 qualified as control subjects, and two were excluded because they reported gastrointestinal illness that did not meet the case

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definition. Of the nine case-patients, eight (89%) had abdominal cramping, seven (78%) had subjective fever, six (67%) had muscle aches, and four (44%) had bloody stools (Table). Median age was 31 years (range: 25–51 years); five (56%) were male. The median incubation period* was 13.5 hours (range: 9.5–95.5 hours); median illness duration was 8.5 days (range: 0.5–14 days). A case-control analysis revealed that case-patients were significantly more likely than control subjects to have consumed potato salad (88% versus 8%, respectively; OR = 84.0; 95% confidence interval = 3.3–4,077; $p < 0.001$).

During September 21–October 1, the local health department and the DPH Food Protection Program conducted an environmental investigation of the restaurant in which the food served at the reception had been prepared. Of the four persons who worked at the restaurant, two were directly involved in food preparation for the reception. All four were interviewed, and none reported experiencing gastrointestinal illness.

*Meal service began at approximately 6 p.m. The incubation period was calculated using 7:30 p.m. as the likely time by which all case-patients had eaten food.

During the investigation, food service workers were observed to have bare-handed contact with ready-to-eat food and did not practice adequate hand washing. Preparation procedures of items served at the reception, including the potato salad, were reviewed, and environmental samples of food contact surfaces and spices used in preparation of the reception food were collected for testing. The environmental and spice samples were obtained >3 weeks after the outbreak occurred and after the facility had been cleaned; *Salmonella* was not detected in these samples. No leftover potato salad was available for testing.

The stool sample from the index case-patient was collected on September 14 and processed at a private laboratory; the clinical isolate was then sent to the DPH laboratory for confirmation. Stool specimens from five additional case-patients and all four food service workers were collected during September 21–October 7 and tested at the DPH laboratory. The specimens were first plated to selective media to test for the presence of *Salmonella*, *Shigella*, *Campylobacter*, and *Escherichia coli* O157. After incubation, presumptive *Salmonella* colonies

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TABLE. Demographic and clinical characteristics of *Salmonella* gastroenteritis outbreak case-patients* at a reception — Connecticut, 2009

Characteristic	Case-patient								
	1	2	3 [†]	4	5	6	7	8	9
Age (yrs)	25	51	27	31	N/A [§]	N/A	31	34	34
Incubation (hrs) [¶]	9.5	11.5	12.5	12.5	13.5	24.5	40.5	64.5	95.5
Signs and symptoms									
Diarrhea**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Abdominal cramping	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Fever (subjective)	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Muscle aches	No	Yes	Yes	Yes	N/A	Yes	Yes	No	Yes
Bloody stools	No	No	Yes	Yes	No	Yes	Yes	No	No
Duration of illness	14 days	7 days	10 days	10 days	2 days	14 days	5 days	<1 day	N/A
Pathogen ^{††}	<i>Salmonella</i> Schwarzengrund	Not tested	<i>Salmonella</i> Typhimurium variant O:5–	<i>Salmonella</i> Typhimurium variant O:5– and <i>Salmonella</i> Schwarzengrund	Negative at DPH	<i>Salmonella</i> Typhimurium variant O:5–	<i>Salmonella</i> Schwarzengrund	Not tested	Negative at private laboratory

* Does not include food service workers; stool specimen from one food service worker tested positive for *Salmonella enterica* serovar Typhimurium variant O:5– and *Salmonella* Schwarzengrund at the Connecticut Department of Public Health (DPH) laboratory.

[†] Index case-patient; clinical isolate, but not stool specimen, was available for testing.

[§] N/A = information not available.

[¶] Meal service began at approximately 6 p.m. Incubation period calculated using 7:30 p.m. as the likely time by which all case-patients had eaten food.

** Three or more loose stools during a 24-hour period in a reception attendee within 5 days after the reception.

^{††} Pathogens were identified by Connecticut DPH laboratory by serotyping and pulsed-field gel electrophoresis.

were serotyped[†] and subtyped genetically by PFGE. Serotyping and PFGE testing were not sequential.[§]

The isolate from the index case-patient was serotyped as *S. Typhimurium* variant O:5–. Initial serotyping steps performed on *Salmonella* isolates obtained from stool specimens revealed a preliminary antigen result consistent with the *S. Typhimurium* variant O:5– already identified for the index case-patient. Consequently, investigators assumed that *S. Typhimurium* variant O:5– was the only outbreak serotype. Next, while final serotyping was pending, *Salmonella* isolates were submitted for PFGE. Testing of the first five isolates yielded two distinct PFGE patterns (PFGE *Xba*I patterns JPXX01.0456 and JM6X01.0036[¶]).

[†] *Salmonella* serotypes are based on the immunoreactivity of two surface structures, the O antigen and the H antigen. Serotyping was performed according to the Kauffmann-White Scheme. Additional information available at <http://www.cdc.gov/ncidod/dbmd/phlisdata/salmtab/2006/salmonellaannualsummary2006.pdf>.

[§] *Salmonella* isolates were first screened for O antigens by using the slide agglutination method, a process that usually takes <1 minute to perform. Screening for H antigens was done by a tube agglutination test, a process that can take days to complete. While the H antigen test was pending, a fresh culture generated from a single-colony pick from the selective media underwent PFGE testing; single-colony picks from different persons' samples were run on the same PFGE gel. Because H antigen and PFGE testing ran concurrently, the PFGE results were typically available before H antigen testing was complete, and therefore, before the final serotype was known.

[¶] PFGE pattern names were assigned by CDC's PulseNet database.

One PFGE pattern appeared to be consistent with *S. Typhimurium*; the other appeared to be consistent with *S. Schwarzengrund*. The results of serotyping verified the presence of both *S. Typhimurium* variant O:5– and *S. Schwarzengrund*.

The identification of both *S. Typhimurium* variant O:5– and *S. Schwarzengrund* in reception attendees raised the possibility that two different *Salmonella* serotypes might be involved in the outbreak. Therefore, laboratory staff systematically collected multiple single-colony picks from original media to screen for the presence of an additional *Salmonella* serotype. After all testing was complete, including isolation, serotyping, and PFGE, two of the six case-patients with specimens at the DPH laboratory were determined to be infected with *S. Typhimurium* variant O:5–, another two with *S. Schwarzengrund*, and one with both; no pathogens were isolated from the stool specimen of the sixth case-patient. A seventh case-patient's stool specimen was tested at a private laboratory; no *Salmonella* was detected. Of the four food service worker specimens tested, one yielded both *S. Schwarzengrund* and *S. Typhimurium* variant O:5– and the other three were negative. All respective *S. Schwarzengrund* isolates and *S. Typhimurium* variant O:5– isolates had indistinguishable PFGE patterns.

What is already known on this topic?

Salmonella commonly causes foodborne illness; however, *Salmonella* outbreaks involving multiple serotypes are reported less commonly.

What does this report add?

Epidemiologic and laboratory data demonstrate that an outbreak of *Salmonella* infection with two different serotypes occurred among guests who attended a reception; rapid identification of the multiple serotypes was facilitated by confirmatory testing at the state laboratory, specifically the use of stool samples for subsequent serotyping and pulsed-field gel electrophoreses testing.

What are the implications for public health practice?

Multiple-serotype *Salmonella* outbreaks might occur more frequently than recognized; if resources permit, health departments can better characterize the epidemiology of *Salmonella* outbreaks by performing serotyping and PFGE, and by testing multiple single-colony picks when multiple *Salmonella* serotypes are suspected.

On September 25, the food service worker with positive stool findings was reinterviewed and reaffirmed the absence of recent gastrointestinal illness, including around the time of the reception. This food service worker had been responsible for transporting food to the banquet hall and ensuring that the food was maintained at the correct temperature before serving, but reported not having prepared, consumed, nor served any of the food.

Control measures implemented by the local health department included exclusion of the *Salmonella*-positive food service worker from the restaurant for approximately 2 weeks until two consecutive stool cultures obtained ≥ 24 hours apart had no bacterial growth. Health department staff members provided information about employee health policies and employee hygiene to the restaurant owners and reviewed the information with them.

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Editorial Note

Epidemiologic and laboratory data demonstrate that an outbreak of *Salmonella* infection with two different serotypes occurred among guests who attended a reception; potato salad was the likely source of this outbreak, but the contamination mechanism is unclear. Likewise, whether the food service worker might have unknowingly contaminated a food item or whether the food service worker also was infected through the same source as the case-patients remains unclear.

Salmonella is the most common bacterial cause of foodborne disease outbreaks in the United States (1). However, outbreaks of *Salmonella* infection with multiple serotypes are reported less commonly in the literature (2–4). Standard public health laboratory practices in Connecticut,** as well as testing techniques used specifically in the context of this outbreak investigation, led to the rapid identification of two distinct serotypes. Connecticut requires all identified *Salmonella* isolates to be submitted to the DPH laboratory, where serotyping and PFGE are routinely performed; private laboratories in Connecticut do not have the capacity to perform full serotyping and PFGE testing. Initiating PFGE testing before finalization of serotyping led to more rapid recognition of the two different serotypes; complete serotyping can take days, whereas PFGE testing can take as little as 1 day after pure isolate is available for analysis.

Systematically screening and testing multiple single-colony picks on each original culture plate, a time-intensive practice that is usually not part of routine laboratory protocol, facilitated identifying both outbreak serotypes. This approach particularly aided discovery of coinfection with two *Salmonella* serotypes in one case-patient and the food service worker. The recognition of coinfection helped investigators conclude that a multiple-serotype outbreak had occurred. Furthermore, testing multiple colonies is dependent upon availability of stool specimens; had all of the case-patients' stool been first tested at a private laboratory, such that only single clinical isolates were available for testing at the DPH

** Connecticut is a participant in the Foodborne Diseases Active Surveillance Network (FoodNet), the principle foodborne disease component of CDC's Emerging Infections Program (EIP). FoodNet is a collaborative project between CDC, 10 EIP sites, the U.S. Department of Agriculture, and the Food and Drug Administration. As part of FoodNet, Connecticut conducts active, laboratory-based surveillance of foodborne bacterial and parasitic pathogens. Additional information is available at <http://www.cdc.gov/foodnet>.

laboratory, coinfection in the case-patient would not have been discovered.

Not all states require that all *Salmonella* isolates be submitted to the public health laboratory for serotyping and PFGE. Additionally, in an outbreak setting, some states with resource limitations might only perform comprehensive testing on a very limited number of case-patient specimens. If the outbreak described in this report had taken place in a state without a requirement for submission of *Salmonella* isolates to the public health laboratory or in a state in which the number of specimens tested was strictly limited, the discovery of both *Salmonella* serotypes might not have occurred. In those public health laboratories that perform both serotype and PFGE testing, but do not do so simultaneously, multiple-serotype infections would not be identified as quickly as they were in this outbreak.

Although not specifically illustrated by the findings in this report, not knowing about all *Salmonella* serotypes involved in an outbreak might hinder the epidemiologic investigation and the public health response. Certain *Salmonella* serotypes are known to be likely associated with particular food types or animal sources. Consequently, knowledge of multiple serotypes involved in an outbreak can help focus the investigation on potential outbreak sources. Databases, such as PulseNet,^{††} can identify and link infected persons to a particular outbreak, thereby defining the scope. In a recent outbreak, PulseNet matched two different *Salmonella* serotypes to an outbreak linked to peppers used in making salami (4). If an outbreak were detected through PulseNet, not knowing all involved serotypes might result in cases not being associated with the outbreak. If only cases with a single serotype were included in such responses, sampled cases might not be representative of all cases. Furthermore, identifying a greater number of cases associated with multiple serotypes in an outbreak might increase the statistical power of the study to implicate a food vehicle or other outbreak source through epidemiologic analysis. Implementation of appropriate control measures relies on knowing the implicated source and the scope of the outbreak, particularly if multiple serotypes are involved.

^{††} PulseNet is a national network of laboratories in which participants submit PFGE results on certain types of bacterial isolates; the database is available on demand to participants, allowing for rapid comparison of PFGE patterns. Additional information is available at <http://www.cdc.gov/pulsenet>.

The findings in this report are subject to at least three limitations. First, lack of a comprehensive guest list prohibited a cohort analysis. Second, recruitment of control subjects through known attendees might have introduced selection bias; attendees who knew each other might have had similar food preferences, potentially increasing the likelihood that case-patient and control subject food histories were similar. However, such a tendency would bias the results toward showing no association. Finally, the time lag between the reception and collection of environmental samples limited their usefulness.

Multiple-serotype *Salmonella* outbreaks might occur more frequently than recognized. Health departments should be aware of the possible occurrence of such outbreaks to better characterize their epidemiology. This outbreak demonstrates the importance of capacity to perform *Salmonella* serotyping and PFGE testing at public health laboratories. In outbreak settings, obtaining stool samples and performing comprehensive serotyping and PFGE at public health laboratories facilitate detection of multiple *Salmonella* serotypes. When more than one *Salmonella* serotype is suspected in an outbreak, screening and testing multiple single-colony picks could be considered, if resources permit, as an important technique for identifying multiple serotypes, including coinfection, among cases.

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Use of a Self-Assessment Questionnaire for Food Safety Education in the Home Kitchen — Los Angeles County, California, 2006–2008

Foodborne diseases remain an important cause of morbidity in the United States among all age groups (1,2). A potentially important contributor to this morbidity is improper food handling and preparation practices in kitchens at restaurants and in private homes (1,2). In 1998, the Los Angeles County Department of Public Health (LACDPH) established numeric scores for restaurant inspections and posted grades for these inspections publicly; by the end of 1998 this initiative was credited with helping to reduce by 13.1% (compared with 1997) the number of hospitalizations for foodborne infections from nontyphoidal *Salmonella*, *Campylobacter*, and *Escherichia coli* in the region (3). In the spring of 2006, the LACDPH Environmental Health Program launched the Home Kitchen Self-Inspection Program, a voluntary self-inspection and education program, to promote safer food hygiene practices at home. This report describes the implementation of this program and the results from its web-based self-assessment questionnaire, the Food Safety Quiz, for the initial program period of 2006–2008. Overall, approximately 13,000 adults completed the quiz; 34% received an A rating, 27% a B, 25% a C, and 14% received a numeric score because they scored lower than 70% on the self-assessment. Use of interactive, online learning tools such as the Food Safety Quiz can be used to promote home food safety in the community. Further research is needed to evaluate and improve the program content and to assess its effect on changing food handling and preparation practices in the home kitchen.

The Home Kitchen Self-Inspection Program includes a Food Safety Quiz* that is based on emerging evidence that the use of online, interactive learning tools are conducive to problem-based learning, improve self-efficacy and self-mastery of selected skills, and offer convenience and flexibility to the learner (4). The content of the questions was guided by food safety education principles† from the U.S.

* Available at <http://publichealth.lacounty.gov/phcommon/public/eh/fsquiz>.

† Available at http://www.fsis.usda.gov/be_foodsafe/bfs_messages/index.asp.

Department of Agriculture: clean, separate, cook, and chill. The framework of the quiz was based on adult learning theories (4) and emphasized such food handling practices as the need to clean and sanitize cutting boards after handling poultry, the safe handling of raw eggs, and appropriate methods for the refrigeration of cooked and uncooked foods. The quiz provided valuable instruction to respondents about better ways to maintain home food safety.

The quiz, available only in English, queried respondents regarding food handling and preparation practices at home, assigning a letter grade at completion using a scoring algorithm (i.e., A [90%–100%], B [80%–89%], C [70%–79%], or an actual score if the rating was below 70%) that was adapted from, but not identical to, the algorithm used for restaurant grading. Although quiz questions were based on food hygiene standards used routinely to evaluate food safety in full-service restaurants, the questionnaire limited queries about physical structure (e.g., damaged floor tiles and cracked walls) and excluded questions on the food handler certification requirements; instead, the quiz rating algorithm specifically focused on food hygiene practices that are considered by the LACDPH Environmental Health Program to be the most relevant to home kitchens and focused on cleaning and chilling as two areas of food safety that county residents might often overlook when cooking at home.

The quiz included 57 questions; 45 were formatted as equally weighted yes/no questions, simulating an inspection checklist that could be completed within 10 minutes. The remaining 12 questions inquired about demographic information. To receive the final score/self-inspection rating, all questions had to be completed. Respondents who received an A rating were mailed a placard with this grade as recognition for their good food handling practices. During March–May, the first 3 months after launch, the quiz was marketed to the public using printed materials and public service announcements in the local media, including television and radio, and at public events.

What is already known on this topic?

In 1998, the Los Angeles County Department of Public Health launched an initiative that publicly posted newly implemented restaurant grades; that year, the initiative was credited with helping to reduce by 13.1% (compared with 1997) the number of hospitalizations for foodborne infections from nontyphoidal *Salmonella*, *Campylobacter*, and *Escherichia coli* in the region.

What is added by this report?

According to a new self-assessment food safety quiz that graded home kitchens similarly to restaurants, 34% of respondent's home kitchens would have received an A rating, 27% a B, 25% a C, and 14% would have received a numeric score because they scored lower than 70% on the self-assessment.

What are the implications for public health practice?

Innovative tools that educate the public about home kitchen safety can complement established restaurant hygiene rating programs and aid other prevention efforts to further reduce foodborne illnesses.

During 2006–2008, a total of 27,129 visits to the website were recorded; 19,205 (71%) respondents reported Los Angeles County postal codes,[§] for which 13,274 unique respondents completed the quiz. Most respondents were female (68%), ranged in age from 18 to 59 years (78%), spoke English at home (86%), and reported being the primary cook (81%); 17% of respondents believed that they had ever become ill from eating at home (Table 1).

When queried regarding food handling and preparation practices, approximately 27% reported not storing partially cooked foods that would not be used immediately in the refrigerator before final cooking, 28% said they did not remove all jewelry from hands and/or did not keep fingernails trimmed when cooking, and 26% reported that their kitchen shelves and cabinets were not clean and free from dust (Table 2). Approximately 36% of respondents said that they did not have a properly working thermometer inside the refrigerator. Approximately 9% reported that they had flies inside the home; 6% reported cockroaches; and 5% reported rodents inside their homes.

If home kitchens were graded similarly to restaurants and were required to post letter grades in the kitchen based on results from the quiz, 34% of

[§] Duplicates (i.e., persons who attempted the online self-assessment more than once) were identified through an algorithm and eliminated. The algorithm accounted for consistency among postal code, date when quiz was taken, and demographic information.

TABLE 1. Characteristics of respondents (N = 13,274) to the Home Kitchen Self-Inspection Program Food Safety Quiz — Los Angeles County, California, 2006–2008

Characteristic	No.	(%)*
Sex		
Male	4,285	(32)
Female	8,989	(68)
Age group (yrs)		
<18	127	(1)
18–39	4,846	(37)
40–59	5,420	(41)
≥60	1,149	(9)
Not reported	1,732	(13)
Language spoken at home		
English	11,412	(86)
Spanish	491	(4)
Tagalog	114	(1)
Other	1,257	(10)
Other†		
Primary cook at home	10,747	(81)
Restaurant ratings influenced decisions to eat at restaurants	11,804	(89)
Respondent believed he/she had become ill from eating at home	2,259	(17)
Ever reported a foodborne illness	1,511	(11)

* Percentages might not sum to 100 because of rounding.

† Not mutually exclusive; respondents could list more than one response.

respondents would have received an A rating, 27% a B, 25% a C; 14% would have received a numeric score because they scored lower than 70%.

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Editorial Note

Home kitchen-related foodborne diseases are vastly underreported (1,2). The findings in this report show that even among interested and motivated persons, food handling and preparation deficiencies occur frequently in the home setting. Only approximately one third of respondents completing the quiz would have received an A rating.

Although the percentages of home kitchens assigned A or B ratings (61%) was considerably lower than for full-service restaurants (98%) during 2006–2008 (LACDPH, unpublished data, 2009), these observations would not be directly comparable to restaurants because the self-assessment and grading of home kitchens were exclusively based on respondent self-reports and were intended to promote learning. Restaurants, by contrast, were physically inspected by

TABLE 2. Number and percentage of respondents (N = 13,274) reporting unsafe kitchen practices,* by sex — Home Kitchen Self-Inspection Program Food Safety Quiz, Los Angeles County, California, 2006–2008

Home kitchen practice	Males		Females		Total	
	No.	(%)	No.	(%)	No.	(%)
When cooking big portions of food to serve later, respondent did not rapidly cool and store it in refrigerator	2,652	(62)	5,815	(65)	8,467	(64)
Respondent did not have a properly working thermometer inside refrigerator	1,653	(39)	3,054	(34)	4,707	(36)
Respondent did not store raw meats below all other food in refrigerator [†]	1,393	(33)	2,865	(33)	4,258	(33)
Respondent did not remove all jewelry from hands before preparing food and/or did not keep fingernails trimmed	925	(22)	2,739	(31)	3,664	(28)
Respondent did not store partially cooked foods that would not be used immediately in refrigerator before final cooking	1,141	(27)	2,465	(27)	3,606	(27)
Kitchen shelves and cabinets were not clean and free from dust	1,028	(24)	2,391	(27)	3,419	(26)
Food in refrigerator was not well-spaced so that cool air can circulate freely	949	(22)	2,055	(23)	3,004	(23)
Flies inside the home	468	(11)	732	(8)	1,200	(9)
Cockroaches inside the home	314	(7)	522	(6)	836	(6)
Rodents inside the home (not including pet rodents in cages)	277	(7)	414	(5)	691	(5)

* As determined by the Los Angeles County Department of Public Health, based on the California Health and Safety Code (available at <http://www.publichealth.lacounty.gov/eh/docs/specialized/cacode.pdf>).

[†] Denominator used to derive the percentage is 12,932, which excludes the 342 respondents who reported that they did not prepare raw meats in their home.

trained food safety professionals and were required to have at least one certified food handler on staff.

During 1999–2007, foodborne diseases caused a reported 2,590 hospitalizations and 17 deaths in Los Angeles County; approximately 600 hospitalizations occurred in 2007 (5–7). These numbers are considered underestimates because not all foodborne illnesses leading to hospitalization or death are confirmed by laboratory testing (8). In 2006, the most common locations for reported foodborne outbreaks in Los Angeles County were restaurants (16 [43%]), followed by foods that were brought or catered to a work place (five [14%]) or eaten at home (five [14%]) (6). The initial decline in hospitalizations related to foodborne illnesses after the public posting of restaurant grades in Los Angeles County in 1998 (3) stalled after 2002 (5). This pattern suggests that addressing other sources of infection (e.g., the food supply, hazards in the food processing and distribution chain, the workplace, and in particular, the home kitchen) might be important to further reduce foodborne illness (6,8). The Home Kitchen Self-Inspection Program was developed by the LACDPH to further help address this public health problem.

The findings in this report are subject to at least two limitations. First, although approximately 13,000 respondents completed the quiz, the sample of respondents is unlikely to be representative of all county

residents for several reasons. Because the questionnaire was available only in English, non-English speaking ethnic minorities could not have participated. Respondents enrolled in this self-assessment exercise based on their interest in food safety. Only persons with computers and access to the Internet were able to participate in the program. Second, the relationship between these practices and conditions and actual home kitchen conditions remains unknown.

The Home Kitchen Self-Inspection Program is the largest effort to date to use a web-based, self-assessment questionnaire as a population learning tool to provide feedback and education about home kitchen safety. LACDPH is applying the information gleaned from the quiz (e.g., implementation barriers, responses about home kitchen practices, and program data biases) to explore ways to improve the program, including 1) increasing the specificity of the question items so that they are more relevant to the home kitchen environment, 2) further tailoring the quiz to ethnically diverse or harder-to-reach communities, and 3) conducting a program evaluation to validate the program's benefits to consumer learning and food handling practices at home. Innovative tools that educate the public about home kitchen safety can complement established restaurant hygiene rating programs and aid other prevention efforts to further reduce foodborne illnesses.

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Updated Recommendations for Prevention of Invasive Pneumococcal Disease Among Adults Using the 23-Valent Pneumococcal Polysaccharide Vaccine (PPSV23)

Invasive disease from *Streptococcus pneumoniae* (pneumococcus) is a major cause of illness and death in the United States, with an estimated 43,500 cases and 5,000 deaths among persons of all ages in 2009 (1). This report provides updated recommendations from the Advisory Committee on Immunization Practices (ACIP) for prevention of invasive pneumococcal disease (IPD) (i.e., bacteremia, meningitis, or infection of other normally sterile sites [2]) through use of the 23-valent pneumococcal polysaccharide vaccine (PPSV23) among all adults aged ≥ 65 years and those adults aged 19–64 years with underlying medical conditions that put them at greater risk for serious pneumococcal infection. The new recommendations include the following changes from 1997 ACIP recommendations (2): 1) the indications for which PPSV23 vaccination is recommended now include smoking and asthma, and 2) routine use of PPSV23 is no longer recommended for Alaska Natives or American Indians aged < 65 years unless they have medical or other indications for PPSV23. ACIP recommendations for revaccination with PPSV23 among the adult patient groups at greatest risk for IPD (i.e., persons with functional or anatomic asplenia and persons with immunocompromising conditions) remain unchanged (2). ACIP recommendations for prevention of pneumococcal disease among infants and youths aged ≤ 18 years using the 13-valent pneumococcal conjugate vaccine (PCV13) and PPSV23 are published separately (3).

Changes in IPD Incidence

Indirect vaccine effects (i.e., herd effects) have reduced pneumococcal infections among unvaccinated persons of all ages, including those aged ≥ 65 years, since introduction of the routine infant 7-valent pneumococcal conjugate vaccine (PCV7) immunization program in 2000 (4). Data from Active Bacterial Core surveillance (ABCs)* indicate that, by 2007, the overall incidence rate of IPD among persons of all ages had decreased by 45% (from 24.4. to 13.5

per 100,000 population), compared with 1998–1999 before PCV7 was introduced (4). Among persons aged 18–49 years, 50–64 years, and ≥ 65 years, rates of IPD decreased 40%, 18%, and 37%, respectively. The decreases resulted from reductions of 87% to 92% in cases of infection with serotypes covered in PCV7 (4). Despite the major direct and indirect PCV7 effects, IPD remains an important cause of illness and death. An estimated 43,500 cases and 5,000 deaths occurred among persons of all ages in 2009; approximately 84% of IPD cases and nearly all deaths occurred in adults (1).

Additional indirect effects can be expected to occur when the PCV13 immunization program, initiated in 2010, is fully implemented, although the magnitude of these effects is difficult to predict (3). In 2008, the serotypes covered in PCV13 caused 53%, 49%, and 44% of IPD cases among persons aged 18–49 years, 50–64 years, and ≥ 65 years, respectively; serotypes covered in PPSV23 caused 78%, 76%, and 66% of IPD cases among persons in these age groups (Figure).

Risk Factors for IPD Among Adults

Rates of pneumococcal infection in the United States vary among demographic groups, with higher rates among infants, young children, and older persons. The presence of certain underlying medical conditions increases the risk for pneumococcal disease and its complications (2). The risk for IPD is greatest among persons who have congenital or acquired immunodeficiency, abnormal innate immune response, human immunodeficiency virus (HIV) infection, or functional or anatomic asplenia (e.g., sickle cell disease or congenital or surgical asplenia) (Table). Alaska Native children and children among certain American Indian populations also have higher rates of IPD. Among Alaska Native and American Indian adults, the majority of IPD cases occur in persons with underlying medical conditions or other risk factors (e.g., heavy alcohol use or smoking) that are associated with increased risk for IPD in the general population (5).

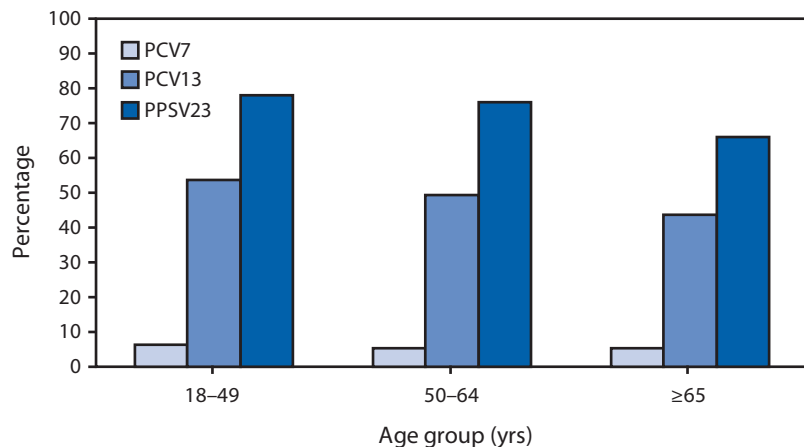
* Additional information available at <http://www.cdc.gov/abcs/index.html>.

From 1998–1999 to 2006–2007, the percentage of adult IPD patients with underlying medical conditions increased from 52% to 59% among those aged 18–64 years and from 69% to 81% among those aged ≥ 65 years. This trend suggests that adults with high-risk conditions might not have benefited as much from the indirect protective effects of childhood PCV7 immunization as persons who are relatively healthy (4).

Asthma. An estimated 7.3% of U.S. adults have active asthma.[†] A case-control study conducted in Tennessee, which identified cases through active, population-based and laboratory-based surveillance and verified history of asthma from the Tennessee Medicaid database, showed that among adults aged 18–49 years, IPD was more common among persons with asthma than persons without asthma (adjusted odds ratio [AOR] = 2.4; 95% confidence interval [CI] = 1.8–3.3). Among persons with high-risk asthma,[§] the risk for IPD was nearly twice that for persons with low-risk asthma (6). In contrast, in a study conducted among a cohort of older veterans (average age: 53 years), persons with asthma did not have higher rates of hospitalization for pneumococcal pneumonia compared with persons in a group without asthma or chronic obstructive pulmonary disease (COPD) who were matched to the asthma patients by age, sex, and region (7). However, in the same study, hospitalization rates for pneumococcal pneumonia among persons with COPD were higher compared with persons in the control group. Because distinguishing between COPD and asthma becomes more difficult with advancing age, misclassification of persons in this study is a possibility.

Cigarette smoking. Population-based surveillance studies conducted before introduction of PCV7 consistently reported that smokers accounted for approximately half of otherwise healthy adults with IPD (8). During 2001–2003, 53% of IPD patients aged 18–64 years were current cigarette smokers (CDC, ABCs unpublished data). In a multicenter, population-based, case-control study in which IPD patients were identified through ABCs, the risk for

FIGURE. Percentage of invasive pneumococcal disease cases caused by serotypes covered in three different pneumococcal vaccine formulations (PCV7, PCV13, and PPSV23) among adults aged ≥ 18 years, by age group — Active Bacterial Core surveillance, United States, 2008



Abbreviations: PCV7 = 7-valent pneumococcal conjugate vaccine. PCV13 = 13-valent pneumococcal conjugate vaccine. PPSV23 = 23-valent pneumococcal polysaccharide vaccine.

IPD among immunocompetent cigarette smokers aged 18–64 years was four times the risk for controls who had never smoked (AOR = 4.1; CI = 2.4–7.3) (9). Significant dose-response relationships with risk for IPD also were observed for number of cigarettes smoked and pack-years of smoking (9). Subsequent studies confirmed that smoking also increases the risk for IPD among other groups, including immunocompromised persons (10).

PPSV23 Efficacy and Effectiveness

Evaluations of PPSV23 efficacy and effectiveness among persons in recommended target groups have yielded contradictory conclusions for prevention of nonbacteremic pneumococcal pneumonia; however, most study results are consistent with protection against IPD among generally healthy young adults and among the general population of older persons. Observational studies have suggested effectiveness estimates ranging from approximately 50% to 80% for prevention of IPD among immunocompetent older adults and adults with various underlying illnesses, supporting the recommendations for using PPSV23 to prevent IPD (11). However, effectiveness has not been demonstrated among immunocompromised persons or very old persons. A recent meta-analysis of 15 randomized controlled trials (RCTs) and seven nonrandomized observational studies of PPSV23 efficacy and effectiveness suggested an overall efficacy of 74% against IPD (CI = 56%–85%), based on pooled results of 10 of the RCTs (12). Analysis

[†] Additional information available at <http://www.cdc.gov/asthma/nhis/07/data.htm>.

[§] Defined as persons with asthma that required at least one of the following: 1) admission for asthma to a hospital or visit to an emergency department; 2) receipt of a prescription for a course of corticosteroids as rescue therapy or a long-term course (120 days or more) of oral corticosteroids; or 3) three or more prescriptions for β -agonists in the year preceding enrollment in the study.

TABLE. Underlying medical conditions or other indications for administration of 23-valent pneumococcal polysaccharide vaccine (PPSV23) among adults aged 19–64 years, by risk group — Advisory Committee on Immunization Practices, (ACIP) 2010

Risk group	Underlying medical condition or other indication
Immunocompetent persons	Chronic heart disease (excluding hypertension)* Chronic lung disease [†] Diabetes mellitus Cerebrospinal fluid leaks Cochlear implant Alcoholism Chronic liver disease, including cirrhosis Cigarette smoking
Persons with functional or anatomic asplenia [§]	Sickle cell disease and other hemoglobinopathies Congenital or acquired asplenia, splenic dysfunction, or splenectomy
Immunocompromised persons [§]	Congenital or acquired immunodeficiencies [¶] HIV infection Chronic renal failure Nephrotic syndrome Leukemias Lymphomas Hodgkin disease Generalized malignancy Diseases requiring treatment with immunosuppressive drugs, including long-term systemic corticosteroids or radiation therapy Solid organ transplantation Multiple myeloma

* Including congestive heart failure and cardiomyopathies.

† Including chronic obstructive pulmonary disease, emphysema, and asthma.

§ A second dose of PPSV23 is recommended 5 years after the first dose for persons with functional or anatomic asplenia and for immunocompromised persons.

¶ Includes B- (humoral) or T-lymphocyte deficiency, complement deficiencies (particularly C1, C2, C3, and C4 deficiencies), and phagocytic disorders (excluding chronic granulomatous disease).

of the results from the seven observational studies yielded a pooled vaccine effectiveness estimate of 52% (CI = 39%–63%). In contrast, a recent meta-analysis that included six RCTs estimated the combined PPSV23 efficacy against pneumococcal bacteremia at only 10%, with a very wide CI (CI = -77%–54%) (13). The large difference in findings from these two meta-analyses might be related to inclusion of different trials.

Recommendations for Use of PPSV23

At its June and October 2008 meetings, ACIP approved new and revised recommendations for the use of PPSV23 to prevent IPD among adults aged <65 years. ACIP concluded that asthma is an independent risk factor for IPD and should be included in the group of chronic pulmonary diseases (e.g., COPD and emphysema) that are indications for PPSV23 (Table); thus, ACIP recommended that persons aged 19–64 years who have asthma should receive a single dose of PPSV23 (Box). ACIP also concluded that adults who smoke cigarettes are at significantly increased risk for

IPD and recommended that persons aged 19–64 years who smoke cigarettes should receive a single dose of PPSV23 and smoking cessation guidance (Box).

ACIP also revised its recommendation for use of PPSV23 among American Indians and Alaska Natives. Routine use of PPSV23 is no longer recommended for persons aged <65 years in these populations unless they have a medical condition or other indication for PPSV23. However, in certain situations, public health authorities may recommend PPSV23 for Alaska Natives and American Indians aged 50–64 years who are living in areas where the risk for IPD is increased.

All persons should be vaccinated with PPSV23 at age 65 years. Those who received PPSV23 before age 65 years for any indication should receive another dose of the vaccine at age 65 years or later if at least 5 years have passed since their previous dose. Those who receive PPSV23 at or after age 65 years should receive only a single dose.

Revaccination. ACIP recommendations for revaccination remain unchanged from the 1997

BOX. Updated recommendations for administration of 23-valent pneumococcal polysaccharide vaccine (PPSV23) among adults aged ≥ 19 years — Advisory Committee on Immunization Practices (ACIP), United States

- PPSV23 should be administered to adults aged 19–64 years with chronic or immunosuppressing medical conditions, including those who have asthma.
- Adults aged 19–64 years who smoke cigarettes should receive PPSV23 and smoking cessation guidance.
- Routine PPSV23 use is no longer recommended for Alaska Natives or American Indians aged <65 years unless they have medical indications for PPSV23. However, in certain situations, public health authorities may recommend PPSV23 for Alaska Natives and American Indians aged 50–64 years who are living in areas where the risk for invasive pneumococcal disease is increased.
- All persons should be vaccinated with PPSV23 at age 65 years. Those who received PPSV23 before age 65 years for any indication should receive another dose of the vaccine at age 65 years or later if at least 5 years have passed since their previous dose. Those who receive PPSV23 at or after age 65 years should receive only a single dose.
- ACIP does not recommend routine revaccination for most persons for whom PPSV23 is indicated. A second dose of PPSV23 is recommended 5 years after the first dose for persons aged 19–64 years with functional or anatomic asplenia and for persons with immunocompromising conditions. ACIP does not recommend multiple revaccinations because of uncertainty regarding clinical benefit and safety.

recommendations (2). For most persons for whom PPSV23 is indicated, ACIP does not recommend routine revaccination. A second dose of PPSV23 is recommended 5 years after the first dose for persons aged 19–64 years with functional or anatomic asplenia and for persons with immunocompromising conditions (Table). ACIP does not recommend multiple revaccinations because of insufficient data regarding

clinical benefit, particularly the degree and duration of protection, and safety.

Smoking cessation. Quitting smoking reduces the risk for pneumococcal disease. One study found that the risk for IPD was reduced by approximately 14% each year after quitting smoking and returned to a risk similar to that for persons who had never smoked in approximately 13 years (9). ACIP emphasizes that smoking cessation guidance should be part of the therapeutic plan for smokers regardless of immunization status. Professional organizations such as the Infectious Disease Society of America and American Thoracic Society also recommend smoking cessation counseling and pneumococcal vaccination for smokers who are hospitalized with community-acquired pneumonia (14). Clinical practice guidelines from the U.S. Public Health Service for treating tobacco use and dependence are available at http://surgeongeneral.gov/tobacco/treating_tobacco_use08.pdf.

Reported by

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Announcements

Clinical Vaccinology Course — November 5–7, 2010

CDC and six other national organizations are collaborating with the National Foundation for Infectious Diseases (NFID), Emory University School of Medicine, and the Emory Vaccine Center to sponsor a Clinical Vaccinology Course November 5–7, 2010, at the Hyatt Regency Bethesda in Bethesda, Maryland. Through lectures and interactive case presentations, the course will focus on new developments and concerns related to the use of vaccines in pediatric, adolescent, and adult populations. Infectious disease experts, including pediatricians, internists, family physicians, and public health professionals, will present the latest information on newly available vaccines and vaccines under development as well as established vaccines whose continued administration is essential to improving disease prevention efforts.

This course is designed specifically for physicians, nurses, physician assistants, pharmacists, vaccine program administrators, and other health-care professionals involved with or interested in the clinical use of vaccines. The course also will be of interest to health-care professionals involved in the prevention and control of infectious diseases, such as federal, state, and local public health officials. Course participants should have a knowledge of or interest in vaccines and vaccine-preventable diseases.

Continuing education credits will be offered. Information regarding the preliminary program, registration, and hotel accommodations is available online (<http://www.nfid.org>), by e-mail (idcourse@nfid.org), by fax (301-907-0878), by telephone (301-656-0003, ext. 19), or by mail (NFID, 4733 Bethesda Avenue, Suite 750, Bethesda, MD 20814-5228).

Preventive Medicine Residency and Fellowship Application Deadline — September 15, 2010

CDC's Preventive Medicine Residency and Fellowship (PMR/F) programs are accepting applications from physicians for the residency and from veterinarians, dentists, nurses, physician assistants, and international medical graduates for the fellowship. Applicants with public health and applied epidemiologic practice experience who seek to become preventive medicine and population health specialists and public health leaders may apply.

PMR/F programs prepare clinicians for leadership roles in public health at federal, state, and local levels through instruction and supervised practical experiences focused on translating epidemiology to public health practice, management, and policy and program development. Residents and fellows spend the practicum year at CDC or at a state or local health department.

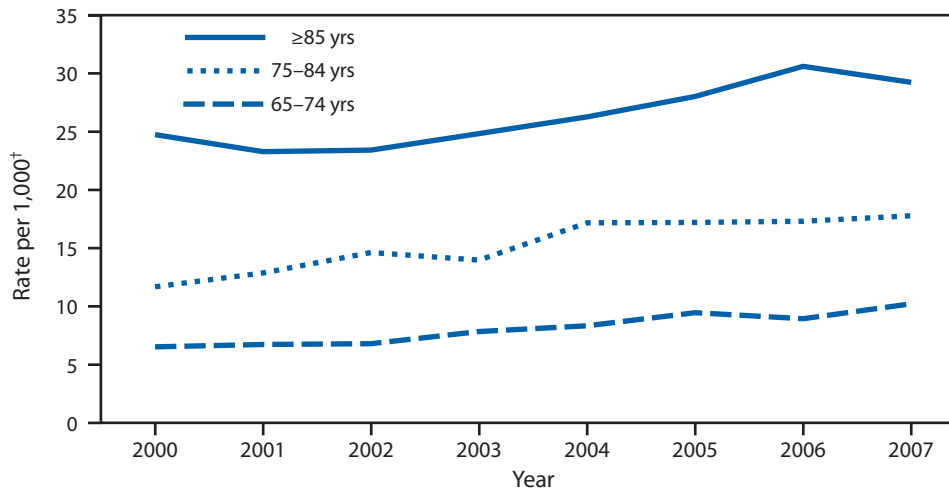
PMR/F alumni occupy leadership positions at CDC, at state and local health departments, and in academia and private-sector agencies. Completion of the residency, which is accredited by the Accreditation Council for Graduate Medical Education for 12 months of practicum training, qualifies graduates to apply for certification by the American Board of Preventive Medicine in Public Health and General Preventive Medicine.

Applications are being accepted for the class that begins in June 2011. The application must be submitted online by September 15, 2010, and supporting documents must be postmarked for delivery to the PMR/F office by September 22, 2010. Additional information regarding the programs, eligibility criteria, and application process is available online (<http://www.cdc.gov/prevmed>), by telephone (404-498-6140), or by e-mail (pmrcdd@cdc.gov).

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Hospitalization Rates for Patients Aged ≥ 65 Years with Septicemia or Sepsis,* by Age Group — National Hospital Discharge Survey, United States, 2000–2007



*Septicemia or sepsis hospitalizations are those with a diagnosis code of 038, 995.91, or 995.92, based on the *International Classification of Diseases, Ninth Revision, Clinical Modification*, in any of seven diagnosis fields of the National Hospital Discharge Survey.

† Inpatient hospitalization rates for 2000–2007 were calculated using U.S. Census Bureau 2000–based postcensal civilian population estimates. Persons might have multiple inpatient septicemia or sepsis hospitalizations, all of which are reflected in the estimates.

Septicemia and sepsis are bloodstream infections. From 2000 to 2007, the rate of hospitalization for septicemia or sepsis for persons aged 65–74 years increased 57%, from 6.5 per 1,000 to 10.2, and the rate for persons aged 75–84 years increased 52%, from 11.7 per 1,000 to 17.8. During 2000–2007, persons aged ≥ 85 years had higher rates of hospitalization for septicemia or sepsis than persons aged 65–84 years. From 2000 to 2007, rates for persons aged ≥ 85 years increased 18%, from 24.7 per 1,000 to 29.2.

SOURCE: National Hospital Discharge Survey, annual files, 2000–2007. Available at <http://www.cdc.gov/nchs/nhds.htm>.

Notifiable Diseases and Mortality Tables

TABLE I. Provisional cases of infrequently reported notifiable diseases (<1,000 cases reported during the preceding year) — United States, week ending August 28, 2010 (34th week)*

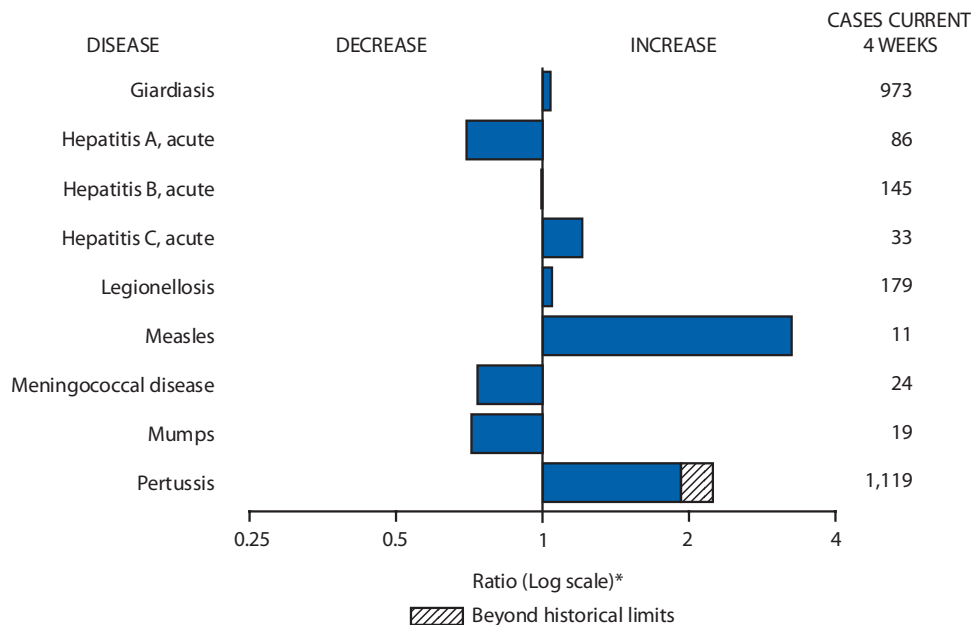
Disease	Current week	Cum 2010	5-year weekly average [†]	Total cases reported for previous years					States reporting cases during current week (No.)
				2009	2008	2007	2006	2005	
Anthrax	—	—	0	1	—	1	1	—	
Botulism, total	—	55	4	118	145	144	165	135	
foodborne	—	5	1	10	17	32	20	19	
infant	—	38	2	83	109	85	97	85	
other (wound and unspecified)	—	12	1	25	19	27	48	31	
Brucellosis	1	81	3	115	80	131	121	120	CA (1)
Chancroid	1	32	0	28	25	23	33	17	NC (1)
Cholera	—	2	0	10	5	7	9	8	
Cyclosporiasis [§]	1	125	3	141	139	93	137	543	NY (1)
Diphtheria	—	—	—	—	—	—	—	—	
Domestic arboviral diseases ^{§, ¶} :									
California serogroup virus disease	—	19	4	55	62	55	67	80	
Eastern equine encephalitis virus disease	—	9	1	4	4	4	8	21	
Powassan virus disease	—	2	0	6	2	7	1	1	
St. Louis encephalitis virus disease	—	2	1	12	13	9	10	13	
Western equine encephalitis virus disease	—	—	—	—	—	—	—	—	
<i>Haemophilus influenzae</i> , ** invasive disease (age <5 yrs):									
serotype b	1	9	0	35	30	22	29	9	VA (1)
nonsertotype b	—	127	3	236	244	199	175	135	
unknown serotype	2	147	3	178	163	180	179	217	NY (1), NC (1)
Hansen disease [§]	—	29	2	103	80	101	66	87	
Hantavirus pulmonary syndrome [§]	—	14	0	20	18	32	40	26	
Hemolytic uremic syndrome, postdiarrheal [§]	1	114	8	242	330	292	288	221	CA (1)
HIV infection, pediatric (age <13 yrs) ^{††}	—	—	1	—	—	—	—	380	
Influenza-associated pediatric mortality ^{§, §§}	2	56	1	358	90	77	43	45	LA (2)
Listeriosis	12	492	23	851	759	808	884	896	NY (1), PA (1), NC (2), GA (1), FL (2), KY (1), TX (1), CO (1), CA (2)
Measles ^{¶¶}	3	46	1	71	140	43	55	66	CA (3)
Meningococcal disease, invasive ^{***} :									
A, C, Y, and W-135	1	172	4	301	330	325	318	297	NV (1)
serogroup B	—	76	2	174	188	167	193	156	
other serogroup	—	7	0	23	38	35	32	27	
unknown serogroup	5	259	8	482	616	550	651	765	NYC (1), PA (1), MI (1), TX (1), CA (1)
Mumps	6	2,283	13	1,991	454	800	6,584	314	NY (3), MD (1), CA (2)
Novel influenza A virus infections ^{†††}	—	1	0	43,774	2	4	NN	NN	
Plague	—	1	0	8	3	7	17	8	
Polio myelitis, paralytic	—	—	—	1	—	—	—	1	
Polio virus Infection, nonparalytic [§]	—	—	—	—	—	—	NN	NN	
Psittacosis [§]	—	4	0	9	8	12	21	16	
Q fever, total ^{§, §§§}	1	75	3	114	120	171	169	136	
acute	1	57	1	94	106	—	—	—	NE (1)
chronic	—	18	0	20	14	—	—	—	
Rabies, human	—	—	—	4	2	1	3	2	
Rubella ^{¶¶¶}	—	6	0	3	16	12	11	11	
Rubella, congenital syndrome	—	—	—	2	—	—	1	1	
SARS-CoV ^{§, ****}	—	—	—	—	—	—	—	—	
Smallpox [§]	—	—	—	—	—	—	—	—	
Streptococcal toxic-shock syndrome [§]	1	117	1	161	157	132	125	129	CT (1)
Syphilis, congenital (age <1 yr) ^{††††}	—	133	8	423	431	430	349	329	
Tetanus	—	2	1	18	19	28	41	27	
Toxic-shock syndrome (staphylococcal) [§]	—	52	2	74	71	92	101	90	
Trichinellosis	—	2	0	13	39	5	15	16	
Tularemia	—	58	4	93	123	137	95	154	
Typhoid fever	4	246	11	397	449	434	353	324	OH (1), FL (1), CO (1), CA (1)
Vancomycin-intermediate <i>Staphylococcus aureus</i> [§]	1	64	1	78	63	37	6	2	FL (1)
Vancomycin-resistant <i>Staphylococcus aureus</i> [§]	—	1	—	1	—	2	1	3	
Vibriosis (noncholera <i>Vibrio</i> species infections) [§]	23	435	17	789	588	549	NN	NN	OH (1), MD (1), VA (1), GA (1), FL (2), TN (2), AZ (1), WA (7), CA (6), HI (1)
Viral hemorrhagic fever ^{§§§§}	—	1	—	NN	NN	NN	NN	NN	
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 August 28, 2010 (34th week)*

—: No reported cases. N: Not reportable. NN: Not Nationally Notifiable Cum: Cumulative year-to-date counts.
 * Incidence data for reporting years 2009 and 2010 are provisional, whereas data for 2005 through 2008 are finalized.
 † Calculated by summing the incidence counts for the current week, the 2 weeks preceding the current week, and the 2 weeks following the current week, for a total of 5 preceding years. Additional information is available at <http://www.cdc.gov/ncphi/diss/nndss/phs/files/5yearweeklyaverage.pdf>.
 ‡ Not reportable in all states. Data from states where the condition is not reportable are excluded from this table except starting in 2007 for the domestic arboviral diseases, STD data, TB data, and influenza-associated pediatric mortality, and in 2003 for SARS-CoV. Reporting exceptions are available at <http://www.cdc.gov/ncphi/diss/nndss/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.
 ** Data for *H. influenzae* (all ages, all serotypes) are available in Table II.
 †† Updated monthly from reports to the Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Implementation of HIV reporting influences the number of cases reported. Updates of pediatric HIV data have been temporarily suspended until upgrading of the national HIV/AIDS surveillance data management system is completed. Data for HIV/AIDS, when available, are displayed in Table IV, which appears quarterly.
 ††† Updated weekly from reports to the Influenza Division, National Center for Immunization and Respiratory Diseases. Since April 26, 2009, a total of 286 influenza-associated pediatric deaths associated with 2009 influenza A (H1N1) virus infection have been reported. Since August 30, 2009, a total of 281 influenza-associated pediatric deaths occurring during the 2009–10 influenza season have been reported. A total of 133 influenza-associated pediatric deaths occurring during the 2008–09 influenza season have been reported.
 ¶¶ The three measles cases reported for the current week were imported.
 *** Data for meningococcal disease (all serogroups) are available in Table II.
 †††† CDC discontinued reporting of individual confirmed and probable cases of 2009 pandemic influenza A (H1N1) virus infections on July 24, 2009. During 2009, three cases of novel influenza A virus infections, unrelated to the 2009 pandemic influenza A (H1N1) virus, were reported to CDC. The one case of novel influenza A virus infection reported to CDC during 2010 was identified as swine influenza A (H3N2) virus and is unrelated to pandemic influenza A (H1N1) virus. Total case count for 2009 was provided by the Influenza Division, National Center for Immunization and Respiratory Diseases (NCIRD).
 ††††† In 2009, 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.
 ††††††† Updated weekly from reports to the Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention.
 †††††††† There was one case of viral hemorrhagic fever reported during week 12. The one case report was confirmed as lassa fever. See Table II for dengue hemorrhagic fever.

FIGURE I. Selected notifiable disease reports, United States, comparison of provisional 4-week totals August 28, 2010, with historical data



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

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TABLE II. Provisional cases of selected notifiable diseases, United States, weeks ending August 28, 2010, and August 29, 2009 (34th week)*

Reporting area	<i>Chlamydia trachomatis</i> infection					Cryptosporidiosis				
	Current week	Previous 52 weeks		Cum 2010	Cum 2009	Current week	Previous 52 weeks		Cum 2010	Cum 2009
		Med	Max				Med	Max		
United States	13,226	22,794	26,156	750,153	824,675	147	122	267	4,361	4,548
New England	574	745	1,396	25,472	26,457	5	8	58	293	285
Connecticut	—	220	736	6,053	7,586	—	0	52	52	38
Maine†	50	49	75	1,640	1,591	2	1	7	53	32
Massachusetts	416	397	638	13,301	12,729	—	3	15	91	109
New Hampshire	54	40	116	1,513	1,399	1	1	6	40	53
Rhode Island†	46	66	116	2,162	2,395	—	0	8	9	7
Vermont†	8	24	63	803	757	2	1	9	48	46
Mid. Atlantic	3,358	3,182	4,619	109,749	103,123	22	15	38	510	529
New Jersey	412	456	698	16,270	16,196	—	0	3	—	38
New York (Upstate)	874	674	2,530	22,025	19,708	14	3	16	130	127
New York City	1,430	1,188	2,144	41,103	38,416	—	1	5	47	60
Pennsylvania	642	877	1,091	30,351	28,803	8	9	25	333	304
E.N. Central	1,106	3,526	4,413	112,368	132,915	31	29	70	1,062	1,101
Illinois	15	851	1,322	23,472	40,662	—	2	7	95	105
Indiana	—	356	786	12,029	15,610	—	4	10	116	189
Michigan	678	891	1,417	31,685	30,482	3	6	12	210	179
Ohio	159	964	1,077	31,710	32,238	19	7	24	293	269
Wisconsin	254	404	495	13,472	13,923	9	9	39	348	359
W.N. Central	263	1,330	1,592	43,414	47,094	24	22	54	746	685
Iowa	16	183	293	6,356	6,431	3	4	18	200	153
Kansas	32	188	381	6,108	7,247	7	2	7	93	67
Minnesota	—	275	337	8,814	9,505	—	3	30	98	179
Missouri	201	490	606	16,061	17,240	—	3	18	157	132
Nebraska†	—	95	237	3,072	3,564	14	2	12	118	63
North Dakota	—	34	93	1,083	1,114	—	0	18	16	7
South Dakota	14	59	82	1,920	1,993	—	2	8	64	84
S. Atlantic	2,988	4,486	5,681	147,381	168,525	14	19	51	652	683
Delaware	72	87	156	2,747	3,101	—	0	2	3	5
District of Columbia	—	100	177	3,199	4,676	—	0	1	2	5
Florida	634	1,411	1,669	48,252	49,185	8	8	24	243	230
Georgia	—	381	1,323	10,170	27,178	2	5	31	197	245
Maryland†	—	452	1,031	14,425	14,955	2	1	3	23	31
North Carolina	759	802	1,562	28,269	28,155	—	1	12	53	71
South Carolina†	541	516	694	17,680	18,205	2	1	8	53	42
Virginia†	882	594	902	20,246	20,660	—	2	8	67	44
West Virginia	100	68	137	2,393	2,410	—	0	2	11	10
E.S. Central	516	1,712	2,410	56,199	62,538	4	4	11	151	136
Alabama†	—	470	661	16,012	18,133	—	1	5	56	43
Kentucky	242	301	642	10,300	8,620	2	1	6	52	38
Mississippi	—	385	780	11,387	15,886	—	0	3	7	12
Tennessee†	274	581	732	18,500	19,899	2	1	5	36	43
W.S. Central	1,703	2,905	4,578	97,728	108,100	5	8	39	222	322
Arkansas†	313	240	402	7,042	9,557	—	1	4	22	34
Louisiana	—	23	1,055	2,922	19,342	1	1	5	28	34
Oklahoma	441	262	1,376	10,606	9,793	4	1	9	55	73
Texas†	949	2,233	3,201	77,158	69,408	—	4	30	117	181
Mountain	393	1,459	2,081	45,057	51,098	15	10	20	338	367
Arizona	87	467	713	13,195	17,103	—	0	3	21	25
Colorado	94	383	709	11,902	11,585	6	2	9	89	96
Idaho†	—	64	191	1,985	2,452	1	2	6	57	56
Montana†	21	58	75	1,922	1,990	1	1	4	33	38
Nevada†	157	177	337	6,381	6,756	—	0	2	14	15
New Mexico†	—	165	453	4,531	5,883	1	2	8	65	96
Utah	23	117	175	3,884	4,071	6	1	4	47	26
Wyoming†	11	38	70	1,257	1,258	—	0	2	12	15
Pacific	2,325	3,472	5,350	112,785	124,825	27	12	27	387	440
Alaska	—	107	147	3,786	3,532	—	0	1	2	4
California	2,012	2,735	4,406	90,758	95,600	17	8	20	226	250
Hawaii	1	112	158	3,687	4,056	—	0	0	—	1
Oregon	—	58	468	1,367	7,104	4	2	7	101	137
Washington	312	396	497	13,187	14,533	6	1	8	58	48
Territories										
American Samoa	—	0	0	—	—	N	0	0	N	N
C.N.M.I.	—	—	—	—	—	—	—	—	—	—
Guam	—	4	31	173	248	—	0	0	—	—
Puerto Rico	—	95	266	3,388	5,213	N	0	0	N	N
U.S. Virgin Islands	—	8	15	132	359	—	0	0	—	—

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

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TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending August 28, 2010, and August 29, 2009 (34th week)*

Reporting area	Dengue Virus Infection									
	Dengue Fever [†]					Dengue Hemorrhagic Fever [‡]				
	Current week	Previous 52 weeks		Cum 2010	Cum 2009	Current week	Previous 52 weeks		Cum 2010	Cum 2009
	Med	Max				Med	Max			
United States	—	2	19	213	NN	—	0	1	2	NN
New England	—	0	1	2	NN	—	0	0	—	NN
Connecticut	—	0	0	—	NN	—	0	0	—	NN
Maine [¶]	—	0	1	1	NN	—	0	0	—	NN
Massachusetts	—	0	0	—	NN	—	0	0	—	NN
New Hampshire	—	0	0	—	NN	—	0	0	—	NN
Rhode Island [¶]	—	0	0	—	NN	—	0	0	—	NN
Vermont [¶]	—	0	1	1	NN	—	0	0	—	NN
Mid. Atlantic	—	0	7	60	NN	—	0	0	—	NN
New Jersey	—	0	0	—	NN	—	0	0	—	NN
New York (Upstate)	—	0	0	—	NN	—	0	0	—	NN
New York City	—	0	5	50	NN	—	0	0	—	NN
Pennsylvania	—	0	2	10	NN	—	0	0	—	NN
E.N. Central	—	0	2	8	NN	—	0	0	—	NN
Illinois	—	0	0	—	NN	—	0	0	—	NN
Indiana	—	0	0	—	NN	—	0	0	—	NN
Michigan	—	0	0	—	NN	—	0	0	—	NN
Ohio	—	0	2	5	NN	—	0	0	—	NN
Wisconsin	—	0	1	3	NN	—	0	0	—	NN
W.N. Central	—	0	2	9	NN	—	0	0	—	NN
Iowa	—	0	1	1	NN	—	0	0	—	NN
Kansas	—	0	0	—	NN	—	0	0	—	NN
Minnesota	—	0	2	8	NN	—	0	0	—	NN
Missouri	—	0	0	—	NN	—	0	0	—	NN
Nebraska [¶]	—	0	0	—	NN	—	0	0	—	NN
North Dakota	—	0	0	—	NN	—	0	0	—	NN
South Dakota	—	0	0	—	NN	—	0	0	—	NN
S. Atlantic	—	0	14	116	NN	—	0	1	1	NN
Delaware	—	0	0	—	NN	—	0	0	—	NN
District of Columbia	—	0	0	—	NN	—	0	0	—	NN
Florida	—	0	13	99	NN	—	0	1	1	NN
Georgia	—	0	2	6	NN	—	0	0	—	NN
Maryland [¶]	—	0	0	—	NN	—	0	0	—	NN
North Carolina	—	0	1	1	NN	—	0	0	—	NN
South Carolina [¶]	—	0	3	8	NN	—	0	0	—	NN
Virginia [¶]	—	0	0	—	NN	—	0	0	—	NN
West Virginia	—	0	1	2	NN	—	0	0	—	NN
E.S. Central	—	0	1	1	NN	—	0	0	—	NN
Alabama [¶]	—	0	0	—	NN	—	0	0	—	NN
Kentucky	—	0	0	—	NN	—	0	0	—	NN
Mississippi	—	0	0	—	NN	—	0	0	—	NN
Tennessee [¶]	—	0	1	1	NN	—	0	0	—	NN
W.S. Central	—	0	0	—	NN	—	0	1	1	NN
Arkansas [¶]	—	0	0	—	NN	—	0	1	1	NN
Louisiana	—	0	0	—	NN	—	0	0	—	NN
Oklahoma	—	0	0	—	NN	—	0	0	—	NN
Texas [¶]	—	0	0	—	NN	—	0	0	—	NN
Mountain	—	0	1	8	NN	—	0	0	—	NN
Arizona	—	0	1	2	NN	—	0	0	—	NN
Colorado	—	0	0	—	NN	—	0	0	—	NN
Idaho [¶]	—	0	0	—	NN	—	0	0	—	NN
Montana [¶]	—	0	1	2	NN	—	0	0	—	NN
Nevada [¶]	—	0	1	3	NN	—	0	0	—	NN
New Mexico [¶]	—	0	1	1	NN	—	0	0	—	NN
Utah	—	0	0	—	NN	—	0	0	—	NN
Wyoming [¶]	—	0	0	—	NN	—	0	0	—	NN
Pacific	—	0	2	9	NN	—	0	0	—	NN
Alaska	—	0	0	—	NN	—	0	0	—	NN
California	—	0	1	4	NN	—	0	0	—	NN
Hawaii	—	0	0	—	NN	—	0	0	—	NN
Oregon	—	0	0	—	NN	—	0	0	—	NN
Washington	—	0	2	5	NN	—	0	0	—	NN
Territories										
American Samoa	—	0	0	—	NN	—	0	0	—	NN
C.N.M.I.	—	—	—	—	NN	—	—	—	—	NN
Guam	—	0	0	—	NN	—	0	0	—	NN
Puerto Rico	—	17	83	1,114	NN	—	0	3	27	NN
U.S. Virgin Islands	—	0	0	—	NN	—	0	0	—	NN

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[†] Dengue Fever includes cases that meet criteria for Dengue Fever with hemorrhage.

[‡] DHF includes cases that meet criteria for dengue shock syndrome (DSS), a more severe form of DHF.

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

TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending August 28, 2010, and August 29, 2009 (34th week)*

Reporting area	Spotted Fever Rickettsiosis (including RMSF) [†]									
	Confirmed					Probable				
	Current week	Previous 52 weeks		Cum 2010	Cum 2009	Current week	Previous 52 weeks		Cum 2010	Cum 2009
	Med	Max				Med	Max			
United States	4	2	14	100	116	18	15	421	873	1,021
New England	—	0	1	—	2	—	0	1	1	9
Connecticut	—	0	0	—	—	—	0	0	—	—
Maine [§]	—	0	0	—	—	—	0	1	1	4
Massachusetts	—	0	0	—	1	—	0	1	—	5
New Hampshire	—	0	0	—	—	—	0	1	—	—
Rhode Island [§]	—	0	0	—	—	—	0	0	—	—
Vermont [§]	—	0	1	—	1	—	0	0	—	—
Mid. Atlantic	—	0	2	13	9	—	1	5	39	73
New Jersey	—	0	0	—	2	—	0	3	—	48
New York (Upstate)	—	0	1	1	—	—	0	3	10	10
New York City	—	0	1	1	—	—	0	4	19	5
Pennsylvania	—	0	2	11	7	—	0	1	10	10
E.N. Central	1	0	1	4	8	—	0	7	52	70
Illinois	—	0	1	2	1	—	0	5	19	43
Indiana	1	0	1	2	3	—	0	5	25	8
Michigan	—	0	1	—	3	—	0	2	3	1
Ohio	—	0	0	—	—	—	0	2	5	15
Wisconsin	—	0	0	—	1	—	0	1	—	3
W.N. Central	—	0	2	8	16	1	2	19	173	218
Iowa	—	0	0	—	1	—	0	1	2	4
Kansas	—	0	1	2	1	—	0	0	—	—
Minnesota	—	0	1	—	1	—	0	1	—	1
Missouri	—	0	1	5	6	—	2	18	166	209
Nebraska [§]	—	0	1	1	7	1	0	1	4	4
North Dakota	—	0	0	—	—	—	0	1	1	—
South Dakota	—	0	0	—	—	—	0	0	—	—
S. Atlantic	3	1	10	53	55	13	5	59	319	310
Delaware	—	0	1	1	—	—	0	2	14	15
District of Columbia	—	0	0	—	—	—	0	1	—	—
Florida	—	0	1	2	—	1	0	1	7	4
Georgia	—	0	6	33	45	—	0	0	—	—
Maryland [§]	—	0	1	1	2	—	0	4	28	32
North Carolina	2	0	3	11	5	10	1	48	178	200
South Carolina [§]	1	0	0	1	3	1	0	2	10	15
Virginia [§]	—	0	2	4	—	1	1	11	82	43
West Virginia	—	0	0	—	—	—	0	1	—	1
E.S. Central	—	0	2	11	7	2	3	28	235	204
Alabama [§]	—	0	1	2	3	—	1	8	44	46
Kentucky	—	0	2	6	1	—	0	0	—	—
Mississippi	—	0	0	—	—	—	0	1	2	9
Tennessee [§]	—	0	2	3	3	2	3	20	189	149
W.S. Central	—	0	3	1	6	2	1	408	48	114
Arkansas [§]	—	0	1	—	—	—	0	110	20	59
Louisiana	—	0	0	—	—	—	0	1	2	2
Oklahoma	—	0	2	—	5	1	0	287	16	39
Texas [§]	—	0	1	1	1	1	0	11	10	14
Mountain	—	0	2	3	12	—	0	3	5	23
Arizona	—	0	2	1	6	—	0	2	1	11
Colorado	—	0	0	—	1	—	0	0	—	—
Idaho [§]	—	0	0	—	—	—	0	1	2	1
Montana [§]	—	0	1	2	4	—	0	1	1	6
Nevada [§]	—	0	0	—	—	—	0	0	—	1
New Mexico [§]	—	0	0	—	—	—	0	1	1	1
Utah	—	0	0	—	—	—	0	0	—	1
Wyoming [§]	—	0	0	—	1	—	0	0	—	2
Pacific	—	0	2	7	1	—	0	1	1	—
Alaska	N	0	0	N	N	N	0	0	N	N
California	—	0	2	6	1	—	0	0	—	—
Hawaii	N	0	0	N	N	N	0	0	N	N
Oregon	—	0	1	1	—	—	0	1	1	—
Washington	—	0	0	—	—	—	0	0	—	—
Territories										
American Samoa	N	0	0	N	N	N	0	0	N	N
C.N.M.I.	—	—	—	—	—	—	—	—	—	—
Guam	N	0	0	N	N	N	0	0	N	N
Puerto Rico	N	0	0	N	N	N	0	0	N	N
U.S. Virgin Islands	—	0	0	—	—	—	0	0	—	—

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[†] Illnesses with similar clinical presentation that result from Spotted fever group rickettsia infections are reported as Spotted fever rickettsioses. Rocky Mountain spotted fever (RMSF) caused by *Rickettsia rickettsii*, is the most common and well-known spotted fever.[§] Contains data reported through the National Electronic Disease Surveillance System (NEDSS).

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