



MMWR™

Morbidity and Mortality Weekly Report

www.cdc.gov/mmwr

Weekly

October 17, 2008 / Vol. 57 / No. 41

National Teen Driver Safety Week – October 19–25, 2008

October 19–25 is National Teen Driver Safety Week. In 2006, a total of 4,144 teens aged 16–19 years died, and nearly 400,000 were treated in emergency departments for injuries sustained in motor-vehicle crashes in the United States (1,2).

By delaying full driving privileges so that teens can gain driving experience under low-risk conditions, comprehensive graduated driver licensing systems can reduce fatal and nonfatal injury crashes of drivers aged 16 years by as much as 38% and 40%, respectively (3). Extending the learner permit period, restricting night-time driving, and limiting teen passengers each contribute to crash reductions (4). Raising the minimum drinking age to 21 years and enforcing “zero” blood alcohol levels for teen drivers also have reduced motor-vehicle-related deaths and injuries. (5).

Information about teen driver safety and National Teen Driver Safety Week are available from CDC at <http://www.cdc.gov/ncipc/duip/spotlite/teendrivers.htm>, the National Highway Traffic Safety Administration at <http://www.nhtsa.dot.gov>, and the Children’s Hospital of Philadelphia at http://stokes.chop.edu/programs/injury/our_research/ydri.php.

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Injuries Resulting from Car Surfing – United States, 1990–2008

“Car surfing” is a term introduced in the mid-1980s to describe a thrill-seeking activity that involves riding on the exterior of a moving motor vehicle while it is being driven by another person (1). Although reports of car-surfing injuries have been published in the United States, no study to date has analyzed these events from a national perspective (2–5). Because traditional public health datasets do not collect morbidity or mortality data on this practice, CDC searched U.S. newspaper reports to provide an initial characterization of car-surfing injuries on a national scale. That analysis identified 58 reports of car-surfing deaths and 41 reports of nonfatal injury from 1990 through August 2008. Most reports of car-surfing injuries came from newspapers in the Midwest and South (75%), and most of the injuries were among males (70%) and persons aged 15–19 years (69%). The first identified newspaper reports about car-surfing injuries were published in the early 1990s, and new reports have been published every year since then. Parents and teens should be aware of the potentially lethal consequences of car surfing, which can occur even at low vehicle speeds, sometimes resulting from unanticipated movements of the vehicle, such as swerving or braking.

National injury surveillance systems, trauma registries, and death certificates lack sufficient detail to distinguish car-surfing victims from others who have fallen from a moving motor vehicle. For example, the National Electronic Injury Surveillance System–All Injury Program, which uses data from emergency department records, does not contain sufficient detail to distinguish car-surfing cases effectively. Among

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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].

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factors that might account for this absence of distinguishing information are a lack of awareness of this activity among health-care professionals and the difficulty of capturing the intent of a person riding on top of a moving vehicle. Another issue is the lack of coding options to describe this particular behavior precisely. For example, although e-codes are typically used to capture cause of injury in traditional public health data sets, the closest e-code, 818.8, is too broad in definition to specifically capture car-surfing cases and does not define the intent of the person who was injured (4). Therefore, to obtain an approximate characterization of car-surfing injuries and deaths, CDC identified probable car-surfing incidents from an August 2008 LexisNexis* search of U.S. newspapers, using the terms "car surfing," and "injury" or "death." A case was defined as an injury of a person that resulted from the person intentionally riding on the exterior of a motor vehicle while it was being driven by another person. Resulting injury could come from falling off the moving vehicle, falling down onto the vehicle, jumping from the vehicle, or being hit by an object while on top of the moving vehicle. Persons who had placed themselves on a stationary vehicle, and did not intend to remain on the vehicle once it began to move, were excluded. Identifying information was used to avoid counting the same event more than once if it was reported in multiple newspapers or repeatedly by the same newspaper.

Several behaviors were excluded that closely resemble car surfing but did not fit the case definition. These included injuries resulting from a person leaning out of a window or the sunroof of a moving vehicle or being pulled alongside or behind a motor vehicle (typically while on a bike or skateboard). An activity known as "ghost riding," in which the driver exits the moving motor vehicle to dance next to it while the vehicle continues to move forward, also was excluded. Three illustrative cases of deaths or serious injury from car-surfing injury are provided below.

Case 1. In May 2001, a male aged 19 years from Massachusetts fell off the back of a car driven by a friend aged 18 years. Observers told authorities that the boy was kneeling on the trunk of the vehicle in an attempt at car surfing and appeared to lose his grip before sliding off the back. The vehicle was traveling at approximately 15 mph at the time of the fall. The boy had massive head and spinal cord injuries, was hospitalized, and died 3 days later.

Case 2. In August 1996, a male aged 14 years ran and jumped onto the hood of a friend's vehicle to car surf as it was pulling out of a residential driveway in Virginia. Witnesses stated that the vehicle was traveling at a slow speed, estimated at 5 mph, when the car hit a bump in the driveway, causing

* Available at <http://lexisnexis.com>.

the boy to slide off of the hood. He fell on his head and had a fatal head injury.

Case 3. In 1992, a male aged 16 years from Illinois was dared by his friends to ride on the hood of their car while they drove it down a road. The friends said the car was traveling at about 35 mph when the boy lost his grip and traveled 18 feet through the air before landing on his head. He had serious head injuries and was in a coma at a local hospital at the time the newspaper report was published.

During 1990–August 2008, a total of 99 cases of car-surfing injury were identified in United States newspapers (Table). One case of car surfing was reported in the South in 1990 and was the only one reported that year. Reports grew in frequency after 1990, increasing to 10 reports in 1995, then averaging 6.4 reported cases per year during 1995–2007 (Figure 1) Cases were reported from 31 U.S. states, with the largest percentages reported from the Midwest[†] (39%) and the South[§] (35%). Fifty-eight of the 99 car-surfing reports indicated fatal injuries, with head trauma cited as the cause of death in 45 of the 58 cases (78%). The specific injury leading to death was not reported in the remaining 13 fatal cases. The majority of persons injured while car surfing were male (70 of 99), and among the 88 reports in which age was indicated, the persons injured ranged in age from 10–37 years (mean: 17.6 years, median: 16 years). By age group, the greatest proportion of cases (69%) was among persons aged 15–19 years. Reports of car-surfing injuries appeared to be seasonal, with numbers rising in the summer months and peaking in August (Figure 2).

The speed of the vehicle at the time of injury was reported in 21 of 99 cases, 17 of which were fatal. Vehicle speed was less than 30 mph in 11 of the 21 cases (52%), with fatalities occurring at speeds ranging from 5 mph to 80 mph. Alcohol or drugs were mentioned as contributing factors in 11 of 99 cases overall (11%) and six of 58 fatal cases (10%). In 28 of 99 cases, a sudden maneuver or movement of the vehicle was reported, which might have contributed to the car surfer subsequently falling from the vehicle. These maneuvers included turning or swerving the vehicle (16 of 28), braking the vehicle (7 of 28), hitting a bump or dip in the road (3 of 28), and accelerating the vehicle (2 of 28).

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Editorial Note: This report is the first to describe car-surfing injuries from a national perspective. It suggests that injury

TABLE. Selected characteristics of car-surfing* cases, based on newspaper reports[†] (N = 99) — United States, 1990–2008[§]

Characteristic	No.
U.S. region[¶] from which case was reported	
Midwest	39
South	35
Northeast	8
West	17
Severity of reported injury	
Fatal	58
Nonfatal	41
Sex	
Male	69
Female	30
Age (yrs)	
10–14	8
15–19	68
20–24	7
25–34	4
≥35	1
Not reported	11
Estimated speed (mph) at time of injury	
1–10	3
11–20	4
21–30	4
31–40	5
41–50	0
>50	5
Not reported	78
Reported movement of vehicle contributing to fall	
Swerve/Turn	16
Brake	7
Hit bump/dip in road	3
Acceleration	2
Not reported	71

* Defined as an activity in which a person attempts to ride on the exterior of a moving motor vehicle while it is being driven by another person.

[†] From newspaper articles obtained through LexisNexis search. Several variables had missing data. The total number of cases with sufficient information is noted for each variable.

[§] Results for 2008 are limited to January–August.

[¶] *Midwest:* Iowa, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, North Dakota, Nebraska, Ohio, South Dakota, and Wisconsin. *South:* Alabama, Arkansas, District of Columbia, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *Northeast:* Connecticut, Massachusetts, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *West:* Arkansas, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming.

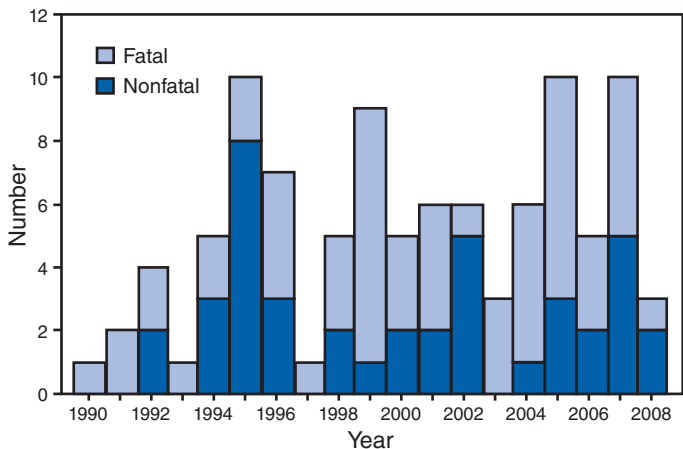
resulting from this activity has been a persistent occurrence among teens in the United States and might occur in regional and seasonal patterns. Despite the potentially lethal consequences of this activity, car surfing shows no evidence of decreasing popularity.

Data compiled from newspaper reports suggest that car surfing is most popular among teenaged males, which is consistent with cases of car-surfing injury reported in the medical literature (2–5). The predominance of head injury as the cause of death also is consistent with the medical literature (2–5). The

[†] Iowa, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, North Dakota, Nebraska, Ohio, South Dakota, and Wisconsin.

[§] Alabama, Arkansas, District of Columbia, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

FIGURE 1. Number of fatal and nonfatal injuries attributable to car surfing,* based on newspaper reports — United States, 1990–2008†



SOURCE: Newspaper reports of car-surfing incidents from a LexisNexis search.

* Defined as an activity where a person attempts to ride on the exterior of a moving motor vehicle while it is being driven by another person.

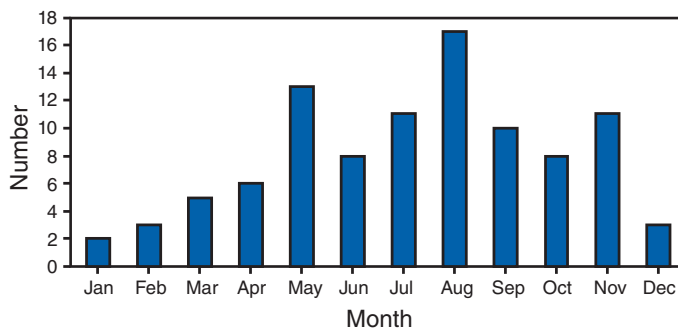
† Results for 2008 are limited to January–August.

data in this analysis, though subject to substantial limitations, suggest that, from a national perspective, high vehicle speeds are not required for a serious or fatal injury to occur, and that sudden changes in vehicle speed or direction might often be the crucial event that forces the car surfer off of the vehicle, even at low speeds. The data further suggest that many car-surfing injuries are not associated with the use of alcohol or drugs.

The findings in this report are subject to at least three limitations. First, the use of newspaper reports to identify cases might be insensitive because 1) LexisNexis does not include all U.S. newspapers, 2) many cases of car-surfing injury (or characteristics of cases) likely are not reported in newspapers (6), and 3) some cases of car surfing might be reported in newspapers under a different activity name. Second, newspapers are not written for scientific purposes and might contain inaccuracies about the injured person or the circumstances of the injury (7). Finally, although 58 of 99 newspaper reports in this study described fatal incidents of car surfing, no inference can be drawn about the case fatality rate for these injuries, given that media reporting might favor the reporting of fatal over nonfatal incidents (8).

Car surfing is one of a range of risky behaviors that U.S. teen motorists participate in that are increasingly being video-recorded and posted on video-sharing websites. However, these videos often do not portray the associated risk for injury or death. Car surfers might underestimate the risk and might not anticipate the sudden vehicle movements that can dislodge

FIGURE 2. Number of car-surfing* injuries, based on newspaper reports, by month — United States, 1990–2008†



SOURCE: Newspaper reports of car-surfing incidents from a LexisNexis search.

* Defined as an activity where a person attempts to ride on the exterior of a moving motor vehicle while it is being driven by another person.

† Results for 2008 are limited to January–August.

them from the vehicle, even at very low speeds. Furthermore, they might not consider that car surfing has led to serious legal charges against the car surfer or vehicle driver (9).

Raised awareness of this activity among parents, educators, law enforcement personnel, and health practitioners might help ameliorate risk-taking decisions among teen drivers and improve recognition of this activity by health-care providers. Raised awareness also might lead to better reporting of these activities in traditional public health data sets and allow more accurate calculation of incidence and fatality rates, which might lead to improved prevention efforts.

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Illnesses and Injuries Related to Total Release Foggers — Eight States, 2001–2006

Total release foggers (TRFs), sometimes called “bug bombs,” are pesticide products designed to fill an area with insecticide and often are used in homes and workplaces to kill cockroaches, fleas, and flying insects. Most TRFs contain pyrethroid, pyrethrin, or both as active ingredients. TRFs also contain flammable aerosol propellants that can cause fires or explosions. The magnitude and range of acute health problems associated with TRF usage has not been described previously. This report summarizes illnesses and injuries that were associated with exposures to TRFs during 2001–2006 in eight states (California, Florida, Louisiana, Michigan, New York, Oregon, Texas, and Washington) and were investigated by the California Department of Pesticide Regulation (CDPR) and state health departments participating in the SENSOR-Pesticides program.* During 2001–2006, a total of 466 TRF-related illnesses or injuries were identified. These illnesses or injuries often resulted from inability or failure to vacate before the TRF discharged, reentry into the treated space too soon after the TRF was discharged, excessive use of TRFs for the space being treated, and failure to notify others nearby. The findings indicate that TRFs pose a risk for acute, usually temporary health effects among users and bystanders. To reduce the risk for TRF-related health effects, integrated pest management control strategies that prevent pests’ access to food, water, and shelter need to be promoted and adopted. In addition, awareness of the hazards and proper use of TRFs need to be better communicated on TRF labels and in public media campaigns.

States participating in the SENSOR-Pesticides program and CDPR conduct surveillance on pesticide poisoning. In addition, the New York City Department of Health and Mental Hygiene through the New York City Poison Control Center (NYCPCC) has access to data on pesticide poisoning. No other states or cities conduct pesticide poisoning surveillance. Cases of acute TRF-related illness or injury consistent with the national case definition for acute pesticide-related illness or injury (*I*) (Table 1) and occurring during 2001–2006 (the latest years for which complete surveillance data were available) were provided to CDC by these surveillance programs.

*Under the Sentinel Event Notification System for Occupational Risk (SENSOR)-Pesticides program, CDC provides cooperative agreement funding and technical support to state health departments to conduct surveillance of acute, occupational, pesticide-related illness and injury. Funding support also is provided by the Environmental Protection Agency. Health departments in 10 states (Arizona, California, Florida, Louisiana, Michigan, New Mexico, New York, Oregon, Texas, and Washington) participated through 2006. Additional information is available at <http://www.cdc.gov/niosh/topics/pesticides>.

TABLE 1. Case definition matrix for total release fogger (TRF)-related illnesses or injuries — eight states,* 2001–2006

Classification criteria [†]	Classification category				
	Definite	Probable	Possible	Suspicious	
Exposure	1	1	2	2	1 or 2
Health effects	1	2	1	2	1 or 2
Causal relationship	1	1	1	1	4

SOURCE: CDC. Case definition for acute pesticide-related illness and injury cases reportable to the National Public Health Surveillance System. Cincinnati, OH: US Department of Health and Human Services, CDC, National Institute for Occupational Safety and Health; 2005. Available at http://www.cdc.gov/niosh/topics/pesticides/pdfs/casedef2003_revapr2005.pdf.

* California, Florida, Louisiana, Michigan, New York, Oregon, Texas, and Washington.

[†] Cases are defined as definite, probable, possible, or suspicious based on scores for each of three criteria: exposure, health effects, and causal relationship. Scores may be 1, 2, or 4 and are assigned based on available evidence for each criterion. For example, a definite case has a score of 1,1,1 (i.e., a score of 1 on all three criteria), and a probable case may have a score of 1,2,1 or 2,1,1. Exposure scores: 1 = laboratory, clinical, or environmental evidence that corroborates TRF exposure; 2 = evidence of TRF exposure based solely on written or verbal report from the patient, a witness, or applicator. Name or chemical class of the active ingredients contained in the TRF is required (unless health effects are produced by an explosion). Health effects scores: 1 = two or more new postexposure signs or laboratory findings reported by a licensed health professional; 2 = two or more postexposure symptoms reported by the patient. Causal relationship scores: 1 = the known toxicology of the putative TRF was consistent with the observed health effects; 4 = insufficient toxicologic information was available to determine a causal relationship between the TRF exposure and the health effects.

Cases of TRF-related illness or injury were classified by the state agencies as definite, probable, possible, or suspicious, according to pesticide exposure and health effects criteria (Table 1). CDC classified the cases provided by NYCPCC. Data from the state agencies and NYCPCC were compared, and duplicate cases were eliminated. In addition to receiving reports from poison control centers, each surveillance program obtains case reports from several other sources, principally state agencies with jurisdiction over pesticide use (e.g., departments of agriculture) and workers compensation claims (2,3). Some California cases might have been missed because the CDPR contract with the California Poison Control System to receive poisoning reports lapsed after 2002 and was not reestablished until late 2006. Detailed information was collected on each case, including demographic data, signs and symptoms, illness or injury severity,[†] Environmental Protection Agency (EPA)

[†] Severity for SENSOR and CDPR cases was coded using standardized criteria (available at <http://www.cdc.gov/niosh/topics/pesticides>). Low-severity illnesses or injuries consist of illnesses and injuries that generally resolve without treatment and where minimal time (<3 days) is lost from work. Such cases typically manifest as eye, skin, and/or upper respiratory irritation. Moderate severity illnesses and injuries consist of non-life-threatening health effects that are generally systemic and require medical treatment. No residual disability is detected, and time lost from work is <6 days. High-severity illnesses and injuries consist of life-threatening health effects that usually require hospitalization, involve substantial time lost from work (>5 days), and can result in permanent impairment or disability. Deaths are fatalities resulting from exposure to one or more pesticides. NYCPCC uses similar criteria for coding severity.

toxicity category,[§] identity of implicated pesticides, location of the exposure, and information on factors that might have contributed to the exposure. Three recent case reports are provided to illustrate common patterns observed in the surveillance data.

Case Reports

Case 1. In March 2008, a woman aged 38 years from Washington visited an emergency department with headache, shortness of breath, nausea, leg cramps, burning eyes, cough, and weakness after she was exposed to fumes from three TRFs (in 6-ounce cans) deployed nearly simultaneously by a downstairs apartment neighbor. One TRF each was set off in the crawlspace beneath the house, in the neighbor's apartment, and in the hallway. The building was an old house converted into apartments, with a single ventilation system connecting all apartments. The neighbor had orally notified some of the tenants but not the patient. The patient recovered completely within 3 days, and the illness was classified as low severity. The TRF dispensed a toxicity category III pesticide product that contained permethrin and tetramethrin as active ingredients.

Case 2. In September 2007, a man aged 34 years who worked as a maintenance worker at an apartment complex in Michigan forgot to disarm the smoke detector before activating a TRF. Because the building elevator shuts down if a smoke detector is triggered, the maintenance worker (without respiratory protection) reentered the mist-filled apartment to disarm the detector. He had onset of cough and upper airway irritation approximately 1 hour after exposure, contacted a poison control center, and did not seek additional medical care. His symptoms resolved within 24 hours, and his TRF-related illness was classified as low severity. He was exposed to a toxicity category III pesticide product with pyrethrins, cyfluthrin, and piperonyl butoxide as active ingredients.

Case 3. In August 2007, a man aged 54 years in California simultaneously set off nine TRFs in his small 700 square foot (6,000 cubic foot) home. Each 1.5-ounce TRF can was designed to treat 5,000 cubic feet of unobstructed space and released a toxicity category III pesticide product containing cypermethrin. When the man returned 6 hours later, a strong odor prompted him to open the doors and windows and to vacate. Entering a second time 4 hours later, the man had onset of headache, dizziness, nausea, and vomiting. He visited an emergency department, where he was treated symptomatically for TRF-related illness with a nebulized anticholinergic bronchodilator, intravenous hydration, and intravenous medication for headache, nausea, and bradycardia. He com-

pletely recovered after 36 hours, and his illness was classified as moderate severity.

Surveillance Data

A total of 466 cases of acute, pesticide-related illness or injury associated with exposure to TRFs during 2001–2006 were identified. SENSOR-Pesticides reported 368 cases, CDPR reported 40 cases, and NYCPC reported 58 cases. Median age of affected persons was 35 years (range: 0–90 years); 255 (57%) were female, and 55 (13%) were exposed while at work. Race information was available for 137 patients, of whom 101 (74%) were white, 17 (12%) were black, and 19 (14%) were of other races. Ethnicity information was available for 158 patients, of whom 31 (20%) were Hispanic. Three cases occurred among pregnant women, and approximately 44 cases occurred among persons with asthma.

A total of 372 (80%) cases were classified as low severity, 84 (18%) cases were moderate severity, and nine (2%) were high severity. One death was classified by the Washington State Department of Health as suspicious. (This death occurred in a female infant aged 10 months who was put to bed the evening of the day her apartment was treated with three TRFs. The infant was found dead the next morning.) Twenty-one persons were hospitalized for 1 or more days (range: 1–35 days), and 43 persons lost time from work or other usual activities because of their illness or injury.

A total of 394 (85%) TRF exposures occurred in private residences (Table 2). Among the 388 cases for which information was available regarding who activated the TRF, 197 (51%) of the illnesses involved the person who activated the TRF.

Among the 463 cases for which information on the implicated TRF product was available, 449 (97%) occurred in persons who were exposed to products with pyrethrin, pyrethroid, or both as active ingredients (Table 3). Health effects most commonly involved the respiratory system (in 358 [77%] cases) (Table 2). The most common factors contributing to exposure included an inability or failure to vacate before the TRF discharged, early reentry, excessive use of TRFs for the space being treated, unintentional discharge of a TRF, and failure to notify others nearby (Table 2).

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[§] EPA classifies pesticide products into one of four toxicity categories based on established criteria (40 CFR part 156). Pesticides with the greatest toxicity are in category I, and those with the least are in category IV.

TABLE 2. Number and percentage of total release fogger (TRF)-related illnesses or injuries, by data source* and selected characteristics — eight states,† 2001–2006

Characteristic	SENSOR (n = 368)	CDPR (n = 40)	NYCPCC (n = 58)	Total (N = 466)	
				No.	(%)
Severity of illness or injury[§]					
High or death	5	2	3	10	(2)
Moderate	50	9	25	84	(18)
Low	313	29	30	372	(80)
Year of exposure					
2001	17	14	4	35	(8)
2002	37	12	2	51	(11)
2003	63	4	12	79	(17)
2004	73	2	27	102	(22)
2005	88	4	4	96	(21)
2006	90	4	9	103	(22)
Reporting state					
California	1	40	—	41	(9)
Florida	62	—	—	62	(13)
Louisiana	101	—	—	101	(22)
Michigan	20	—	—	20	(4)
New York	65	—	58	123	(26)
Oregon	29	—	—	29	(6)
Texas	32	—	—	32	(7)
Washington	58	—	—	58	(12)
Status					
Definite	23	6	1	30	(6)
Probable	52	30	5	87	(19)
Possible	291	4	52	347	(75)
Suspicious	2	0	0	2	(<1)
Maximum toxicity^{**}					
I (Danger)	1	0	0	1	(<1)
II (Warning)	16	3	3	22	(5)
III (Caution)	289	37	36	362	(78)
Unknown/Missing	62	0	19	81	(17)
Location of exposure					
Private residence	306	32	56	394	(85)
Nonmanufacturing commercial	22	4	1	27	(6)
Other	16	4	1	21	(5)
Unknown	24	0	0	24	(5)

See Table 2 footnotes on next page.

Editorial Note: TRFs are registered by EPA for use by home owners and others. When activated, the TRF cans are designed to empty their contents completely. No special training or licensing is required to use a TRF. Although numerous media reports in recent years have described injuries and property destruction resulting from explosions caused by activation of TRFs in the presence of ignition sources (e.g., gas pilot lights and electrical appliances, such as air conditioners and refrigerators, that cycle off and on) (D. Richmond, California Department of Pesticide Regulation, personal communication, 2008), this is the first report in the scientific literature to describe the range of exposure circumstances and acute health problems associated with TRF usage.

TRFs generally release pyrethroids, pyrethrins, or both. Pyrethrins are insecticides derived from chrysanthemum flowers (pyrethrum) (4). Piperonyl butoxide and n-octyl bicycloheptene dicarboximide often are added to pyrethrin

products to inhibit insects' microsomal enzymes that detoxify pyrethrins (4). Although pyrethrins have little systemic toxicity in mammals, they appear to possess some irritant and sensitizing properties (4) and have been reported to induce contact dermatitis, conjunctivitis, and asthma (5,6). In addition, anaphylactic reactions (4) and health effects involving the neurologic, cardiovascular, and gastrointestinal systems have been reported (6). Pyrethroids are a class of synthetic insecticides that are chemically similar to natural pyrethrins (3) and have low potential for systemic toxicity in mammals. Signs and symptoms of pyrethroid toxicity include abnormal skin sensation (e.g., burning, itching, tingling, and numbness), dizziness, salivation, headache, fatigue, vomiting, diarrhea, seizure, irritability to sound and touch, and other central nervous system effects (4,7). Propellants and other solvents in the TRFs also might contribute to observed symptoms (4).

TABLE 2. (Continued) Number and percentage of total release fogger (TRF)-related illnesses or injuries, by data source* and selected characteristics — eight states,† 2001–2006

Characteristic	SENSOR (n = 368)	CDPR (n = 40)	NYCPCC (n = 58)	Total (N = 466)	
				No.	(%)
Factors contributing to exposure††					
Unable to vacate before TRF discharged	79	6	22	107	(23)
Early reentry	50	7	6	63	(14)
Failure to vacate	51	2	3	56	(12)
Unintentional discharge	43	3	7	53	(11)
Too many TRFs for space	40	6	2	48	(10)
Failure to notify others	36	5	6	47	(10)
Sprayed in face or at close range	28	8	1	37	(8)
Inadequate airing out of treated space	27	2	3	32	(7)
Explosion	13	4	2	19	(4)
Using fogger as spot spray	10	4	2	16	(3)
Emergency response	6	2	0	8	(2)
Other	5	0	1	6	(1)
Unknown	42	4	5	51	(11)
Type of signs and symptoms experienced§§					
Respiratory (e.g., cough, respiratory tract irritation, dyspnea, and wheezing)	281	32	45	358	(77)
Gastrointestinal (e.g., nausea, vomiting, and abdominal pain)	163	13	37	213	(46)
Neurological (e.g., headache, dizziness, diaphoresis, weakness, and paresthesias)	154	16	8	178	(38)
Ocular (e.g., pain, irritation, inflammation, and lacrimation)	61	9	17	87	(19)
Dermatologic (e.g., skin irritation/pain, erythema, and rash)	67	5	3	75	(16)
Cardiovascular (e.g., chest pain, tachycardia, and hypertension)	45	3	0	48	(10)

* SENSOR = Sentinel Event Notification System for Occupational Risk (SENSOR)-Pesticides program; CDPR = California Department of Pesticide Regulation; NYCPCC = New York City Poison Control Center.

† California, Florida, Louisiana, Michigan, New York, Oregon, Texas, and Washington.

§ Low-severity illnesses or injuries consist of illnesses and injuries that generally resolve without treatment and where minimal time (<3 days) is lost from work. Such cases typically manifest as eye, skin, and/or upper respiratory irritation. Moderate severity illnesses and injuries consist of non-life-threatening health effects that are generally systemic and require medical treatment. No residual disability is detected, and time lost from work is <6 days. High-severity illnesses and injuries consist of life-threatening health effects that usually require hospitalization, involve substantial time lost from work (>5 days), and can result in permanent impairment or disability. Deaths are fatalities resulting from exposure to one or more pesticides.

† Cases of TRF-related illness or injury were classified as definite, probable, possible, or suspicious. Additional information available at http://www.cdc.gov/niosh/topics/pesticides/pdfs/casedef2003_revapr2005.pdf.

** The Environmental Protection Agency classifies pesticide products into one of four toxicity categories based on established criteria (40 CFR part 156). Pesticides with the greatest toxicity are in category I, and those with the least are in category IV.

†† Each case might have more than one factor contributing to exposure.

§§ Many patients reported signs and symptoms in more than one organ system.

The findings in this report are subject to at least five limitations. First, the number of reported cases is probably an underestimate of the actual magnitude of illnesses and injuries associated with TRFs. The surveillance systems that identified cases are passive and, therefore, might have missed some TRF-related illnesses and injuries. Second, in 2006, only 10 states had pesticide poisoning surveillance systems, and the data in this report might not be representative of the 40 states without such surveillance systems. Third, because most (85%) TRF-related case reports were obtained from poison control centers, some California cases might have been missed when the contract between CDPR and the California Poison Control System was not in effect. Fourth, TRF-related illnesses and injuries also might have been missed because exposure and health effects information was insufficient to satisfy the case definition in some instances (e.g., approximately 68 reports

were excluded because information on TRF ingredients were not available, and approximately 100 NYCPCC reports were excluded because health effects data were missing or sparse). Finally, although all cases were consistent with case definition criteria, the possibility of false positives cannot be excluded. Because clinical findings of pesticide poisoning often are non-specific and no standard diagnostic test exists, some illnesses related temporally to TRF exposures might be coincidental and not caused by TRFs.

TRFs can reduce pest populations and often are used by consumers as a low cost alternative to professional pest control services. However, because of their design to broadcast pesticides, they have a substantial potential for unintended exposures, especially when the pesticide label is ignored or misunderstood. Greater efforts are needed to promote safer alternatives to TRFs. Integrated pest management (IPM)

TABLE 3. Ten most common active ingredients in total release fogger (TRF) products* associated with illness or injury, by number of associated cases — eight states,† 2001–2006

Active ingredient (PC [§] code)	Chemical class	No. of cases
Pyrethrins (069001)	Pyrethrin	182
Cypermethrin (109702)	Pyrethroid	122
Permethrin (109701)	Pyrethroid	95
Tetramethrin (069003)	Pyrethroid	75
Methoprene (105401)/ S-methoprene (105402)	Other	50
Fenvalerate (109301)	Pyrethroid	30
Tralomethrin (121501)	Pyrethroid	24
D-trans-allethrin (004003)	Pyrethroid	19
Phenothrin (069005)	Pyrethroid	18
Chlorpyrifos (059191)	Organophosphorus compound	15

SOURCES: Sentinel Event Notification System for Occupational Risk (SENSOR)-Pesticides program, California Department of Pesticide Regulation, and New York City Poison Control Center.

* Many TRF products contain more than one active ingredient.

† California, Florida, Louisiana, Michigan, New York, Oregon, Texas, and Washington.

§ Pesticide chemical; active ingredient code assigned by the Environmental Protection Agency.

control strategies need to be promoted and adopted. IPM can reduce indoor insect populations and minimize the need for insecticides (8).

The public also should be warned about TRF dangers through broad media campaigns that explain the importance of reading and understanding the pesticide label, using the correct number of TRFs, and taking necessary precautions (e.g., turning off ignition sources and promptly leaving the premises). TRF labels should be improved to make information easier to find and understand. Current TRF labels indicate the number of cubic feet that one container will treat effectively for pests, which requires the user to employ arithmetic to calculate both the volume of space to be treated and the number of TRFs

needed to treat a space of that size. Use of delayed-release TRFs also might prevent illnesses and injuries by allowing the user to vacate the premises before the insecticide is released. Notices should be posted on the exterior of spaces where TRFs are used, indicating when the TRF treatment will be made and when reentry into the space is permitted. Coinhabitants (and nearby neighbors, when multiunit housing is treated) also should be informed at least 24 hours before a TRF treatment is started.

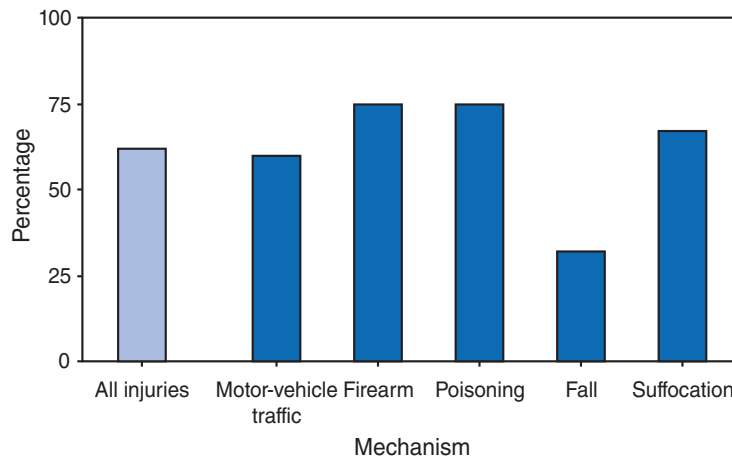
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QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Injury Deaths* for Which Death Was Pronounced Outside of a Hospital,† by Leading Mechanism of Injury Death§ — United States, 2005



* Includes deaths from unintentional injuries, suicides, homicides, deaths of undetermined intent, and deaths attributed to legal intervention.

† Includes deaths pronounced in homes, in hospice facilities, in nursing homes, on arrival to hospital, and in other places outside of a hospital, clinic, emergency department, or medical center. Place of death was not specified for 0.5% of all injury deaths; these were excluded from the percentage calculations.

§ Mechanisms are mutually exclusive.

In 2005, 62% of all injury deaths occurred outside of a hospital. Seventy-five percent of persons who died as a result of poisoning or firearm-related injuries, compared with 32% of persons who died from falls, died outside of a hospital.

SOURCE: National Vital Statistics System, mortality data (based on death certificate information), 2005. Available at <http://www.cdc.gov/nchs/about/major/dvs/vitalstatsonline.htm>.

TABLE 1. Provisional cases of infrequently reported notifiable diseases (<1,000 cases reported during the preceding year) — United States, week ending October 11, 2008 (41st week)*

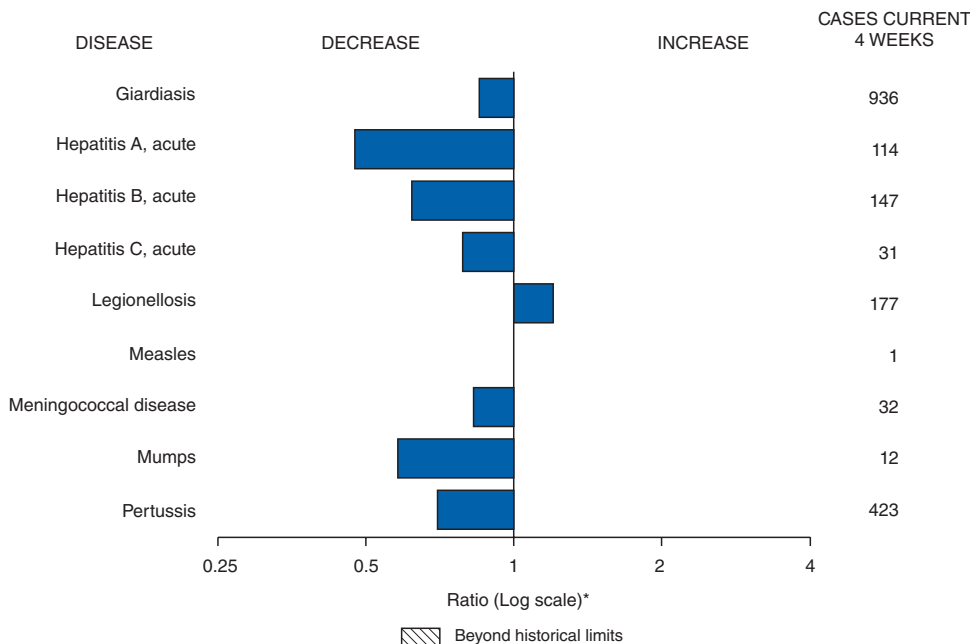
Disease	Current week	Cum 2008	5-year weekly average†	Total cases reported for previous years					States reporting cases during current week (No.)
				2007	2006	2005	2004	2003	
Anthrax	—	—	—	1	1	—	—	—	
Botulism:									
foodborne	1	7	0	32	20	19	16	20	IN (1)
infant	—	75	2	85	97	85	87	76	
other (wound & unspecified)	—	12	1	27	48	31	30	33	
Brucellosis	3	67	2	131	121	120	114	104	CA (3)
Chancroid	1	28	1	23	33	17	30	54	OR (1)
Cholera	—	1	0	7	9	8	6	2	
Cyclosporiasis§	1	110	1	93	137	543	160	75	IN (1)
Diphtheria	—	—	0	—	—	—	—	1	
Domestic arboviral diseases§,¶:									
California serogroup	—	33	2	55	67	80	112	108	
eastern equine	—	2	0	4	8	21	6	14	
Powassan	—	1	—	7	1	1	1	—	
St. Louis	—	9	0	9	10	13	12	41	
western equine	—	—	—	—	—	—	—	—	
Ehrlichiosis/Anaplasmosis§,**:									
<i>Ehrlichia chaffeensis</i>	2	606	11	828	578	506	338	321	NY (1), KY (1)
<i>Ehrlichia ewingii</i>	—	7	—	—	—	—	—	—	
<i>Anaplasma phagocytophilum</i>	5	252	11	834	646	786	537	362	NY (5)
undetermined	—	56	3	337	231	112	59	44	
<i>Haemophilus influenzae</i> ,††									
invasive disease (age <5 yrs):									
serotype b	1	21	1	22	29	9	19	32	IN (1)
nonserotype b	—	129	3	199	175	135	135	117	
unknown serotype	1	145	3	180	179	217	177	227	FL (1)
Hansen disease§	2	61	2	101	66	87	105	95	FL (1), CA (1)
Hantavirus pulmonary syndrome§	—	12	0	32	40	26	24	26	
Hemolytic uremic syndrome, postdiarrheal§	8	163	5	292	288	221	200	178	MN (2), IA (1), KS (2), NC (1), CA (2)
Hepatitis C viral, acute	6	631	17	849	766	652	720	1,102	IN (1), MI (1), FL (2), WA (1), OR (1)
HIV infection, pediatric (age <13 years)§§	—	—	5	—	—	380	436	504	
Influenza-associated pediatric mortality§,¶¶	1	89	—	77	43	45	—	N	GA (1)
Listeriosis	4	462	22	808	884	896	753	696	NY (1), NYC (1), NC (1), WA (1)
Measles***	—	129	0	43	55	66	37	56	
Meningococcal disease, invasive†††:									
A, C, Y, & W-135	1	223	5	325	318	297	—	—	CO (1)
serogroup B	—	124	2	167	193	156	—	—	
other serogroup	—	27	1	35	32	27	—	—	
unknown serogroup	5	474	10	550	651	765	—	—	MN (1), MS (1), AZ (1), CA (2)
Mumps	5	329	14	800	6,584	314	258	231	NY (1), FL (1), WA (3)
Novel influenza A virus infections	—	—	—	1	N	N	N	N	
Plague	—	1	0	7	17	8	3	1	
Poliomyelitis, paralytic	—	—	0	—	—	1	—	—	
Polio virus infection, nonparalytic§	—	—	—	—	N	N	N	N	
Psittacosis§	—	9	0	12	21	16	12	12	
Qfever§,§§§ total:	—	91	2	171	169	136	70	71	
acute	—	83	—	—	—	—	—	—	
chronic	—	8	—	—	—	—	—	—	
Rabies, human	—	—	0	1	3	2	7	2	
Rubella¶¶¶	—	12	0	12	11	11	10	7	
Rubella, congenital syndrome	—	—	—	—	1	1	—	1	
SARS-CoV§,****	—	—	—	—	—	—	—	8	
Smallpox§	—	—	—	—	—	—	—	—	
Streptococcal toxic-shock syndrome§	3	110	1	132	125	129	132	161	CT (1), NY (2)
Syphilis, congenital (age <1 yr)	—	153	7	430	349	329	353	413	
Tetanus	—	8	1	28	41	27	34	20	
Toxic-shock syndrome (staphylococcal)§	—	46	2	92	101	90	95	133	
Trichinellosis	—	5	0	5	15	16	5	6	
Tularemia	1	82	2	137	95	154	134	129	UT (1)
Typhoid fever	3	314	8	434	353	324	322	356	NC (1), CA (2)
Vancomycin-intermediate <i>Staphylococcus aureus</i> §	—	6	0	37	6	2	—	N	
Vancomycin-resistant <i>Staphylococcus aureus</i> §	—	—	0	2	1	3	1	N	
Vibriosis (noncholera <i>Vibrio</i> species infections)§	13	346	7	447	N	N	N	N	NC (1), GA (1), FL (1), AZ (1), WA (1), CA (8)
Yellow fever	—	—	—	—	—	—	—	—	

See Table 1 footnotes on next page.

TABLE 1. (Continued) Provisional cases of infrequently reported notifiable diseases (<1,000 cases reported during the preceding year) — United States, week ending October 11, 2008 (41st 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. Eighty-seven cases occurring during the 2007–08 influenza season have been reported.
 *** No measles cases were reported for the current week.
 ††† Data for meningococcal disease (all serogroups) are available in Table II.
 §§§ 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 October 11, 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
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TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending October 11, 2008, and October 13, 2007 (41st week)*

Reporting area	Streptococcal diseases, invasive, group A					<i>Streptococcus pneumoniae</i> , invasive disease, nondrug resistant†				
	Current week	Previous 52 weeks		Cum 2008	Cum 2007	Current week	Previous 52 weeks		Cum 2008	Cum 2007
		Med	Max				Med	Max		
United States	23	96	259	4,241	4,279	12	37	166	1,224	1,343
New England	—	6	31	303	326	—	1	14	55	102
Connecticut	—	0	26	94	95	—	0	11	—	12
Maine§	—	0	3	22	22	—	0	1	1	2
Massachusetts	—	3	8	138	162	—	1	5	39	69
New Hampshire	—	0	2	20	24	—	0	1	7	9
Rhode Island§	—	0	9	17	7	—	0	2	7	8
Vermont§	—	0	2	12	16	—	0	1	1	2
Mid. Atlantic	5	18	43	846	792	3	4	19	151	240
New Jersey	—	3	11	133	144	—	1	6	30	44
New York (Upstate)	2	6	17	279	244	3	2	14	80	82
New York City	—	3	10	155	187	—	1	8	41	114
Pennsylvania	3	6	16	279	217	N	0	0	N	N
E.N. Central	3	19	42	791	824	3	6	23	215	233
Illinois	—	5	16	206	248	—	1	6	46	59
Indiana	—	2	11	113	99	2	0	14	32	14
Michigan	3	3	10	144	171	1	1	5	57	60
Ohio	—	5	14	226	196	—	1	5	47	50
Wisconsin	—	2	10	102	110	—	1	3	33	50
W.N. Central	—	4	39	321	286	1	2	16	111	74
Iowa	—	0	0	—	—	—	0	0	—	—
Kansas	—	0	5	34	28	1	0	3	15	1
Minnesota	—	0	35	154	137	—	0	13	48	41
Missouri	—	1	10	71	74	—	1	2	29	21
Nebraska§	—	0	3	33	23	—	0	3	7	10
North Dakota	—	0	5	10	15	—	0	2	5	1
South Dakota	—	0	2	19	9	—	0	1	7	—
S. Atlantic	5	22	37	896	1,032	3	6	16	223	240
Delaware	—	0	2	6	10	—	0	0	—	—
District of Columbia	—	0	4	23	17	—	0	1	1	2
Florida	2	5	11	210	252	2	1	4	52	50
Georgia	1	5	14	199	198	1	1	5	54	55
Maryland§	—	4	8	144	174	—	1	5	45	51
North Carolina	2	2	10	120	140	N	0	0	N	N
South Carolina§	—	1	5	55	88	—	1	4	39	39
Virginia§	—	2	12	110	131	—	0	6	25	36
West Virginia	—	0	3	29	22	—	0	1	7	7
E.S. Central	—	4	9	145	174	—	2	11	72	76
Alabama§	N	0	0	N	N	N	0	0	N	N
Kentucky	—	1	3	33	34	N	0	0	N	N
Mississippi	N	0	0	N	N	—	0	3	16	5
Tennessee§	—	3	7	112	140	—	1	9	56	71
W.S. Central	—	8	85	364	255	1	5	66	203	185
Arkansas§	—	0	2	5	17	—	0	2	5	11
Louisiana	—	0	2	12	14	—	0	2	10	30
Oklahoma	—	2	19	93	58	1	1	7	56	40
Texas§	—	6	65	254	166	—	3	58	132	104
Mountain	7	10	22	453	472	1	5	12	181	180
Arizona	3	3	9	165	183	1	2	8	92	89
Colorado	3	3	8	130	116	—	1	4	51	38
Idaho§	—	0	2	12	15	—	0	1	3	2
Montana§	N	0	0	N	N	—	0	1	4	1
Nevada§	—	0	2	8	2	N	0	0	N	N
New Mexico§	—	2	8	84	80	—	0	3	15	28
Utah	1	1	5	48	71	—	0	3	15	22
Wyoming§	—	0	2	6	5	—	0	1	1	—
Pacific	3	3	10	122	118	—	0	2	13	13
Alaska	1	0	4	32	22	N	0	0	N	N
California	—	0	0	—	—	N	0	0	N	N
Hawaii	2	2	10	90	96	—	0	2	13	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).

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