

World Hepatitis Day — July 28, 2011

July 28, 2011, marks the first official World Hepatitis Day established by the World Health Organization (WHO). CDC joins with WHO in calling for a renewed commitment against a largely silent but persistent epidemic. Worldwide, nearly 500 million persons are living with chronic hepatitis B virus or hepatitis C virus (HCV) infections, and these infections cause approximately 1 million deaths annually (1); most persons with chronic viral hepatitis are unaware of their infections. Effective tools are available to prevent infection with viral hepatitis, including hepatitis B vaccination, surveillance, education, screening, and treatment; the challenge is to build the capacity to extend these interventions globally. In 2010, the World Health Assembly passed a resolution urging greater control of viral hepatitis (2).

In Europe, HCV infection outbreaks and rising incidence have been observed among men who have sex with men (MSM) with human immunodeficiency virus (HIV) infection. This issue of *MMWR* includes a report on sexual transmission of HCV among HIV-infected MSM in New York City. The findings emphasize the importance of HCV screening among these men, which allows for preventive care and treatment.

In the United States, World Hepatitis Day will be observed July 28 at a White House event. Information regarding the webcast of this event will be available at <http://www.cdc.gov/hepatitis>.

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Sexual Transmission of Hepatitis C Virus Among HIV-Infected Men Who Have Sex with Men — New York City, 2005–2010

In the United States, an estimated 3.2 million persons are living with hepatitis C virus (HCV) infection (1). HCV transmission occurs primarily through percutaneous exposure to blood, and persons who inject drugs are at greatest risk for infection. The role of sexual transmission of HCV has not been well defined. However, reports over the past decade, mainly from Europe, have implicated sexual transmission of HCV among human immunodeficiency virus (HIV)-infected men who have sex with men (MSM). In late 2005, two HIV-infected MSM, each with acute HCV infection that was suspected to have been acquired sexually, were evaluated at Mount Sinai Medical Center in New York City, prompting Mount Sinai to request referrals of similar patients (2). During 2005–2010, a total of 74 HIV-infected MSM with recently acquired HCV infection and no reported history of injection-drug use were evaluated. To examine the role of sexual transmission, a matched case-control study and viral analysis were conducted. Results from the case-control study showed that high-risk sexual behavior was the most likely mode of transmission among these men. Phylogenetic analyses revealed five clusters of closely related HCV variants, suggesting networks of transmission among these men. The findings underscore the importance of screening HIV-infected MSM for HCV, particularly those engaged in high-risk sexual behavior.

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For this study, a case-patient was defined as an HIV-infected MSM examined at Mount Sinai during October 2005–December 2010 who had 1) a newly elevated alanine transferase (ALT) level, 2) a newly positive HCV-antibody test result, and 3) no other evident cause of the newly elevated ALT level. To the extent possible, positive HCV-antibody results were confirmed by HCV RNA testing. If no record was found of a previous negative HCV-antibody test, a finding of jaundice or an ALT elevation of more than 15-fold above the upper limit of normal (i.e., >450 U/L) also was required. To assess whether patients might have had a previous positive HCV test result unknown to the referring physicians, the date of the first positive HCV-antibody test of a subset of patients (24 men) was confirmed by the New York City Department of Health and Mental Hygiene through review of the hepatitis registry of HCV surveillance data. Providers of primary care to HIV-infected MSM in New York City (who, as part of care, routinely obtain ALT levels on their patients during HIV monitoring visits) were contacted by the lead investigator and asked to refer patients with newly elevated ALT levels to Mount Sinai as soon as possible. Reminders were provided periodically throughout the study period. A total of 35 HIV-care providers contributed information on their patients to this study.

Characteristics of Case-Patients

During October 2005–December 2010, Mount Sinai evaluated 74 HIV-infected MSM who reported no injection-drug

use and had newly elevated ALT levels and a positive HCV antibody test result; 73 of 74 also had documented HCV viremia. Median age of the 74 patients was 39 years; 41 were non-Hispanic white, 14 non-Hispanic black, 18 Hispanic, and one Asian (Table 1). Median CD4+ cell count for the patients was 483 cells/ μ L (range: 66–1,258 cells/ μ L). Sixty patients (81%) were asymptomatic, and new HCV infection was detected solely because of new ALT elevation; 14 (19%) had jaundice at presentation. Median peak ALT level was 665 U/L (range: 72–5,291 U/L). No other cause for the patients' elevated ALT levels was found (e.g., no new infection with hepatitis A or B virus and no new drug therapy). Of the 74 patients, 65 (91%) had a previous negative HCV-antibody test result before detection of hepatitis (median: 12 months; range: 0–110 months).

Case-Control Study

To assess the role of sexual transmission of HCV, a matched case-control study was conducted beginning in July 2007. HIV-infected MSM examined at Mount Sinai during July 2007–December 2010 who were within 12 months of clinical onset of HCV infection and who reported no injection-drug use were recruited as case-patients. For each case-patient, 1–10 controls (i.e., HIV-infected MSM who did not have HCV infection, reported no injection-drug use, and matched by age [± 5 years] and race/ethnicity) were recruited by Mount Sinai staff members from among the practices that referred

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TABLE 1. Characteristics of MSM with HIV and recent HCV coinfection (N = 74) — New York City, 2005–2010

Characteristic	Result	
Age (median) (yrs)	39	(23–63)
Race/Ethnicity		
White, non-Hispanic (No. [%])	41	(55)
Black, non-Hispanic (No. [%])	14	(19)
Hispanic (No. [%])	18	(24)
Asian, non-Hispanic (No. [%])	1	(1)
CD4 count (median) (cells/ μ L)	483	(66–1,258)
Duration of HIV infection (median) (yrs)	8	(0–23)
Receipt of antiretroviral drug therapy (No. [%])	55	(74)
HIV viral load <400 copies/mL (No. [%])	50	(68)
No previous HCV-positive serology (No. [%])	9	(12)
Seroconversion interval* (median) (mos) (N = 65)	12	(0–110)
Presence of jaundice on presentation (No. [%])	14	(19)
Peak ALT (median) (U/L)	665	(72–5,291)
Peak HCV viral load (\log_{10} IU/mL)	6.68	(<0.7–8.0)
HCV genotype (N = 72)		
1a (No. [%])	65	(90)
1b (No. [%])	4	(6)
2b (No. [%])	2	(3)
3a (No. [%])	1	(1)

Abbreviations: MSM = men who have sex with men; HIV = human immunodeficiency virus; HCV = hepatitis C virus; ALT: alanine aminotransferase.

* Interval between last negative and first positive HCV antibody test.

case-patients during the enrollment period. In all, 22 case-patients and 53 control subjects were enrolled in the study.

All participants were asked to complete self-administered questionnaires regarding their sexual practices and drug-use behaviors during the 12 months preceding diagnosis (for case-patients) or preceding the questionnaire (for matched controls). To conduct a matched analysis, a conditional logistic regression of each variable (i.e., sexual practice or drug use behavior) was performed. Those variables that had a p value of ≤ 0.20 in the univariable analysis, as well as those previously associated with sexual transmission (3), were entered into a model and analyzed using multivariable conditional logistic regression (i.e., forward, backward, and stepwise) to determine which variables were independently associated with HCV infection.

Univariable results. Univariable analyses indicated that the HIV-infected MSM newly infected with HCV (case-patients) were significantly more likely than the HIV-infected MSM without HCV infection (matched controls) to have had receptive (matched odds ratio [mOR] = 24.87) or insertive (mOR = 2.62) anal intercourse with no condom and with ejaculation, practiced receptive (mOR = 10.08) or insertive (mOR = 7.90) fisting, used sex toys (mOR = 4.38), engaged in group sex (mOR = 19.28), engaged in sex while high on drugs (mOR = 11.37), previously had syphilis (mOR = 8.80) or gonorrhea (mOR = 5.02), and had sex while high

on methamphetamine (mOR = 26.80) (Table 2). Because three variables (receptive anal intercourse, no condom, no ejaculation; sex while high on gamma hydroxybutyrate [GHB]; and sex while high on ketamine) yielded undefined ORs, the data were analyzed further using exact conditional logistic regression. Results showed that case-patients were significantly more likely than controls to report receptive anal intercourse with no condom and no ejaculation (mOR = 24.26) and sex while high on GHB (mOR = 16.34).

Multivariable results. Results from the multivariable analyses showed that receptive anal intercourse with no condom and with ejaculation of the partner (adjusted odds ratio [AOR] = 23.00) and sex while high on methamphetamine (AOR = 28.56) were both significantly related to acquiring HCV infection. Of all the practices and behaviors, having sex while using methamphetamine was most strongly associated with HCV infection (Table 2).

Results of Phylogenetic Analyses

Polymerase chain reaction and sequencing of a 470 base-pair region of NS5B from HCV strains recovered from 50 of the 74 men were conducted using methods described previously (4). Forty-seven of the 50 were genotype 1a, and three were genotype 1b. A maximum-likelihood phylogenetic tree was then created (5).^{*} These analyses identified five clusters of closely related HCV variants from 26 (55%) of the 47 men with genotype 1a infections.

* Available at http://www.cdc.gov/hepatitis/resources/professionals/pdfs/msm_hcv_ns5b-sequence_tree.pdf.

What is already known on this topic?

Infection with hepatitis C virus (HCV) is a major cause of morbidity, and, if left untreated, can lead to chronic liver disease and death. HCV transmission occurs primarily through percutaneous exposure to blood (injection-drug users are at greatest risk), but the role of sexual transmission has not been well defined.

What is added by this report?

Sexual transmission was found to be the most likely mode of transmission of HCV among human immunodeficiency virus (HIV)-infected men who have sex with men (MSM) in this study in New York City.

What are the implications for public health practice?

These findings, and those elsewhere, suggest that sexual transmission of HCV can occur undetected among HIV-infected MSM in the absence of injection-drug use. Health-care providers should consider HCV testing for HIV-infected MSM with high-risk sexual behaviors or concomitant ulcerative sexually transmitted diseases (e.g., syphilis and herpes simplex virus).

TABLE 2. Odds ratios for comparison of case-patients (HIV-infected MSM with HCV infection) and controls (HIV-infected MSM without HCV infection), by sexual practice and drug use behavior, using conditional logistic regression — New York City, 2007–2010

Characteristic	Case-patients (n = 22)		Controls* (n = 53)		Univariable analysis			Multivariable analysis		
	No.	(%)	No.	(%)	OR	(95% CI)	p value	AOR	(95% CI)	p value
Receptive anal intercourse, with condom										
Yes	16	(73)	26	(50)	1.68	(0.57–4.96)	0.35			
No	6	(27)	26	(50)						
Receptive anal intercourse, no condom, no ejaculation										
Yes	22	(100)	21	(40)	ND [†]					
No	0	—	32	(60)						
Receptive anal intercourse, no condom, with ejaculation										
Yes	19	(86)	12	(23)	24.87	(3.18–194.55)	0.002	23.00	(2.17–243.84)	0.009
No	3	(14)	41	(77)						
Insertive anal intercourse, with condom										
Yes	13	(59)	24	(45)	1.34	(0.48–3.78)	0.58			
No	9	(41)	29	(55)						
Insertive anal intercourse, no condom, no ejaculation										
Yes	17	(77)	18	(34)	8.13	(1.76–37.55)	0.007			
No	5	(23)	35	(66)						
Insertive anal intercourse, no condom, with ejaculation										
Yes	13	(59)	14	(26)	2.62	(1.00–6.87)	0.05			
No	9	(41)	39	(74)						
Receptive fisting										
Yes	8	(36)	3	(6)	10.08	(2.03–50.02)	0.005			
No	14	(64)	50	(94)						
Insertive fisting										
Yes	8	(36)	3	(6)	7.90	(1.96–31.84)	0.004			
No	14	(64)	50	(94)						
Use of sex toys										
Yes	12	(55)	13	(25)	4.38	(1.35–14.26)	0.01			
No	10	(45)	40	(75)						
Group sex										
Yes	20	(91)	18	(34)	19.28	(2.51–148.23)	0.005			
No	2	(9)	35	(66)						
Previously had syphilis										
Yes	11	(50)	9	(17)	8.80	(1.88–41.05)	0.006			
No	11	(50)	43	(83)						
Previously had gonorrhea										
Yes	15	(68)	17	(33)	5.02	(1.40–18.05)	0.01			
No	7	(32)	35	(67)						

See table footnotes on page 949.

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Editorial Note

This report suggests high-risk sexual behavior as a cause of HCV transmission among HIV-infected MSM in New York City. Unprotected receptive anal intercourse with ejaculation and sex while high on methamphetamine were the

most important predictors of HCV infection. Results from phylogenetic analyses suggest networks of HCV transmission among these men. The findings of high-risk sex, concurrent noninjection-drug use, and phylogenetic clustering are similar to those observed among cohorts of HIV-infected MSM with HCV infection in Northern Europe and Australia (4). A notable finding from this study and those in other countries is the association of noninjection, recreational drug use (e.g., methamphetamine use) with the acquisition of HCV infection.

Sexual transmission of HCV is considered to be an inefficient and rare mode of transmission (6). However, concurrent HIV infection results in increased HCV RNA levels (viral load) (7), which are thought to increase infectiousness of HCV acquired through sexual contact. Of further concern among persons who are coinfecting is that HIV accelerates HCV disease progression, even in its early stages (2). End-stage liver disease and hepatocellular carcinoma, both usually resulting from

TABLE 2. (Continued) Odds ratios for comparison of case-patients (HIV-infected MSM with HCV infection) and controls (HIV-infected MSM without HCV infection), by sexual practice and drug use behavior, using conditional logistic regression — New York City, 2007–2010

Characteristic	Case-patients (n = 22)		Controls* (n = 53)		Univariable analysis			Multivariable analysis		
	No.	(%)	No.	(%)	OR	(95% CI)	p value	AOR	(95% CI)	p value
Sex while high on drugs										
Yes	17	(81)	14	(27)	11.37	(2.51–51.52)	0.002			
No	4	(19)	38	(73)						
Sex while high on cocaine										
Yes	3	(14)	4	(8)	1.32	(0.27–6.50)	0.74			
No	19	(86)	49	(92)						
Sex while high on GHB										
Yes	7	(32)	0	—	ND [†]					
No	15	(68)	53	(100)						
Sex while high on ketamine										
Yes	2	(9)	0	—	ND [†]					
No	20	(91)	53	(100)						
Sex while high on ecstasy										
Yes	4	(18)	2	(4)	2.89	(0.52–16.12)	0.23			
No	18	(82)	51	(96)						
Sex while high on marijuana										
Yes	8	(36)	8	(15)	3.10	(0.84–11.51)	0.09			
No	14	(64)	45	(85)						
Sex while high on methamphetamine										
Yes	13	(59)	2	(4)	26.80	(3.30–217.77)	0.002	28.56	(1.84–443.03)	0.02
No	9	(41)	51	(96)						
Sex while drunk										
Yes	13	(59)	19	(37)	0.18	(0.67–7.04)	0.19			
No	9	(41)	33	(63)						

Abbreviations: HIV = human immunodeficiency virus; MSM = men who have sex with men; HCV = hepatitis C virus; OR = odds ratio; CI = confidence interval; AOR = adjusted odds ratio; ND = not defined; GHB = gamma hydroxybutyrate.

* Controls matched for age (± 5 yrs) and race/ethnicity.

[†] Because each of these variables yielded undefined ORs, the data were further analyzed using exact conditional logistic regression. Univariable results were as follows: receptive anal intercourse, no condom, no ejaculation (OR = 24.26 [95% CI = 4.13– ∞], $p < 0.0001$); sex while high on GHB (OR = 16.34 [95% CI = 2.39– ∞], $p = 0.002$); sex while high on ketamine (OR = 4.38 [95% CI = 0.38– ∞], $p = 0.222$). All variables were further tested in a model using exact conditional logistic regression; however, none of the three variables exhibited significant independent effects on acquiring HCV infection in the multivariable analysis. The multivariable results from the exact conditional procedure were the same as those from the conditional procedure (i.e., only receptive anal intercourse, no condom, with ejaculation and sex while high on methamphetamine exhibited significant independent effects on acquiring HCV infection).

chronic HCV infection, are now leading causes of death not attributable to acquired immunodeficiency syndrome (AIDS) among HIV-infected persons in the United States (8).

The findings in this report are subject to at least three limitations. First, recall of events such as ejaculation by sex partner up to 12 months before HCV diagnosis can be imperfect. For example, the findings should not be interpreted to definitively exclude acquisition of HCV by some men through unprotected receptive anal intercourse without ejaculation, even though this variable did not exert a significant independent effect on HCV infection in the multivariable analysis. Second, refusal to acknowledge injection-drug use is not uncommon, and other types of stigmatizing risk behavior also might be underreported. Such social desirability bias was addressed by using a self-administered questionnaire and assuring each patient that his responses would not be shared with his primary-care provider. Finally, study investigators relied on patient referrals from HIV-care providers outside Mount Sinai, and referral bias might have occurred; however, the number of referring providers was fairly sizable ($n = 35$).

Sexual transmission of HCV among HIV-infected MSM is more widespread than this one study demonstrates. A recent U.S. report described HCV-antibody seroconversions among HIV-infected MSM without a history of injection-drug use (9). A recent European report that examined a group of studies, primarily from Europe, found substantial increases, particularly during 2002–2007, in the incidence of HCV infection among HIV-infected MSM, demonstrating just how serious the epidemic has become among these men (10). Hepatitis C should be added to the list of infections spread among HIV-infected MSM who have sex with HCV-infected partners. HIV-infected patients should be counseled and reminded that unprotected sex between HIV-infected partners can transmit other infections, including HCV. In addition to HCV screening for MSM newly diagnosed with HIV, routine HCV screening using both ALT and antibody testing should be considered for HIV-infected MSM, particularly those with high-risk sexual behaviors or concomitant ulcerative sexually transmitted diseases (e.g., syphilis and herpes simplex virus).[†]

[†] Based on CDC's Sexually Transmitted Diseases Treatment Guidelines, 2010, available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5912a1.htm>.

Finally, newly diagnosed HCV infections among HIV-infected MSM should be reported to state and local health authorities.

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Chlorine Gas Exposure at a Metal Recycling Facility — California, 2010

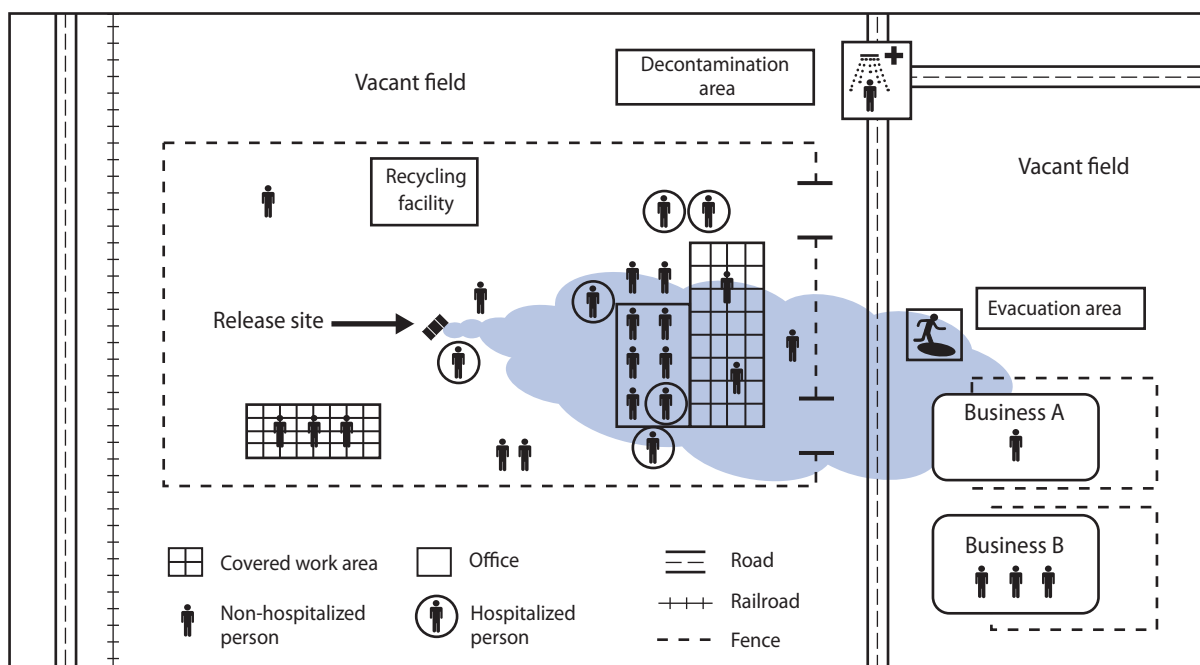
On June 8, 2010, chlorine gas was released from a ruptured, 1-ton, low-pressure tank being recycled at a California metal recycling facility. A total of 23 persons, including employees, customers, and workers at nearby businesses, were treated for the effects of the fumes at seven area hospitals. Chlorine is a corrosive, greenish-yellow gas that is heavier than air and can cause severe respiratory damage; it is used widely in water purification, sewage treatment, and disinfectant washes for foods. Following the incident, the Agency for Toxic Substances and Disease Registry (ATSDR) and CDC collaborated with the California Department of Public Health (CDPH) on an Assessment of Chemical Exposures (ACE) to determine 1) the circumstances surrounding those exposed during the chlorine gas release, 2) health effects associated with exposures, and 3) recommendations for preventing recurrences. This report describes the chlorine gas release in California and summarizes the results of the ACE investigation. Of 29 persons potentially exposed to chlorine gas, 27 were interviewed to collect information regarding their exposures. In addition, information regarding acute health effects and symptoms was abstracted from medical records. At the time of the chlorine gas release, 15 persons were outdoors, and 13 were exposed for >30 minutes before they were decontaminated. Twenty-three persons reported experiencing one or more upper or

lower respiratory tract symptoms within 24 hours of exposure; six persons were hospitalized for 1–11 days. Based on these findings, CDPH issued a statewide alert to all recycling facilities on how to handle containers with potential hazardous waste.

The chlorine gas release occurred at 2:44 p.m. at a metal recycling facility located in an industrial area. A worker used an excavator to cut into a 1-ton, low-pressure tank that was unlabeled, reportedly empty, and sold to the facility as scrap metal. When punctured, the tank produced an explosive release of a greenish-yellow cloud of gas. The release occurred outdoors in an open work area and affected 29 persons who were at or near the recycling facility (Figure). Of the 16 workers at the recycling facility, the majority were outdoors at the time of the release. Most followed a planned evacuation route, exiting the facility through the main gate and meeting in an open field across the street in an evacuation area that was downwind from the tank (Figure).

When emergency medical services and fire department personnel arrived at the scene, they set up a decontamination area 200 yards north of the facility, where the majority of exposed persons were decontaminated by rinsing with water. Twenty-two of those exposed were then transported by ambulance (one person self-transported) to seven local hospitals where some were decontaminated again by removing clothing and washing

FIGURE. Schematic of chlorine gas release at a metal recycling facility, which resulted in 23 persons seeking hospital treatment and six being hospitalized — California, 2010



with soap and water. At 5:58 p.m., local hazardous materials team members identified the gas as chlorine and measured a concentration of 328 ppm near the tank.

ATSDR and CDC arrived in California on June 14 to assist CDPH with the ACE investigation. The ACE program, which is part of the National Toxic Substance Incidents Program, provides assistance to state and local health departments for rapid assessments after large-scale toxic substance releases. Of the 29 persons identified as potentially exposed during the release, 16 were workers at the facility, and 13 were either customers or in businesses located across the street and downwind from the tank. Twenty-seven persons were interviewed (in English and Spanish), and information was collected regarding demographics, exposure characteristics, acute health effects, medical history, occupational history, and health services use. Two persons were not available at the time of interviews. Medical charts were obtained and abstracted for the 23 persons treated at area hospitals, six of whom were admitted. One of the six hospitalized persons was not interviewed.

Twenty-seven (93%) of the 29 potentially exposed persons were aged >18 years; average age was 40 years, with a range of 2–77 years. Of the 27 interviewed, 20 (74%) were Hispanic; 21 (78%) were male, and 18 (67%) had at least a high school education. Fifteen (56%) persons were outdoors at the time of the chlorine gas release, and 24 (89%) reported smelling an odor (Table 1). A total of 22 (82%) had been decontaminated (either by rinsing with water, removing clothing, or washing with soap and water), and 13 (48%) said they were exposed to chlorine gas for >30 minutes before being decontaminated. Five (19%) said they were exposed for <30 minutes, and nine (33%) either did not know how long or did not answer the question.

Twenty-three (85%) of the 27 persons interviewed reported experiencing acute health effects within 24 hours of the chlorine gas release (Table 2). The most common symptoms reported were coughing (22 persons, 82%); difficulty breathing/feeling out of breath (22, 82%); headache (21, 78%); and burning of the nose, throat, or lungs (20, 74%).

Among the 27 interviewed, five persons (19%) reported preexisting high blood pressure, four (15%) reported diabetes, and three (11%) reported allergies (11%); eight (30%) reported current smoking. None of the 27 reported any preexisting respiratory conditions (e.g., asthma or chronic obstructive pulmonary disease) that might have placed them at greater risk from the chlorine exposure.

Of the 23 exposed persons who received care at seven area hospitals, 17 (74%) were treated and discharged from the emergency department, and six (26%) were hospitalized. Five (83%) of the six hospitalized patients worked at the recycling facility. Among those who received medical care,

TABLE 1. Circumstances surrounding chlorine gas exposure reported by 27 persons who were interviewed — California, 2010

Circumstance	No.	(%)
Exposure time*		
<30 min	5	(19)
≥30 min	13	(48)
Don't know/Missing	9	(33)
Location		
Indoors	10	(37)
Outdoors	15	(56)
Don't know/Missing	2	(7)
Distance from release site		
≤100 yards	10	(37)
>100 yards	15	(56)
Don't know/Missing	2	(7)
Smelled odor		
Yes	24	(89)
No	2	(7)
Don't know/Missing	1	(4)
Odor type		
Strong	23	(85)
Mild	—	—
Don't know/Missing	4	(15)
In gas cloud		
Yes	15	(56)
No	9	(33)
Don't know/Missing	3	11
Evacuated area		
Yes	25	(93)
No	1	(4)
Don't know/Missing	1	(4)
Sheltered in place		
Yes	1	(4)
No	25	(93)
Don't know/Missing	1	(4)
Decontaminated		
Yes	22	(82)
No	5	(19)

*Exposure time = (time decontaminated) – (time of chlorine gas release).

TABLE 2. Health effects experienced by 27 persons within 24 hours of chlorine gas exposure — California, 2010

Health effect	No.	(%)
Illness within 24 hrs		
Yes	23	(85)
No	4	(15)
Symptoms within 24 hrs*		
Coughing	22	(82)
Difficulty breathing/feeling out of breath	22	(82)
Headache	21	(78)
Burning nose, throat, or lungs	20	(74)
Increased congestion or mucous	19	(70)
Dizziness/lightheadedness	18	(67)
Eye irritation/pain/burning	18	(67)
Runny nose	18	(67)
Wheezing in chest	17	(63)
Chest tightness or pain/angina	16	(59)
Nausea	16	(59)
Skin irritation/pain/burning	8	(30)

* Affected persons were asked about each symptom separately. The number responding "yes" for each symptom is shown.

What is already known on this topic?

Exposure to chlorine, which is used in numerous industrial processes and for water treatment, can cause severe respiratory damage, depending on the concentration.

What is added by this report?

In June 2010 in California, chlorine gas was released from a tank sold as scrap metal; 23 persons were treated for the effects of the fumes, including six who were hospitalized for 1–11 days.

What are the implications for public health practice?

Health officials should urge metal recycling facilities to 1) only accept containers that are cut open, dry, or without a valve or plug; 2) treat closed containers as potential hazardous waste; and 3) develop and practice a hazardous gas release evacuation plan.

four had an oxygen saturation level <95% recorded in the emergency department. Five persons had an arterial blood gas measurement when they first reached a hospital, and their partial pressure of oxygen values ranged from 62 to 78 mmHg (reference range: 80–100 mmHg) (1).

Among those who were discharged from the emergency department, three received oxygen, and nine were prescribed nebulized β_2 -agonists. All six of those hospitalized were prescribed nebulized β_2 -agonists; five received oxygen, three were given steroids (oral or intravenous), and two were treated with antibiotics. Most of the hospitalized patients were released after 1–4 days. However, one recycling facility worker was hospitalized for 11 days and required mechanical ventilation for 2 days.

Reported by

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Editorial Note

The incident described in this report demonstrates the risk for unintentional release of a hazardous substance at a metal recycling facility. During 2001–2009, ATSDR's Hazardous Substance Emergency Events Surveillance (HSEES) program received reports of 21 incidents in nine participating states involving a tank that contained a hazardous substance.

In 2009, a total of 230 chlorine release events were reported to HSEES, of which 81 resulted in injuries (2). In California, which is not an HSEES participating state, an earlier chlorine gas release occurred in February 2010 at another scrap metal recycling facility. In that incident, a 1-ton tank being moved by a crane was punctured, and chlorine gas released, resulting in hospitalization of five workers for respiratory symptoms (3).

Chlorine, in its various forms, is used in chemical and plastic manufacturing, textile and paper bleaching, and water purification (4). Chlorine is a respiratory irritant and can produce symptoms ranging from mild ocular and upper respiratory irritation to severe inflammation of bronchoalveolar tissues, which can lead to death (5). The symptoms caused by chlorine depend on the concentration to which a person is exposed. In the incident described in this report, the symptoms experienced were consistent with those reported in previous community exposures (6–10). Although the number of exposed persons was smaller in this incident, the proportion hospitalized was higher (21%) than in incidents reported previously in Pennsylvania (8%) (7) and South Carolina (12%) (10). However, unlike those earlier incidents, which occurred near highly populated areas and involved greater amounts of chlorine gas, no fatalities occurred in California.

As a result of the June 2010 incident in California, the CDPH Division of Environmental and Occupational Disease Control, Emergency Planning and Preparedness Team produced a Chemical Release Alert, which was mailed to approximately 1,200 recycling facilities in the state. The alert urged facilities to 1) only accept containers that are cut open, dry, or without a valve or plug; 2) treat all closed containers as potential hazardous waste; and 3) develop and practice an evacuation plan, including training workers to stay upwind when evacuating after a hazardous gas release (3).

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Severe Hearing Impairment Among Military Veterans — United States, 2010

A substantial proportion of hearing loss in the United States is attributable to employment-related exposure to noise (1). Among military veterans, the most common service-connected disabilities are hearing impairments (2), suggesting that occupational noise exposure during military service might cause more veterans to have hearing loss than nonveterans. However, a recent analysis of data from the 1993–1995 Epidemiology of Hearing Loss Study did not find significant differences between the two groups (3). To further investigate hearing loss among veterans, specifically the prevalence of severe hearing impairment (SHI), data from the 2010 Annual Social and Economic Supplement (ASEC) to the Current Population Survey (CPS) were analyzed. This report describes the results of those analyses, which indicated that the prevalence of SHI among veterans was significantly greater than among nonveterans. Veterans were 30% more likely to have SHI than nonveterans after adjusting for age and current occupation, and veterans who served in the United States or overseas during September 2001–March 2010, the era of overseas contingency operations (including Operations Enduring Freedom and Iraqi Freedom), were four times more likely than nonveterans to have SHI. These findings suggest a need for increased emphasis on improving military hearing conservation programs (HCPs) and on hearing loss surveillance in military and veterans' health systems.

CPS is a monthly national survey of 57,000 households conducted by the Bureau of the Census for the Bureau of Labor Statistics. CPS obtains information on employment, demographics and other characteristics of the civilian, noninstitutionalized population aged ≥ 16 years. ASEC is conducted each year in conjunction with the March survey to collect additional data on work experience, income, noncash benefits, and migration. Data on all sample household members are collected from a single respondent by trained interviewers using a standardized questionnaire during in-person or telephone interviews. The combined 2010 CPS-ASEC response rate was 85.9% (4). For this report, data on 151,995 persons aged ≥ 17 years were analyzed to produce population-weighted estimates of SHI prevalence for the total population and various demographic and occupational subgroups by veteran status and period of most recent military service (before September 2001 versus September 2001–March 2010). Veteran status was defined as ever having served on active duty in the armed forces. SHI was identified based on self or proxy report of being deaf or having “serious difficulty hearing” (4). Prevalence ratios, adjusted for the effect of

demographic and occupational* factors, were produced using multivariable Poisson regression. Two regression models were used. The first, model A, treated the independent variable, veteran status, as dichotomous, and was used to compare all veterans with nonveterans. The second, model B, included three categories for the independent variable and was used to compare veterans who served before and after September 2001 with nonveterans separately.

In 2010, 8.9% of the U.S. population aged ≥ 17 years were veterans, but only 0.7% of the population had served after September 2001. The prevalence of SHI among nonveterans was 2.5%. Among all veterans, the prevalence was 10.4%; among veterans who served after September 2001, the prevalence was 3.9% (Table 1).[†] The prevalence of SHI increased with age for veterans and nonveterans.

Among nonveterans, men and women reported similar prevalences of SHI (2.3% and 2.5%, respectively). Female veterans, however, had a significantly lower prevalence of SHI than male veterans (4.0% versus 10.9%; $p < 0.05$), but a significantly higher prevalence than either male or female nonveterans. Among nonveterans and veterans alike, non-Hispanic blacks reported the lowest SHI prevalence of all racial/ethnic groups and non-Hispanic whites the highest. The prevalence of SHI was significantly higher for veterans than for nonveterans in all occupational categories ($p < 0.05$) except farming, fishing, and forestry, and in production occupations.[§] Small sample sizes limited the ability to compare subgroups for veterans who served after September 2001.

In the multivariable analysis, increasing age was positively associated with SHI, as was working in certain occupational categories (Table 2) and unemployment or nonparticipation in the labor force, relative to working in management, business, and financial occupations. Female sex and race/ethnicity other than non-Hispanic white were significantly negatively associated with SHI ($p < 0.05$). Controlling for demographic factors and occupation, all veterans were 30% more likely to have SHI than nonveterans in model A (adjusted prevalence ratio = 1.3). In model B, veterans who served after September 2001 were four times more likely than nonveterans to have SHI (adjusted prevalence ratio = 4.0) (Table 2).

* Current occupation was defined based on the 11 major groupings of census occupation codes used in the CPS-ASEC. The CPS-ASEC uses 2002 census occupation codes, which, in turn, are based on the 2000 standard occupational classification (SOC) codes.

[†] Bivariate analyses not age-standardized.

[§] Production occupations include assemblers and fabricators; plant and system operators; machinists and machine operators; and food processing, metal, plastic, printing, textile, apparel, furnishing, and wood workers.

TABLE 1. Percentage of persons aged ≥17 years reporting severe hearing impairment (SHI), by veteran status and selected characteristics — Current Population Survey, United States, 2010

Characteristic	Veterans								
	Nonveterans			All service periods			September 2001–2010 service period		
	No.*	% with SHI†	(95% CI)	No.*	% with SHI†	(95% CI)	No.*	% with SHI†	(95% CI)
Total	212,237	2.5	(2.3–2.6)	20,634	10.4	(9.8–11.0)	1,696	3.9	(2.6–5.8)
Age group (yrs)									
17–24	33,463	0.4	(0.4–0.5)	197	0.8	(0.1–4.9)	197	0.8	(0.1–4.9)
25–34	39,425	0.5	(0.4–0.6)	1,286	2.0	(1.2–3.5)	869	2.8	(1.6–4.9)
35–44	38,142	1.0	(0.8–1.1)	2,051	1.8	(1.1–2.8)	257	3.7	(1.4–9.7)
45–54	41,128	1.5	(1.3–1.7)	3,186	3.9	(3.0–5.0)	257	4.4	(1.7–11.3)
55–64	30,334	3.0	(2.7–3.3)	5,045	8.2	(7.1–9.5)	111	17.8	(8.4–33.7)
≥65	29,745	10.0	(9.4–10.6)	8,869	17.4	(16.2–18.6)	4	0.0	—
Sex									
Male	93,494	2.3	(2.2–2.5)	19,141	10.9	(10.3–11.6)	1,397	4.3	(2.8–6.3)
Female	118,743	2.5	(2.4–2.7)	1,493	4.0	(2.7–5.7)	299	2.5	(0.8–7.1)
Race/Ethnicity									
White, non-Hispanic	141,442	2.9	(2.7–3.0)	16,825	11.3	(10.6–12.0)	1,155	4.8	(3.0–7.5)
Black, non-Hispanic	24,804	1.5	(1.3–1.7)	2,056	4.6	(3.5–5.8)	262	0.8	(0.1–4.8)
Hispanic	31,513	1.6	(1.4–1.8)	1,107	8.3	(6.5–10.7)	203	3.1	(0.9–10.5)
Other, non-Hispanic	14,479	1.8	(1.5–2.1)	645	8.8	(6.7–11.5)	77	4.0	(1.0–14.8)
Current occupation									
Management, business, and financial	20,401	1.0	(0.8–1.2)	1,936	4.7	(3.4–6.5)	212	2.3	(0.7–7.7)
Professional and related	30,665	0.9	(0.8–1.1)	1,911	3.7	(2.6–5.2)	254	2.6	(0.8–8.6)
Service	25,854	1.0	(0.8–1.1)	1,439	4.0	(2.8–5.7)	271	2.3	(0.7–7.2)
Sales and related	16,305	1.1	(0.9–1.4)	935	4.0	(2.5–6.3)	88	0.0	—
Office and administrative support	18,876	1.0	(0.8–1.2)	874	5.2	(3.3–8.2)	146	5.0	(1.8–13.0)
Farming, fishing, and forestry	1,119	1.6	(0.8–3.1)	41	9.0	(1.2–45.1)	4	0.0	—
Construction and extraction	8,394	1.3	(1.0–1.6)	861	5.5	(3.4–8.8)	99	3.4	(0.4–23.7)
Installation, maintenance, and repair	4,682	1.3	(0.9–2.0)	776	5.4	(3.3–8.9)	91	6.1	(2.1–16.4)
Production [§]	8,299	1.7	(1.3–2.2)	790	3.2	(1.9–5.1)	101	4.4	(1.0–17.4)
Transportation and material moving	8,301	1.3	(0.9–1.7)	1,053	5.0	(3.2–7.7)	119	2.7	(0.4–17.5)
Other	11	0.0	—	29	5.1	(0.7–30.4)	27	5.5	(0.7–32.3)
Unemployed or not in labor force	69,328	5.3	(5.0–5.6)	9,989	16.7	(15.6–17.9)	285	8.4	(4.5–15.1)

Abbreviation: CI: confidence interval.

* Estimated population, in thousands.

† Bivariate analyses not age-standardized.

§ Production occupations include assemblers and fabricators; plant and system operators; machinists and machine operators; and food processing, metal, plastic, printing, textile, apparel, furnishing, and wood workers.

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Editorial Note

Military service can entail harmful exposure to high-intensity noise from firearms, explosives, jet engines, machinery, and other sources during combat operations, training, or in the course of general job duties. Such exposures can cause or contribute to hearing impairments, including hearing loss, if adequate hearing protection is not available and properly used (2,5). The findings in this report indicate that prior military service is associated with increased prevalence of SHI, independent of demographic factors and current occupation.

For veterans who served after September 2001, the prevalence is even higher than for other veterans.

Noise-induced hearing loss is a permanent disability, although the impairment sometimes can be rehabilitated with hearing aids. Since 1978, the Department of Defense (DoD) policy has required each of the armed services to have in place HCPs incorporating noise hazard identification, safety signs and labels, noise mitigation, education and training, audiometric surveillance, and program evaluation (2). However, a 2005 Institute of Medicine report identified certain shortcomings in military HCPs (5). Between 10% and 18% of service members enrolled in military HCPs had standard threshold shifts in hearing,[¶] a prevalence two to five times higher than would be considered acceptable in a

¶ A standard threshold shift is a change of 10 dB or more in the average hearing thresholds at 2,000, 3,000, and 4,000 Hz in comparison with a baseline audiogram.

TABLE 2. Adjusted prevalence ratios (APRs)* for severe hearing impairment among persons aged ≥17 years — Current Population Survey, United States, 2010

Characteristic	Model A		Model B	
	APR	(95% CI)	APR	(95% CI)
Age [†]	1.1	(1.1–1.1)	1.1	(1.1–1.1)
Sex				
Male	Referent		Referent	
Female	0.6	(0.6–0.7)	0.6	(0.6–0.7)
Race/Ethnicity				
White, non-Hispanic	Referent		Referent	
Black, non-Hispanic	0.6	(0.6–0.7)	0.6	(0.6–0.7)
Hispanic	0.9	(0.8–1.0)	0.9	(0.8–1.0)
Other, non-Hispanic	0.8	(0.7–1.0)	0.8	(0.7–1.0)
Current occupation				
Management, business, and financial	Referent		Referent	
Professional and related	1.0	(0.8–1.3)	1.0	(0.8–1.3)
Service	1.3	(1.1–1.7)	1.3	(1.1–1.7)
Sales and related	1.3	(1.0–1.7)	1.3	(1.0–1.7)
Office and administrative support	1.3	(1.0–1.7)	1.3	(1.0–1.7)
Farming, fishing, and forestry	1.9	(1.0–3.9)	1.9	(1.0–3.9)
Construction and extraction	1.5	(1.2–2.0)	1.5	(1.2–2.0)
Installation, maintenance, and repair	1.5	(1.1–2.2)	1.5	(1.0–2.2)
Production [‡]	1.7	(1.3–2.2)	1.7	(1.3–2.2)
Transportation and material moving	1.4	(1.0–2.0)	1.4	(1.0–2.0)
Other	4.9	(0.4–54.4)	2.0	(0.2–21.4)
Unemployed or not in labor force	2.5	(2.1–3.0)	2.5	(2.1–3.0)
Veteran				
Yes	1.3	(1.2–1.5)	—	
No	Referent		—	
Period of military service				
September 2001–2010	—		4.0	(2.7–6.0)
Before September 2001	—		1.3	(1.2–1.4)
None	—		Referent	

Abbreviation: CI = confidence interval.

* Prevalence ratios statistically adjusted for the effects of all other variables in the table.

[†] Prevalence ratio associated with a 1-year increase in age.

[‡] Production occupations include assemblers and fabricators; plant and system operators; machinists and machine operators; and food processing, metal, plastic, printing, textile, apparel, furnishing, and wood workers.

What is already known on this topic?

Military service entails hazardous exposure to high-intensity noise. Hearing impairments are the most common types of service-connected disability for which veterans are being compensated by the Department of Veterans Affairs.

What is added by this report?

The prevalence of severe hearing impairment (SHI) among veterans is significantly greater than among nonveterans. After adjusting for age and current occupation, veterans are 30% more likely to have SHI than nonveterans, and veterans who served after September 2001 are four times more likely than nonveterans to have SHI.

What are the implications for public health?

Improvements in military hearing conservation programs and increased emphasis on hearing loss surveillance in military and veterans' health systems will be needed to reduce the prevalence of disability caused by hearing impairments among veterans.

civilian, industrial HCPs (5). A more recent report from the Government Accountability Office (GAO) also concluded that improvements in military HCPs would lead to improved outcomes (2). For its part, DoD has acknowledged the increase in sequelae from auditory injuries among service members and the need for improvements to military HCPs, and has concurred with the GAO's recommendations (2).

Beyond the effect of SHI on the well-being of individual veterans, higher rates of SHI are costly to the nation because of increased use of medical services and disability payments. According to the Department of Veterans Affairs (VA), hearing impairments have been the most common type of service-connected disability since 2005, and the number of veterans being awarded compensation for hearing impairment has continued to grow each year. In fiscal year 2009, the VA paid approximately \$1.1 billion to compensate 1.2 million veterans who filed claims for service-connected hearing impairments (6,7).

The findings in this report are subject to at least six limitations. First, ascertainment of SHI was based on self or proxy report by the survey household respondent and was not validated by audiometric testing. Although self report has been found to have acceptable sensitivity and specificity compared with audiometric measurement of hearing loss in past studies (8), proxy report has not been similarly validated. This could have resulted in some misclassification errors. Second, although physical requirements for military service ensured that SHI

was not present in the exposed group before entering military service, the specific cause of subsequent hearing impairment was not determined. Third, these analyses assume equal incidence of age-related hearing loss and other hearing loss unrelated to noise among veterans and nonveterans. This assumption most likely resulted in underestimation of prevalence ratios. Persons with congenital deafness and hearing loss resulting from childhood infections or other nonservice-related causes were not excluded from the reference group. Fourth, although attempts were made to adjust for current occupation and demographic characteristics, data on past occupations and on recreational and other nonoccupational noise exposures (e.g., hunting or listening to loud music) were not available. To the extent such factors were differentially distributed between veterans and nonveterans, adjustments might have been insufficient to control for all potential confounding factors. Fifth, because data on length of service were unavailable,

adjustments for duration of exposure were not possible. Finally, the cross-sectional nature of these analyses precludes making direct causal inferences.

Noise-induced hearing loss is preventable. The observed association of SHI with military service, and particularly with service in the United States or overseas after September 2001, underscores the need for improved HCPs in the various service branches and the importance of hearing loss surveillance in military and VA health systems. The study results also suggest a need for further research to identify possible causes for the increased prevalence of SHI among veterans with service after September 2001. Increased exposure to combat and its attendant uncontrolled noise hazards is a potential hypothesis, but data on specific exposures during military service were unavailable in the CPS-ASEC. In 2008, serious auditory injuries sustained by service members in Operations Enduring Freedom and Iraqi Freedom led Congress to mandate that DoD create a Hearing Center of Excellence to improve hearing loss prevention and treatment and to establish an electronic registry to track and share information with the VA on military personnel with hearing loss.** DoD is finishing plans for the center and the registry (2). GAO also has made specific recommendations to DoD for improvement of military HCPs (2).

** Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, Pub. L. No. 110-417, Sect. 721, 122 Stat. 4506 (2008).

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Announcement

Epidemic Intelligence Service Application Deadline — September 1, 2011

Applications are now being accepted for CDC's July 2012–June 2014 Epidemic Intelligence Service (EIS) program. EIS is a 2-year, postgraduate program of service and on-the-job training for health professionals interested in the practice of epidemiology. Each year, EIS provides approximately 80 persons from around the world opportunities to gain hands-on experience in epidemiology at CDC or state or local health departments. EIS officers, often called CDC's "disease detectives," have gone on to assume leadership positions at CDC and other public health agencies. The EIS experience also is useful for health professionals who would like to gain a population-based perspective on public health practice.

Persons with a strong interest in applied epidemiology who meet at least one of the following qualifications may apply to EIS: 1) physicians with ≥ 1 year of clinical training; 2) persons with a doctoral degree in epidemiology, biostatistics, social or behavioral sciences, natural sciences, or nutrition sciences; 3) dentists, physician assistants, or nurses with a master of public health (MPH) or equivalent degree; 4) veterinarians with an MPH or equivalent degree or relevant public health experience.

The deadline for submitting applications for the July 2012–June 2014 EIS program is September 1, 2011. Information regarding the new EIS online application and program details is available at <http://www.cdc.gov/eis/applynow.html>; by telephone (404-498-6110); or via e-mail (eis@cdc.gov).

Errata

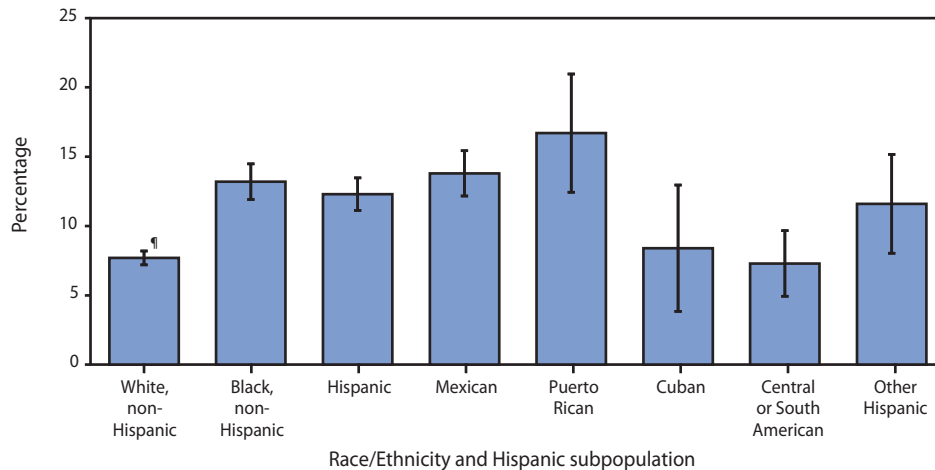
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In the report, "Illnesses associated with exposure to methyl bromide-fumigated produce—California, 2010," errors occurred on pages 923 and 924. On page 923, in the second full paragraph of the second column, the fifth sentence should read as follows: "Assuming first-order elimination kinetics and a 12-day half-life for inorganic bromide, his serum bromide was estimated to have been 5.87 mg/dL on March 13, his last day working in cold storage." On page 924, first full paragraph of the 1st column, the fourth sentence should read as follows: "After learning that patient A had similar symptoms, a serum bromide test was obtained on March 20, 2010, that showed a bromide level of 1.5 mg/dL, which was estimated to have been a level of 8.5 mg/dL on patient B's last work day (February 18)."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Adults Aged ≥ 18 Years Who Ever Received a Diagnosis of Diabetes,* by Race/Ethnicity and Hispanic Subpopulation[†] — National Health Interview Survey, United States, 2009[§]



* Respondents were asked if they had ever been told by a doctor or other health professional that they had diabetes or sugar diabetes (female respondents were instructed to exclude pregnancy-related diabetes). Responses from persons who said they had "borderline" diabetes were treated as unknown with respect to diabetes. Unknowns were not included in the denominators when calculating percentages.

[†] Persons of Hispanic origin might be of any race or combination of races.

[§] Estimates are age adjusted using the projected 2000 U.S. standard population as the standard population and using four age groups: 18–44 years, 45–64 years, 65–74 years, and ≥ 75 years.

[¶] 95% confidence interval.

During 2009, non-Hispanic black adults (13.2%) were almost twice as likely as non-Hispanic white adults (7.7%) to have been told by a doctor or other health professional that they had diabetes. The prevalence of diagnosed diabetes also was higher among Hispanic adults (12.3%) than among non-Hispanic white adults. Among Hispanic subpopulations, Mexican adults (13.8%) and Puerto Rican adults (16.7%) were more likely to have been told by a doctor or other health professional that they had diabetes compared with Central or South American adults (7.3%).

Source: National Health Interview Survey, 2009 data. Available at <http://www.cdc.gov/nchs/nhis.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 July 16, 2011 (28th week)*

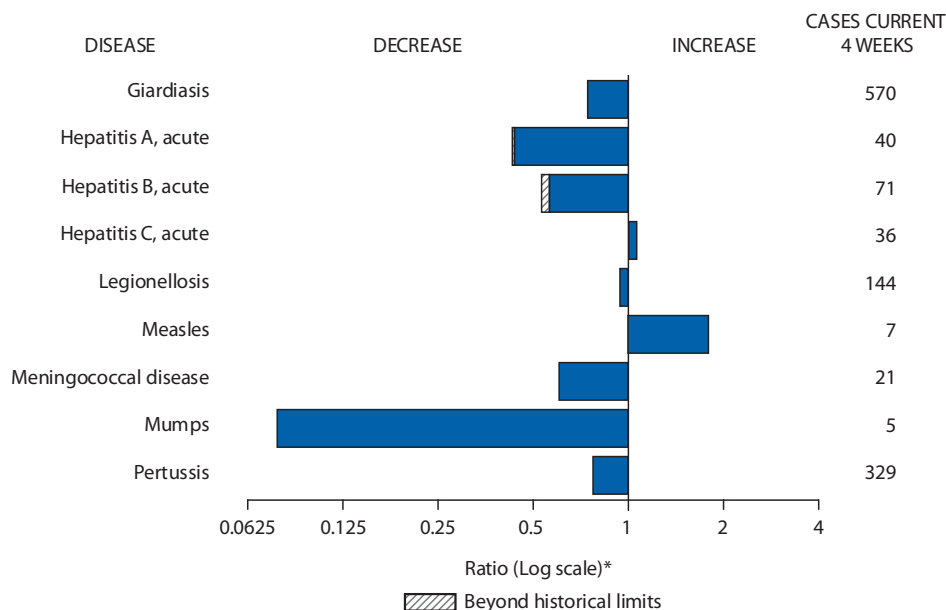
Disease	Current week	Cum 2011	5-year weekly average [†]	Total cases reported for previous years					States reporting cases during current week (No.)
				2010	2009	2008	2007	2006	
Anthrax	—	—	—	—	1	—	1	1	
Arboviral diseases ^{§, ¶} :									
California serogroup virus disease	—	2	3	75	55	62	55	67	
Eastern equine encephalitis virus disease	—	—	0	10	4	4	4	8	
Powassan virus disease	—	2	0	8	6	2	7	1	
St. Louis encephalitis virus disease	—	—	0	10	12	13	9	10	
Western equine encephalitis virus disease	—	—	—	—	—	—	—	—	
Babesiosis	21	95	3	NN	NN	NN	NN	NN	RI (2), NY (16), PA (3)
Botulism, total	1	45	3	112	118	145	144	165	
foodborne	—	5	0	7	10	17	32	20	
infant	1	34	2	80	83	109	85	97	TX (1)
other (wound and unspecified)	—	6	0	25	25	19	27	48	
Brucellosis	2	37	2	115	115	80	131	121	CA (2)
Chancroid	—	12	1	24	28	25	23	33	
Cholera	—	24	0	13	10	5	7	9	
Cyclosporiasis [§]	4	67	6	179	141	139	93	137	NY (1), FL (2), TX (1)
Diphtheria	—	—	—	—	—	—	—	—	
<i>Haemophilus influenzae</i> ,** invasive disease (age <5 yrs):									
serotype b	—	4	0	23	35	30	22	29	
nonsertotype b	—	60	4	200	236	244	199	175	
unknown serotype	5	145	3	223	178	163	180	179	OH (2), MD (1), FL (1), HI (1)
Hansen disease [§]	1	23	2	98	103	80	101	66	FL (1)
Hantavirus pulmonary syndrome [§]	—	10	1	20	20	18	32	40	
Hemolytic uremic syndrome, postdiarrheal [§]	2	55	7	266	242	330	292	288	FL (1), TN (1)
Influenza-associated pediatric mortality ^{§, ††}	1	110	1	61	358	90	77	43	VA (1)
Listeriosis	2	231	20	821	851	759	808	884	NY (1), KY (1)
Measles ^{§§}	2	136	1	63	71	140	43	55	NY (1), PA (1)
Meningococcal disease, invasive ^{¶¶} :									
A, C, Y, and W-135	1	110	5	280	301	330	325	318	NY (1)
serogroup B	—	54	3	135	174	188	167	193	
other serogroup	—	5	0	12	23	38	35	32	
unknown serogroup	7	256	9	406	482	616	550	651	NY (2), MD (1), FL (3), CA (1)
Novel influenza A virus infections ^{***}	—	1	0	4	43,774	2	4	NN	
Plague	—	1	0	2	8	3	7	17	
Poliomyelitis, paralytic	—	—	—	—	1	—	—	—	
Polio virus Infection, nonparalytic [§]	—	—	—	—	—	—	—	NN	
Psittacosis [§]	—	1	0	4	9	8	12	21	
Q fever, total [§]	—	35	3	131	113	120	171	169	
acute	—	23	2	106	93	106	—	—	
chronic	—	12	0	25	20	14	—	—	
Rabies, human	—	1	0	2	4	2	1	3	
Rubella ^{†††}	—	3	0	5	3	16	12	11	
Rubella, congenital syndrome	—	—	—	—	2	—	—	1	
SARS-CoV [§]	—	—	—	—	—	—	—	—	
Smallpox [§]	—	—	—	—	—	—	—	—	
Streptococcal toxic-shock syndrome [§]	3	74	2	148	161	157	132	125	NY (3)
Syphilis, congenital (age <1 yr) ^{§§§}	—	75	8	377	423	431	430	349	
Tetanus	—	4	0	10	18	19	28	41	
Toxic-shock syndrome (staphylococcal) [§]	—	42	2	82	74	71	92	101	
Trichinellosis	—	7	0	7	13	39	5	15	
Tularemia	—	43	5	124	93	123	137	95	
Typhoid fever	1	185	8	468	397	449	434	353	FL (1)
Vancomycin-intermediate <i>Staphylococcus aureus</i> [§]	—	27	1	91	78	63	37	6	
Vancomycin-resistant <i>Staphylococcus aureus</i> [§]	—	—	—	2	1	—	2	1	
Vibriosis (noncholera <i>Vibrio</i> species infections) [§]	9	222	16	848	789	588	549	NN	GA (1), FL (6), TX (1), CA (1)
Viral hemorrhagic fever ^{¶¶¶}	—	—	—	1	NN	NN	NN	NN	
Yellow fever	—	—	—	—	—	—	—	—	

See Table 1 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 July 16, 2011 (28th week)*

—: No reported cases. N: Not reportable. NN: Not Nationally Notifiable. Cum: Cumulative year-to-date counts.
 * Case counts for reporting years 2010 and 2011 are provisional and subject to change. For further information on interpretation of these data, see http://www.cdc.gov/osels/ph_surveillance/nndss/phs/files/ProvisionalNationa%20NotifiableDiseasesSurveillanceData20100927.pdf.
 † Calculated by summing the incidence counts for the current week, the 2 weeks preceding the current week, the 2 weeks following the current week, for a total of 5 preceding years. Additional information is available at http://www.cdc.gov/osels/ph_surveillance/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 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/osels/ph_surveillance/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 weekly from reports to the Influenza Division, National Center for Immunization and Respiratory Diseases. Since October 3, 2010, 114 influenza-associated pediatric deaths occurring during the 2010-11 influenza season have been reported.
 ‡‡ The two 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, four cases of human infection with novel influenza A viruses, different from the 2009 pandemic influenza A (H1N1) strain, were reported to CDC. The four cases of novel influenza A virus infection reported to CDC during 2010 and the one case reported in 2011 were identified as swine influenza A (H3N2) virus and are unrelated to the 2009 pandemic influenza A (H1N1) virus. Total case counts for 2009 were provided by the Influenza Division, National Center for Immunization and Respiratory Diseases (NCIRD).
 ††† No rubella cases were reported for the current week.
 †††† 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 of 2010. 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 July 16, 2011, 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

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Morbidity and Mortality Weekly Report

TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending July 16, 2011, and July 17, 2010 (28th week)*

Reporting area	Dengue Virus Infection†									
	Dengue Fever§					Dengue Hemorrhagic Fever¶				
	Current week	Previous 52 weeks		Cum 2011	Cum 2010	Current week	Previous 52 weeks		Cum 2011	Cum 2010
	Med	Max				Med	Max			
United States	—	3	55	44	248	—	0	2	—	4
New England	—	0	3	1	4	—	0	0	—	—
Connecticut	—	0	0	—	—	—	0	0	—	—
Maine**	—	0	2	—	3	—	0	0	—	—
Massachusetts	—	0	0	—	—	—	0	0	—	—
New Hampshire	—	0	0	—	—	—	0	0	—	—
Rhode Island**	—	0	1	—	—	—	0	0	—	—
Vermont**	—	0	1	1	1	—	0	0	—	—
Mid. Atlantic	—	1	25	19	71	—	0	1	—	2
New Jersey	—	0	5	—	8	—	0	0	—	—
New York (Upstate)	—	0	5	—	11	—	0	1	—	1
New York City	—	1	17	10	43	—	0	1	—	1
Pennsylvania	—	0	3	9	9	—	0	0	—	—
E.N. Central	—	0	7	4	18	—	0	1	—	—
Illinois	—	0	3	1	4	—	0	0	—	—
Indiana	—	0	2	1	4	—	0	0	—	—
Michigan	—	0	2	—	3	—	0	0	—	—
Ohio	—	0	2	—	5	—	0	0	—	—
Wisconsin	—	0	2	2	2	—	0	1	—	—
W.N. Central	—	0	6	—	16	—	0	1	—	—
Iowa	—	0	1	—	1	—	0	0	—	—
Kansas	—	0	1	—	2	—	0	0	—	—
Minnesota	U	0	1	—	9	U	0	0	—	—
Missouri	—	0	1	—	3	—	0	0	—	—
Nebraska**	—	0	6	—	—	—	0	0	—	—
North Dakota	—	0	0	—	1	—	0	0	—	—
South Dakota	—	0	0	—	—	—	0	1	—	—
S. Atlantic	—	1	19	11	96	—	0	1	—	1
Delaware	—	0	0	—	—	—	0	0	—	—
District of Columbia	—	0	0	—	—	—	0	0	—	—
Florida	—	1	13	10	78	—	0	1	—	1
Georgia	—	0	2	—	6	—	0	0	—	—
Maryland**	—	0	0	—	—	—	0	0	—	—
North Carolina	—	0	2	1	—	—	0	0	—	—
South Carolina**	—	0	3	—	5	—	0	0	—	—
Virginia**	—	0	3	—	5	—	0	0	—	—
West Virginia	—	0	1	—	2	—	0	0	—	—
E.S. Central	—	0	2	—	1	—	0	0	—	—
Alabama**	—	0	2	—	—	—	0	0	—	—
Kentucky	—	0	1	—	—	—	0	0	—	—
Mississippi	—	0	0	—	—	—	0	0	—	—
Tennessee**	—	0	0	—	1	—	0	0	—	—
W.S. Central	—	0	4	—	13	—	0	0	—	1
Arkansas**	—	0	0	—	—	—	0	0	—	1
Louisiana	—	0	2	—	1	—	0	0	—	—
Oklahoma	—	0	1	—	1	—	0	0	—	—
Texas**	—	0	2	—	11	—	0	0	—	—
Mountain	—	0	2	3	7	—	0	0	—	—
Arizona	—	0	2	2	2	—	0	0	—	—
Colorado	—	0	0	—	—	—	0	0	—	—
Idaho**	—	0	1	—	1	—	0	0	—	—
Montana**	—	0	1	—	2	—	0	0	—	—
Nevada**	—	0	1	—	1	—	0	0	—	—
New Mexico**	—	0	0	—	1	—	0	0	—	—
Utah	—	0	1	1	—	—	0	0	—	—
Wyoming**	—	0	0	—	—	—	0	0	—	—
Pacific	—	0	7	6	22	—	0	0	—	—
Alaska	—	0	0	—	1	—	0	0	—	—
California	—	0	5	2	17	—	0	0	—	—
Hawaii	—	0	0	—	—	—	0	0	—	—
Oregon	—	0	0	—	—	—	0	0	—	—
Washington	—	0	2	4	4	—	0	0	—	—
Territories										
American Samoa	—	0	0	—	—	—	0	0	—	—
C.N.M.I.	—	—	—	—	—	—	—	—	—	—
Guam	—	0	0	—	—	—	0	0	—	—
Puerto Rico	—	32	550	299	4,308	—	0	20	1	96
U.S. Virgin Islands	—	0	0	—	—	—	0	0	—	—

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

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

* Case counts for reporting year 2010 and 2011 are provisional and subject to change. For further information on interpretation of these data, see http://www.cdc.gov/osels/ph_surveillance/nndss/phs/files/ProvisionalNationalNotifiableDiseasesSurveillanceData20100927.pdf. Data for TB are displayed in Table IV, which appears quarterly.

† Updated weekly from reports to the Division of Vector-Borne Infectious Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases (ArboNET Surveillance).

§ Dengue Fever includes cases that meet criteria for Dengue Fever with hemorrhage, other clinical and unknown case classifications.

¶ 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 July 16, 2011, and July 17, 2010 (28th week)*

Reporting area	Shigellosis					Spotted Fever Rickettsiosis (including RMSF) [†]									
	Current week	Previous 52 weeks		Cum 2011	Cum 2010	Confirmed					Probable				
		Med	Max			Current week	Previous 52 weeks	Cum 2011	Cum 2010	Current week	Previous 52 weeks	Cum 2011	Cum 2010		
United States	178	258	742	5,218	7,276	5	2	11	57	77	31	23	245	515	639
New England	—	3	20	83	214	—	0	0	—	—	—	0	1	2	1
Connecticut	—	0	18	18	69	—	0	0	—	—	—	0	0	—	—
Maine [§]	—	0	4	16	3	—	0	0	—	—	—	0	1	—	1
Massachusetts	—	2	14	42	126	—	0	0	—	—	—	0	0	—	—
New Hampshire	—	0	2	1	5	—	0	0	—	—	—	0	1	1	—
Rhode Island [§]	—	0	4	4	10	—	0	0	—	—	—	0	1	1	—
Vermont [§]	—	0	1	2	1	—	0	0	—	—	—	0	0	—	—
Mid. Atlantic	5	14	74	304	985	2	0	1	6	2	—	1	5	12	50
New Jersey	—	3	16	40	232	—	0	0	—	1	—	0	3	—	34
New York (Upstate)	4	3	18	97	89	—	0	0	—	1	—	0	3	2	3
New York City	1	5	14	113	175	—	0	0	—	—	—	0	2	5	7
Pennsylvania	—	4	56	54	489	2	0	1	6	—	—	0	2	5	6
E.N. Central	17	17	37	367	1,018	—	0	1	1	1	2	1	5	34	49
Illinois	—	6	20	77	626	—	0	1	—	—	—	0	2	15	24
Indiana [§]	—	1	4	32	31	—	0	1	—	1	2	0	3	14	15
Michigan	—	4	9	76	137	—	0	0	—	—	—	0	1	—	1
Ohio	17	5	27	182	178	—	0	1	1	—	—	0	2	5	6
Wisconsin	—	0	4	—	46	—	0	0	—	—	—	0	1	—	3
W.N. Central	6	14	52	184	1,538	1	0	4	8	7	10	4	23	136	132
Iowa	—	0	4	8	32	—	0	0	—	—	—	0	1	1	3
Kansas [§]	2	3	12	33	162	—	0	0	—	—	—	0	0	—	—
Minnesota	U	0	4	—	29	U	0	0	—	—	U	0	2	—	—
Missouri	4	7	41	134	1,291	1	0	2	5	5	9	4	23	134	127
Nebraska [§]	—	0	10	5	20	—	0	3	3	2	1	0	1	1	1
North Dakota	—	0	0	—	—	—	0	0	—	—	—	0	1	—	1
South Dakota	—	0	2	4	4	—	0	0	—	—	—	0	0	—	—
S. Atlantic	70	66	132	1,958	1,091	—	1	6	31	49	8	6	59	154	173
Delaware [§]	—	0	1	1	35	—	0	1	1	1	—	0	2	9	11
District of Columbia	—	0	3	7	18	—	0	1	1	—	—	0	0	—	—
Florida [§]	57	36	99	1,419	419	—	0	1	3	2	1	0	2	4	6
Georgia	8	13	26	284	385	—	0	3	15	39	—	0	0	—	—
Maryland [§]	—	2	7	46	63	—	0	1	2	—	2	0	5	10	27
North Carolina	4	3	36	123	74	—	0	4	5	6	—	1	47	73	76
South Carolina [§]	1	1	5	27	37	—	0	1	3	—	—	0	2	11	7
Virginia [§]	—	2	8	47	59	—	0	2	1	1	5	2	12	45	46
West Virginia	—	0	66	4	1	—	0	0	—	—	—	0	1	2	—
E.S. Central	7	13	29	290	404	2	0	3	5	11	3	5	26	115	193
Alabama [§]	—	5	15	102	78	—	0	1	—	1	—	1	6	24	36
Kentucky	3	1	6	34	168	—	0	0	—	6	—	0	0	—	—
Mississippi	3	2	7	72	22	—	0	1	1	—	—	0	4	1	13
Tennessee [§]	1	4	14	82	136	2	0	2	4	4	3	4	20	90	144
W.S. Central	51	57	503	1,200	1,223	—	0	8	—	1	7	1	235	36	36
Arkansas [§]	1	2	7	33	25	—	0	2	—	—	7	0	28	28	12
Louisiana	2	5	13	96	137	—	0	0	—	—	—	0	1	2	1
Oklahoma	—	2	161	40	155	—	0	5	—	—	—	0	202	4	13
Texas [§]	48	46	338	1,031	906	—	0	1	—	1	—	0	5	2	10
Mountain	9	17	32	361	337	—	0	5	6	2	1	0	7	26	4
Arizona	6	7	19	112	182	—	0	4	6	—	—	0	7	20	—
Colorado [§]	3	2	7	43	45	—	0	1	—	—	—	0	1	2	—
Idaho [§]	—	0	3	12	12	—	0	0	—	—	1	0	1	1	1
Montana [§]	—	1	15	104	4	—	0	0	—	2	—	0	0	—	1
Nevada [§]	—	0	6	10	17	—	0	0	—	—	—	0	0	—	—
New Mexico [§]	—	3	10	55	59	—	0	0	—	—	—	0	0	—	1
Utah	—	1	4	24	18	—	0	0	—	—	—	0	1	—	1
Wyoming [§]	—	0	1	1	—	—	0	0	—	—	—	0	1	3	—
Pacific	13	23	63	471	466	—	0	2	—	4	—	0	0	—	1
Alaska	—	0	2	3	—	N	0	0	N	N	N	0	0	N	N
California	13	18	59	369	368	—	0	2	—	4	—	0	0	—	—
Hawaii	—	1	3	30	31	N	0	0	N	N	N	0	0	N	N
Oregon	—	1	4	26	33	—	0	0	—	—	—	0	0	—	1
Washington	—	2	22	43	34	—	0	1	—	—	—	0	0	—	—
Territories															
American Samoa	—	1	1	1	1	N	0	0	N	N	N	0	0	N	N
C.N.M.I.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Guam	—	0	1	1	5	N	0	0	N	N	N	0	0	N	N
Puerto Rico	—	0	1	—	3	N	0	0	N	N	N	0	0	N	N
U.S. Virgin Islands	—	0	0	—	—	—	0	0	—	—	—	0	0	—	—

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

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

* Case counts for reporting year 2010 and 2011 are provisional and subject to change. For further information on interpretation of these data, see http://www.cdc.gov/osels/ph_surveillance/nndss/phs/files/ProvisionalNationalNotifiableDiseasesSurveillanceData20100927.pdf. Data for TB are displayed in Table IV, which appears quarterly.[†] 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).

Morbidity and Mortality Weekly Report

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