

Histoplasmosis Outbreak Associated with the Renovation of an Old House — Quebec, Canada, 2013

On May 19, 2013, a consulting physician contacted the Laurentian Regional Department of Public Health (Direction de santé publique des Laurentides [DSP]) in Quebec, Canada, to report that two masons employed by the same company to do demolition work were experiencing cough and dyspnea accompanied by fever. Other workers also were said to be ill. DSP initiated a joint infectious disease, environmental health, and occupational health investigation to determine the extent and cause of the outbreak. The investigation identified 14 persons with respiratory symptoms among 30 potentially exposed persons. A strong correlation was found between exposure to demolition dust containing bat or bird droppings and a diagnosis of histoplasmosis. Temporary suspension of construction work at the demolition site in Saint-Eustache, Quebec, northwest from Montreal, and transport of the old masonry elements to a secure site for burial were ordered, and information about the disease was provided to workers and residents. To prevent future outbreaks, recommendations included disinfection of any contaminated material, disposal of waste material with proper control of aerosolized dust, and mandatory use of personal protective equipment such as gloves, protective clothing, and adequate respirators.

Histoplasmosis is an infectious disease caused by inhalation of spores produced by the fungus *Histoplasma capsulatum* (HC) (1,2). The organism can be excreted by bats and birds in their droppings and can persist in the environment for several years (3). Pulmonary infection sometimes causes symptoms typical of pneumonia (e.g., dyspnea, fever, and thoracic pain). The incubation period varies ranges from 7 to 21 days. Renovation of old houses that have sheltered colonies of bats has been associated with histoplasmosis resulting from worker exposure to aerosolized spores of the fungus (4–6). Disseminated histoplasmosis is a rare form of the infection that can be fatal, even if properly treated.

On May 19, 2013, a consulting physician contacted DSP to report that two masons employed by the same company were experiencing cough and dyspnea accompanied by fever. Other

workers were also reported to be sick. A joint infectious disease, environmental health, and occupational health investigation was initiated by DSP. The objectives of the investigation were to describe the demolition work, the workers, and other persons involved, and the medical history of persons who became ill, to determine the extent and cause of the outbreak.

Initial questioning revealed that the two workers became ill 48 hours earlier. Because of the severity of the symptoms, both patients were referred to the emergency department of a Montreal tertiary-care center. One of the two patients was hospitalized. Further investigation revealed that during May 18–20, 2013, six masons were evaluated in the emergency department for similar symptoms, and two were hospitalized. All the masons had recently carried out demolition of the exterior walls of a century-old brick house and had seen a large quantity of dried bird or bat droppings behind the bricks. The demolition work was reported to have caused a cloud of dust in the immediate environment. Given the history of exposure to droppings, the diagnosis of histoplasmosis was considered.

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The investigation led to the identification and questioning of the 30 persons believed to have been exposed to HC from work-site debris during April 29–May 14, 2013. Those 30 included 21 men and nine women, with a mean age of 39 years (median: 30.8 years, range: 16–77 years). A standardized questionnaire was used to record symptoms and determine potential exposures. Half of the exposed person were workers: six masons who demolished the brick walls, four bricklayers, one debris sorter working for a container company from outside the Laurentian region who picked up the demolition debris and transported it to a sorting site away from the demolition site, two other debris sorters from the same company who cleaned the bricks, and two metal workers from a third company who carried out repairs to the roof eaves. The other 15 persons included the homeowner and his wife, who lived on the ground floor of the house, and two tenants living upstairs; three visitors who walked around on the site for 10–90 minutes; and eight neighbors.

Of these 30 persons, 14 experienced respiratory symptoms: six masons, three debris sorters, the two residents on the ground floor, the two neighbors whose bedroom faced the demolition site, and one of the visitors to the site (Table). These 14 persons consulted a physician. Two workers were hospitalized. Symptoms began to appear during May 2–17, with a peak occurring May 13–17 (Figure). In order of frequency, the symptoms were dyspnea (100%), chills (86%), headaches (86%), sweating (79%), chest pain (79%), asthenia (79%), fever (71%), cough (71%), myalgia (57%), nausea (43%),

TABLE. Number of histoplasmosis cases associated with the renovation of an old house, by exposure level, hospitalization status, and worker/resident status — Quebec, Canada, May 1–18, 2013

Occupation	Total	Exposure level	Case		Histoplasmosis cases	
			Yes	No	Confirmed	Hospitalized
Workers	15		9	6	4	2
Masons	6	High	6	0	2	2
Bricklayers	4	Low	0	4		
Debris sorters	3	High	3	0	2	
Metal workers	2	Low	0	2		
Others	15		5	10	0	0
Residents	4	High	2	2		
Neighbors	8	Low	2	6		
Visitors	3	Low	1	2		
Total	30		14	16	4	2

diarrhea (36%), erythema (29%), abdominal pain (14%), and vomiting (14%). The average duration of respiratory symptoms was 12.6 days (median: 13.5 days; range: 5–20 days). All the symptomatic persons recovered without any specific treatment for histoplasmosis.

A clinical case of histoplasmosis was defined as the presentation of at least four of the following symptoms: dyspnea, chest pain, cough, fever, chills, sweating, asthenia, or myalgia, with onset during April 30–May 19, 2013, in a person exposed to the demolition site or involved in the handling of demolition debris during April 29–May 14, 2013. A confirmed case was defined as a case meeting the clinical case definition plus detection of HC antigen in a serum or urine specimen. All of the 14 persons

The *MMWR* series of publications is published by the Center for Surveillance, Epidemiology, and Laboratory Services, 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* 2013;62:[inclusive page numbers].

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who had respiratory symptoms met at least the clinical case definition. Hospitalized patients underwent radiologic investigation, in conjunction with blood and microbiologic analysis, to rule out other viral, bacterial, or fungal infections, including legionellosis and tuberculosis.

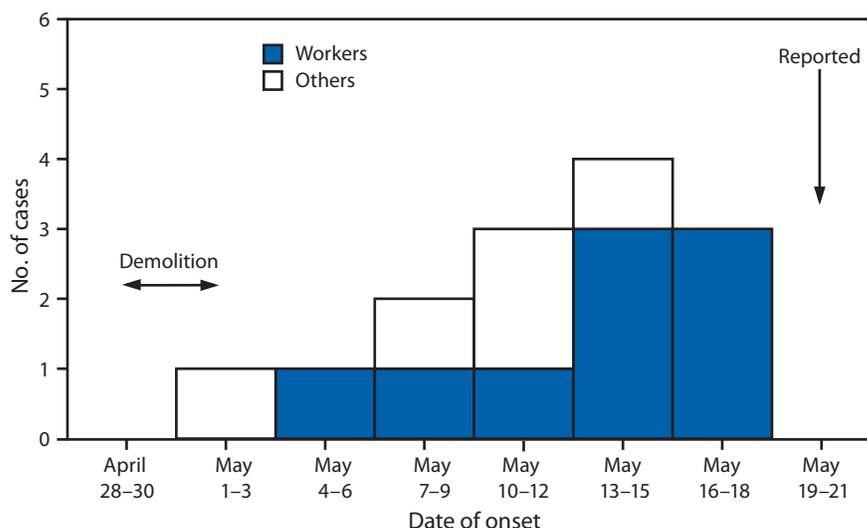
A diagnosis of histoplasmosis was confirmed for the two hospitalized masons through a positive serum and a positive urinary HC antigen test. The diagnosis for the two debris sorters was confirmed by a urinary HC antigen test. Five of the other 11 workers received a clinical diagnosis of histoplasmosis resulting from exposure to the same material as the confirmed cases, the presence of compatible clinical manifestations and chest radiographs demonstrating abnormalities. Among the 15 residents, visitors, and neighbors, the illnesses of five were considered clinical cases of histoplasmosis.

Exposure was categorized as high in persons who directly manipulated contaminated material during the demolition, transportation, or debris removal, and in persons who lived in the house during the renovation. If not present during those activities, persons were considered to have experienced low exposure.

Among the 13 persons categorized as having been highly exposed, 11 experienced symptoms, compared with three of 17 persons with a low level of exposure (relative risk = 4.8, 95% confidence interval = 1.7–13.7) (Table). Simply being present during the demolition (April 29–May 1) was also strongly associated with infection. Of 23 persons present, 14 experienced symptoms, compared with none of the seven persons exposed after demolition (relative risk = ∞ , 95% confidence interval = undetermined; $p < 0.005$).

The recommendations made by DSP consisted of temporarily suspending any further construction work and informing the workers and the residents about the disease. The risk for additional contamination from the house's environment was assessed. The old bricks from the demolition debris were contained and buried underground at a secure site. The debris around the house was removed by workers before involvement of DSP. The house's surroundings were washed by heavy rains during the following days. The Laurentian Regional Occupational Health and Safety Commission also made recommendations to the employers concerning similar work in the future: communicate health risks to workers and insist on preventive measures, particularly the constant use of a respirator. Although the masons were provided with respirators, they wore them intermittently because of the hot weather; respirators were not made available for the three debris sorters.

FIGURE. Number of histoplasmosis cases associated with the renovation of an old house, by worker status and date of illness onset — Quebec, Canada, May 1–18, 2013



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Editorial Note

A wide range of activities have been associated with histoplasmosis outbreaks: construction, maintenance, renovation, excavation (4–6); caving (7); school activities or day camp (8); search for treasure (9); and agricultural activities (10), among others. The common variable inherent in these activities is the exposure to bird or bat droppings (1) or contaminated soil.

When buildings, particularly old houses, have previously sheltered colonies of bats or birds, appropriate measures should be taken before starting renovation work to protect the health of persons in and around the area.

In this investigation, the confirmation of a diagnosis of histoplasmosis for debris sorters who did not work at the demolition site but handled contaminated materials away from the site demonstrates that the radius of exposure might be greater than expected. As a result, protective measures should be recommended to all workers who might be exposed to contaminated material.

The findings in this report are subject to at least two limitations. First, a conservative approach to risk assessment was adopted by including persons such as residents of the house in the high exposure scenario, and by including clinical cases that could be related to an etiology other than histoplasmosis. Second, the small number of persons involved in this outbreak

What is already known on this topic ?

Histoplasmosis outbreaks can occur when demolition work produces dust containing bird or bat droppings.

What is added by this report?

During the renovation of an old house in Quebec, Canada, 14 of 30 workers and residents exposed to dust from bird or bat droppings experienced respiratory symptoms consistent with histoplasmosis. Of the four persons whose infection was laboratory-confirmed, two were hospitalized. Illness was highly correlated with exposure to dust during demolition of the exterior walls, and with the handling of contaminated debris away from the work site.

What are the implications for public health practice?

Employers need to provide the appropriate protective equipment and reinforce to employees the necessity of applying protective measures during demolition work, including when handling debris away from the work site.

limits the power of analysis and the conclusions that can be drawn from the investigation. Moreover, the even smaller number of symptomatic persons who were tested for HC antigen reduces the specificity of the diagnosis. Despite these limitations, the high relative risk shows a strong correlation between demolition dust exposure and the onset of disease.

This outbreak highlights the importance for employers to understand the health risks associated with renovation of old houses in areas where bats or birds roost. Employers should also be made aware of the recommended health measures for their workers, such as wearing a respirator (*I*).

Acknowledgments

Bruno Cossette, Linda Montplaisir, Francine Veilleux, Laurentian Regional Dept of Public Health, Saint-Jérôme, Québec, Canada.

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Outbreak of Salmonellosis Associated with Consumption of Pulled Pork at a Church Festival — Hamilton County, Ohio, 2010

On June 18, 2010, Hamilton County Public Health (HCPH), a local health department in Ohio, began receiving reports of gastrointestinal illness from persons who attended a church festival held during June 11–13 in a suburban community of Hamilton County. HCPH investigated and confirmed the existence of a foodborne outbreak associated with consumption of pulled pork prepared in a private home and sold at the church festival. Sixty-four attendees with gastroenteritis were identified. *Salmonella enterica* serotype Typhimurium (*Salmonella* Typhimurium) was found in stool specimens from three patients; no other pathogen was found. Because the outbreak was identified after the church festival had concluded, the environmental investigation was limited to interviews of food handlers. The primary public health interventions consisted of 1) active surveillance for additional cases of salmonellosis associated with the festival, 2) consultation with the festival organizers and food vendors to ensure the pork product was not resold or consumed elsewhere, 3) education of the festival organizers and food vendors about relevant public health regulations and food safety practices, 4) traceback of the implicated product to the retailer in Indiana, and 5) notification of the Indiana State Department of Health. The results of the investigation call attention to the public health implications of unregulated food service at events such as church festivals, which generally are exempt from public health inspection and licensure in Ohio. Food sold in such environments might place populations at risk for foodborne illness.

During June 11–13, 2010, an estimated 9,000 persons attended a church festival held in a suburban community of Hamilton County, Ohio. Fifteen vendors sold food at the church festival; none were licensed or inspected by HCPH. In Ohio, religious organizations generally are exempt from standard licensure requirements (Ohio Revised Code) (1).

On June 14, symptoms of gastrointestinal illness were noted by the index patient who attended the church festival and who identified two household contacts who also were ill. On June 18, HCPH began an investigation of an outbreak of gastrointestinal illness associated with the church festival and reported the outbreak to the Ohio Department of Health. The purpose of the investigation was to determine the magnitude, cause, and source of the outbreak. Data from initial interviews of ill persons who also attended the church festival indicated that the route of transmission was likely foodborne. The outbreak case definition was a gastrointestinal illness (i.e.,

vomiting and/or diarrhea) with onset during June 13–18 in a person who had attended the church festival.

Cases were sought with the assistance of the church festival coordinator, who provided information on 22 attendees with gastrointestinal illness who had complained directly to the church. On June 21, a total of 64 persons whose illnesses met the outbreak case definition were interviewed using a standard hypothesis-generating questionnaire. Based on these interviews, typical symptoms were vomiting and diarrhea with onset within 24 hours of the festival closing (June 13) and a duration >24 hours. Several ill persons reported that they believed their illness resulted from consuming pulled pork, coleslaw, or both, served by a single vendor on the last day of the festival. When interviewed, the vendor reported selling 123 servings of pulled pork, some with coleslaw.

Salmonella was confirmed as the outbreak pathogen on June 24, when *Salmonella* was cultured from the stool specimens of three patients whose illnesses met the outbreak case definition. Two of the five patients who had stool specimens cultured were negative for bacterial pathogens, including *Salmonella*, *Shigella*, Shiga toxin-producing *Escherichia coli*, and *Campylobacter*. Although the two patients had negative stool cultures, they met the outbreak case definition and reported that they had begun treatment with trimethoprim-sulfamethoxazole before producing a stool specimen.

A matched case-control study was conducted to ascertain the primary risk factor or factors associated with the gastrointestinal illness. Most of the case-patients were identified after being referred by church staff members or a person who had been interviewed by HCPH investigators. Matched controls were identified during case-patient interviews and were asymptomatic household members who also had attended the church festival. Case-patients were matched to controls using m:n matching (i.e., varying number of case-patients and controls in matched sets). Case-patients and controls were interviewed by telephone using an outbreak-specific survey instrument designed to collect demographic, clinical, and food-exposure data. Thirty-eight case-patients agreed to participate in the study and were interviewed; however, only 23 case-patients could be matched to a household control and included in the matched analysis. Among the 31 controls who agreed to participate, 30 provided adequate food-exposure data for analysis. Thirteen matched sets were generated from the 23 case-patients and 30 controls who were included in the matched analysis.

Conditional logistic regression was used to calculate the approximate and exact odds ratios for the association between each food item and illness. Use of exact methods was necessary because pulled pork was a nearly perfect predictor of disease and resulted in a zero cell count (i.e., there were no ill persons who did not eat the pulled pork).

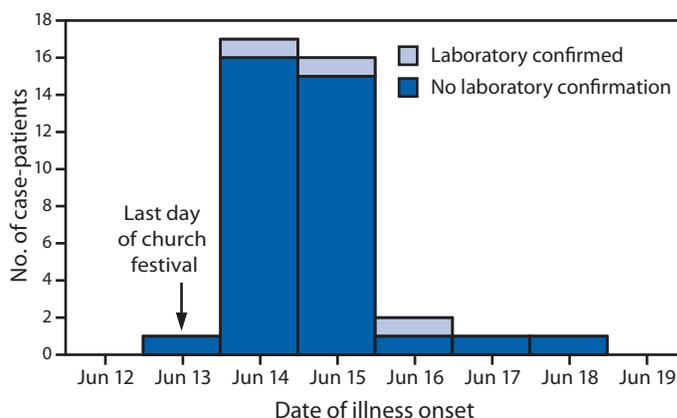
The median age of the case-patients was 44 years (range: 11–72 years), and 19 (50%) were males. This was significantly higher than the median age of controls (15 years; range: 5–67 years) ($p < 0.001$); 16 (52%) of the controls were male. Approximately 89% (34) of case-patients reported an onset of illness during June 13–15, for a median incubation period of 2 days (i.e., days from the end of the church festival to the onset of symptoms) (Figure). Four case-patients reported incubation periods of 3 days (two case-patients), 4 days (one), and 5 days (one). The most frequently reported symptoms were diarrhea (37 case-patients [97%]), cramps (26 [68%]), body ache (23 [61%]), fever (22 [58%]), and headache (21 [55%]). Of those case-patients who had diarrhea, four (11%) reported experiencing bloody diarrhea. The median duration of illness was 5 days among the 26 (68%) case-patients who were no longer symptomatic at the time of interview; seven case-patients who reported antibiotic use also had a median duration of illness of 5 days. Fifteen (40%) case-patients reported seeing a health-care provider since illness onset. No hospitalizations or deaths were reported in the outbreak.

Fifty-one food items served at the church festival were evaluated as sources of exposure in the case-control study. Only pulled pork and coleslaw were identified as statistically significant predictors of the disease associated with the outbreak. Twenty-three (100%) of the case-patients who were included in the matched analysis ate the pulled pork; four (13%) of the 30 controls ate the pulled pork (matched odds ratio = 58.9 [95% confidence interval = 9.4– ∞]). The matched odds ratio for consuming coleslaw was 26.2 (95% confidence interval = 3.2–215.7).

All three *Salmonella* isolates were submitted to the Ohio Department of Health laboratory for molecular genotyping and had matching pulsed-field gel electrophoresis (PFGE) patterns identified as *Salmonella* Typhimurium variant Copenhagen (JPXX01.0003). No additional cases were identified through PulseNet, the national molecular subtyping network for food-borne disease surveillance. No food or environmental samples were available for testing.

To assess environmental factors that might have contributed to the outbreak, the pulled pork vendor was interviewed and revealed that the pork was prepared in a private home. The vendor reported that the pulled pork was cooked to an internal temperature of approximately 180°F (82°C), subsequently cooled in pans in a residential-style (i.e., noncommercial) refrigerator, and then reheated at the church festival. The refrigerator internal

FIGURE. Number of case-patients (N = 38) participating in a matched case-control study after a salmonellosis outbreak associated with a church festival, by date of illness onset and laboratory confirmation status of *Salmonella* infection — Ohio, June 2010



temperature was said to have been below 41°F (5°C) during cooling, but the vendors were unable to report the time it took for the cooked product to reach a uniform temperature of $\leq 41^\circ\text{F}$ ($\leq 5^\circ\text{C}$). The time and temperature parameters of the reheating process also were unknown. After the interviews with the implicated food vendor and discussions with the festival coordinator, it was determined that this vendor's operation would have been subject to the food service licensing requirements specified by the Ohio Revised Code. Although the vendor was operating at the church festival, the management of the vendor's proceeds precluded an exemption under Ohio Revised Code. The vendor and festival coordinator were informed of the relevant public health regulations and the associated food safety practices. HCPH used this experience to initiate the development of new outreach and education materials designed specifically to address food safety regulations and concerns related to events and venues, such as church festivals, that are generally exempt from food service licensure and inspection in the state of Ohio.

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Editorial Note

Salmonellosis is a common cause of foodborne illness and has contributed to local and national level outbreaks in various settings and environments (2–4). Common risk factors include exposure to contaminated food or water (5). Prevention measures include proper food handling, hand hygiene, and cooking procedures. A breakdown in procedure can increase the risk for foodborne outbreaks during large events.

According to a 2006 study by the U.S. Department of Agriculture's National Animal Health Monitoring System, the *Salmonella* serotype associated with the outbreak represented 22.6% of all *Salmonella* isolated from swine (6). *Salmonella* Typhimurium variant Copenhagen was the second most common *Salmonella* serotype identified by the national study, although the prevalence was low (6). Because swine are known reservoirs for *Salmonella* Typhimurium, pork products, especially those processed and prepared in unregulated environments, are potential vehicles of disease transmission.

CDC's Foodborne Outbreak Online Database (FOOD) lists four *Salmonella* outbreaks in three states associated with food consumed at a church, temple, or religious location in 2011 (the most recent year for which FOOD data are available online).^{*} A recent outbreak of salmonellosis after a church barbeque in North Carolina resulted in nine reported, laboratory-confirmed cases with five hospitalizations 10 days later.[†] Dissemination of risk messages and targeted food-safety education should be a focus for local health departments in and outside of Ohio.

The results of the investigation underscore the risk associated with food service at large-scale events and the importance of rapid investigation to determine the cause of foodborne outbreaks in these environments. Large-scale gatherings provide an opportunity for point-source exposure to foodborne pathogens. Although prevention measures are effective, a breakdown in food handling procedures, such as improperly cooked or stored meat or cross-contamination, can lead to pathogen exposure. Complicating the issue is that food service operations on church grounds are commonly exempt from regulation and licensing in Ohio, excusing these entities from conventional public health inspections conducted as prevention measures (1). The absence of these preventive measures might increase the risk for improper food preparation and handling, increasing the likelihood of foodborne outbreaks. The experience of this outbreak investigation revealed that environments without public health regulation, such as church festivals, might place populations at risk for foodborne illness and might benefit from food safety education of festival organizers and food vendors.

^{*} Additional information available at <http://wwwn.cdc.gov/foodborneoutbreaks/default.aspx>.

[†] Additional information available at http://www.ncdhhs.gov/pressrel/2013/2013-09-17_clev_co_salmonella_outbreak.htm.

What is already known on this topic?

Festivals and fairs have been implicated in foodborne outbreaks and might remain environments that place persons at risk for foodborne illness. In Ohio, church festivals generally are exempt from food service licensure and inspection.

What is added by this report?

An outbreak of salmonellosis in southwest Ohio in June of 2010 was associated with consumption of pulled pork prepared in a private home and sold to attendees of a church festival. *Salmonella* isolates available from three of 38 reported cases had matching pulsed-field gel electrophoresis patterns identifying the outbreak pathogen as *Salmonella* Typhimurium variant Copenhagen.

What are the implications for public health practice?

Food service operations at large-scale events, including church festivals and fairs, might place populations at risk for foodborne illness. In particular, environments without public health regulation might benefit from education of event organizers and food vendors regarding food safety practices.

Acknowledgments

Timothy Ingram, Kathy Lordo, Hamilton County Public Health. Members of the Hamilton County Board of Health. Ohio Dept of Health Outbreak Response and Bioterrorism Investigation Team. Ohio Dept of Health Laboratory staff members. Div of Biostatistics and Epidemiology, Cincinnati Children's Hospital Medical Center.

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CDC Grand Rounds: Evidence-Based Injury Prevention

Approximately 5.8 million persons die from injuries each year, accounting for 10% of all deaths worldwide (1). In the United States, 180,000 persons die each year from injuries, making the category the country's leading cause of death for those aged 1–44 years and the leading cause of years of potential life lost before age 65 years (2). Injuries also result in 2.8 million hospitalizations and 29 million emergency department visits each year in the United States. Motor vehicle crashes, falls, homicides, suicides, domestic violence, child maltreatment, and other forms of intentional and unintentional injury affect all strata of society, with widespread physical, mental, and reproductive health consequences. Injuries and violence affect not only individuals, but also families and communities, producing substantial economic and societal burdens related to health-care costs, work loss, and disruption of education. The estimated annual U.S. cost in medical expenses and lost productivity resulting from injuries is \$355 billion (2).

As is true in most areas of public health, to effectively prevent injuries, injury and violence prevention strategies and interventions should be tested in real-world settings. Real-world settings also can be fertile laboratories for generating new interventions and prevention strategies. Community input to help identify and prioritize problems for which interventions should be developed, propose interventional models, and test, refine, and adapt interventions can help ensure relevance, feasibility, acceptability, scalability, and sustainability.

Translating injury and violence prevention evidence into action in the United States depends on coordination among federal, state, and local agencies, and partnerships in the research and practice communities. In 2010, CDC published a compendium of 22 effective interventions from around the world aimed at prevention of falls among older adults (3), then funded the translation of some of these strategies into programs for specific communities and delivery systems. Three programs to prevent falls that were highlighted in the compendium currently are being piloted in Colorado, New York, and Oregon (3). The following two case studies on suicide and alcohol-impaired driving are examples of using an evidence-based approach to injury and violence prevention to improve public health policy and practice.

Case Study 1: Using Science to Guide Suicide Prevention Activities in Oregon

During the past 10 years, the U.S. suicide rate has increased approximately 10%, despite greater recognition of the problem and expansion of antidepressant use (4). For every suicide death, approximately 11 suicide attempts are made, and many other persons have suicidal thoughts. One theorist has suggested that there are three key factors leading to suicide: 1) “thwarted belongingness,” or feelings of alienation despite trying to connect with others; 2) “perceived burdensomeness,” or feeling like a burden to others; and 3) “the acquired ability to enact lethal self-injury,” or desensitization to pain and death from repeated exposure. The last factor is supported by the observation that the risk factor most strongly associated with dying by suicide is having attempted suicide previously; a pattern of increasing lethality of attempts is observed among some suicide decedents (5).

In 2010 in Oregon, a total of 685 deaths were attributed to suicide, more than in 2009 and more than the number of deaths attributed to motor vehicle crashes. Suicide was the state's eighth leading cause of death, and the rate of death by suicide among men was almost four times the rate among women. The highest suicide death rates were observed in men aged ≥ 75 years. To address the high suicide rate, the Public Health Division of the Oregon Health Authority, along with other state agencies and representatives from 13 communities throughout Oregon, created a suicide prevention plan for older adults. Development of the plan was funded by CDC and the Substance Abuse and Mental Health Services Administration.

Surveillance data from the National Violent Death Reporting System (NVDRS) was important to development of the plan. NVDRS is a registry of deaths by suicide, homicide, legal intervention, and undetermined intent that links data from multiple sources, including death certificates, medical examiners, law enforcement, and crime laboratories. Through NVDRS, public health practitioners and researchers have access to data regarding the circumstances surrounding reported deaths that are not available from the National Vital Statistics System. NVDRS has been in operation since 2002 and is currently implemented in 18 states, including Oregon.

In 2009, NVDRS data for the 640 reported suicide deaths in Oregon indicated that 209 (33%) of the decedents had experienced a depressed mood, and 268 (42%) had disclosed suicidal intent (Table). Persons aged 20–44 years were most likely to have disclosed suicidal intent (50%), followed by those aged ≥ 65 years (40%), aged 45–64 years (38%), and aged 10–24 years (37%).

Whereas substantial percentages of suicide decedents in younger age groups had experienced alcohol or substance abuse (e.g., 34% of those aged 20–44 years) and relationship problems (e.g., 48% of

This is another in a series of occasional MMWR reports titled CDC Grand Rounds. These reports are based on grand rounds presentations at CDC on high-profile issues in public health science, practice, and policy. Information about CDC Grand Rounds is available at <http://www.cdc.gov/about/grand-rounds>.

TABLE. Prevalence of selected circumstances surrounding reported suicide deaths, by age group — National Violent Death Reporting System, Oregon, 2009

Circumstance	Age group (yrs)							
	10–24 (n = 59)		20–44 (n = 193)		45–64 (n = 277)		≥65 (n = 111)	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Depressed mood	16	(27)	67	(35)	93	(34)	33	(30)
Alcohol or substance abuse	14	(24)	66	(34)	80	(29)	10	(9)
Relationship problem	21	(36)	93	(48)	74	(27)	12	(11)
Job or financial problem	6	(10)	52	(27)	82	(30)	7	(6)
Lived alone	NA	NA	NA	NA	NA	NA	49	(44)
Chronic disease or declining health	13	(22)	45	(23)	94	(34)	75	(68)
Went to health-care provider in the 30 days before death	NA	NA	NA	NA	NA	NA	19	(17)
Disclosed suicidal intent	22	(37)	96	(50)	106	(38)	44	(40)

Abbreviation: NA = not assessed; these data were collected only for decedents aged ≥65 years.

those aged 20–44 years and 36% of those aged 10–24 years), chronic disease or declining health was more prevalent (68%) among suicide decedents aged ≥65 years (Table). Additional findings exclusively regarding decedents aged ≥65 years (prevalences in other age groups were not assessed) indicated that 44% had lived alone, and only 17% had visited a health-care provider in the 30 days before death, suggesting a need for community intervention to reduce social isolation and use of health-care encounters as intervention venues. The substantial prevalence of disclosed suicidal intent also supported the idea that sensitizing health-care and social-service providers to the possibility of disclosure and giving them guidance regarding how to respond might be worthwhile interventions.

The Oregon Older Adult Suicide Prevention Plan (6) has helped raise awareness about the risk for suicide among older persons. Suicide prevention interventions have been integrated into other services provided to older adults and also have been included in broader agency discussions about promoting healthy aging. As one result, Oregon's state health department has collaborated with Oregon Health and Sciences University to develop a web-based training program for primary-care providers on recognition and management of suicide risks among older adults.

Case Study 2: From Evidence to Policy in Alcohol-Impaired Driving

In 2011, alcohol-impaired driving resulted in almost 10,000 traffic deaths in the United States, accounting for one third of all traffic-related deaths (7), approximately 27 deaths per day. An analysis of data from 2010 found that alcohol-related traffic deaths cost \$65 billion for that year alone (8). A conservative estimate is that one in 10 persons in the United States will be involved in an alcohol-related crash in their lifetime. Blood alcohol content (BAC), the measure of alcohol in a person's bloodstream as detected by blood, breath, or urine testing, has been found to have a direct and dose-response effect on driving performance (9).

In 1939, Indiana became the first state to implement a presumptive BAC limit for impaired driving of 0.15% for drivers. By the 1950s, many other states followed, setting their BAC limit at 0.15% at the recommendation of the American Medical Association. By the 1960s, states began lowering their BAC limit from 0.15% to 0.10%, as scientific evidence mounted regarding the relationship between driver BAC and fatal crashes. In 1980, Utah became the first state to lower its limit to 0.08%. By 1992, the National Highway Traffic Safety Administration had proposed that all states adopt 0.08% BAC laws, and in 1998, a legislative proposal was introduced in Congress that would have required states to enact and enforce 0.08% BAC laws or face cuts in highway funding (10). That proposal failed and, instead, grants were offered to states that lowered their BAC limits to 0.08%; however, only three states did so.

In the 1990s, only four published studies had demonstrated the effectiveness of 0.08% BAC laws in reducing traffic fatalities. In 1999, a Government Accountability Office report concluded that the evidence did not conclusively establish that 0.08% BAC laws, by themselves, resulted in reductions in the number and severity of traffic crashes (11).

Subsequently, CDC and the Community Preventive Services Task Force began a systematic review of the effectiveness of 0.08% BAC laws (12). The results of nine studies that met the quality criteria set by the task force demonstrated a median 7% decline in fatalities in states with 0.08% BAC laws. It was estimated that if all states had 0.08% BAC laws, 400–600 lives could be saved annually. The task force concluded that 0.08% BAC laws were effective in reducing alcohol-related traffic fatalities and recommended enactment of these laws based on strong evidence (13). Shortly afterward, a bill was approved and subsequently signed into law on October 23, 2000, that included cuts in highway funds for states without 0.08% BAC laws, based in part on the available scientific evidence demonstrating lives could be saved. By 2004, all U.S. states had enacted 0.08% BAC legislation (14). However, the impact on reducing fatalities was not realized until several years later. Self-reported episodes of drinking and

driving declined from 161 million in 2006 to 112 million in 2010, and death rates from alcohol-impaired driving have shown similar declines, with steep reductions since 2005 (7).

Additional work is needed to further reduce the incidence of fatalities related to alcohol-impaired driving in the United States, including supporting and promoting other interventions such as use of ignition interlocks and sobriety checkpoints, enforcement of primary seatbelt laws and reduction of binge drinking (15), and assessing the evidence of the impact on traffic fatalities in the United States by lowering the BAC limits even further, to 0.05%, which is already the legal limit in nearly half of all countries (16,17).

The Future of Injury and Violence Prevention

Most events resulting in injury, death, or disability are predictable, and therefore preventable. An important contemporary challenge in injury prevention is the need to make the best use of technologies that can prevent injuries at the personal and population level, while mitigating hazards resulting from technological advances (e.g., distracted driving).

Expanded use of the Internet and social media can provide platforms to disseminate evidence-based injury prevention information. Evaluation research and community-based studies are needed to assess the effects of such communications on progress toward the ultimate goals of preventing injuries and deaths.

Community prevention efforts can attain maximum impact by recognizing that injury and violence prevention are core components of public health. Injury prevention practice can inform research, much like research informs clinical practice, and the growth and education of the next generation of practitioners and researchers needs to be ensured through training (18). Injury prevention efforts should be visible, with their value documented to ensure accountability and increase impact in communities. Innovative solutions to injury problems should be pursued, and opportunities to link clinical medicine and public health should be fostered (19). As the U.S. population becomes older and more ethnically diverse, the additional challenges of language, access to health-care information, and limited public health resources for injury and violence prevention will grow more pronounced.

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Notes from the Field

New Delhi Metallo- β -Lactamase–Producing *Escherichia coli* Associated with Endoscopic Retrograde Cholangiopancreatography — Illinois, 2013

Infections with carbapenem-resistant *Enterobacteriaceae* (CRE)* are increasing among patients in medical facilities (1). CRE that produce *Klebsiella pneumoniae* carbapenemase (KPC) have been responsible for much of the increase in the United States. However, New Delhi metallo- β -lactamase (NDM)–producing CRE have the potential to add to this burden. Since first reported in 2009, through 2012, 27 patients with NDM-producing CRE have been confirmed by CDC from isolates submitted by state laboratories. Since January 2013, a total of 69 patients with NDM-producing CRE have been identified in the United States; 44 patients were from northeastern Illinois.

From March to July 2013, nine patients with positive cultures for NDM-producing *Escherichia coli* (eight clinical cultures and one rectal surveillance culture) were identified in northeastern Illinois. An investigation was conducted to understand and prevent the transmission of NDM-producing CRE. A case was defined as an NDM-producing *E. coli* isolate, recovered from a patient in northeastern Illinois, with >85% similarity by pulsed-field gel electrophoresis (PFGE) to the outbreak strain, detected after January 1, 2013. Of the nine cases, eight were treated at the same hospital (hospital A). To determine risk factors for acquiring NDM-producing CRE, a case-control study was conducted. The eight patients cared for at hospital A were selected as case-patients; 27 controls were randomly selected from among 131 hospital A patients with negative surveillance cultures. A history of undergoing endoscopic retrograde cholangiopancreatography (ERCP)[†] at hospital A was strongly associated with case status (six of eight [75%] versus one of 27 [4%]; odds ratio = 78.0; 95% confidence interval = 6.0 to >999.99).

After manual cleaning and high-level disinfection in an automated endoscope reprocessor, cultures were obtained from the ERCP endoscope used on five of the case-patients. NDM-producing *E. coli* and KPC-producing *K. pneumoniae*

were recovered from the terminal section (the elevator channel) of the device.[§] The *E. coli* isolate was highly related (>95%) to the outbreak strain by PFGE. Retrospective review and direct observation of endoscope reprocessing did not identify lapses in protocol. Previous studies have shown an association between ERCP endoscopes and transmission of multidrug-resistant bacteria; the design of the ERCP endoscopes might pose a particular challenge for cleaning and disinfection (2,3).

Among 91 ERCP patients who were initially notified that they had potential exposure to a culture-positive endoscope, 50 returned for rectal surveillance cultures. NDM-producing *E. coli* were recovered from 23 (46%). An additional 12 patients with NDM-producing CRE have been identified in northeastern Illinois, bringing the total during January–December 2013 to 44. In September 2013, as a result of the investigation, hospital A changed ERCP endoscope reprocessing from automated high-level disinfection to gas sterilization with ethylene oxide; no new cases with exposure to a gas-sterilized ERCP endoscope have been identified.

This investigation highlights the potential for CRE transmission following ERCP. Health-care facilities with CRE outbreaks should consider the possibility of ERCP-related transmission. If ERCP-related transmission of CRE is suspected, reprocessing and preventative maintenance procedures for ERCP endoscopes should be evaluated in consultation with the manufacturer of the endoscope and automated endoscope reprocessor, if used. In addition, expertise in the evaluation and prevention of CRE transmission are available at CDC and can be accessed via state and local health departments.

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*Additional information about CRE is available at <http://www.cdc.gov/hai/organisms/cre/cre-patientgeneral.html>.

[†]An endoscopic procedure used to diagnose and treat problems of the bile and pancreatic ducts.

[§]An illustration identifying the parts of the elevator channel is available at <http://www.health.qld.gov.au/endoscopereprocessing/flash/432.asp>.

Announcements

Recommendation Regarding Improving Mental Health and Addressing Mental Illness from the Community Preventive Services Task Force

The Community Preventive Services Task Force recently posted new information on its website: “Improving Mental Health and Addressing Mental Illness: Mental Health Benefits Legislation.” The information is available at <http://www.the-communityguide.org/mentalhealth/benefitslegis.html>.

Established in 1996 by the U.S. Department of Health and Human Services, the task force is an independent, nonfederal, uncompensated panel of public health and prevention experts whose members are appointed by the Director of CDC. The task force provides information for a wide range of decision makers on programs, services, and policies aimed at improving population health. Although CDC provides administrative, research, and technical support for the task force, the recommendations developed are those of the task force and do not undergo review or approval by CDC.

National Birth Defects Prevention Month and Folic Acid Awareness Week — January 2014

This year, National Birth Defects Prevention Month focuses on how common, costly, and critical birth defects are in the United States. Birth defects are relatively common, affecting one in every 33 infants born in the United States each year, or approximately 120,000 infants (1). Birth defects also are costly. Each year, total hospital costs for U.S. children and adults with birth defects exceed \$2.6 billion, not including costs for outpatient care or many provider charges (2). As the leading cause of infant mortality, birth defects also are critical, accounting for one in every five infant deaths (3).

January 6–12, 2014, is National Folic Acid Awareness Week. If a woman consumes the recommended amount of folic acid before and during early pregnancy, it can help prevent major birth defects of the brain and spine (neural tube defects) (4). Health-care providers should encourage every woman of childbearing age to consume folic acid from fortified foods or supplements, or a combination of the two, in addition to a varied diet rich in folate. Additional information about folic acid is available at <http://www.cdc.gov/folicacid>.

Health-care professionals can help prevent many other birth defects by encouraging women of childbearing age to manage health conditions and adopt healthy behaviors before becoming pregnant, including not drinking alcohol (5) or using tobacco (6), controlling their blood glucose if they have diabetes (7), maintaining a healthy weight before becoming pregnant (8), and limiting prescription and over-the-counter medications to those that are essential (9). Additional information is available at <http://www.cdc.gov/birthdefects>.

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Errata

Vol. 62, No. SS-8

In the Surveillance Summary, “Abortion Surveillance — United States, 2010,” on page 19 in Table 2, under the column for abortions reported by residence, the following numbers, rates, and ratios of abortions should have been reported for Maine, Massachusetts, Pennsylvania, Rhode Island, Virginia, and Washington:

State/Area	Residence		
	No.	Rate	Ratio
Maine	2,251	9.3	174
Massachusetts	20,398	15.1	280
Pennsylvania	37,738	15.5	263
Rhode Island	3,480	16.2	311
Virginia	25,906	15.7	252
Washington	21,096	15.6	244

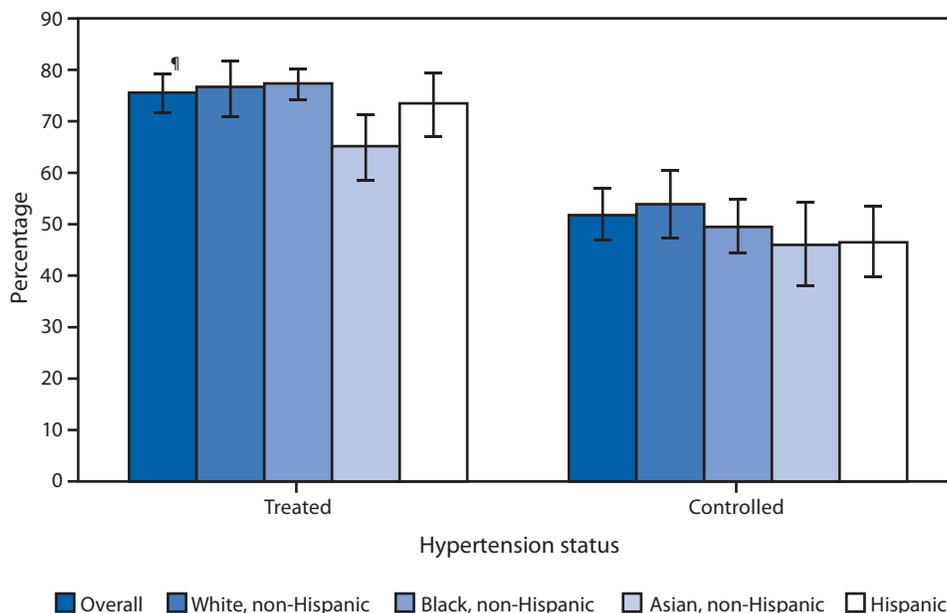
Vol. 62, No. 47

In the report, “Very High Blood Lead Levels Among Adults — United States, 2002–2011,” several errors occurred. On page 967, the ninth sentence of the first paragraph should read, “Persistent very high BLLs (≥ 40 $\mu\text{g}/\text{dL}$ in **>1 calendar year**) were found among 2,210 (19%) of these adults.” The sixth sentence of the second paragraph should read, “A very high BLL measured **in >1 calendar year** was defined as a persistent very high BLL.” The second sentence of the third paragraph should read, “Among these adults, 2,210 (19%) had persistent very high BLLs, 1,487 (13%) had BLLs ≥ 60 $\mu\text{g}/\text{dL}$, and 96 had BLLs ≥ 60 $\mu\text{g}/\text{dL}$ **in >1 calendar year** (Table 1).” On page 968, the last row header of Table 1 should read, “Total no. of adults with persistent very high BLLs (**in >1 calendar year**).” On page 970, in the “What is added by this report?” section of the summary box text, the first sentence should read, “Data collected by the Adult Blood Lead Epidemiology and Surveillance program during 2002–2011 identified 11,536 adults with very high BLLs (≥ 40 $\mu\text{g}/\text{dL}$), of whom 19% had elevated BLLs recorded **in >1 calendar year**.” Finally, in the “What are the implications for public health practice?” section of the summary box, the first sentence should read, “The finding that many workers have harmful BLLs, some that are **present for >1 calendar year**, is of grave concern.”

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Adults Aged ≥ 18 Years with Hypertension Reporting Treatment* and Control[†] of Their Condition,[§] by Race/Ethnicity — United States, National Health and Nutrition Examination Survey, 2011–2012



* Currently taking medication to lower blood pressure, based on affirmative responses to the following questions: "Because of your high blood pressure/hypertension, have you ever been told to take prescribed medicine?" and "Are you now following this advice to take prescribed medicine?" among those with hypertension.

[†] Having measured systolic blood pressure <140 mm Hg and diastolic blood pressure <90 mm Hg among those with hypertension.

[§] Measured systolic blood pressure of ≥ 140 mm Hg, diastolic blood pressure of ≥ 90 mm Hg, or currently taking medication to lower blood pressure.

[¶] 95% confidence interval.

During 2011–2012, 75.6% of adults aged ≥ 18 years with hypertension were taking medication to lower their blood pressure, and 51.8% had their blood pressure under control. Non-Hispanic Asian adults with hypertension were less likely to be taking medication (65.2%) than were non-Hispanic black (77.4%) and non-Hispanic white (76.7%) adults with hypertension. No difference was observed in controlled hypertension among adults in the different race and Hispanic ethnicity groups.

Source: Nwankwo T, Yoon S, Burt V, Gu Q. Hypertension among adults in the United States: National Health and Nutrition Examination Survey, 2011–2012. NCHS data brief no. 133. Hyattsville, MD: US Department of Health and Human Services, CDC; 2013. Available at <http://www.cdc.gov/nchs/data/databriefs/db133.htm>.

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The *Morbidity and Mortality Weekly Report (MMWR)* Series is prepared by the Centers for Disease Control and Prevention (CDC) and is available free of charge in electronic format. To receive an electronic copy each week, visit *MMWR*'s free subscription page at <http://www.cdc.gov/mmwr/mmwrsubscribe.html>. Paper copy subscriptions are available through the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone 202-512-1800.

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U.S. Government Printing Office: 2014-723-032/01038 Region IV ISSN: 0149-2195