

Workers' Memorial Day — April 28, 2018

Workers' Memorial Day, observed annually on April 28,* recognizes workers who were injured, became ill, or died because of exposures to hazards at work. In 2016, work-related injuries claimed the lives of 5,190 U.S. workers, and the fatal injury rate (3.6 per 100 full time equivalent workers)[†] rose for the third consecutive year, to the highest rate since 2010. Although deaths resulting from work-related injuries are captured through surveillance, most deaths resulting from work-related illness are not. In 2007, an estimated 53,445 persons died from work-related illness (1). In 2016, employers reported approximately 2.9 million nonfatal work-related injuries and illnesses to private industry workers.[§]

Occupational injuries and illnesses also have economic costs. The societal cost of work-related fatalities, injuries, and illnesses was estimated at \$250 billion in 2007, based on methods that focus on medical costs and productivity losses (1).

New data on fatal falls overboard in the fishing industry, one of the nation's most hazardous industries, are reported in this issue of *MMWR* (2). Since 1991, the CDC-NIOSH Western States Division has studied fishing safety and developed interventions to reduce the incidence of injuries and fatalities among the nation's fishermen. More information about commercial fishing safety can be found at <https://www.cdc.gov/niosh/topics/fishing/>.

* Established in 1970 by the American Federation of Labor and Congress of Industrial Organizations.

[†] <https://www.bls.gov/news.release/pdf/cfoi.pdf>.

[§] <https://www.bls.gov/news.release/pdf/osh.pdf>.

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Fatal Falls Overboard in Commercial Fishing — United States, 2000–2016

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Commercial fishing is one of the most dangerous jobs in the United States, with a 2016 work-related fatality rate (86.0 deaths per 100,000 full-time equivalent workers) 23 times higher than that for all U.S. workers (3.6) (1). Sinking vessels cause the most fatalities in the industry; however, falling from a fishing vessel is a serious hazard responsible for the second highest number of commercial fishing-associated fatalities (2,3). CDC's National Institute for Occupational Safety and Health (NIOSH) analyzed data on unintentional fatal falls overboard in the U.S. commercial fishing industry to identify gaps in the use of primary, secondary, and tertiary prevention strategies. During 2000–2016, a total of 204 commercial fishermen died after unintentionally falling overboard. The majority of falls (121; 59.3%) were not witnessed, and 108 (89.3%) of these victims were not found. Among 83 witnessed falls overboard, 56 rescue attempts were made; 22 victims were recovered but were not successfully resuscitated. The circumstances, rescue attempts, and limited use of lifesaving

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and recovery equipment indicate that efforts to reduce these preventable fatalities are needed during pre-event, event, and post-event sequences of falls overboard. Vessel owners could consider strategies to prevent future fatalities, including lifeline tethers, line management, personal flotation devices (PFDs), man-overboard alarms, recovery devices, and rescue training.

A case of commercial fishing–associated overboard fall fatality was defined as a fatal traumatic injury resulting from an unintentional fall from a commercial fishing vessel in United States waters during 2000–2016. Fishermen often live on their vessels when working and are exposed to hazards while off duty; therefore, victims were considered to be at work for the entire time they were at sea. Cases were identified from NIOSH's Commercial Fishing Incident Database, a national surveillance system that collects detailed information on all work-related fatalities in the fishing industry; data sources include U.S. Coast Guard investigative reports, local law enforcement reports, medical examiner documents, and news media. Records for each fall overboard were reviewed to determine the circumstances of the fall, including time in water, any use of survival or rescue equipment, recovery attempts, and administration of medical treatment. A descriptive analysis of event and decedent characteristics, including year, geographic region, fishery,* victim demographics, worker activity, primary cause of the fall, and contributing factors, was conducted. The

*Fishery was defined as the fish species targeted and geographic location in which the fishing vessel was operating at the time of the event. Gear type was specified when multiple methods of harvesting could apply.

trend in the number of fatal falls overboard over the course of the study period was evaluated using Poisson regression.

During 2000–2016, unintentional falls overboard resulted in 204 fatalities, representing 27.0% of all work-related deaths in the industry. Fall-overboard fatalities ranged from a high of 20 in 2003 to a low of five in 2016 (Figure 1). On average, the number of falls overboard decreased by 3.9% annually (incidence rate ratio = 0.961; $p = 0.006$).

Fatalities occurred most frequently on the East Coast (62; 30.4%), followed by the Gulf of Mexico (60; 29.4%), Alaska (51; 25.0%), and the West Coast (26; 12.8%). Five deaths occurred off the Hawaiian Coast. The Gulf of Mexico shrimp fishery had the highest number of fall-overboard deaths (34; 16.7%), followed by East Coast lobster (18; 8.8%), Alaska salmon drift gillnet (16; 7.8%), and East Coast scallop (10; 4.9%).

Among 187 (91.7%) decedents with information available on age, the median age was 43 years (range = 16–77 years). Overall, 202 (99.0%) decedents were male (Table). The majority of victims were employed as deckhands (120; 58.8%), and among 94 (46.1%) with information on years of experience, victims had a median of 16 years of experience in the fishing industry (range = 0–65 years). Nine victims (4.4%) were confirmed to have taken formal marine safety training.

Among 152 (74.5%) fatalities for which information on victim activity preceding the fall was available, half (77; 50.7%) occurred while the victims were working with fishing gear, including setting gear (35; 23.0%), hauling gear onboard (20; 13.2%), and handling gear on deck (12; 7.9%). Falls

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 30329-4027.

Suggested citation: [Author names; first three, then et al., if more than six.] [Report title]. *MMWR Morb Mortal Wkly Rep* 2018;67:[inclusive page numbers].

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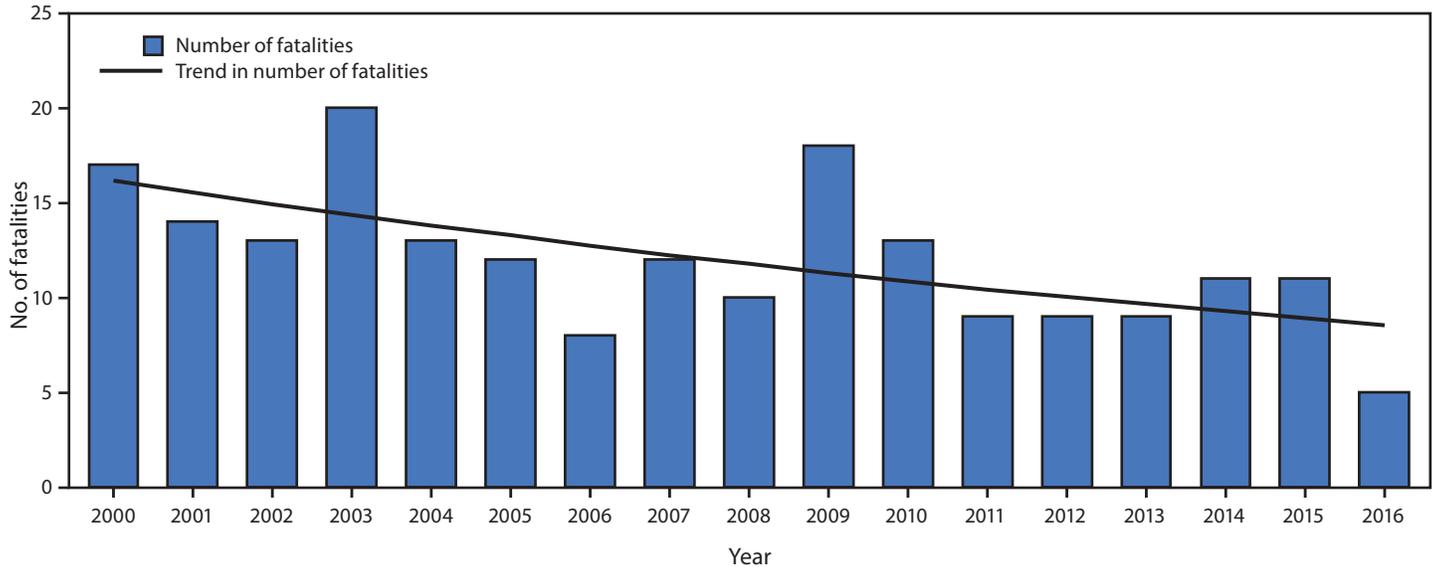
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FIGURE 1. Number and trend* of unintentional fatal falls overboard (N = 204) in the commercial fishing industry, by year — United States, 2000–2016

* Significant decrease in the number of fatalities during 2000–2016 (Poisson regression, no exposure; incidence rate ratio = 0.961, $p = 0.006$).

also occurred while crewmembers were on deck while off duty (34; 22.4%). Among 149 (73.0%) cases where the cause of the fall was known, the leading causes were losing balance (48; 32.2%), tripping or slipping (47; 31.5%), and becoming entangled in gear (31; 20.8%). Of all 204 falls, the most commonly identified contributing factors included working alone (99; 48.5%), alcohol and drug use (37; 18.1%), and inclement weather (24; 11.8%).

The majority of falls (121; 59.3%) were unwitnessed, and most of these victims (108; 89.3%) were not located within an hour of the fall (Figure 2). For the 83 witnessed falls overboard, 56 (67.5%) rescue attempts were made, with 22 victims recovered but none successfully resuscitated.

In all instances, none of the victims was wearing a PFD at the time of death. Among 19 (9.3%) events in which use of a life ring[†] was noted, recovery attempts failed in most cases (14; 73.7%). A man-overboard alarm was only reportedly used in one event. Among the 30 crewmembers who were recovered from the water within an hour, cardiopulmonary resuscitation (CPR) was attempted on 21 (70.0%), but none could be resuscitated.

Discussion

Preventing falls overboard is a priority area in fishing safety (2–4). Primary prevention strategies include creating

[†] A life ring is a circular flotation device carried on a vessel that can be used in a man-overboard recovery attempt. The life ring is attached to a line and can be thrown to the person in the water to provide immediate buoyancy and prevent drowning while rescue attempts continue.

enclosed workspaces, raising the gunnels[§] on the vessel, and using lifelines and tethers where possible; vessel modifications should be conducted in consultation with a naval architect or engineer. Because of differences in fishing methods, workers in some fisheries are more exposed to entanglement hazards than are others, especially those who work with lines while setting gear (e.g., East Coast lobstermen). Engineering controls, such as line bins that catch excess line while hauling gear, can control hazards by reducing the amount of line on deck. In addition, enforcing drug- and alcohol-free policies on vessels might reduce the likelihood of crewmembers unintentionally falling from a vessel.

Without flotation, victims can drown within minutes after immersion in cold water through cold-shock responses, including hyperventilation and aspiration, as well as the deterioration of muscle function from lowered temperature, impeding swim efforts (5). Although federal regulations[¶] mandate that commercial fishing vessels carry a PFD for each crewmember, there are no requirements for fishermen to wear them while working. Lack of PFD use is associated with workers' negative perceptions and attitudes toward PFDs. Many fishermen recognize the effectiveness of PFDs to prevent drownings, but concerns regarding discomfort, cost, work interference, and potential for entanglement hinder widespread adoption

[§] The gunnel, also known as gunwale, is the uppermost edge of the side of a vessel.
[¶] Requirements for Commercial Fishing Industry Vessels, 46 C.F.R., Chap. 1, Part 28; 2012.

TABLE. Characteristics of 204 unintentional fatal falls overboard in the commercial fishing industry — United States, 2000–2016

Characteristic (no. [%] known)	No. (% of known)
Age group, yrs (187 [91.7])	
≤24	17 (9.1)
25–44	84 (44.9)
45–64	79 (42.2)
≥65	7 (3.7)
Unknown (% of total)	17 (8.3)
Gender (204 [100.0])	
Male	202 (99.0)
Female	2 (1.0)
Race/Ethnicity (144 [70.6])	
Non-Hispanic	
White	72 (50.0)
Asian	29 (20.1)
American Indian/Alaska Native	16 (11.1)
Black/African American	8 (5.6)
Other	3 (2.1)
Hispanic	16 (11.1)
Unknown (% of total)	60 (29.4)
Position (204 [100.0])	
Operator	79 (38.7)
Deckhand	120 (58.8)
Other	5 (2.5)
Experience, yrs (94 [46.1])	
≤1	11 (11.7)
2–5	14 (14.9)
6–10	14 (14.9)
11–20	28 (29.8)
≥21	27 (28.7)
Unknown (% of total)	110 (53.9)
Worker activity before fall (152 [74.5])	
Traffic onboard	11 (7.2)
On watch	11 (7.2)
Working with fishing gear	
Preparing gear	10 (6.6)
Setting gear	35 (23.0)
Hauling gear	20 (13.2)
Handling gear on deck	12 (7.9)
Working with the catch	7 (4.6)
Off duty	34 (22.4)
Other	12 (7.9)
Unknown (% of total)	52 (25.5)
Cause of fall (149 [73.0])	
Lost balance	48 (32.2)
Trip/Slip	47 (31.5)
Gear entanglement	31 (20.8)
Struck by gear/object	14 (9.4)
Washed overboard	9 (6.0)
Unknown (% of total)	55 (27.0)

throughout the industry (6,7). In 2008, NIOSH conducted a study in which participants in several Alaskan fisheries wore and evaluated various PFD types. Although preferences differed by fishery, each identified favorable PFDs that were acceptable to work in (8). On the basis of this research, one manufacturer worked collaboratively with the fishing industry and developed an innovative PFD that was responsive to workers' concerns (9). Additional PFD evaluations have been conducted in the Pacific Northwest, Gulf of Mexico, and New England.

Summary

What is already known about this topic?

Commercial fishermen experience fatalities at a rate much higher than that of all U.S. workers, partially driven by falls overboard, a leading cause of work-related deaths in the industry.

What is added by this report?

During 2000–2016, 204 commercial fishermen died from unintentional falls overboard. Fifty-nine percent of falls were not witnessed, and 89.3% of these victims were not found. Among 83 witnessed falls, 22 victims were recovered but not resuscitated. None wore a personal flotation device (PFD).

What are the implications for public health practice?

Prevention strategies can be implemented to prevent future fatalities, including reducing fall hazards; using PFDs, man-overboard alarms, and recovery devices; and training crewmembers on resuscitation and treatment.

Attempts to increase PFD use should continue, particularly given the increased commercial availability of comfortable and workable PFDs.

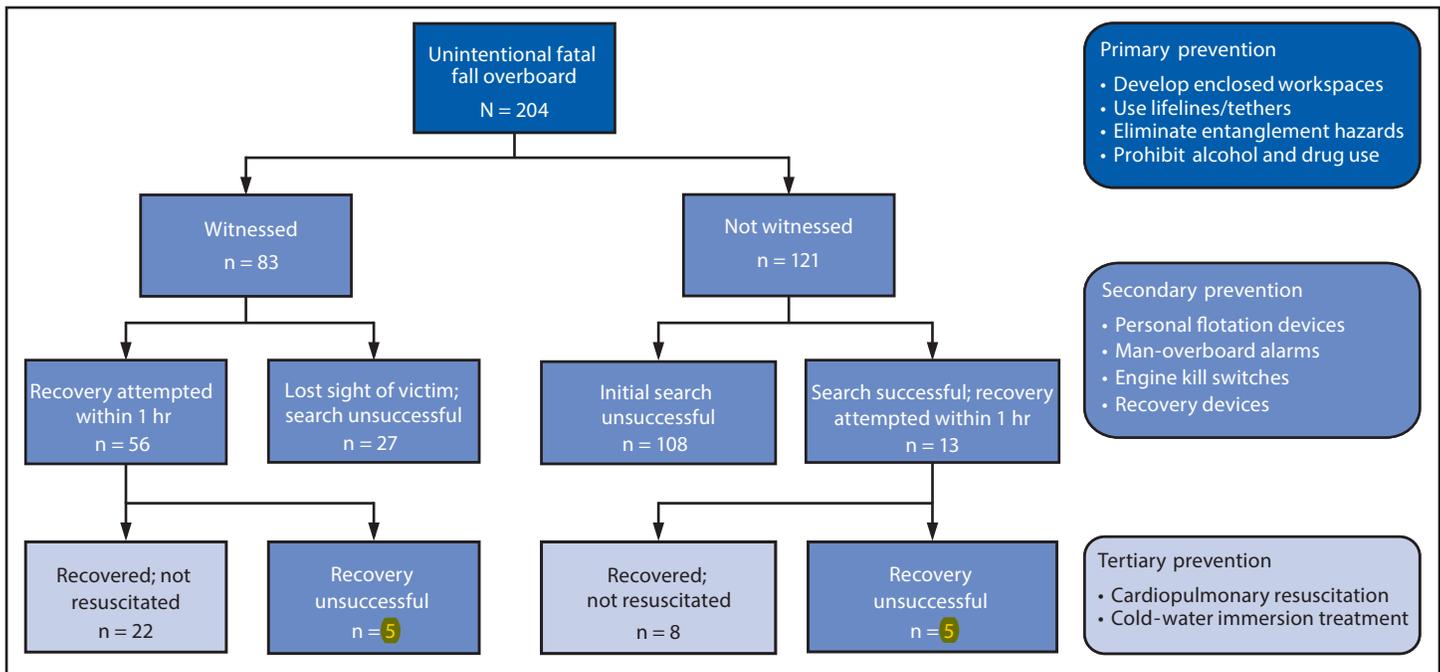
The majority of fatal falls overboard in this study were not observed. An unwitnessed fall overboard results in search and rescue delays and reduces the chances of a successful recovery. A man-overboard alarm is a small device worn by a worker that, in the event of water immersion, relays a signal to a receiver on the vessel and sounds an alarm to enable prompt rescue efforts. Use of this technology has not been widely adopted by the fishing industry despite its potential to save lives and be incorporated into work gear.

Although rescue attempts were made within 1 hour for 69 victims, over half (39; 56.5%) were unable to be recovered from the water, underscoring the difficulty of retrieving an overboard fall victim. Effective recovery devices, such as lifting slings, can provide additional flotation and help hoist the victim onto the vessel. Participation in marine safety training and drills can prepare crewmembers in man-overboard response and recovery. For fishermen who work alone, a reboarding ladder should be available on the vessel for self-rescue. Some man-overboard alarms include engine shutoff features that would keep the vessel nearby to facilitate reboarding.

None of the 30 crewmembers who were recovered onboard within 1 hour could be resuscitated. Successful treatment might be more likely if professional medical assistance were possible, a challenge when operating in remote locations. Having first-aid trained crewmembers administer CPR, prevent further heat loss, and rewarm the victim is a priority (5).

The findings in this report are subject to at least three limitations. First, the level of missing data varied among cases, and for at least one variable (years of experience), exceeded 50%. This circumstance might have introduced bias by underestimating

FIGURE 2. Recovery status of unintentional fatal fall overboard victims (N = 204) and associated prevention strategies — United States, 2000–2016



certain fall or decedent characteristics when variables with missing data were analyzed. Second, denominator data were unavailable to enable calculation of fatality rates. A decreasing trend in the number of falls overboard was observed, but it is unclear if risk similarly declined. Finally, data were not available on nonfatal falls overboard. Comparison of fatal and nonfatal events might help identify factors associated with the successful rescue of crewmembers from the water.

Although the overall decline in the number of fatal falls overboard is encouraging, these largely preventable events remain a leading contributor to commercial fishing deaths. Implementation of prevention strategies discussed in this report by vessel owners could continue this positive trend and result in substantial safety improvements within the industry. Future research can include activities to understand barriers to adoption of these prevention strategies, particularly in fisheries where these events occur frequently, and evaluate the efficacy of interventions, as supported by the NIOSH strategic plan (10).

Conflict of Interest

No conflicts of interest were reported.

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Three Rotavirus Outbreaks in the Postvaccine Era — California, 2017

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Before the introduction of rotavirus vaccine in 2006, rotavirus was the most common cause of severe diarrhea among U.S. children (1). Currently, two rotavirus vaccines are licensed for use in the United States, both of which have demonstrated good field effectiveness (78%–89%) against moderate to severe rotavirus illness (2), and the use of these vaccines has substantially reduced the prevalence of rotavirus in the United States (3). However, the most recent national vaccine coverage estimates indicate lower full rotavirus vaccine–series completion (73%) compared with receipt of at least 3 doses of vaccines containing diphtheria, tetanus, and pertussis antigens (95%), given on a similar schedule to rotavirus vaccines (4). In the postvaccine era in the United States, rotavirus activity persists in a biennial pattern (3). This report describes three rotavirus outbreaks that occurred in California in 2017. One death was reported; however, the majority of cases were associated with mild to moderate illness, and illness occurred across the age spectrum as well as among vaccinated children. Rotavirus vaccines are designed to mimic the protective effects of natural infection and are most effective against severe rotavirus illness (2). Even in populations with high vaccination coverage, some rotavirus infections and mild to moderate illnesses will occur. Rotavirus vaccination should continue to be emphasized as the best means of reducing disease prevalence in the United States.

Outbreak 1: Child Care Center in Long Beach

In late March 2017, the Long Beach Department of Health and Human Services (LBDHHS) was notified of an outbreak of acute gastroenteritis (AGE) at a child care center. The facility provided daycare to 80 children aged 2–5 years and afterschool care to 135 additional children; 27 staff members were employed. LBDHHS emphasized hand hygiene, provided facility-cleaning recommendations consistent with those for norovirus outbreaks, and advised parents to keep ill children home for at least 48 hours after symptom resolution. At a site visit, LBDHHS provided detailed recommendations and education to staff members, and the facility later closed to perform more thorough cleaning. By April 17, 2017, a total of 27 cases of AGE among children and four cases among staff members had been reported; the classrooms for children aged 2 years and 3 years experienced the highest attack rates (43% and 37%, respectively). Five secondary cases among household contacts

were reported. Symptom onset dates ranged from March 22 through April 12, 2017. Among 31 patients for whom symptom information was available, 22 (71%) had diarrhea, 17 (55%) had vomiting, 13 (42%) reported abdominal cramps, 12 (38%) had fever, and four (13%) reported nausea. Patient age ranged from 2 to 86 years (median age = 4 years). Three patients visited their primary care provider; no hospitalizations or deaths occurred. Norovirus was initially suspected to be the causative agent, but four stool specimens tested at the Long Beach Public Health Laboratory were norovirus-negative. Specimens were then sent to the California Department of Public Health (CDPH) Viral and Rickettsial Disease Laboratory (VRDL), a CaliciNet Outbreak Support Center, where all specimens tested positive by reverse-transcription polymerase chain reaction (RT-PCR) for rotavirus. These samples were genotyped as G12P[8] by CDC's Rotavirus Surveillance Laboratory. The California immunization registry indicated that six (22%) of the 27 children with rotavirus were vaccinated, including four who were fully vaccinated. However, actual coverage might have been higher in this population because provider use of the registry is not mandated and the facility did not require proof of rotavirus vaccination for enrollment.

Outbreak 2: Adult Assisted Living and Memory Care Facility in San Mateo

In early April 2017, the San Mateo County Division of Public Health, Policy, and Planning was notified of an outbreak of AGE at an assisted living and memory care facility housing 44 residents and employing 40 staff members. San Mateo health officials recommended standard control measures for gastrointestinal illness outbreaks (e.g., isolation and cohorting, contact precautions, suspension of group activities, promotion of handwashing, and disinfection with bleach solution or a disinfectant approved by the Environmental Protection Agency [EPA] as effective against norovirus). By April 10, 2017, nine cases had been reported, including four among residents and five among staff members. Symptom onset dates occurred during March 31–April 6, 2017. All nine patients had diarrhea, two reported abdominal cramps, and one had vomiting. Patient age ranged from 22 to 90 years (median age = 47 years); no patients were eligible to have received rotavirus vaccine. At least one patient sought primary

Summary**What is already known about this topic?**

The introduction of vaccines against rotavirus, the most common cause of severe diarrhea among U.S. children, has substantially reduced disease incidence.

What is added by this report?

Rotavirus outbreaks in a child care center and an adult assisted living facility caused primarily mild illness. In a pediatric subacute care facility, illness was widespread and resulted in one death in a toddler with underlying complications.

What are the implications for public health practice?

Rotavirus vaccination is most effective against severe disease. Vaccination reduces transmission and might confer indirect protection to unvaccinated individuals, but outbreaks will continue. Public health practitioners and clinicians should consider rotavirus in cases of acute gastroenteritis and promote rotavirus vaccination per CDC guidelines.

care; no hospitalizations or deaths were reported. As in the first outbreak, norovirus was initially suspected, but two stool specimens tested at the county public health laboratory were norovirus-negative. These specimens were then sent to CDPH VRDL for additional testing, where they were both found to be rotavirus-positive by RT-PCR; they were later genotyped as G12P[8] by CDC.

Outbreak 3: Subacute Care Facility for Children in Santa Clara County

On May 1, 2017, the Santa Clara County Public Health Department (SCCPHD) was notified of an outbreak of AGE at a subacute inpatient care facility for patients aged <21 years with complex medical needs. In consultation with SCCPHD, the facility increased cleaning and disinfection with bleach solution, implemented cohorting and isolation procedures, cancelled group activities, and suspended new admissions. A site visit by SCCPHD confirmed good adherence to hand hygiene and contact precautions. Nonetheless, by the end of the outbreak, 24 of the 25 facility patients and three of 115 staff members had fallen ill. Symptom onset dates ranged from April 24 through May 17, 2017. The median duration of symptoms was 7.5 days; 23 (85%) patients had diarrhea, and 15 (56%) had vomiting. Patient age ranged from 6 months to 39 years (median age = 2 years). Although most cases resolved without major complications, one child aged 22 months with preexisting respiratory failure died; the cause of death was attributed to rotavirus-induced dehydration. This patient, as well as 16 others, had received no doses of rotavirus vaccine; three other patients had received a single dose. Though reasons for nonvaccination were not tracked by the facility, many of the

children had been vaccinated according to delayed vaccination schedules and might have aged out of eligibility for rotavirus vaccination (1).^{*} Laboratory testing by a gastroenteritis multipathogen PCR panel at a local hospital confirmed rotavirus in 11 of 14 samples; no other pathogens were detected. Eight samples forwarded to CDPH VRDL were found to be PCR-positive for rotavirus, and five were then forwarded to CDC for genotyping. Four were genotyped as G12P[8]; one was identified as a G12 virus, but its P type was not identified.

Discussion

Although U.S. rotavirus activity has substantially declined since the introduction of rotavirus vaccine, rotavirus disease continues to occur sporadically throughout the year and epidemically in a biennial winter-spring seasonal pattern, affecting even vaccinated persons (3). Further, as evidenced by these outbreaks as well as previously published reports, rotavirus affects not only young children, but also adults, especially those in congregate living settings (5,6).

Although these outbreaks represent a small proportion of U.S. rotavirus outbreaks, and are not necessarily representative of all outbreaks, they illustrate some general characteristics of rotavirus outbreaks in the postvaccine era. The first outbreak, in the child care center, was characterized by comparatively mild illness in otherwise healthy children and illustrates that rotavirus outbreaks do occur in the postvaccine era, even among healthy, vaccinated populations. Current rotavirus vaccines are highly effective against severe diarrheal illness, but they do not necessarily prevent infection or milder disease. Thus, rotavirus disease and outbreaks can occur even in populations where vaccination coverage is high.

The second outbreak, in an adult assisted living and memory care facility, demonstrated that rotavirus can and does cause illness in adult populations and can spread easily among adults living in close quarters, such as nursing homes. Though adults do not receive rotavirus vaccine, research has indicated that rotavirus vaccination of children might have an indirect protective effect in the adult population (7). As use of multipathogen PCR testing increases, there might be more detection of rotavirus outbreaks in adult populations. Rotavirus outbreaks are sometimes initially suspected to be norovirus, but rotavirus should not be ruled out as a causative agent because of the age of the affected population. Nonetheless, the public health recommendations are similar for both norovirus and rotavirus. Hand hygiene, cohorting and isolation, and surface disinfection with appropriate products should be emphasized. Cleaning surfaces with soap and water followed by a 5-minute

^{*}The maximum ages for initiating and completing the rotavirus vaccination series are 14 weeks 6 days and 8 months, respectively.

application of 1000–5000 ppm chlorine solution (5–25 tbsp [2.5–12.5 oz] of household bleach [5.25% sodium hypochlorite] per gallon of water) or other disinfectant registered as effective against norovirus by the EPA is appropriate for both pathogens (8,9).

The third outbreak also occurred among children; however, in contrast to the first outbreak, it affected an already vulnerable population with low vaccination coverage and was associated with the highest attack rate among the three outbreaks, as well as one fatality. Reasons for nonvaccination among children in the facility were not ascertained; however, most patients at the facility had spent time in neonatal and pediatric intensive care units, where use of live viral vaccines is discouraged (1), and many were too old to begin rotavirus vaccine after discharge. Additional research might be necessary to evaluate the risks and benefits of this practice.

Although the impact of rotavirus vaccines against various commonly circulating strains has been well documented, rotavirus outbreaks will continue to occur, even among highly vaccinated populations. Although genotype G12P[8] was detected in samples from all three outbreaks, this likely reflects the fact that G12P[8] has been the most common circulating strain in the United States in recent years (10). Both currently available rotavirus vaccines have demonstrated effectiveness against this strain (2); however, because rotavirus vaccination coverage lags behind that of other childhood vaccines, many children remain susceptible to severe rotavirus disease. Public health practitioners, as well as clinicians, should continue to consider rotavirus as a suspected agent in cases of AGE across all ages and should promote rotavirus vaccination among eligible infants according to CDC recommendations.

Conflict of Interest

No conflicts of interest were reported.

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Adherence to CDC Recommendations for the Treatment of Uncomplicated Gonorrhea — STD Surveillance Network, United States, 2016

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Gonorrhea, the sexually transmitted disease (STD) caused by *Neisseria gonorrhoeae*, is the second most common notifiable disease in the United States after chlamydia; 468,514 cases were reported to state and local health departments in 2016, an increase of 18.5% from 2015 (1). *N. gonorrhoeae* has progressively developed resistance to most antimicrobials used to treat the infection (2). As a result, CDC recommends two antimicrobials (250 mg of ceftriaxone [IM] plus 1 g of azithromycin [PO]) for treating uncomplicated gonorrhea to improve treatment efficacy and, potentially, to slow the emergence and spread of antimicrobial resistance. To monitor adherence to the current CDC-recommended regimen for uncomplicated gonorrhea, CDC reviewed enhanced data collected on a random sample of reported cases of gonorrhea in seven jurisdictions participating in the STD Surveillance Network (SSuN) and estimated the proportion of patients who received the CDC-recommended regimen for uncomplicated gonorrhea, by patient characteristics and diagnosing facility type. In 2016, the majority of reported patients with gonorrhea (81%) received the recommended regimen. There were no differences in the proportion of patients receiving the recommended regimen by age or race/ethnicity; however, patients diagnosed with gonorrhea in STD (91%) or family planning/reproductive health (94%) clinics were more likely to receive this regimen than were patients diagnosed in other provider settings (80%). These data document high provider adherence to CDC gonorrhea treatment recommendations in specialty STD clinics, indicating high quality of care provided in those settings. Local and state health departments should monitor adherence with recommendations in their jurisdictions and consider implementing interventions to improve provider and patient compliance with gonorrhea treatment recommendations where indicated.

SSuN is a CDC-supported, sentinel surveillance project comprised of 10 selected state and city health departments that conduct investigations to collect supplementary information on a random sample of gonorrhea cases reported from all health care providers/reporting sources in their jurisdictions (<https://www.cdc.gov/std/ssun/default.htm>). These investigations include contacting the diagnosing provider to verify treatment and conducting patient interviews to collect behavioral and demographic information. Case weights were developed to account for local sample fractions and adjust for

nonresponse by patient sex and age group, allowing CDC to produce estimates representative of all reported gonorrhea cases in these jurisdictions (3).

Analyses were restricted to seven of the 10 SSuN jurisdictions (Baltimore, Maryland; California, excluding San Francisco; Florida; Massachusetts; Multnomah County, Oregon; Minnesota; and Philadelphia, Pennsylvania) with documented treatment information (antimicrobials and dosages) for $\geq 90\%$ of cases with complete investigations. Cases with missing patient treatment information (6.7%) were excluded from further analysis. Based on provider report of treatment provided, patients treated with the recommended dual therapy for uncomplicated gonorrhea (i.e., 250 mg dose of ceftriaxone [IM] plus 1 g dose of azithromycin [PO]) were classified as having received the recommended regimen. All other patients were classified as having received other regimens. Weighted estimates of the number and proportion of patients treated with the recommended regimen and corresponding 95% confidence intervals (CI) were calculated. Prevalence ratios (PRs) were estimated to identify differences in documented treatment by patient characteristics and diagnosing facility type. Gay, bisexual, and other men who have sex with men (MSM) were defined as any male patient reporting male sex partners in the previous 2–3 months or reporting their sexual orientation as gay or bisexual.

In 2016, a total of 91,719 gonorrhea cases were reported in the seven participating SSuN jurisdictions. Among these, 8,393 (9.2%) were randomly sampled; complete provider investigations were obtained for 3,213 cases for a response rate of 38%. Overall, 93.3% of these patients had a treatment documented and were included in the analysis.

Based on weighted analysis,* CDC estimated that 81.3% (95% CI = 79.2–83.4) of reported patients with gonorrhea in these SSuN jurisdictions were treated with the recommended dual therapy for uncomplicated gonorrhea (Table 1). The percentage of patients treated with this regimen varied by jurisdiction (range = 76.7% to 92.0%). There were no differences by patient age or race/ethnicity (Table 2). Although not statistically significant, women were somewhat less likely than men to receive the recommended regimen (79.3% versus

*Case weights developed based on proportion sampled in each jurisdiction; nonresponse adjustments developed by gender and age group. All analyses were conducted using statistical software with linearized Taylor-Series 95% confidence intervals.

TABLE 1. Estimated number of gonorrhea cases by treatment regimens received — STD Surveillance Network, United States, 2016

Treatment regimen	Weighted no.*	Weighted % (95% CI)*
Recommended treatment for uncomplicated gonorrhea		
Ceftriaxone 250 mg + azithromycin 1 g	74,599	81.3 (79.2–83.4)
Other regimens		
Ceftriaxone 250 mg only	5,430	5.9 (4.8–7.0)
Ceftriaxone any dosage + doxycycline	4,016	4.4 (3.3–5.5)
Azithromycin only	2,884	3.1 (2.1–4.1)
Ceftriaxone + azithromycin (other or unknown dosage)	1,936	2.1 (1.3–2.9)
Doxycycline only	1,055	1.2 (0.5–1.8)
Cefixime + azithromycin or doxycycline	599	0.7 (0.5–0.9)
Ceftriaxone (125 mg or unknown dosage) only	530	0.6 (0.2–1.0)
Other antimicrobials†	420	0.5 (0.0–1.0)
Cefotaxime 1 g + azithromycin 1 g or ceftizoxime 1 g + azithromycin 1 g	115	0.1 (0.0–0.3)
Cefixime only	83	0.1 (0.0–0.2)
Azithromycin 2 g + gentamicin or gemifloxacin	51	0.1 (0–0.1)

Abbreviations: CI = confidence interval, STD = sexually transmitted disease.

* No., %, and 95% CI reflect weighted estimates for all reported gonorrhea cases; minor variance in weights might cause category estimates to total to slightly more or less than overall case estimate.

† Other antimicrobials include azithromycin 1 g + doxycycline, fluoroquinolone alone, and gentamicin alone.

TABLE 2. Estimated cases by patient demographics, diagnosing facility type, and treatment regimen received — STD Surveillance Network, United States, 2016

Characteristic	Regimen received				Prevalence ratio (95% CI)
	Recommended for uncomplicated gonorrhea		Other		
	Weighted no.*	Weighted % (95% CI)*	Weighted no.*	Weighted % (95% CI)*	
Total	74,599	81.3 (79.2–83.4)	17,120	18.7 (16.6–20.8)	—
Gender and sex of sex partner(s)					
Women	26,088	79.3 (75.5–83.0)	6,822	20.7 (17.0–24.5)	0.96 (0.91–1.02)
MSM	27,804	84.8 (81.4–88.2)	4,994	15.2 (11.8–18.8)	1.07 (1.01–1.13)
MSW	18,641	78.9 (74.8–83.0)	4,993	21.1 (17.0–25.2)	0.96 (0.90–1.02)
Men with unknown sex of sex partner(s)	2,066	86.9 (79.7–94.1)	311	13.1 (5.9–20.3)	1.07 (0.98–1.17)
Age group (yrs)					
≤19	10,570	83.1 (77.5–88.7)	2,148	16.9 (11.3–22.5)	1.03 (0.95–1.10)
20–24	19,842	81.2 (77.2–85.3)	4,586	18.8 (14.7–22.8)	1.00 (0.94–1.06)
25–29	17,600	84.3 (80.1–88.5)	3,283	15.7 (11.5–19.9)	1.05 (0.99–1.11)
30–34	9,901	80.0 (74.4–85.7)	2,468	20.0 (14.3–25.6)	0.98 (0.91–1.06)
35–39	5,887	77.3 (69.1–85.5)	1,729	22.7 (14.5–30.9)	0.95 (0.85–1.06)
40–44	3,697	82.1 (72.3–91.9)	806	17.9 (8.1–27.7)	1.01 (0.89–1.14)
≥45	7,099	77.2 (70.2–84.1)	2,100	22.8 (15.9–29.8)	0.94 (0.86–1.04)
Race/Ethnicity					
White	16,424	77.4 (72.7–82.0)	4,808	22.6 (18.0–27.3)	0.94 (0.88–1.00)
Black	29,178	82.5 (79.5–85.6)	6,172	17.5 (14.4–20.5)	1.02 (0.97–1.08)
Hispanic	21,492	84.8 (80.8–88.8)	3,853	15.2 (11.2–19.2)	1.06 (1.00–1.12)
All other races	5,210	81.5 (72.4–90.6)	1,185	18.5 (9.4–27.6)	1.00 (0.89–1.12)
Missing/Refused	2,294	67.5 (54.5–80.6)	1,103	32.5 (19.4–45.5)	0.82 (0.68–1.00)
Diagnosing provider/Facility type					
STD clinic	11,565	90.8 (87.0–94.6)	1,174	9.2 (5.4–13.0)	1.14 (1.08–1.20)
Private provider/HMO/ PPO	19,090	75.8 (70.9–80.6)	6,104	24.2 (19.4–29.1)	0.91 (0.85–0.97)
Hospital ED/Emergent/Urgent care	3,249	74.6 (67.8–81.5)	1,105	25.4 (18.5–32.2)	0.91 (0.83–1.01)
Family planning/ Reproductive health clinics	11,319	93.8 (91.0–96.6)	748	6.2 (3.4–9.0)	1.18 (1.13–1.23)
Other HD/Public clinics or tribal clinics	4,516	88.1 (80.7–95.5)	610	11.9 (4.5–19.3)	1.09 (1.00–1.19)
All other†	10,506	86.3 (82.2–90.5)	1,665	13.7 (9.5–17.8)	1.07 (1.01–1.13)
Unknown	14,353	71.5 (66.0–77.1)	5,715	28.5 (22.9–34.0)	0.85 (0.78–0.92)

Abbreviations: CI = confidence interval; ED = emergency department; HD = health department; HIV = human immunodeficiency virus; HMO = health maintenance organization; MSM = men who have sex with men; MSW = men who have sex with women only; PPO = preferred provider organization; STD = sexually transmitted disease.

* No., %, and 95% CI reflect weighted estimates for all reported gonorrhea cases; minor variance in weights might cause category estimates to total to slightly more or less than overall case estimate.

† All other includes: HIV primary/specialty care or HIV testing sites, correctional facilities, school-based pediatric or adolescent care, and other provider types.

82.5%; PR = 0.96, 95% CI = 0.91–1.02). MSM were more likely to receive the recommended regimen compared with heterosexual men and women (84.8% versus 79.4%; PR = 1.07, 95% CI = 1.01–1.13). Patients diagnosed with gonorrhea in family planning/reproductive health clinics were more likely to receive the recommended regimen than were patients diagnosed in other provider settings (93.8% versus 79.5%; PR = 1.18, 95% CI = 1.13–1.23). Similarly, patients diagnosed in STD clinics were more likely to receive the recommended regimen than were patients diagnosed in other provider settings (90.8% versus 79.8%; PR = 1.14, 95% CI = 1.08–1.20). When stratified by sexual behavior, patients whose gonorrhea was diagnosed in STD and family planning/reproductive health clinics were more likely to be treated with the recommended regimen whether or not they were MSM.

Overall, 18.7% (95% CI = 16.6–20.8) of patients received other regimens (Table 1). The most frequent other regimens reported were ceftriaxone 250 mg only (5.9%), ceftriaxone any dosage and doxycycline (4.4%), and azithromycin only (3.1%). Fewer than 0.5% of patients were treated with a regimen suggesting treatment of a patient with a cephalosporin allergy (e.g., azithromycin plus either gentamicin or gemifloxacin) or a patient with a complicated gonococcal infection (e.g., azithromycin plus either cefotaxime or ceftizoxime).

Discussion

CDC's gonorrhea treatment recommendations are periodically revised based on the best available evidence of emerging trends in antimicrobial susceptibility. Provider awareness of, and adherence to current treatment recommendations helps ensure that all patients are treated with the most effective therapy and might decrease the development of antimicrobial resistance. Monitoring treatment practices across all provider and diagnostic settings helps identify opportunities for interventions to increase provider adherence. The current analysis provides estimates of treatment practices among all providers diagnosing gonococcal infections in seven of 10 SSuN jurisdictions and are the first published estimates of adherence to CDC recommendations since gonorrhea treatment guidelines were revised in 2012 and in 2015 (2,4).

This analysis documents high levels of compliance with CDC treatment recommendations, with 81% of patients receiving recommended dual therapy for uncomplicated gonorrhea and substantiate high levels of compliance observed in previous analyses of gonorrhea cases reported in jurisdictions participating in SSuN during 2006–2008 and 2010–2012 (5,6). Optimally, all patients diagnosed with uncomplicated gonorrhea should be treated with the recommended regimen to ensure effective treatment and to help forestall the emergence of antimicrobial resistance. However, in practice, many factors

Summary

What is already known about this topic?

CDC's treatment recommendations for gonorrhea were revised in 2012 and 2015 based on emerging antimicrobial resistance.

What is added by this report?

In 2016, 81% of gonorrhea cases in seven jurisdictions were treated with the recommended regimen for uncomplicated gonorrhea (250 mg dose of ceftriaxone [IM] plus 1 g dose of azithromycin [PO]), but this varied by provider type.

What are the implications for public health practice?

Providers should be aware of the national guidelines for the treatment of sexually transmitted infections. Monitoring of treatment practices is a critical public health priority to help assure that patients receive the highest quality of care, and to address the emerging threat of antimicrobial-resistant gonorrhea.

might influence provider's adherence to the recommended regimen, including the availability of injectable medications at the time of treatment and patient-reported allergies. In the current analysis, patients diagnosed with gonorrhea in STD and family planning/reproductive health clinics were more likely to be treated with the recommended regimen than were patients diagnosed in other provider settings, similar to observations from earlier studies (7,8). Across all provider settings, MSM were more likely to be treated with the recommended regimen, and MSM were more likely than non-MSM to receive a diagnosis in STD clinics. However, in stratified analyses by sexual behavior and diagnosing facility type, STD clinics were still more likely to treat with the recommended regimen than were other provider types. Implementation of guidelines in other provider settings might be influenced by a smaller volume of patients with gonorrhea seeking care and services, as providers diagnosing fewer cases might be less familiar with current recommendations.

The majority of patients treated with other regimens were treated with only one antimicrobial, including 3% of all patients treated with azithromycin only and 1.2% with doxycycline alone. Azithromycin monotherapy is not recommended for treatment of gonococcal infections because of concerns about emerging resistance and case reports of treatment failures (1,2,9). In addition, tetracycline has not been recommended as treatment regimen for gonorrhea since the 1980s because of established chromosomally and plasmid-mediated resistance in the United States (10). These findings reinforce the imperative for state and local jurisdictions to identify provider settings where patients are receiving inadequate treatment. Additional training and education on the importance of adherence to treatment recommendations might increase the proportion of patients adequately treated and further delay the emergence of antimicrobial-resistant gonorrhea.

The findings in this report are subject to at least four limitations. First, findings are based on enhanced investigations conducted for a random sample of gonorrhea cases in seven jurisdictions; SSuN is not designed to be nationally representative although these jurisdictions reported approximately 20% of all gonorrhea cases in the United States in 2016. Second, although case weights were calculated to account for differing sample fractions across SSuN jurisdictions and for nonresponse, it is possible that unmeasured bias exists. CDC is unable to adjust these data for nonresponse by provider type because the complete distribution by provider type in the underlying population of cases is unknown. If providers who were less likely to treat patients with a recommended therapy were also less likely to respond to investigators, this analysis might overestimate the proportion of patients treated with the recommended regimen. Third, a small number of patients might have had allergies or other clinical scenarios that would have been appropriately treated with an alternative regimen; however, allergies and complications are not documented during SSuN investigations. Consequently, findings might underestimate the proportion of appropriately treated patients with gonorrhea. Finally, treatment information was missing for 6.7% of sampled cases; it is plausible that these patients were treated with the recommended regimen, but investigators were unable to document treatment at the time of the investigation.

Despite the high level of treatment adherence documented in this analysis, improving provider adherence to treatment recommendations for antibiotic use across the full spectrum of health care settings is an integral part of a comprehensive approach to combating the emergence of antimicrobial-resistant gonorrhea. State and local health departments should continue to work with the providers and patients to assure timely detection and treatment of gonorrhea according to current CDC treatment recommendations (2).

Acknowledgments

Christina Schumacher, Baltimore City Health Department; Heidi Bauer, Joan Chow, Emily Han, California Department of Public Health; Craig Wilson, Sonya du Bernard, Lisa Thompson, Florida Department of Health; Kathleen Hsu, Heather Elder, Massachusetts Department of Public Health; Krissie Guerard, Dawn Ginzl, Laura Tourdot, Minnesota Department of Health; Lenore Asbel, Greta Anschuetz, Robbie Madera, Philadelphia Department of Public Health; Gail Bolan, Jim Braxton, Brian Emerson, LaZetta Grier, Eloisa Llata, Tremeka Sanders, Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC.

Conflict of Interest

No conflicts of interest were reported.

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Notes from the Field

Identification of Tourists from Switzerland Exposed to Rabies Virus While Visiting the United States — January 2018

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On January 16, 2018, CDC was notified by the Florida Department of Health of potential rabies virus exposure in two persons believed to be residents of Switzerland. Rabies virus infections cause a fatal encephalitis, and persons exposed to the virus are advised to receive postexposure prophylaxis (PEP) as soon as possible (1). On January 10, 2018, a married couple found a bat in a Naples, Florida, shopping mall parking lot and took it to a local veterinary clinic. The woman, estimated to be aged 50–60 years, stated that they were Swiss tourists. No other identifying information was obtained. On January 15, 2018, the bat tested positive for rabies by the direct fluorescent antibody test at the Florida Department of Health public health laboratory. After repeated efforts to identify the couple were unsuccessful, CDC was able to locate the couple by using the national focal point network maintained by World Health Organization (WHO) International Health Regulations (IHR) (2); the two were promptly administered PEP.

After the bat tested positive for rabies, multiple follow-up interviews during the next 3 days with staff members at the local veterinary clinic and mall employees conducted by the Florida Department of Health revealed no additional information regarding the couple. Because of the limited information available about the couple, their potential for a rabies virus exposure, and concern that they might have traveled out of the Naples area, the Florida Department of Health in Collier County next issued a press release on January 18 requesting that the couple contact health department officials.*

CDC worked with the Florida Department of Health from January 16 to January 24 to try to gain more information regarding the couple. On January 24, with no further identifying information obtained and the couple still not located, the CDC Poxvirus and Rabies Branch and the Division of Global Migration and Quarantine contacted the national focal point in Switzerland identified through the IHR network maintained by

WHO to inform the Swiss government of the incident. Under article 44 of IHR, WHO encourages international collaborations for the detection and assessment of public health events. IHR national focal points are positions within governments staffed by points of contact who are available at all times to send urgent communications and disseminate information when public health risks of potential international concern are identified (2). National focal points regularly share pertinent public health information for contact tracing with each other. Accordingly, CDC contacted the Swiss IHR national focal point because of the need for timely risk assessment and administration of PEP to prevent rabies virus infection.

The Swiss Federal Office of Public Health issued a national press release on January 25 and was contacted by the couple within 5 hours (personal communication, Jesse Blanton, CDC, 2018). The couple confirmed handling the bat with their bare hands but did not report being bitten. The couple also confirmed that no other persons approached the bat during the time it was in their possession. The couple was advised to begin PEP, which was started the same day (January 25).

Since January 2017, CDC's Poxvirus and Rabies Branch has used the IHR national focal point network to issue health alerts regarding potential rabies virus exposures in 12 persons. The IHR health alerts have resulted in at least four persons receiving potentially lifesaving treatment for rabies (Table).

The decision to notify the Swiss IHR national focal point was made after considering the severity of rabies virus infections in exposed persons, despite the lack of identifiable information available. This event illustrates the usefulness of the WHO IHR national focal point network for communicating binational, time-sensitive public health information. The Swiss Federal Office of Public Health was rapidly able to employ effective messaging to identify the persons at risk.

The IHR national focal point network maintained by WHO can be activated outside of pandemic situations to strengthen international public health relationships; communicate valuable, time-sensitive information; and strengthen global health capacity through coordinated response efforts. The CDC examples since January 2017 highlight the increasingly multinational nature of rabies virus exposure investigations, the collateral benefit of having the WHO IHR national focal point system in place, and the willingness of IHR signatories to expand its application to urgent situations, even those involving a small number of persons.

*http://collier.floridahealth.gov/_files/_documents/press-releases/_documents/20180118rabies.pdf.

TABLE. Health alerts issued by CDC regarding potential rabies virus exposures using the International Health Regulations National Focal Point Network, January 2017–January 2018

Month	Circumstance	Countries notified	No. of persons exposed	PEP administered
May 2017	Non-U.S. citizens exposed to rabid dog while traveling in India	India, Spain	4	No; public health assessment determined PEP not needed
August 2017	Non-U.S. citizens exposed to bats in Grand Teton National Park, Wyoming, United States	Australia, France, Mexico, United Kingdom	4	Unknown; follow-up is ongoing
January 2018	U.S. citizens exposed to rabid dog imported from Egypt; Egyptian government notified for follow-up investigation	Egypt	2	Yes
January 2018	Non-U.S. citizens exposed to rabid bat in Florida	Switzerland	2	Yes

Abbreviation: PEP = postexposure prophylaxis.

Acknowledgments

Florida Department of Health, Collier County, Florida; staff members of the National International Health Regulations Focal Point for Switzerland, Swiss Federal Office of Public Health, Division of Communicable Diseases.

Conflict of Interest

No conflicts of interest were reported.

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Errata

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In the Surveillance Summary “Disparities in Preconception Health Indicators — Behavioral Risk Factor Surveillance System, 2013–2015, and Pregnancy Risk Assessment Monitoring System, 2013–2014,” on page 7, the second sentence under the heading “Postpartum Use of Contraception (PRAMS)” should have read “The most effective methods (i.e., male or female sterilization, implant, and intrauterine device) have a failure rate that is <1% with typical use, and moderately effective methods (shot, pill, patch, ring or diaphragm) include those with typical failure rates of **6%–12%**.”

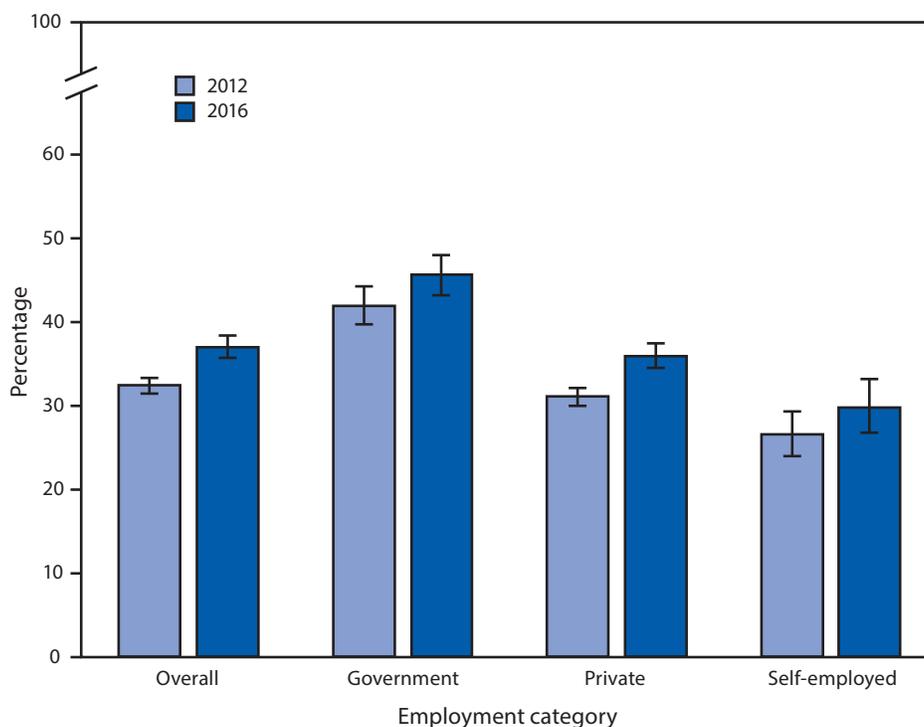
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In the report “Emergence of Monkeypox — West and Central Africa, 1970–2017,” on page 306, the next to the last sentence in the first paragraph under “Monkeypox Cases in West Africa and Central Africa” should have read “With **89** confirmed cases, Nigeria is currently experiencing the largest documented outbreak of human monkeypox in West Africa.”

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage* of Currently Employed[†] Adults Aged ≥18 Years Who Received Influenza Vaccine in the Past 12 Months,[§] by Employment Category[¶] — National Health Interview Survey,** United States, 2012 and 2016



* With 95% confidence intervals shown with error bars.

[†] Working for pay at a job or business, or with a job or business but not at work, in the week prior to the survey.

[§] Based on a positive response to the following questions: in 2012, to either "During the past 12 months, have you had a flu shot" or to "During the past 12 months, have you had a flu vaccine sprayed in your nose by a doctor or other health professional?"; and in 2016 to the question "During the past 12 months, have you had a flu vaccination?"

[¶] Based on the response to a question that asks for the category that best describes the respondent's current job or work situation. Only selected categories are shown. Federal, state, and local government employees are aggregated in the figure as government employees. The employment category might not reflect the adult's employment at the time of the vaccination.

** Estimates are based on household interviews of a sample of the noninstitutionalized U.S. civilian population and are derived from the National Health Interview Survey Sample Adult component.

From 2012 to 2016, the percentage of employed adults who had received an influenza vaccine in the past 12 months increased overall (32.4% versus 37.0%), among government employees (42.0% versus 45.6%), and private-sector employees (31.1% versus 36.0%), but there was no significant increase among the self-employed (26.5% versus 29.8%). In both years, a higher percentage of government employees had received an influenza vaccine compared with private-sector employees, who had higher percentages than the self-employed.

Source: National Health Interview Survey, 2012 and 2016. <https://www.cdc.gov/nchs/nhis.htm>.

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Morbidity and Mortality Weekly Report

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ISSN: 0149-2195 (Print)