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Outbreak of Cryptosporidiosis Among Responders to a Rollover of a Truck Carrying Calves — Kansas, April 2013

Lindsey Martin Webb, MPH[1], Sheri A. Tubach, MS, MPH[1], D. Charles Hunt, MPH[1] (Author affiliations at end of text)

In April 2013, the Thomas County Health Department notified the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response section (KDHE) of two cases of cryptosporidiosis among emergency responders to a tractor-trailer rollover. The truck was carrying approximately 350 preweaned Holstein calves. An outbreak investigation was led by KDHE with assistance from the county health department; six cases of cryptosporidiosis were identified among the 15 emergency responders. No additional primary cases with this exposure or secondary cases were identified. Disease was associated with carrying calves (relative risk [RR] = 3.0) and contact with fecal matter (RR = 4.5). The calves were aged <10 days and reportedly suffered from scours (diarrheal disease), which is often caused by *Cryptosporidium spp.* (*1*), a chlorine-tolerant protozoan parasite. Because of the age of the calves and the conditions at the rollover scene, a high potential existed for fecal contamination and subsequent transmission of *Cryptosporidium*. This outbreak is the first report of both law enforcement and volunteer emergency responders contracting cryptosporidiosis, with transmission of *Cryptosporidium* attributed solely to direct contact with animals and their feces. Human illness resulting from contact with animals during an emergency response might be minimized if 1) all responders are aware of the potential for zoonotic transmission, 2) education is provided on proper animal handling including the use of appropriate personal protective equipment, and 3) responders practice thorough hand hygiene and decontaminate clothing and equipment following contact with feces.

In the early morning of March 10, 2013, a truck carrying approximately 350 Holstein steer calves overturned in a snowstorm near Colby, Kansas. Many of the calves died as a result; many others were scattered outside of the truck. City police officers and county sheriff's deputies responded to the incident, controlled traffic, and secured the scene. The officers then contacted a towing company and community volunteers with horses and cattle trailers to assist with righting the truck and securing the calves. Because of the very young age of the calves and the injuries and stress resulting from the rollover, most calves that survived the initial impact were unable to walk and had to be carried by responders onto cattle trailers.

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Responders noted that most of the calves had scours. Deceased calves were loaded into the wrecked truck and towed to the local sale barn. The next day, towing company employees returned to the sale barn and loaded the carcasses onto another truck for shipment to a rendering plant.

Following the report of two cases of cryptosporidiosis in persons who responded to a tractor-trailer rollover involving calves, investigators from KDHE hypothesized that illness might be associated with exposure to calves, fecal contamination at the scene, and returning to a location without electrical power and therefore no hot water to thoroughly wash hands or decontaminate equipment and clothing. A retrospective cohort study was conducted among emergency responders to identify additional ill persons and determine risk factors associated with illness. For this investigation, a probable case was defined as diarrhea (three or more loose or watery stools in 24 hours) and either abdominal cramping, vomiting, or anorexia in an emergency responder within 10 days after the response to the rollover. A confirmed case was defined as an illness that met the definition for a probable case with laboratory evidence of *Cryptosporidium* infection.

KDHE interviewed responders by telephone using an outbreak-specific questionnaire. Fifteen persons participated in the response to this emergency; all were interviewed. Six (40%) respondents were ill and of those, two (33%) had confirmed cases and four (67%) had probable cases of cryptosporidiosis. Fourteen (93%) of the responders were male; all ill persons were male and ranged in age from 17 to 34 years (median = 29 years). Five (33%) responders were law enforcement officers; one became ill. Ten (67%) responders included towing truck employees, the driver of the wrecked truck, and other persons from the community; five were ill. The most common symptoms besides diarrhea were abdominal cramps, anorexia, and weight loss (five [83%] reports each). Five (83%) persons sought medical care.

Although positive rapid antigen test results from stool specimens from two responders prompted this investigation, no additional persons submitted stool specimens. The incubation period ranged from 6 to 8 days (median = 7 days). Among four persons whose illness had resolved by the time of interview, duration ranged from 7 to 13 days (median = 9 days). No deaths or hospitalizations were reported. At the time of the outbreak investigation, no calves were available to be tested for *Cryptosporidium*.

In bivariate analysis, ill responders were statistically more likely than responders who were not ill to have carried calves during the response (RR = 3.0) and to have reported coming into contact with fecal matter (RR = 4.5) (Table). Responders who returned to a location without electrical power following the response were more likely to later become ill than those who returned to a location with power (RR = 4.5); however, this association did not reach statistical significance. No one reported eating any foods during the response; all beverages consumed were contained in sealable plastic bottles and consuming a beverage during the response was not significantly associated with illness (RR = 2.5) (Table).

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TABLE. Exposures possibly associated with acquiring cryptosporidiosis among responders to the rollover of a truck carrying calves — Kansas, April 2013

Exposure	No. of persons exposed	No. of ill persons exposed	Relative risk	(95% confidence interval)
Carried calves	9	6	3.0	(1.2–7.6)
Contact with fecal matter	8	6	4.5	(1.3–15.3)
Location without power	4	3	4.5	(0.6–33.7)
Beverage during response	8	5	2.5	(0.9–6.7)

Discussion

Cryptosporidium transmission is fecal-oral and can occur through ingestion of contaminated recreational water, untreated drinking water, or food, or by contact with infected persons or animals, most notably preweaned calves. Outbreaks caused by *Cryptosporidium* are commonly associated with recreational water, including waterparks and swimming pools, whereas outbreaks associated with zoonotic transmission outside of farm settings are less frequently reported (*2*). The cryptosporidiosis outbreak described in this report was associated with handling preweaned Holstein calves and coming into contact with calf feces while responding to a tractor-trailer rollover. Six (40%) of the 15 responders became ill with cryptosporidiosis following this response. Occupational outbreaks have been reported in agricultural settings and veterinary schools (*3–5*). At least one outbreak has been reported among emergency responders following a firefighting response at a location where *Cryptosporidium* was detected in calf fecal specimens as well as in environmental water samples (*6*). This outbreak is the first report of both law enforcement and volunteer emergency responders becoming infected with *Cryptosporidium* for which only direct contact with animals and their feces was identified as the source of transmission.

Holstein cows are commonly used for milk production; Holstein steers born on dairy farms are sometimes transported to another location to be raised for beef. Very young calves being moved from dairy facilities might be deprived of colostrum and transported with calves from many different farms, which can increase stress and pathogen transmission among calves (*7*). Scours is common among young calves, and preweaned calves are most likely to be infected with *Cryptosporidium parvum*, a zoonotic species of *Cryptosporidium* that can be transmitted to humans (*8*). Calves in stressful situations usually experience more severe symptoms of scours associated with an increased shedding of enteric pathogens (*7*). Before the truck rollover, the calves were transported in crowded conditions over long distances during severe winter weather. Additionally, the calves were reportedly aged <10 days; transporting calves at such a young age might provide more opportunity for pathogen transmission, which can be exacerbated by severe stress. The conditions at the scene of the rollover and the conditions during transport might have led to an increased probability of pathogen transmission. Neither the driver nor the trucking company was cited for any legal violations.

Contact with livestock, particularly young calves, is a risk factor for zoonotic transmission recognized by health professionals and animal industry workers; however, professional and volunteer emergency responders might be less aware of the potential risk (*9*). Prior to this rollover response, volunteer responders reportedly were not provided with illness prevention education. Responders did not wear personal protective equipment, but all wore work gloves and heavy outerwear because of the cold weather. Although community members were contacted to provide assistance, no veterinarian was consulted regarding the appropriate care or handling of the calves. A veterinarian could have provided guidance on minimizing transmission of disease while also overseeing humane handling of the animals. The rollover occurred during a snowstorm, and some locations in town did not have electrical power at the time which could have contributed to some persons being unable to appropriately clean or sanitize their clothing and equipment and could have made handwashing less effective or less likely following the response, thus increasing the risk for infection.

This outbreak highlights the need for awareness of zoonotic transmission among those handling calves, including emergency responders. Education of responders is important to prevent future outbreaks of zoonoses that might result from

What is already known on this topic?

Cryptosporidiosis is a diarrheal illness caused by the chlorine-tolerant protozoan *Cryptosporidium*. Transmission is fecal-oral and can occur via ingestion of contaminated recreational water, untreated drinking water, or food, or by contact with infected persons or animals, most notably young calves.

What is added by this report?

Two cases of cryptosporidiosis were laboratory diagnosed among 15 persons responding to the rollover of a tractor-trailer carrying approximately 350 calves. An investigation found four additional responders with symptoms meeting a probable case definition. Diarrhea following the exposure was associated with carrying calves and contact with fecal matter. This is the first report of both law enforcement and volunteer emergency responders contracting *Cryptosporidium* for which the mode of transmission was confirmed to be solely zoonotic.

What are the implications for public health practice?

Public health professionals and emergency responders should be aware of the potential for occupational zoonotic transmission during responses to incidents involving animals. Awareness, education, proper hygiene, and personal protective equipment use can prevent transmission of zoonoses during an emergency response.

agricultural emergencies (*9*). Cryptosporidiosis prevention messaging should include instruction on the potential for fecal-oral zoonotic transmission. Education also should be provided on the use of appropriate personal protective equipment (e.g., disposable outer wear, rubber gloves, and rubber boots) during the response and postresponse clean-up. Responders should ensure that all protective clothing is promptly removed and disinfected after handling calves or coming into contact with their feces, followed by thoroughly washing hands with soap and water to prevent infection or recontamination (*7*). These practices are likely to help reduce fecal-oral exposures during emergency responses involving animals where the potential exists for zoonotic transmission of *Cryptosporidium spp*. and other pathogens.

Acknowledgments

Monique Cheatum, Thomas County Health Department.

[1]Kansas Department of Health and Environment (Corresponding author: Lindsey Martin Webb, lwebb@kdheks.gov, 785-296-3304)

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Update: Influenza Activity — United States, September 28–December 6, 2014

Melissa Rolfes, PhD[1], Lenee Blanton, MPH[1], Lynnette Brammer, MPH[1], Sophie Smith, MPH[1], Desiree Mustaquim, MPH[1], Craig Steffens, MPH[1], Jessica Cohen, MPH[1], Michelle Leon, MPH[1], Sandra S. Chaves, MD[1], Anwar Isa Abd Elal[1], Larisa Gubareva, PhD[1], Henrietta Hall[1], Teresa Wallis, MS[1], Julie Villanueva, PhD[1], Xiyan Xu, MD[1], Joseph Bresee, MD[1], Nancy Cox, PhD[1], Lyn Finelli, DrPH[1] (Author affiliations at end of text)

CDC collects, compiles, and analyzes data on influenza activity year-round in the United States (http://www.cdc.gov/flu/weekly/fluactivitysurv.htm). The influenza season generally begins in the fall and continues through the winter and spring months; however, the timing and severity of circulating influenza viruses can vary by geographic location and season. Influenza activity in the United States increased starting mid-October through December. This report summarizes U.S. influenza activity* during September 28–December 6, 2014.†

Viral Surveillance

During September 28–December 6, approximately 250 World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System collaborating laboratories in the United States tested 124,618 respiratory specimens for influenza viruses; 13,641 (10.9%) were positive (Figure 1). Of these, 12,175 (89.3%) were influenza A viruses, and 1,466 (10.7%) were influenza B viruses. Of the 12,175 influenza A viruses, 5,122 (42.1%) were subtyped; 5,077 (99.1%) of these were influenza A (H3) viruses, and 45 (0.9%) were influenza A (H1N1)pdm09 (pH1N1) viruses. Since September 28, influenza-positive tests have been reported from 50 states, the District of Columbia, Guam, and Puerto Rico, representing all 10 U.S. Department of Health and Human Services (HHS) regions.§ Thus far, influenza A viruses have predominated nationally and in all 10 HHS regions.

Influenza Virus Characterization

WHO collaborating laboratories in the United States are requested to submit a subset of their influenza-positive respiratory specimens to CDC for further virus characterization (*1*). Since October 1, CDC has antigenically or genetically characterized¶ 236 influenza viruses or specimens collected by U.S. laboratories during the 2014–15 season, including 10 pH1N1 viruses, 197 influenza A (H3N2) viruses, and 29 influenza B viruses. All pH1N1 viruses were antigenically like the 2014–15 Northern Hemisphere influenza A vaccine component (A/California/7/2009-like [H1N1]). Of the 197 influenza A (H3N2) viruses, 64 (32.5%) were characterized as A/Texas/50/2012-like (the influenza A [H3N2] component of the 2014–15 Northern Hemisphere influenza vaccine), and 133 (67.5%) showed either reduced titers with antiserum produced against A/Texas/50/2012 or belonged to a genetic group that typically shows reduced titers to A/Texas/50/2012. Among viruses that showed reduced titers with antiserum raised against A/Texas/50/2012, most were antigenically similar to A/Switzerland/9715293/2013, the H3N2 virus selected for the 2015 Southern Hemisphere influenza vaccine. A/Switzerland/9715293/2013 is related to, but antigenically and genetically distinguishable, from the A/Texas/50/2012 vaccine virus. A/Switzerland-like H3N2 viruses were first detected in the United States in small numbers in March of 2014 and began to circulate in greater numbers over the spring and summer. Twenty (69%) of the influenza B viruses tested belong to the B/Yamagata lineage and were characterized as B/Massachusetts/2/2012-like, which is included as an influenza B component in the 2014–15 Northern Hemisphere trivalent and quadrivalent influenza vaccines. The remaining nine (31%) influenza B viruses tested belong to the B/Victoria lineage, and of these, seven (78%) were characterized as B/Brisbane/60/2008-like, which is included as an influenza B component in the 2014–15 Northern

* The CDC influenza surveillance system collects five categories of information from eight data sources: 1) viral surveillance (World Health Organization collaborating laboratories, the National Respiratory and Enteric Virus Surveillance System, and novel influenza A virus case reporting); 2) outpatient illness surveillance (U.S. Outpatient Influenza-Like Illness Surveillance Network); 3) mortality (122 Cities Mortality Reporting System and influenza-associated pediatric mortality reports); 4) hospitalizations (Influenza Hospitalization Surveillance Network [FluSurv-NET], which includes the Emerging Infections Program and surveillance in three additional states); and 5) summary of the geographic spread of influenza (state and territorial epidemiologist reports).

† Data reported as of December 12, 2014.

§ Region 1: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Region 2: New Jersey, New York, Puerto Rico, and the U.S. Virgin Islands. Region 3: Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia. Region 4: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. Region 5: Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. Region 6: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. Region 7: Iowa, Kansas, Missouri, and Nebraska. Region 8: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. Region 9: Arizona, California, Hawaii, Nevada, American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Marshall Islands, and Republic of Palau. Region 10: Alaska, Idaho, Oregon, and Washington.

¶ CDC routinely uses hemagglutination inhibition (HI) assays to antigenically characterize influenza viruses year-round to compare how similar currently circulating influenza viruses are to those included in the influenza vaccine, and to monitor for changes in circulating influenza viruses (http://www.cdc.gov/flu/professionals/laboratory/antigenic.htm). However, a portion of recent influenza A (H3N2) viruses do not grow to sufficient hemagglutination titers for antigenic characterization by HI assays. For many of these viruses, CDC is also performing genetic characterization to infer antigenic properties.

Hemisphere quadrivalent influenza vaccine. Two (22%) of the B/Victoria-lineage viruses tested showed reduced titers to B/Brisbane/60/2008.

Novel Influenza A Viruses

One human infection with an influenza A (H3N2) variant virus (H3N2v) was reported to CDC from Wisconsin during the week ending October 18 (week 42). Contact between the patient and swine in the week preceding illness was reported. The patient was not hospitalized and fully recovered. This is the first H3N2v infection reported for the 2014–15 influenza season.

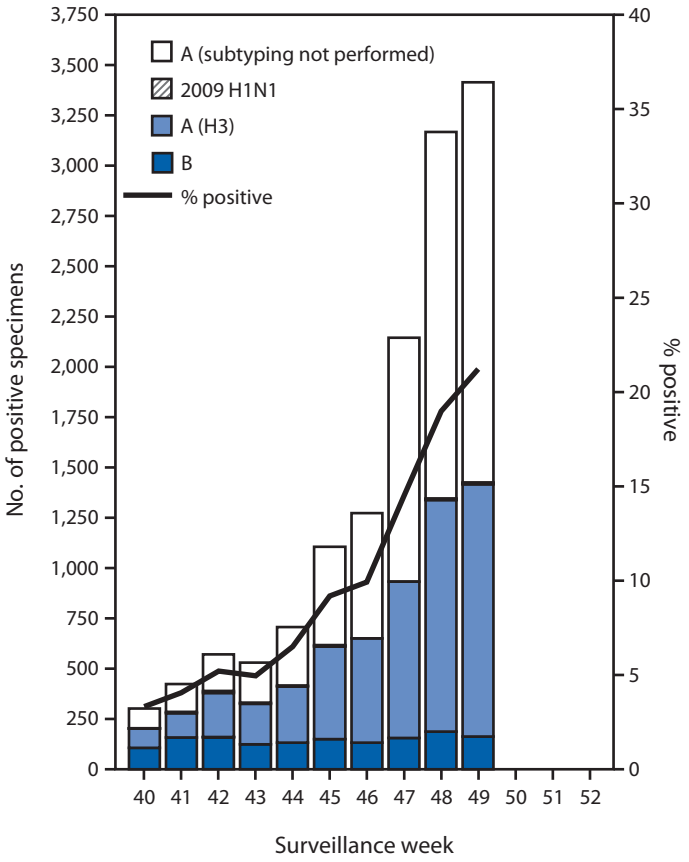
Antiviral Resistance of Influenza Viruses

Testing of pH1N1, influenza A (H3N2), and influenza B virus isolates for resistance to neuraminidase inhibitors (oseltamivir and zanamivir) is performed at CDC using a functional assay. Additionally, pH1N1 and influenza A (H3N2) clinical samples are tested for mutations of the virus known to confer oseltamivir resistance. Since October 1, a total of 139 influenza viruses have been assessed for antiviral resistance, including five pH1N1 viruses, 106 influenza A (H3N2) viruses, and 28 influenza B viruses. Of the 139 influenza A and B viruses tested, all were sensitive both to oseltamivir and zanamivir.

Outpatient Illness Surveillance

Since September 28, the weekly percentage of outpatient visits for influenza-like illness (ILI)** reported by approximately 1,800 U.S. Outpatient ILI Surveillance Network (ILINet) providers in 50 states, New York City, Chicago, the U.S. Virgin Islands, Puerto Rico, and the District of Columbia, which comprise ILINet, has ranged from 1.2% to 2.6% and was first reported to be at or above the national baseline†† of 2.0% during week 47 (week ending November 22) (Figure 2). Peak weekly percentages of outpatient visits for ILI ranged from 2.4% to 7.6% from the 1997–98 through 2013–14 seasons, excluding the 2009 pandemic. Data collected in ILINet are used to produce a measure of ILI activity§§ by jurisdiction. During week 49, Alabama, Georgia, Illinois, Louisiana, Mississippi, Texas, and Puerto Rico experienced high ILI activity, two states (Florida and Indiana) experienced moderate ILI activity, and seven states (Idaho, Kansas, Maryland, Missouri, South Carolina, Utah, and Virginia) experienced low ILI activity. New York City and 35 states experienced minimal ILI activity, and data were insufficient to calculate an ILI activity level for the District of Columbia.

FIGURE 1. Number* and percentage of respiratory specimens testing positive for influenza, by type, surveillance week, and year — U.S. World Health Organization and National Respiratory and Enteric Virus Surveillance System collaborating laboratories, United States, 2014–15 influenza season†



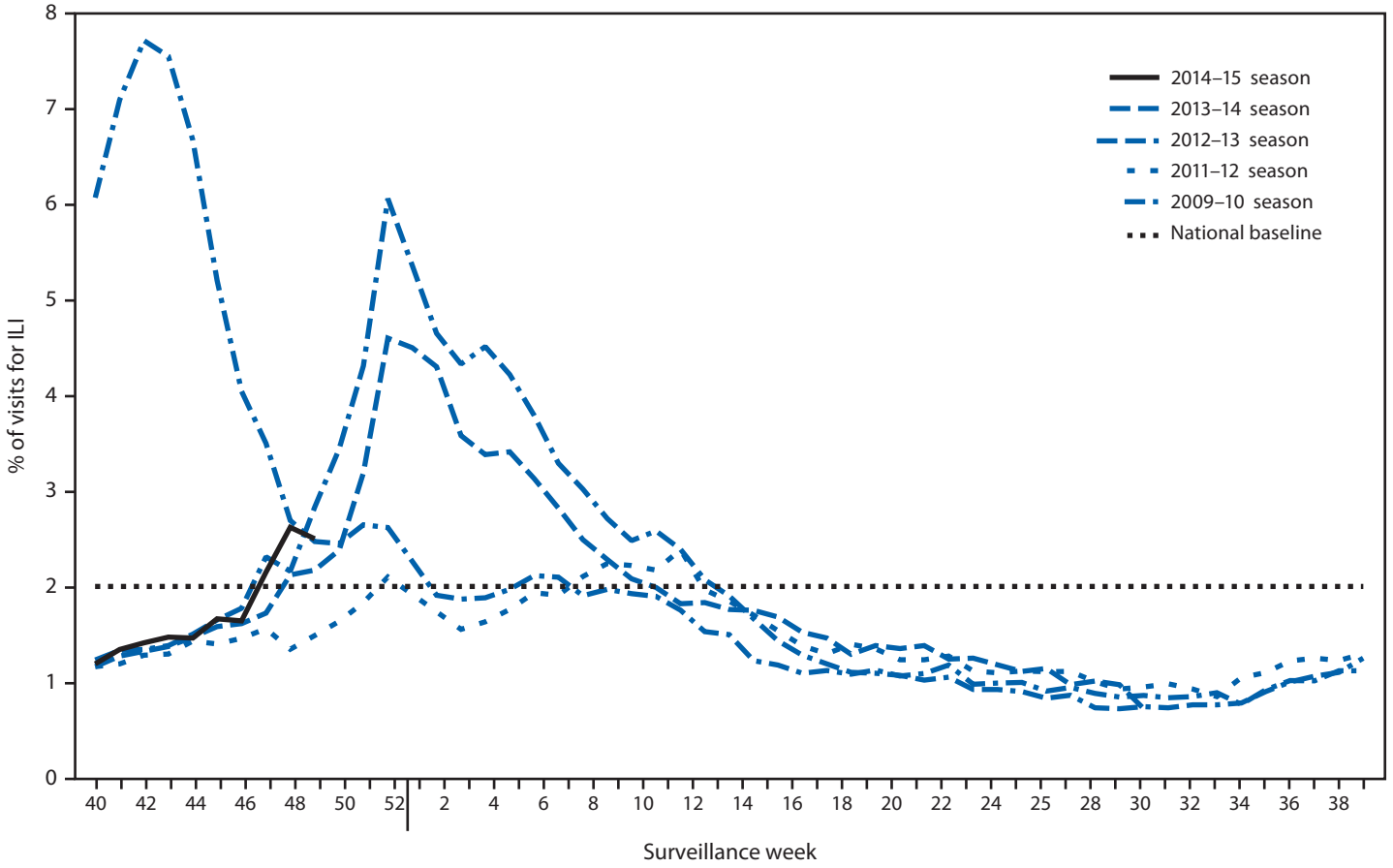
* N = 13,641.
† Data reported as of December 12, 2014.

** Defined as a temperature ≥100°F (≥37.8°C), oral or equivalent, and cough and/or sore throat, without a known cause other than influenza.

†† The national and regional baselines are the mean percentage of visits for ILI during noninfluenza weeks for the previous three seasons plus two standard deviations. A noninfluenza week is defined as periods of ≥2 consecutive weeks in which each week accounted for <2% of the season's total number of specimens that tested positive for influenza. National and regional percentages of patient visits for ILI are weighted on the basis of state population. Use of the national baseline for regional data is not appropriate.

§§ Activity levels are based on the percentage of outpatient visits in a jurisdiction attributed to ILI and are compared with the average percentage of ILI visits that occur during weeks with little or no influenza virus circulation. Activity levels range from minimal, which would correspond to ILI activity from outpatient clinics being at or below the average, to high, which would correspond to ILI activity from outpatient clinics being much higher than the average. Because the clinical definition of ILI is very nonspecific, not all ILI is caused by influenza; however, when combined with laboratory data, the information on ILI activity provides a clearer picture of influenza activity in the United States.

FIGURE 2. Percentage of all outpatient visits for influenza-like illness (ILI)* reported to CDC, by surveillance week — Outpatient Influenza-Like Illness Surveillance Network, United States, September 28–December 6, 2014, and selected previous influenza seasons†



* Defined as a fever (≥100°F [≥37.8°C]), oral or equivalent, and cough and/or sore throat, without a known cause other than influenza.
† Data reported as of December 12, 2014.

Geographic Spread of Influenza Activity

For the week ending December 6 (week 49), 14 states (Colorado, Delaware, Florida, Georgia, Illinois, Kentucky, Louisiana, Maryland, Minnesota, New York, North Carolina, Ohio, Pennsylvania, and Texas) reported widespread geographic spread of influenza¶¶, Puerto Rico, Guam, and 25 states (Alabama, Alaska, Arkansas, Connecticut, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, Mississippi, Missouri, Montana, Nevada, North Dakota, Oklahoma, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin) reported regional spread, and the U.S. Virgin Islands and seven states reported local spread (Arizona, Idaho, Nebraska, New Hampshire, New Jersey, New Mexico, and Oregon). Sporadic influenza activity was reported by the District of Columbia and four states.

¶¶ Levels of activity are 1) no activity; 2) sporadic: isolated laboratory-confirmed influenza case(s) or a laboratory-confirmed outbreak in one institution, with no increase in activity; 3) local: increased ILI, or at least two institutional outbreaks (ILI or laboratory-confirmed influenza) in one region of the state, with recent laboratory evidence of influenza in that region and virus activity no greater than sporadic in other regions; 4) regional: increased ILI activity or institutional outbreaks (ILI or laboratory-confirmed influenza) in at least two but less than half of the regions in the state with recent laboratory evidence of influenza in those regions; and 5) widespread: increased ILI activity or institutional outbreaks (ILI or laboratory-confirmed influenza) in at least half the regions in the state, with recent laboratory evidence of influenza in the state.

Influenza-Associated Hospitalizations

CDC monitors hospitalizations associated with laboratory-confirmed influenza in adults and children through the

Influenza Hospitalization Surveillance Network (FluSurv-NET),*** which covers approximately 27 million persons, 9% of the U.S. population. From October 1 through December 6 (week 49), 1,028 laboratory-confirmed influenza-associated hospitalizations were reported, yielding a rate of 3.8 per 100,000 population. The highest rate of hospitalization was among adults aged ≥65 years (13.4 per 100,000 population) and young children 0–4 years (6.2 per 100,000 population). Among all hospitalizations, 952 (92.6%) were influenza A, 68 (6.6%) were influenza B, four (0.4%) were influenza A and influenza B coinfections, and four (0.4%) had no virus type information. Among those with influenza A subtype information, 274 (100%) were influenza A (H3N2) viruses.

Pneumonia- and Influenza-Associated Mortality

During the week ending December 6 (week 49), pneumonia and influenza (P&I) was reported as an underlying or contributing cause of 6.0% (794 of 13,261) of all deaths reported to the 122 Cities Mortality Reporting System. This percentage is below the epidemic threshold of 6.6% for the week.††† Since September 28, the weekly percentage of deaths attributed to P&I ranged from 5.0% to 6.0% and has not exceeded the epidemic threshold so far this season. Peak weekly percentages of deaths attributable to P&I in the previous five seasons ranged from 7.9% during the 2008–09 and 2011–12 seasons to 9.9% during the 2012–13 season.

*** FluSurv-NET conducts population-based surveillance for laboratory-confirmed influenza-associated hospitalizations among children aged <18 years (since the 2003–04 influenza season) and adults aged ≥18 years (since the 2005–06 influenza season). FluSurv-NET covers approximately 70 counties in the 10 Emerging Infections Program states (California, Colorado, Connecticut, Georgia, Maryland, Minnesota, New Mexico, New York, Oregon, and Tennessee) and additional Influenza Hospitalization Surveillance Project (IHSP) states. IHSP began during the 2009–10 season to enhance surveillance during the 2009 H1N1 pandemic. IHSP sites included Iowa, Idaho, Michigan, Oklahoma, and South Dakota during the 2009–10 season; Idaho, Michigan, Ohio, Oklahoma, Rhode Island, and Utah during the 2010–11 season; Michigan, Ohio, Rhode Island, and Utah during the 2011–12 season; Iowa, Michigan, Ohio, Rhode Island, and Utah during the 2012–13 season; and Michigan, Ohio, and Utah during the 2013–14 and 2014–15 seasons. Incidence rates are calculated using CDC's National Center for Health Statistics population estimates for the counties included in the surveillance catchment area. Laboratory confirmation is dependent on clinician-ordered influenza testing, and testing for influenza often is underutilized because of the poor reliability of rapid test results and greater reliance on clinical diagnosis for influenza. As a consequence, the number of cases identified as part of influenza hospitalization surveillance likely is an underestimate of the actual number of persons hospitalized with influenza.

††† The seasonal baseline proportion of P&I deaths is projected using a robust regression procedure, in which a periodic regression model is applied to the observed percentage of deaths from P&I that were reported by the 122 Cities Mortality Reporting System during the preceding 5 years. The epidemic threshold is set at 1.645 standard deviations above the seasonal baseline.

What is already known on this topic?

CDC collects, compiles, and analyzes data on influenza activity year-round in the United States. The influenza season generally begins in the fall and continues through the winter and spring months; however, the timing and severity of circulating influenza viruses can vary by geographic location and season.

What is added by this report?

During September 28–December 6, 2014, influenza activity overall in the United States has been increasing. Influenza A (H3N2) viruses were the most frequently identified viruses. More than half of the influenza A (H3N2) viruses characterized thus far this season have evidence of reduced reactivity to sera produced against the A/Texas/50/2012-like (H3N2) vaccine virus, a component of the 2014–15 Northern Hemisphere trivalent and quadrivalent influenza vaccines. All influenza viruses tested to date have been sensitive to the antiviral drug oseltamivir and zanamivir.

What are the implications for public health practice?

Despite less than optimal match between circulating viruses and the vaccine virus, vaccination remains the most effective method to prevent influenza and its complications. Health care providers should recommend vaccination to all unvaccinated persons aged ≥6 months now and throughout the influenza season. Treatment with influenza antiviral medications can reduce severe outcomes of influenza, when initiated as early as possible, in patients with confirmed or suspected influenza.

Influenza-Associated Pediatric Mortality

As of December 6 (week 49), seven influenza-associated pediatric deaths that occurred in the 2014–15 season were reported to CDC. Four deaths were associated with an influenza A (H3) virus, two deaths were associated with an influenza A virus for which no subtyping was performed, and one death was associated with an influenza B virus. The number of influenza-associated pediatric deaths reported to CDC in the previous three seasons has ranged from 37 during the 2011–12 season to 171 during the 2012–13 season. During the 2009 pandemic, 358 pediatric deaths were reported from April 15, 2009, through October 2, 2010 (traditional influenza seasons include data from October [week 40] through September [week 39] of the following year).

Discussion

As monitored by all CDC influenza surveillance systems, influenza activity in the United States for the 2014–15 season is low but increasing. Although the timing of influenza activity varies from year to year, peak activity in the United States most commonly occurs during January–March, but there

can be substantial influenza activity as early as November and December. From September 28 to December 6, 2014, influenza A (H3N2) viruses were identified most frequently in the United States, but pH1N1 and influenza B viruses also were reported. Antigenic or genetic characterization of influenza-positive respiratory specimens submitted to CDC indicate that over half of the recently examined influenza A (H3N2) viruses show evidence of antigenic drift from the A/Texas/50/2012 (H3N2) virus (the H3N2 component on the 2014–15 Northern Hemisphere influenza vaccine). Even during seasons when the match between the vaccine viruses and circulating viruses is less than optimal and protection against illness might be reduced, vaccination remains the most effective method to prevent influenza and its complications. Health care providers should recommend vaccination to all unvaccinated persons aged ≥6 months now and throughout the influenza season. In 2014, the Advisory Committee on Immunization Practices recommended the preferential use of live attenuated influenza vaccine (LAIV) for healthy children aged 2 through 8 years (*2*). However, if LAIV is not available, inactivated influenza vaccine should be used, and vaccination should not be delayed to procure LAIV (*2*). Children aged 6 months through 8 years who are being vaccinated for the first time require 2 doses of influenza vaccine, administered ≥4 weeks apart (*3*). For children aged 6 months through 8 years who have received influenza vaccination during a previous season, health care providers should consult Advisory Committee on Immunization Practices guidelines to assess whether 1 or 2 doses are required (*2*).

Antiviral medications continue to be an important adjunct to vaccination for reducing the health impact of influenza. On January 21, 2011, Advisory Committee on Immunization Practices recommendations on the use of antiviral agents for treatment and chemoprophylaxis of influenza were released (*4*). This guidance remains in effect for the 2014–15 season, and recommended antiviral medications include oseltamivir (Tamiflu) and zanamivir (Relenza). All influenza viruses tested for the 2014–15 season since October 1 have been susceptible to oseltamivir and zanamivir. Amantadine and rimantadine are not recommended because of high levels of resistance to these drugs among circulating influenza A viruses (*4*). In addition, influenza B viruses are not susceptible to amantadine or rimantadine. Treatment with antivirals is recommended as soon as possible without waiting for confirmatory testing for patients with confirmed or suspected influenza who have severe, complicated, or progressive illness; who require hospitalization; or who are at higher risk for influenza complications[§§§] (*4*). Clinical benefit is greatest when antiviral treatment is administered early. When indicated, antiviral treatment should be started as soon as possible after illness onset, ideally within 48 hours of symptom onset. However, antiviral treatment might still have some benefits in patients with severe, complicated, or progressive illness and in hospitalized patients when started after 48 hours of illness onset. Antiviral treatment also may be considered for previously healthy, symptomatic outpatients who are not considered to be at high risk and have confirmed or suspected influenza, if treatment can be initiated within 48 hours of illness onset. Residents of long-term care facilities can experience severe and fatal illness during influenza outbreaks; residents with confirmed or suspected influenza should be treated with antivirals immediately, without waiting for laboratory confirmation of influenza (*4*). During periods where two or more residents of long-term care facilities are ill within 72 hours with confirmed or suspected influenza, antivirals should be given prophylactically to residents and should be considered for any unvaccinated staff (*4*). Additionally, antiviral chemoprophylaxis can be considered for all staff, regardless of vaccination status, if the outbreak is caused by a strain of influenza virus that is not well matched to the vaccine (*4*).

Influenza surveillance reports for the United States are posted online weekly and are available at http://www.cdc.gov/flu/weekly. Additional information regarding influenza viruses, influenza surveillance, influenza vaccine, influenza antiviral medications, and novel influenza A virus infections in humans is available at http://www.cdc.gov/flu.

[§§§] Persons at higher risk include 1) children aged <2 years; 2) adults aged ≥65 years; 3) persons with chronic pulmonary conditions (including asthma); cardiovascular disease (except hypertension alone); renal, hepatic, hematologic (including sickle cell) disease; metabolic disorders (including diabetes mellitus); or neurologic and neurodevelopmental conditions (including disorders of the brain, spinal cord, peripheral nerve, and muscle, such as cerebral palsy, epilepsy [seizure disorders], stroke, intellectual disability [mental retardation], moderate to severe developmental delay, muscular dystrophy, or spinal cord injury); 4) persons with immunosuppression, including that caused by medications or by human immunodeficiency virus infection; 5) women who are pregnant or postpartum (within 2 weeks after delivery); 6) persons aged ≤18 years who are receiving long-term aspirin therapy; 7) American Indians/Alaska Natives; 8) persons who are morbidly obese (i.e., body mass index ≥40); and 9) residents of nursing homes and other chronic care facilities.

Acknowledgments

State, county, city, and territorial health departments and public health laboratories. US WHO collaborating laboratories. National Respiratory and Enteric Virus Surveillance System laboratories. US Outpatient Influenza-Like Illness Surveillance Network. Influenza Hospitalization Surveillance Network. Influenza-Associated Pediatric Mortality Surveillance System. 122 Cities Mortality Reporting System.

[1]Influenza Division, National Center for Immunization and Respiratory Diseases, CDC (Corresponding author: Melissa Rolfes, mrolfes1@cdc.gov, 404-639-3747)

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Illnesses and Deaths Among Persons Attending an Electronic Dance-Music Festival — New York City, 2013

Alison Ridpath, MD[1,2], Cynthia R. Driver, DrPH[1], Michelle L. Nolan, MPH[1], Adam Karpati, MD[1], Daniel Kass, MSPH[1], Denise Paone, EdD[1], Andrea Jakubowski[1], Robert S. Hoffman, MD[1], Lewis S. Nelson, MD[1], Hillary V. Kunins, MD[1] (Author affiliations at end of text)

Outdoor electronic dance-music festivals (EDMFs) are typically summer events where attendees can dance for hours in hot temperatures. EDMFs have received increased media attention because of their growing popularity and reports of illness among attendees associated with recreational drug use. MDMA (3,4-methylenedioxymethamphetamine) is one of the drugs often used at EDMFs (*1*). MDMA causes euphoria and mental stimulation but also can cause serious adverse effects, including hyperthermia, seizures, hyponatremia, rhabdomyolysis, and multiorgan failure (*2,3*). In this report, MDMA and other synthetic drugs commonly used at dance festivals are referred to as "synthetic club drugs." On September 1, 2013, the New York City (NYC) Department of Health and Mental Hygiene (DOHMH) received reports of two deaths of attendees at an EDMF (festival A) held August 31–September 1 in NYC. DOHMH conducted an investigation to identify and characterize adverse events resulting in emergency department (ED) visits among festival A attendees and to determine what drugs were associated with these adverse events. The investigation identified 22 cases of adverse events; nine cases were severe, including two deaths. Twenty-one (95%) of the 22 patients had used drugs or alcohol. Of 17 patients with toxicology testing, MDMA and other compounds were identified, most frequently methylone, in 11 patients. Public health messages and strategies regarding adverse health events might reduce illnesses and deaths at EDMFs.

Festival A was planned to be held outdoors from 11 a.m. to 11 p.m. over the 3-day Labor Day weekend, with approximately 40,000 attendees each day. Admission was restricted to persons aged ≥18 years. The daily outdoor heat index was 85°F–90°F (29°C–32°C). Alcoholic beverages were sold by concessionaires to persons aged ≥21 years. Ill patrons could seek care onsite at medical tents, from which ambulances transported attendees to local EDs if necessary. As a result of the two deaths, the third day of the festival was canceled by event promoters in consultation with NYC officials.

An adverse event was defined as an ED visit among any festival A attendee ≤12 hours after the event; a severe case was defined as one with seizure, intubation, intensive care unit (ICU) admission, or death. Cases were identified by review of festival A's list of ED transports, ED registration logs for patient aged 16–30 years at nine NYC hospitals with selected key words (i.e., intoxicated, unresponsive, seizure, altered mental status, cardiac or respiratory arrest, or concert or festival attendee), NYC Poison Control Center reports of intoxications, the NYC Office of the Chief Medical Examiner list of deaths, and DOHMH's ED syndromic surveillance system. ED records, hospital charts, medical examiner records, and laboratory results of patients with adverse events were reviewed. Available blood and urine samples from patients were sent to an external laboratory for additional toxicology testing, including testing for synthetic club drugs. Alcohol use was defined as a positive hospital laboratory result, and drug use was defined as a positive hospital or external toxicology result. Among cases without toxicology testing, patients were considered to have used drugs or alcohol if such use was noted in the medical record. Positive toxicology from drugs administered therapeutically was excluded from analysis.

Twenty-two cases were identified, 17 from the festival A ED transport list, three from the NYC Poison Control Center database, and two from NYC ED registration logs. Median age of the 22 patients was 21 years (range = 16–29 years). Fifteen (68%) were residents of New York state, and four were residents of NYC. Four (18%) had body temperature greater than 102°F (38.9°C) (Table 1).

Among the 22 patients, 21 (95%) had used drugs or alcohol. Eleven (50%) had used alcohol with or without other drugs, and 12 (55%) had used synthetic club drugs with or without other drugs or alcohol. Among the nine severe cases, six had used synthetic club drugs only and none had used alcohol only. Biologic specimens were available for additional toxicology testing from 17 patients. MDMA was identified in one decedent, and MDMA plus methylone (a synthetic cathinone) in the other decedent. Four of 17 tested positive for methylone alone; three for methylone and MDMA; one for methylone and methamphetamine; one for methylone, methamphetamine, and cocaine; and two for MDMA alone (Table 2).

In comparison with other EDMFs occurring in NYC during September 2012–September 2014 or a 2010 New Year's Eve EDMF in Los Angeles (*4*), the rates among attendees of hospital admissions and ICU admission or death per 10,000 person days did not differ significantly (Table 3). The death rate associated with festival A in 2013 also was compared with the number of unintentional poisoning deaths from all

TABLE 1. Number (N = 22) and percentage of attendees transported to emergency departments after an electronic dance music festival, by selected characteristics — New York City, 2013

Characteristic	No.	(%)
Sex		
Female	13	(59)
Male	9	(41)
Median age (range) (yrs)	21 (16–29)	
Age group (yrs)		
<18*	2	(9)
18–20	8	(36)
≥21	12	(55)
Residence		
New York state	15	(68)
New York City	4	(18)
Signs and symptoms (no. of persons tested)		
Temperature >102°F (38.9°C)	4	(18)
Tachycardia (heart rate >100 beats/min)	14	(64)
Low sodium (sodium <135 mEq/L)	5 (18)	(23)
Acute kidney injury (creatinine >1.3 mg/dL)	4 (17)	(24)
Muscle breakdown (creatinine kinase >1,000 IU/L)	7 (7)	(100)
Disposition		
Treated and released at the hospital	13	(59)
Admitted to the hospital	5	(23)
Died	2	(9)
Other†	2	(9)
Severe case	9	(41)
Seizure	6	(27)
Intubated	5	(23)
Admitted to intensive care unit	5	(23)
Died	2	(9)

* The festival was restricted to those aged ≥18 years, however two persons were reported as aged <18 years in the medical records.
† One person left before being evaluated by a physician, and one person left against medical advice.

psychoactive substances in a comparable NYC age group during 2012, the most recent year that collated data were available (*5*). Among persons aged 15–34 years, the death rate from all psychoactive substances in NYC was 0.02/100,000 person-days, compared with 2.5/100,000 person-days at festival A in 2013.

Discussion

This investigation identified 22 attendees with adverse events, including two deaths, associated with an EDMF; 95% of the attendees had used drugs or alcohol, and toxicology testing identified MDMA and other compounds, most frequently methylone. Drugs believed to contain MDMA are sold under the street names "ecstasy" and "molly." These illicit substances might contain additional or substituted compounds. According to the Drug Abuse Warning Network, the number of ED visits nationally involving MDMA increased 120% during 2004–2011 (*6*). Although fatal drug overdoses have been reported at EDMFs, no reports regarding the rate of MDMA use at EDMFs are available, although one study reported a 5.4% prevalence of "amphetamines/MDMA" in drug assays among patrons exiting San Francisco clubs with electronic dance music events (*7*).

Limited information exists regarding rates of hospital admissions and deaths at EDMFs to compare with rates from the 2013 festival A. One published investigation was conducted in Los Angeles after the death of an attendee at a New Year's Eve EDMF (*4*). In NYC, adverse health events at music festivals have not been routinely reported to DOHMH. However, during the summer of 2012, two ED physicians reported to DOHMH that multiple persons requiring ICU admission had been transported from an EDMF. As a result, DOHMH initiated surveillance for adverse events at EDMFs, which detected the two deaths at festival A in 2013. EDMF organizers were asked to report to DOHMH every 4 hours the number of medical tent visits and attendees transported to EDs. Hospitals were alerted in advance and reminded to report drug poisoning to the NYC Poison Control Center, and DOHMH syndromic surveillance of EDs was modified to identify visits relating to drug use and overdose.

The death rate associated with festival A in 2013 was found to be much higher than that for unintentional poisoning deaths from all psychoactive substances in a comparable NYC age group during 2012. However, without toxicology comparisons, it cannot be determined whether methylone, a compound chemically similar to MDMA with both stimulant and hallucinogenic properties and similar adverse effects, might have been the cause of the higher than expected mortality (*8*).

DOHMH has developed recommendations to mitigate the risk for adverse events at future EDMFs, including restricting admission to persons aged ≥18 years, employing strategies to reduce excess alcohol consumption, prohibiting the sale of mixed energy-alcohol drinks, providing readily accessible no-cost drinking water, identifying impaired patrons and bringing them to medical attention (e.g., by using roaming teams and visual inspections of attendees at entrances and exits), developing a plan to prevent heat-related illness for summer events, distributing harm-reduction messages in advance of and during events; and implementing a surveillance system to rapidly identify adverse health events including reporting ED transports to DOHMH every 4 hours.

Festival A was held again in 2014 in NYC over the Labor Day weekend. The outdoor heat index was 80°F–90°F, and there were ≤ 25,000 attendees each day. At this year's festival A, promoters with DOHMH consultation instituted and strengthened a number of safety measures, including roaming teams of peer volunteers (one per 500 attendees), stricter entrance procedures (denying admission to ticket holders visibly under the influence of drugs or alcohol), procedures to reduce heat exposure (reduced festival hours), and required viewing of harm reduction messages before entering the festival. The DOHMH

TABLE 2. Number (N = 22) and percentage of attendees transported to emergency departments after an electronic dance music festival, by drug and alcohol use — New York City, 2013

			Severe cases (n = 9)		Nonsevere cases (n = 13)	
Drug and alcohol use	No.	(%)	No.	(%)	No.	(%)
Any drug or alcohol use	21	(95)	9	(100)	12	(92)
Alcohol use with or without other drugs	11	(50)	3	(33)	8	(62)
Alcohol use only	6	(27)	0	(0)	6	(46)
Synthetic club drug use with or without other drugs or alcohol	12	(55)	8	(89)	4	(31)
Synthetic club drug use only	9	(41)	6	(67)	3	(23)
Marijuana use with or without other drugs or alcohol	3	(14)	1	(11)	2	(15)
Cocaine use with or without other drugs or alcohol	1	(5)	1	(11)	0	(0)

TABLE 3. Numbers and rates of hospitalization and intensive care unit (ICU) admission or death among attendees of selected electronic dance music festivals — New York City and Los Angeles, 2010–2014

	Person-days attendance	Transported to ED*	Treated in medical tent*	Total hospitalizations†		ICU admission or death†	
Electronic dance music festival (year)	No.	No.	No.	No.	Rate per 10,000 person-days	No.	Rate per 10,000 person-days
Los Angeles New Year's Eve festival (2010)	45,000	18	NA	3	0.67	1§	0.22
New York City festival A (2012)	106,000	135	1,100	11	1.04	7	0.66
New York City festival A (2013)	80,000	18	964	5	0.63	7	0.88
New York City festival B (2013)	90,000	39	252	4	0.44	4	0.44
New York City festival A (2014)	58,000	10	NA	1	0.17	2	0.34

Abbreviations: ED = emergency department; NA = not available.
* Number of persons transported to ED and treated in medical tent as reported by medical providers.
† p-values were >0.05 for comparison of rates among all festivals.
§ Los Angeles reported the death of one attendee; however, this death did not meet the case definition because death occurred >12 hours after the festival ended.

surveillance system identified 10 cases from festival A this year, including two severe cases and one death. The death was attributed to use of methamphetamine. The death occurred several hours after the event had closed for the day; future mitigation strategies might include enhanced supervision of patrons leaving the venue.

The findings in this report are subject to at least three limitations. First, data regarding adverse events or drug use for attendees not requiring ED transport were unavailable. It is known that a substantial number of persons were treated on-site and that certain persons would likely have been transported to EDs had medical treatment tents not been available. Second, information regarding additional risk factors (e.g., physical exertion, amount and frequency of drug and alcohol use, and intake of caffeine, water, and food) was limited. Third, biologic specimens were not available from all patients for external testing; for these untested patients, drug use was defined on the basis of a medical record report, which might have resulted in misclassification of the exposure. Of six patients not tested for alcohol, two reported alcohol use in the medical record. Of five patients without external toxicology testing, one reported MDMA use in the medical record.

Depending on applicable state and local laws, health departments might have a role in issuing permits, determining medical service requirements, recognizing adverse health

What is already known on this topic?

MDMA (3,4-methylenedioxymethamphetamine), also known as ecstasy or molly, is an amphetamine derivative that has both stimulant and hallucinogenic effects. Although MDMA is an illicit substance, it is used recreationally, including at electronic dance-music festivals, and can cause adverse health events.

What is added by this report?

The New York City Department of Health and Mental Hygiene investigated adverse events resulting in emergency department visits among persons who attended an electronic dance-music festival held August 31–September 1, 2013 in the city. The investigation identified 22 cases of adverse events; nine were severe, including two deaths. Twenty-one of 22 patients had used drugs or alcohol. Of 17 patients with toxicology testing, MDMA and other compounds were identified, most frequently methylone, in 11 patients.

What are the implications for public health practice?

As a result of this investigation, the New York City Department of Health and Mental Hygiene and festival promoters developed multiple interventions including implementing a surveillance system for adverse events and safety measures (e.g. roaming teams of peer volunteers, stricter entrance procedures, procedures to reduce heat exposure, and required viewing of harm reduction messages before entering the festival). These interventions might help prevent adverse health events at future electronic dance-music festivals in New York City and elsewhere.

events, and guiding harm reduction messaging at EDMFs. Further study is needed of risk factors that might modify rates of adverse health events from EDMFs. In addition, study of other mass-gathering events could provide data for comparison with EDMFs.

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[1]New York City Department of Health and Mental Hygiene; [2]Epidemic Intelligence Service, CDC (Corresponding author: Hillary Kunins, hkunins1@health.nyc.gov, 347-396-7012)

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Update: Ebola Virus Disease Epidemic — West Africa, December 2014

Incident Management System Ebola Epidemiology Team, CDC; Guinea Interministerial Committee for Response Against the Ebola Virus; World Health Organization; CDC Guinea Response Team; Liberia Ministry of Health and Social Welfare; CDC Liberia Response Team; Sierra Leone Ministry of Health and Sanitation; CDC Sierra Leone Response Team; Viral Special Pathogens Branch, National Center for Emerging and Zoonotic Infectious Diseases, CDC

On December 16, 2014, this report was posted as an MMWR *Early Release on the* MMWR *website (http://www.cdc.gov/mmwr).*

CDC is assisting ministries of health and working with other organizations to end the ongoing epidemic of Ebola virus disease (Ebola) in West Africa (*1*). The updated data in this report were compiled from situation reports from the Guinea Interministerial Committee for Response Against the Ebola Virus, the World Health Organization, the Liberia Ministry of Health and Social Welfare, and the Sierra Leone Ministry of Health and Sanitation. Total case counts include all suspected, probable, and confirmed cases, which are defined similarly by each country (*2*). These data reflect reported cases, which make up an unknown proportion of all cases, and reporting delays that vary from country to country.

According to the latest World Health Organization update on December 10, 2014 (*3*), a total of 17,908 Ebola cases have been reported as of December 7 from three West African countries (Guinea, Liberia, and Sierra Leone) where transmission is widespread and intense. The highest reported case counts were from Sierra Leone (7,897cases) and Liberia (7,719), followed by Guinea (2,292). Peaks in the number of new cases occurred in Liberia (509 cases), Sierra Leone (748 cases), and Guinea (292 cases) at epidemiologic weeks 38 (September 14–20), 46 (November 9–15), and 41 (October 5–11), respectively (Figures 1 and 2). A total of 6,373 deaths have been reported. Investigation of localized transmission in two locations in Mali (Kourémalé and Bamako) is ongoing, with a current total of eight cases and six deaths reported (*4*). Transmission was interrupted successfully in Nigeria (October 19) and prevented in Senegal (October 17) (*3*).

There were 4,281 new Ebola cases reported during the 4-week period of November 9–December 6, compared with the 2,705 new cases reported during the 3-week period of October 19–November 8 (*5*). Cases were widely distributed geographically among districts in all three countries, with the prefecture of Mamou in Guinea reported to be newly affected. During both periods, counts of reported Ebola cases were highest in the area around Monrovia, including Grand Cape Mount, Liberia; the Western Area and northwest districts of Sierra Leone, particularly Bombali and Port Loko; and Conakry, Guinea (Figure 3).

As of December 6, the highest cumulative incidence rates (>100 cases per 100,000 population) were reported by two prefectures in Guinea (Guéckédou and Macenta), six counties in Liberia (Bong, Grand Cape Mount, Lofa, and, particularly, Bomi, Margibi, and Montserrado, with cumulative incidence of >300 cases per 100,000 population), and six districts in Sierra Leone (Bombali, Kailahun, Kenema, Port Loko, Tonkolili, and Western Area) (Figure 4). Evidence of decreasing incidence in Lofa and Montserrado, Liberia, has been described elsewhere (*6*–*8*), though cases continue to be reported from these counties, especially Montserrado.

The latest updates on the 2014 Ebola epidemic in West Africa, including case counts, are available at http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/index.html. The most up-to-date infection control and clinical guidelines on the 2014 Ebola epidemic in West Africa are available at http://www.cdc.gov/vhf/ebola/hcp/index.html.

Acknowledgments

World Health Organization. Geospatial Research, Analysis, and Services Program, CDC. Situational Awareness Team, Office of Public Health Preparedness and Response, CDC.

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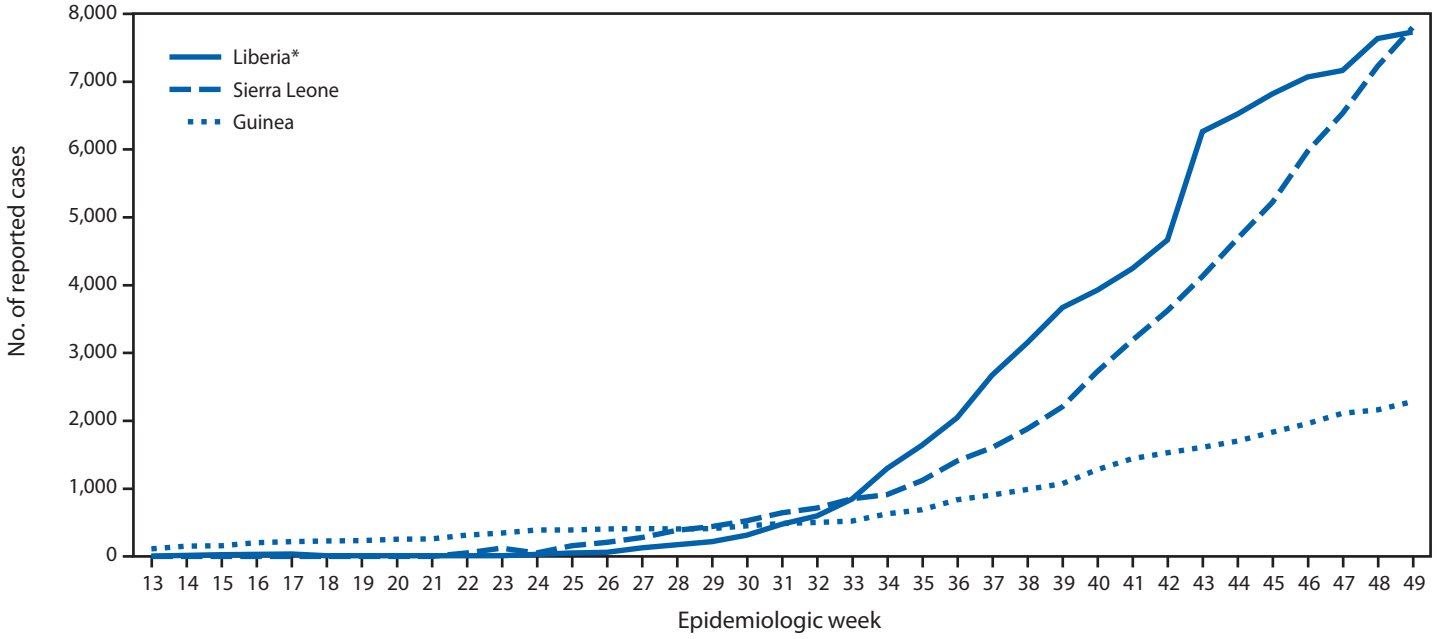
FIGURE 1. Cumulative number of Ebola virus disease cases reported, by epidemiologic week — three countries, West Africa, March 29–November 30, 2014



* A change in reporting source data at week 43 resulted in an adjustment of cumulative cases in Liberia.

FIGURE 2. Number of new Ebola virus disease cases reported, by epidemiologic week — three countries, West Africa, March 29–November 30, 2014

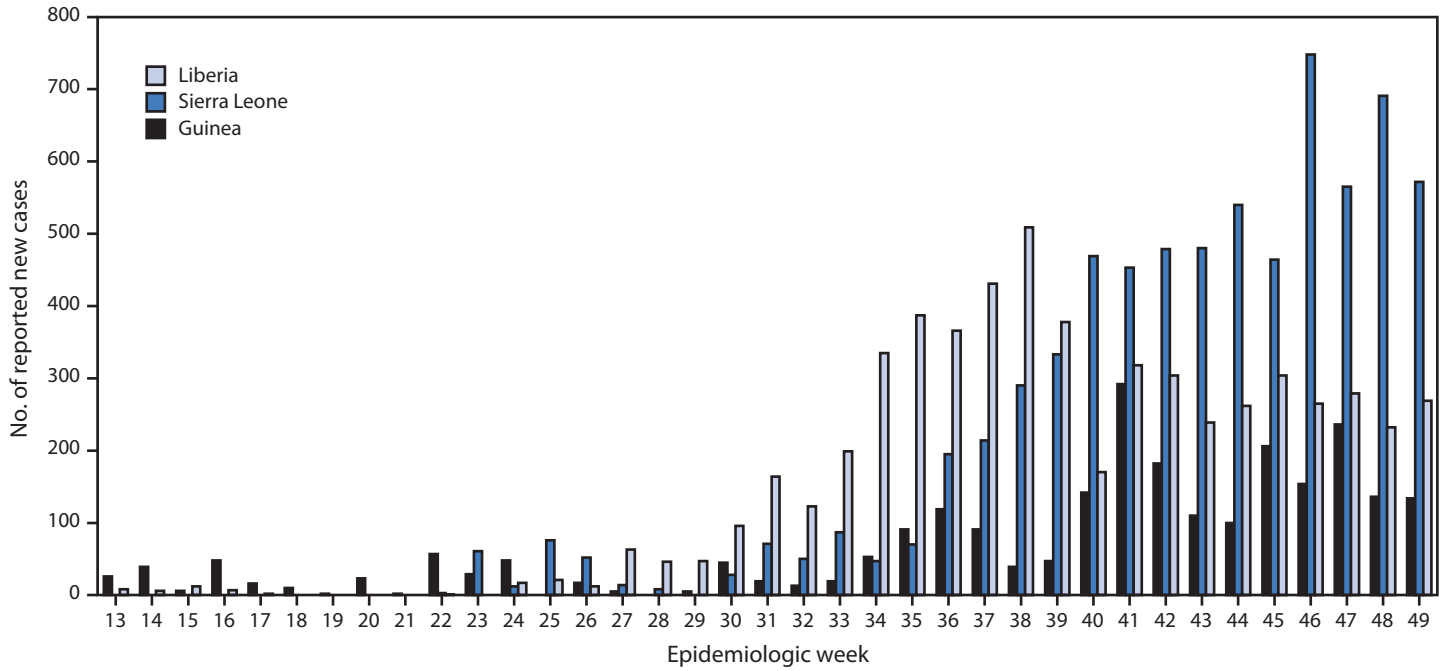


FIGURE 3. Number of new cases of Ebola virus disease reported — Guinea, Liberia, and Sierra Leone, November 9–30, 2014

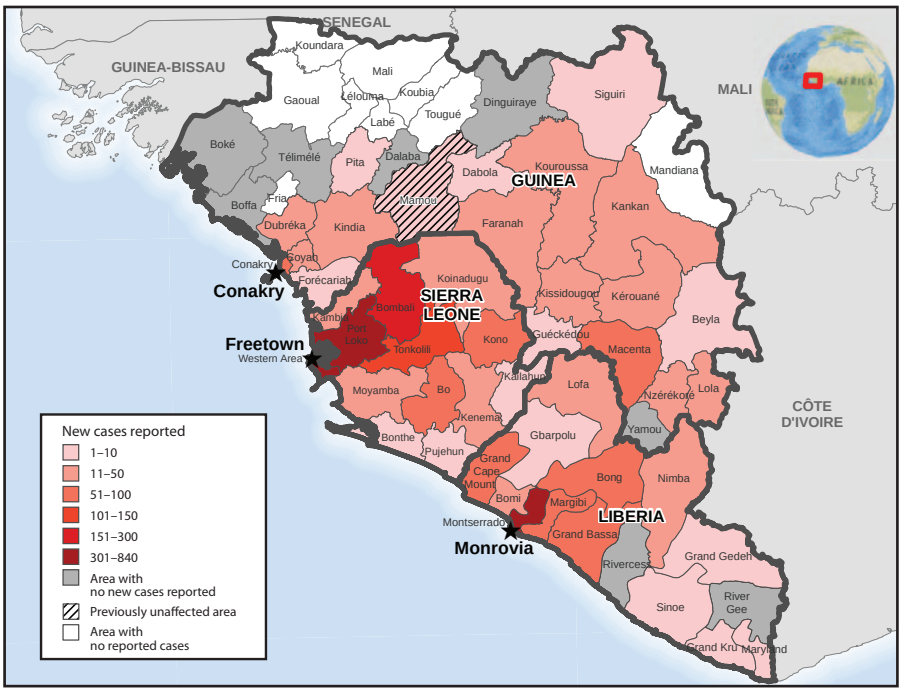
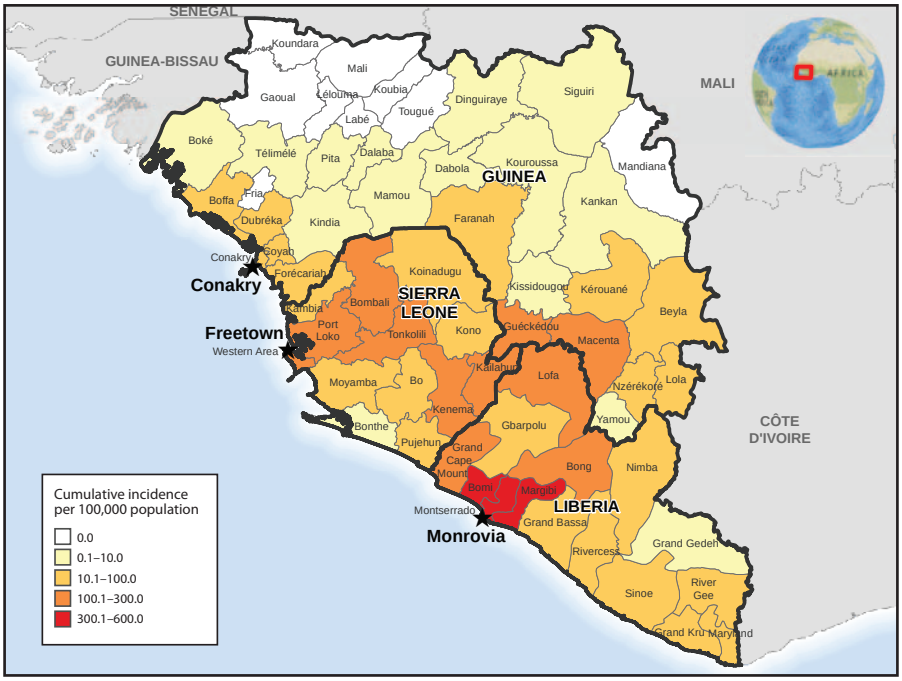


FIGURE 4. Cumulative incidence of Ebola virus disease — Guinea, Liberia, and Sierra Leone, November 30, 2014



Challenges in Responding to the Ebola Epidemic — Four Rural Counties, Liberia, August–November 2014

Aimee Summers, PhD[1,2], Tolbert G. Nyenswah, MPH [3], Joel M. Montgomery, PhD[2,4], John Neatherlin, MPH[2,4], Jordan W. Tappero, MD[2], (Author affiliations at end of text)

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The first cases of Ebola virus disease (Ebola) in West Africa were identified in Guinea on March 22, 2014 (*1,2*). On March 30, the first Liberian case was identified in Foya Town, Lofa County, near the Guinean border (*3*). Because the majority of early cases occurred in Lofa and Montserrado counties, resources were concentrated in these counties during the first several months of the response, and these counties have seen signs of successful disease control (*4,5*). By October 2014, the epidemic had reached all 15 counties of Liberia (*6*). During August 27–September 10, 2014, CDC in collaboration with the Liberian Ministry of Health and Social Welfare assessed county Ebola response plans in four rural counties (Grand Cape Mount, Grand Bassa, Rivercess, and Sinoe [Figure 1]), to identify county-specific challenges in executing their Ebola response plans, and to provide recommendations and training to enhance control efforts. Assessments were conducted through interviews with county health teams and health care providers and visits to health care facilities. At the time of assessment, county health teams reported lacking adequate training in core Ebola response strategies and reported facing many challenges because of poor transportation and communication networks. Development of communication and transportation network strategies for communities with limited access to roads and limited means of communication in addition to adequate training in Ebola response strategies is critical for successful management of Ebola in remote areas.

Inadequate Training and Supplies

At the time of assessment, a total of 25 suspected, 16 probable, and 19 confirmed cases had been reported by the four counties: Grand Cape Mount (two suspected, four probable, and four confirmed), Grand Bassa (21 suspected, 12 probable, and 13 confirmed), Rivercess (one confirmed), Sinoe (two suspected and one confirmed) (*7,8*). Response teams in the four counties reported lacking adequate training in case investigation, contact tracing, infection control (including safe burial practices), and health education. Only Grand Bassa reported having teams trained in case investigation and contact tracing at the time of its first reported case. County health officials in Rivercess, Sinoe, and Grand Cape Mount reported that corpses had been transported by persons without prior training in safe burial practices and health care workers had not received any training in transporting a patient with possible Ebola. Grand Bassa and Grand Cape Mount health officials reported having a functioning ambulance, whereas the other two counties reported no functioning ambulance. Only Grand Bassa health officials reported having an ambulance crew trained in loading and transporting a suspected Ebola patient.

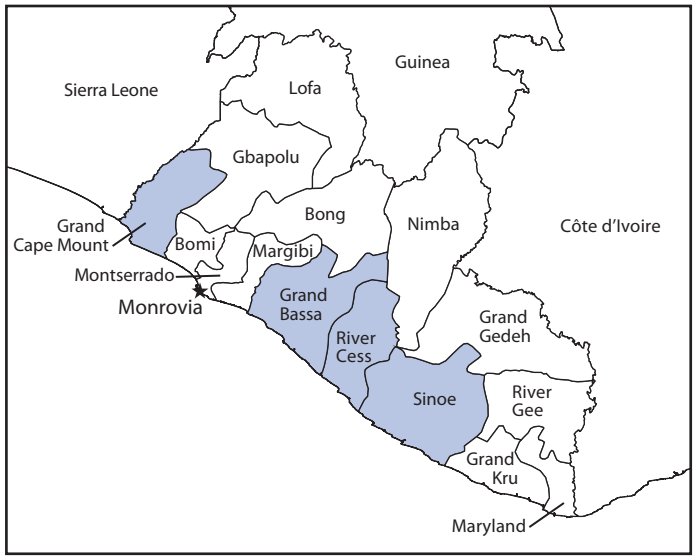
Only one laboratory technician had been trained to safely collect and handle specimens from a possible Ebola patient in Grand Cape Mount and Grand Bassa, whereas Sinoe health officials reported having no laboratory technicians trained in handling Ebola specimens. In all four counties, health care workers had a limited supply of personal protective equipment, but had not received training in its proper use. Essential drugs were reported lacking at rural health clinics for all four counties (Figure 2).

Poor Transportation and Communication Networks

Case investigation teams in Grand Bassa and Sinoe reported walking for up to 8 hours from the nearest road and crossing several rivers to reach communities where cases had been reported and where contact tracing and safe burials had not occurred because there were no trained personnel. During the rainy season (July–December), county health officials in all four counties reported existing roads often were impassable or could only be used by four-wheel drive vehicles, which were rarely available, making it impossible to transport laboratory specimens or patients from these counties to Ebola treatment units located in Monrovia (Figure 3). Many communities in these counties reported a lack of telephone coverage, making it difficult for community leaders to notify county health teams about suspected Ebola patients, to arrange a clinical evaluation, or to receive laboratory test results in a timely manner. Because of poor connectivity, workers in Rivercess County reported driving 6 hours round-trip to the next county to send surveillance reports to the Ministry of Health and Social Welfare over the Internet. County health officials in Sinoe reported a 3-day lag in receiving laboratory test results.

As of November 21, 100 suspected, 114 probable, and 101 confirmed Ebola cases were reported from the four counties: Grand Cape Mount (38 suspected, 26 probable, and 32 confirmed), Grand Bassa (42 suspected, 68 probable,

FIGURE 1. Location of the four rural counties assessed for challenges associated with Ebola epidemic response plans — Liberia, August–November 2014



and 33 confirmed), Rivercess (nine suspected, 17 probable, and 18 confirmed), Sinoe (11 suspected, three probable, and 18 confirmed) (*9*). Although additional training in case investigation, contact tracing, infection control, safe burials, and health education had reportedly occurred in all four counties during late September–November, these counties still reported facing many of the same challenges identified in the August 27–September 10 assessments, and case counts continued to increase.

Continuing Challenges

Continuing challenges as of November, included lack of trained personnel in remote areas and logistic constraints regarding travel and communication. Grand Cape Mount officials reported a continued lack of vehicles to transport patients and an insufficient number of trained contact tracers to manage the growing number of cases. In Grand Bassa, health officials reported an ongoing lack of ambulances and communication between the Ebola treatment units and county health teams regarding patient status and laboratory results. In addition, the capacity to investigate cases in remote areas in Grand Bassa was reportedly insufficient because of limited trained personnel and transportation capabilities. In Sinoe, contact tracing and supervision was reportedly lacking in remote areas, and poor road conditions and vehicle maintenance continued to make transportation challenging for patients and county health teams. Rivercess had incorporated active case finding into its response strategy but difficulties with transportation and communication networks reportedly remained.

The Ebola epidemic in Liberia presents unique challenges not only from its spread into crowded urban environments (*10*)

FIGURE 2. Mostly empty shelves in a clinic lacking essential drugs in Gblorseo Town — Rivercess County, Liberia, September 2014

FIGURE 3. A nearly impassable bridge on the road connecting Sinoe County with Monrovia, the closest location with Ebola treatment units — Liberia, September 2014

but also its occurrence in remote communities. As in urban counties, county and district health teams in rural counties with remote regions need adequate training in 1) case reporting; 2) case investigation; 3) case management; 4) contact tracing; 5) safe burials; 6) safe collection, processing, and transport of blood specimens for testing; and 7) development of a county-level incident management system. However, in rural counties, few roads, poor road conditions, and an overall lack of vehicles, vehicle maintenance, Internet connectivity, and limited telephone network coverage impedes epidemic control. Development of innovative communication and transportation network strategies for communities with limited access to roads and limited means of communication is critical for successful

management of Ebola in remote areas. These strategies are needed to ensure essential supplies such as personal protective equipment, chlorine/disinfectants, body bags, and sprayers can reach county health teams and suspected, probable, and confirmed Ebola patients can be transported and isolated in Ebola treatment units as soon as they are identified (*10*).

[1]Epidemic Intelligence Service, [2]Division of Global Health Protection, Center for Global Health, CDC, [3]Liberian Ministry of Health and Social Welfare, [4]CDC Kenya, Center for Global Health, CDC (Corresponding authors: Aimee Summers, asummers1@cdc.gov, 770-488-3619; Tolbert G. Nyenswah, tgnyenswah74@yahoo.com, +231 88 655 8612)

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Support Services for Survivors of Ebola Virus Disease — Sierra Leone, 2014

Seung Hee Lee-Kwan, PhD[1,2], Nickolas DeLuca, PhD[3], Monica Adams, PhD[1], Matthew Dalling, MSc[4], Elizabeth Drevlow, MA[5], Gladys Gassama[6], Tina Davies[7] (Author affiliations at end of text)

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As of December 6, 2014, Sierra Leone reported 6,317 laboratory-confirmed cases of Ebola virus disease (Ebola), the highest number of reported cases in the current West Africa epidemic (*1*). The Sierra Leone Ministry of Health and Sanitation reported that as of December 6, 2014, there were 1,181 persons who had survived and were discharged (*2*). Survivors from previous Ebola outbreaks have reported major barriers to resuming normal lives after release from treatment, such as emotional distress, health issues, loss of possessions, and difficulty regaining their livelihoods (*3,4*). In August 2014, a knowledge, attitude, and practice survey regarding the Ebola outbreak in Sierra Leone, administered by a consortium of partners that included the Ministry of Health and Sanitation, UNICEF, CDC, and a local nongovernmental organization, Focus 1000, found that 96% of the general population respondents reported some discriminatory attitude towards persons with suspected or known Ebola (*5*). Access to increased psychosocial support, provision of goods, and family and community reunification programs might reduce these barriers (*3,6*). Survivors also have unique potential to contribute to the Ebola response, particularly because survivors might have some immunity to the same virus strain (*7*). In previous outbreaks, survivors served as burial team members, contact tracers, and community educators promoting messages that seeking treatment improves the chances for survival and that persons who survived Ebola can help their communities (*4*). As caregivers in Ebola treatment units, survivors have encouraged patients to stay hydrated and eat and inspired them to believe that they, too, can survive (*4,8*). Survivors regaining livelihood through participation in the response might offset the stigma associated with Ebola (*9*).

The Sierra Leone Ebola Emergency Operations Psychosocial Consortium, which consists of members of the Sierra Leone government, nongovernmental organizations, and donor agencies, assessed survivors' health, psychosocial, and financial needs, and their interest in supporting the Ebola response. In October 2014, the consortium assessed survivor needs in three districts (Bo, Kenema, and Bombali). Methods included 1) convening a National Survivor Conference in the Kenema District, where they conducted five focus groups with 36 survivors, 2) conducting in-depth interviews with 12 survivors, 3) conducting five additional district-specific focus groups with a total of 51 survivors, and 4) observing six survivor wellness center counseling sessions. The focus group discussions and in-depth interviews included assessing experiences as a survivor, support needed, support received when discharged from a medical facility, what they would tell other survivors of Ebola, what makes survivors feel special about having survived Ebola, and specific jobs or tasks survivors could perform. Data from summary findings from each of the 10 focus groups, 12 in-depth interviews, and six direct observation field notes were reviewed and coded to identify emerging themes.

Common themes that emerged were immediate and long-term concerns about physical and mental health, stigma, psychosocial issues, reintegration needs, and financial needs. Survivors reported health problems; the most common symptoms reported were blurred or partial loss of vision, dizziness, headache, sleeplessness, and myalgia. Survivors who reported physical health issues after recovery expressed interest in receiving medical attention specific to reported post-Ebola health issues. Survivors also raised concerns regarding psychosocial issues (e.g., stigma and shame that prevents reintegration into their community, as well as survivor guilt) and financial burden. Many Ebola survivors had most of their belongings burnt or taken away as part of infection control, including their clothing and household goods. Many reported being shunned by the community and had difficulty accessing shops to purchase replacement goods. Survivors emphasized the critical need for comprehensive discharge counseling and the provision of a packet of materials, including clothing and cash for transportation, as well as facilitation of reentry into the community by professional psychosocial support counselors.

Survivors showed great interest in contributing to the Ebola response through activities like sharing their stories directly with their community, with Ebola patients currently receiving care, or with a larger audience through radio and other broadcast media. They also expressed interest in participating in Ebola care and treatment support and direct care, and providing moral support to other Ebola patients to give them hope. Many indicated that supporting themselves with this work would help restore their own dignity.

Upon completion of the assessment, findings were shared with select district-level Emergency Operations Center staff and partners involved in the response to improve and coordinate the survivor services. To address commonly reported sequelae of Ebola, the nongovernmental organization Sight Savers

(http://www.sightsavers.org) is piloting the provision of free eye examinations and treatment for survivors with vision problems in select districts. The services will be rolled out nationally in the coming months. The Sierra Leone Ebola Emergency Operations Psychosocial Consortium also is coordinating partners and districts to improve the initial and ongoing psychosocial support for survivors. A counselor-client flipbook that contains a series of pictures with information to help change health behaviors is in development and will serve as an aid for counselors to ensure consistent and comprehensive discharge planning and counseling for all survivors throughout Sierra Leone. Likewise, a comprehensive survivor packet has been designed to ensure the consistent provision of resources to survivors upon discharge. The packet includes a mattress, bed sheets, a blanket, a towel, a pillow, a water bucket, a cell phone, utensils, a cooking pot, laundry soap, bar soap, a toothbrush and toothpaste, a mosquito net, a set of clean clothes and under garments, plastic sandals, food, cash, condoms, and multivitamins.

To assist with survivor reintegration in the community, the consortium recommends that counselors accompany survivors when returning to their home village after discharge to facilitate reunification and reintegration of survivors into their communities. The reintegration process also includes trained counselors speaking with local traditional authorities and other community members about the survivor's status, the importance of survivor acceptance, and ways the community can support the survivor. In addition, stigma mitigation educational materials targeting the community have been developed and implemented, including 1) various media channels highlighting survivor stories and testimonials, 2) training of district nongovernmental organizations to address stigma, and 3) training of trainers of psychosocial support counselors to use interpersonal communication materials during community engagement activities.

Finally, national and local health officials have started considering the roles Ebola survivors can serve as part of Ebola outbreak response. The Sierra Leone Ebola Emergency Operations Psychosocial Consortium is coordinating the distribution of comprehensive discharge counseling, reintegration services, and packet distribution and establishing survivor support centers and services at the district level. Further monitoring and guidance from international partners regarding best practices will inform next steps for supporting Ebola survivors, potentially integrating them further into response activities.

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[1]Epidemic Intelligence Service, CDC; [2]Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion, CDC; [3] Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC; [4]UNICEF, Sierra Leone; [5]GOAL, Sierra Leone; [6]Kenema Government Hospital, Kenema, Sierra Leone; [7]Sierra Leone Ministry of Social Welfare, Gender, and Children's Affairs (Corresponding author: Seung Hee Lee-Kwan, sleekwan@cdc.gov, 770-488-6020)

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Reintegration of Ebola Survivors into Their Communities — Firestone District, Liberia, 2014

M. Allison Arwady, MD[1], Edmundo L. Garcia[2], Benedict Wollor, MD[2], Lyndon G. Mabande, MD[2], Erik J. Reaves, DO[1], Joel M. Montgomery, PhD[3]
(Author affiliations at end of text)

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The current Ebola virus disease (Ebola) epidemic in West Africa is unprecedented in size and duration (*1*). Since the outbreak was recognized in March 2014, the World Health Organization (WHO) has reported 17,145 cases with 6,070 deaths, primarily in Guinea, Liberia, and Sierra Leone (*2*). Combined data show a case-fatality rate of approximately 70% in patients with a recorded outcome (*3*); a 30% survival rate means that thousands of patients have survived Ebola. An important component of a comprehensive Ebola response is the reintegration of Ebola survivors into their communities.

Firestone Liberia, Inc. (Firestone) is a large rubber plantation operator in the Firestone District of central Liberia that serves the health needs of approximately 80,000 persons, including employees, their dependents, and retirees, as well as other persons in the district. Firestone District is made up of many small communities, some associated with specified work areas. In April 2014, following the first Ebola case diagnosed in the district, the company established a comprehensive Ebola response, including the management of patients in a dedicated Ebola treatment unit (ETU) (*4*). Contacts who had a high-risk exposure, such as sharing a household with a confirmed Ebola patient, were encouraged to enter voluntary quarantine in dedicated facilities (converted schools) for 21 days. Firestone offered this voluntary quarantine to nonemployees as well as employees. Persons in voluntary quarantine were closely monitored and at the first sign of symptoms were transferred to the ETU for testing and care. To prepare communities for the return of Ebola survivors and minimize potential stigmatization, Firestone established a survivor reintegration program.

Survivors of past Ebola epidemics have reported substantial negative psychosocial impacts. In one study, 35% of survivors reported feeling rejected by society, including by family, friends, and neighbors (*5*). Survivors often face stigma, income loss, and grief, particularly if friends and family members have died; in addition, many of their possessions have been destroyed to prevent disease transmission (*6*). Some family members concerned about infection have been reluctant to accept orphaned children (*7*). However, survivors also have long-lasting antibodies to the circulating Ebola virus strain that could confer immunity to subsequent infection with the same strain (*8*). Survivors might be able to provide care to infected persons, although they should follow infection control protocols, including use of appropriate personal protective equipment that is recommended for all persons providing care to Ebola patients. Some survivors have donated plasma to other Ebola patients, although the benefit of passive immunotherapy is, as yet, unproven (*9*). Survivors also can play important roles in educating communities about Ebola, particularly in areas with high infection rates, where fear might prevent ill persons from seeking medical care. They can offer hope that survival is possible if medical care is obtained during the early stages of infection (*10*).

Epidemiologic Characteristics of Survivors

During August 1–November 1, 2014, 33 Ebola patients (30 laboratory-confirmed using a real-time reverse transcription–polymerase chain reaction assay at the Liberian Institute of Biomedical Research) died in the Firestone ETU. But during the same period, 22 survivors who had laboratory-confirmed Ebola were discharged from the ETU after symptom resolution and negative follow-up Ebola testing, yielding a survival rate of 42%. In the ETU, 5 days after all of a laboratory-confirmed Ebola patient's symptoms had resolved, blood was retested, using the same procedure as before. If the repeat sample was negative, the survivor was transferred to a recovery room in the ETU and remained there for 3 more days before ETU discharge. This period was used to educate and counsel the survivor and to make preparations with the survivor's community for a return home.

Thirteen (60%) of the 22 Ebola survivors were Firestone employees or dependents, six were retiree dependents, and three had no connection to Firestone. The mean age of survivors was 23 years (range = 8 months–54 years), and they were significantly younger ($p = 0.003$, by Student's t-test) than nonsurvivors, whose mean age was 38 years (range = 4 years–81 years). Six (27%) survivors were children aged <13 years, six (27%) were teens aged 13–17 years, and the remaining 10 were adults aged ≥21 years. Twelve (55%) were female. Ten survivors had at least one other family member who also was a survivor (two families had three survivors; two had two survivors). Before reintegration, the 22 survivors had been in isolation

and treatment at the Firestone ETU for a mean of 16 days (range = 9–23 days).

Fourteen (64%) of the 22 survivors were being followed as contacts of known patients with Ebola when they became ill, and 12 (86%) of these had been in voluntary quarantine for a mean of 7 days (range = 1–13 days) before symptom onset. As of November 1, a total of 250 contacts from 63 families had entered voluntary quarantine, 167 (67%) of whom were Firestone employees or dependents.

Survivor Reintegration Process

Plans for reintegration into the community begin before the survivor leaves the ETU, with a goal of helping the family and home community accept the survivor's return. For 1 or 2 days before a survivor is released from the ETU, Firestone's reintegration team travels to the survivor's home and meets with neighbors and community leaders to discuss the plan to bring the survivor home. At this meeting, the team educates the community about Ebola transmission, emphasizing that survivors are no longer ill and have been declared free from Ebola. The team encourages and answers questions and addresses community concerns to help ensure that survivors are welcomed and not stigmatized. If the survivor is a child, the team also ensures that appropriate guardians have been identified and that the child will be able to continue attending school. The team and community then plan a program to receive the survivor back into the community.

On the day of reintegration, Firestone's medical director, the ETU coordinator, and other medical staff members bring the survivor to the community, accompanied by the reintegration team, radio station personnel, and clergy (Figure 1). If the survivor is a Firestone employee or an employee's dependent, work supervisors and teammates also attend. Representatives from the Ministry of Health and Social Welfare are also invited, and community members decorate the survivor's home with traditional palm leaves to signify the festive occasion.

The formal program begins with prayers and a praise and worship session, led by the community and clergy members. A local community leader makes opening remarks and officially welcomes the survivor home. The Firestone Health Services medical director speaks about the survivor's recovery and about the importance of seeking immediate medical attention when one gets sick. Representatives from the county health team and the Ministry of Health and Social Welfare emphasize ongoing education and response efforts. The tone throughout the event is celebratory; holding a separate pre-integration meeting in the preceding days ensures that community concerns and questions have been addressed before the survivor's arrival.

FIGURE 1. Ebola survivor, accompanied by medical director, being welcomed by her community — Firestone District, Liberia, 2014

The survivor is given an opportunity to speak, and many adults choose to describe their recent care in the ETU. These first-hand survivor accounts have been powerful tools to help dispel misconceptions and fears about what happens in an ETU. The program is broadcast live on the radio and replayed several times after the occasion. In some cases, messages from survivors have been reused in radio programs devoted to Ebola education and awareness.

The medical director presents the survivor with a laminated Certificate of Medical Clearance, declaring that the individual is free from Ebola (Figure 2). The back of the certificate includes reminders for survivors, advising temporary abstinence from sex and covering ways the survivor might use recovery to benefit others (e.g., "do not donate blood until you feel strong and are advised by your doctor," and "help educate others about Ebola and share your experiences freely"). Each survivor also receives a solidarity kit, which includes a new mattress, bedding, towels, an insecticide-treated mosquito net, soaps and toiletries, a 50-kg bag of rice, 3 gallons (11 liters) of cooking oil, toys for children, clothing, and cash for food and personal necessities (Figure 3).

After the reintegration ceremony, the physician-led Firestone medical team visits all survivors at home every week for 3 months, both for a clinical checkup and to provide social and psychological support. One month after ETU discharge, blood is drawn for a follow-up blood chemistry analysis.

No major reintegration problems have occurred to date; one survivor (the wife of a Firestone employee) who had not been a full-time resident in Firestone District before her illness reported some initial social exclusion but gained acceptance

FIGURE 2. Ebola survivors, three orphans and their uncle, receiving Certificate of Medical Clearance as part of the Firestone Ebola Survivor Reintegration Program — Firestone District, Liberia, 2014

FIGURE 3. Truck transporting solidarity kits containing essential supplies for Ebola survivors returning home — Firestone District, Liberia, 2014

over time. None of the other survivors, including those who were not Firestone employees or dependents, reported major problems reintegrating into their communities. All who were employed have returned to work, all orphans continue to live with their designated guardians, and arrangements have been made to ensure that all children are able to resume schooling once schools reopen (all schools remain closed by government decree because of the ongoing epidemic). There have been no housing issues, attacks on survivors, or other episodes of community unrest. The reintegration ceremonies continue to be well-attended by dozens of community members, and the two-stage meeting approach by the reintegration team has ensured celebratory rather than confrontational events.

Although official reintegration programs do not allow for anonymity and can raise questions of survivor privacy, in the small communities in the Firestone District a person's status as an Ebola patient is already widely known. Formal reintegration programs legitimize family and community member concerns regarding Ebola transmission risks, offer opportunities for continued education, and provide an important first step in the necessary psychosocial support for survivors. When these programs are made public, they can help dispel rumors, provide hope, and encourage community members to report suspected Ebola cases or seek care early, which can, in turn, decrease transmission and increase survival among those with infection.

[1]Epidemic Intelligence Service, CDC; [2]Firestone Liberia, Inc.; [3]Division of Global Health Protection-Kenya, CDC (Corresponding author: M. Allison Arwady, xdr3@cdc.gov)

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Notes from the Field

Fatal Rat-Bite Fever in a Child — San Diego County, California, 2013

Jessica K. Adam, MD[1,2,3], Aiden K. Varan, MPH[2,3,4], Alice L. Pong, MD[5,6], Eric C. McDonald, MD[2] (Author affiliations at end of text)

In August 2013, the County of San Diego Health and Human Services Agency was notified of a fatal case of rat-bite fever (RBF) in a previously healthy male, aged 10 years, who owned pet rats. Two days before his death, the patient experienced rigors, fevers, vomiting, headaches, and leg pains. His physician noted a fever of 102.6°F (39.2°C), documented a normal examination, diagnosed viral gastroenteritis, and prescribed anti-nausea medication. During the next 24 hours, the patient experienced vomiting and persistent fever. He was confused and weak before collapsing at home. Paramedics reported the patient was unresponsive and had dilated pupils; resuscitation was initiated in the field and was continued for >1 hour after arrival at the emergency department but was unsuccessful. A complete blood count performed during resuscitation revealed anemia (hemoglobin 10.0 g/dL [normal = 13.5–18.0 g/dL], thrombocytopenia (platelets 40,000/μL [normal = 140,000–440,000/μL]), leukocytosis (white blood cells 17,900 cells/μL [normal = 4,000–10,500/μL]) with 16% band neutrophils; the patient also had evidence of disseminated intravascular coagulation. No rash or skin breakdown was noted. Lung, liver, and epiglottis tissue collected postmortem was positive for *Streptobacillus moniliformis* DNA by polymerase chain reaction.

During the 10 days before his death, the patient had obtained his second pet rat; *S. moniliformis* was detected by polymerase chain reaction in oropharyngeal tissue from this rat. Oropharyngeal swabs of the first pet rat were negative for *S. moniliformis* by polymerase chain reaction. The autopsy report noted that patient had been scratched by his pet rats.

RBF is a systemic illness of humans caused principally by *S. moniliformis*, a gram-negative bacterium that is commensal among rats (*1*). The organism can be transmitted to humans through rodent bites or scratches; approximately one in 10 bites might cause infection (*2*). Infection can also occur after handling infected rodents without a bite or scratch, or through ingestion of food or water contaminated with the bacteria (*1*). Symptoms include fever, rash, vomiting, and muscle or joint pain. RBF is treatable with antibiotics (*3*); approximately 13% of untreated RBF illnesses are fatal (*2*).

Nearly all domestic and wild rats carry *S. moniliformis* (*2*). An estimated 0.1% of U.S. households owned one or more pet rats during 2011 (Sharon Granskog, American Veterinary Medical Association, personal communication, April 25, 2014).

RBF is not a reportable condition in California or nationally. To estimate RBF incidence in San Diego County, hospitals in San Diego County that discharged any patients during 2000–2012 with *International Classification of Diseases, Ninth Revision* codes 026.0–026.1 (for streptobacillary fever and spirillary fever) were identified based on data from the California Office of Statewide Health Planning and Development. Medical records were requested, and 16 cases were identified. One additional RBF case was reported to the County of San Diego Health and Human Services Agency during 2013 as an occurrence of unusual disease.

Among the 17 cases, the median patient age was 10 years (range = 4–67 years); 59% of patients were female, and 65% were healthy before infection. Most infections (94%) were pet-associated; one patient had an occupational exposure (rat breeder). Sixteen of 17 patients reported exposure to rats. Of these, 44% reported only having handled a rat, 38% reported being bitten, and 13% reported a scratch. All patients had blood drawn for cultures; only 29% tested positive for *S. moniliformis*; the remainder were treated presumptively for RBF on the basis of exposure and clinical presentation. All patients survived except the patient described in this report.

RBF is a rare but potentially fatal illness that should be considered in persons with rash, fever, and joint pain and when a history of rodent exposure is reported. Clinicians suspecting *S. moniliformis* infection should promptly alert laboratory staff because microbiologic diagnosis is difficult, requiring specific media and incubation conditions. Clinicians should also consider requesting diagnosis assistance from their state public health laboratories. Because rapid laboratory confirmation might not be possible, empiric treatment for RBF in the setting of appropriate exposure history might be considered.

Pet rat owners should wear gloves and wash their hands thoroughly after handling rats or cleaning rat cages, avoid rat secretions, and promptly seek medical care if they have RBF symptoms (*4*) after contact with rats.

Acknowledgments

Infectious Diseases Pathology Branch, Division of High-Consequence Pathogens and Pathology, National Center for Emerging and Zoonotic Infectious Diseases, CDC. County of San Diego Medical Examiner's Office.

Notes from the Field

[1]Epidemic Intelligence Service, CDC; [2]County of San Diego Health and Human Services Agency, San Diego, California; [3]Division of Global Migration and Quarantine, National Center for Emerging and Zoonotic Infectious Diseases, CDC; [4]CDC and Council of State and Territorial Epidemiologists Applied Epidemiology Fellowship; [5]Rady Children's Hospital, San Diego, California; [6]Division of Pediatric Infectious Diseases, University of California San Diego, San Diego, California (Corresponding author: Jessica K. Adam, xdc5@cdc.gov, 619-692-5571)

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Measles Transmission at a Domestic Terminal Gate in an International Airport — United States, January 2014

Jared S. Vega, JD[1], Miguel Escobedo, MD[1], Cynthia R. Schulte[2], Jennifer B. Rosen, MD[3], Stephanie Schauer, PhD[4], Rachel Wiseman, MPH[5], Susan A. Lippold, MD[1], Joanna J. Regan, MD[1]
(Author affiliations at the end of text)

In March 2014, CDC identified a possible cluster of four laboratory-confirmed measles cases among passengers transiting a domestic terminal in a U.S. international airport. Through epidemiologic assessments conducted by multiple health departments and investigation of flight itineraries by CDC, all four patients were linked to the same terminal gate during a 4-hour period on January 17, 2014. Patient 1, an unvaccinated man aged 21 years with rash onset February 1, traveled on two domestic flights on January 17 and 18 that connected at the international airport. Patient 2, an unvaccinated man aged 49 years with rash onset February 1, traveled from the airport on January 17. Patient 3, an unvaccinated man aged 19 years with rash onset January 30, traveled domestically with at least a 4-hour layover at the airport on January 17. Patient 4, an unvaccinated man aged 63 years with rash onset February 5, traveled on a flight to the airport on January 17.

Patients 1 and 2 traveled on the same flight from the airport and were seated one row apart; both spent time at the departure gate before the flight. Patient 3, whose flight departed after the flight of patients 1 and 2, also reported spending time at this gate area during the time that patients 1 and 2 were present. Patient 4 passed through the same domestic gate around the time the other three patients were waiting to depart.

For cases in three of the patients genotyping was performed and identified the measles strain as B3, the predominant strain circulating in the Philippines and in the United States in early 2014 (*1*). Based on the available information, it is likely that transmission occurred in the airport at the domestic gate. The source case of this presumed cluster was not identified, and no other cases were identified beyond this cluster of four cases.

Measles transmission has occurred in airports, an environment in which travelers from measles-endemic areas or areas where outbreaks are occurring are likely to be present (*2,3*). The exposures in this report were not prolonged and occurred in a domestic rather than an international terminal, highlighting the fact that measles is highly contagious and that measles continues to pose a risk for infection among unvaccinated persons in the United States. Ensuring that all susceptible travelers are vaccinated against measles is an important way to decrease the spread and importation of measles in the United States (*1*). Airports and other travel venues should be considered as potential exposure settings when investigating cases.

Acknowledgment

California Department of Public Health Immunization Branch.

[1]Division of Global Migration and Quarantine, National Center for Emerging and Zoonotic Infectious Diseases, CDC; [2]New York State Department of Health; [3]New York City Department of Health and Mental Hygiene; [4]Wisconsin Department of Health Services; [5]Texas Department of State Health Services (Corresponding author: Jared S. Vega, jvega@cdc.gov, 310-215-2365)

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Errata

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In the report, "State Laws Prohibiting Sales to Minors and Indoor Use of Electronic Nicotine Delivery Systems — United States, November 2014," on page 1149, in Figure 2, "States with and without laws prohibiting smoking and use of electronic nicotine delivery systems (ENDS) in indoor areas of private worksites, restaurants, and bars — United States, November 30, 2014," DC was incorrectly shaded. DC should have been shaded to indicate "**Prohibits indoor smoking only**."

In the report, "Airport Exit and Entry Screening for Ebola — August–November 10, 2014," on page 1165, in the Figure "Number of travelers (N = 1,986*) arriving from Guinea, Liberia, and Sierra Leone who were screened for Ebola at U.S. airports, by state and county of destination — October 11–November 10, 2014," for Minnesota, the numeral **82** should have been included in the outline for the number of travelers to that state.

In the report, "Clinical Inquiries Regarding Ebola Virus Disease Received by CDC — United States, July 9–November 15, 2014," errors occurred in the list of authors and their affiliations. Those should read as follows:

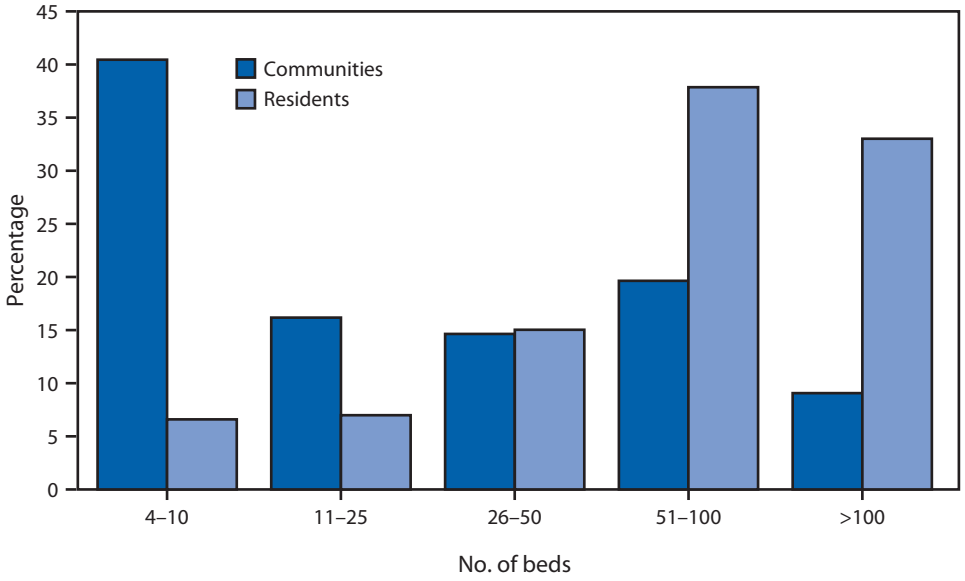
Mateusz P. Karwowski, MD[1,2,3], Elissa Meites, MD[2,4], Kathleen E. Fullerton, MPH[2,5], Ute Ströher, PhD[2,6], Luis Lowe, MS, MPH[2,7], Mark Rayfield, PhD[2,8], Dianna M. Blau, DVM, PhD[2,6], Barbara Knust, DVM[2,6], Jacqueline Gindler, MD[2,9], Chris Van Beneden, MD[2,10], Stephanie R. Bialek, MD[2,11], Paul Mead, MD[2,12], **Alexandra M. Oster, MD[2,13]** (Author affiliations at end of text)

[1]Epidemic Intelligence Service, CDC; [2]Epidemiology/Laboratory Task Force, 2014 Ebola Response Team, CDC; [3]Division of Environmental Hazards and Health Effects, National Center for Environmental Health, CDC; [4]Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC; [5]Division of Health Informatics and Surveillance, Center for Surveillance, Epidemiology, and Laboratory Services, CDC; [6]Division of High-Consequence Pathogens and Pathology, National Center for Emerging and Zoonotic Infectious Diseases, CDC; [7]Division of Preparedness and Emerging Infections, National Center for Emerging and Zoonotic Infectious Diseases, CDC; [8]Division of Global Disease Detection and Emergency Response, Center for Global Health, CDC; [9]Global Immunization Division, Center for Global Health, CDC; [10]Division of Bacterial Diseases, National Center for Immunization and Respiratory Diseases, CDC; [11]Division of Viral Diseases, National Center for Immunization and Respiratory Diseases, CDC; [12]Division of Vector-Borne Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC; **[13]Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC** (Corresponding author: Mateusz (Matt) P. Karwowski, ydh4@cdc.gov, 770-488-4397)

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage Distribution of Residential Care Communities* and Residents,† by Number of Beds§ — National Study of Long-Term Care Providers, United States, 2012



* Assisted living and similar communities (e.g., personal care homes, adult care homes, board and care homes, and adult foster care). Residential care communities with missing data were excluded.
† Participating administrators and directors of residential care communities were asked, "What is the total number of residents currently living at this residential care community? Include respite care residents."
§ Participating administrators and directors of residential care communities were asked, "At this residential care community, what is the number of licensed, registered, or certified residential care beds? Include both occupied and unoccupied beds."

In 2012, there were 22,200 residential care communities serving 713,300 residents across the United States. Forty percent of residential care communities were smaller with 4–10 beds, but these communities housed only 7% of all residents. The largest residential care communities with more than 100 beds were only 9% of all communities but housed 33% of all residents.

Source: Caffrey C, Harris-Kojetin L, Rome V, Sengupta M. Operating characteristics of residential care communities, by community bed size: United States, 2012. NCHS data brief, no 170. Hyattsville, MD: National Center for Health Statistics; 2014. Available at http://www.cdc.gov/nchs/data/databriefs/db170.htm.

Reported by: Vincent Rome, MPH, vrome@cdc.gov, 301-458-4466; Christine Caffrey, PhD; Lauren Harris-Kojetin, PhD.

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