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Nationwide Rubella Epidemic — Japan, 2013

Rubella usually is a mild, febrile rash illness in children and adults; however, infection early in pregnancy, particularly during the first 16 weeks, can result in miscarriage, stillbirth, or an infant born with birth defects (i.e., congenital rubella syndrome [CRS]) (*1*). As of 2013, goals to eliminate rubella have been established in two World Health Organization regions (the Region of the Americas by 2010 and the European Region by 2015), and targets for accelerated rubella control and CRS prevention have been established by the Western Pacific Region (WPR) (*2*). In 1976, Japan introduced single-antigen rubella vaccine in its national immunization program, targeting girls in junior high school. In 1989, a measles-mumps-rubella (MMR) vaccine was introduced, targeting children aged 12–72 months. However, adult males remain susceptible to rubella. From January 1 to May 1, 2013, a total of 5,442 rubella cases were reported through the rubella surveillance system in Japan, with the majority (77%) of cases occurring among adult males. Ten infants with CRS were reported during October 2012–May 1, 2013. Countries and regions establishing a goal of accelerated control or elimination of rubella should review their previous and current immunization policies and strategies to identify and vaccinate susceptible persons and to ensure high population immunity in all cohorts, both male and female.

During 1999–2007, rubella surveillance in Japan consisted of aggregate case reporting to the pediatric sentinel surveillance system. Cases were reported from a representative sample of approximately 3,000 pediatric inpatient and outpatient medical facilities. In January 2008, the sentinel surveillance systems were replaced by nationwide case-based surveillance for rubella, and all physicians were required to report any clinically diagnosed or laboratory-confirmed rubella case* to local health officials. In April 1999, nationwide, case-based surveillance for CRS† had been established.

Until the early 2000s, rubella was endemic in Japan, with periodic epidemics approximately every 5 years and seasonal increases in the spring and summer. The number of reported rubella cases remained at record low levels until 2010, and in 2011, a few outbreaks were reported in the workplace among adult males. In

* Rubella case definition: clinically diagnosed rubella case is a diffuse punctate and maculopapular rash, fever, and lymphadenopathy; laboratory-confirmed rubella case is the presence of all of the mentioned signs and one of the following: 1) isolation of the virus or detection of viral RNA from blood, throat, or cerebrospinal fluid samples by reverse transcription–polymerase chain reaction; or 2) detection of rubella-specific immunoglobulin M antibodies from a serum sample or a significant increase in rubella-specific immunoglobulin G antibody titers in paired serum samples obtained at acute and convalescent phases.

† Laboratory-confirmed CRS case definition: 1) clinically confirmed CRS in an infant who has a positive blood test for rubella-specific immunoglobulin M or hemagglutination inhibition antibody levels sustained or higher than expected from passively transferred maternal antibody; or 2) detection of rubella virus in specimens from throat, saliva, or urine. CRS is clinically confirmed if an infant has 1) at least two of the following complications: cataract, congenital glaucoma, congenital heart disease, hearing impairment, or pigmentary retinopathy; or 2) one of those complications and one of the following complications: purpura, splenomegaly, microcephaly, meningoencephalitis, radiolucent bone disease, or jaundice developed within 24 hours after birth.

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2012, the number of rubella cases sharply increased to 2,392, with the rise in cases continuing into 2013 (Figure 1). From January 1 to May 1, 2013, a total of 5,442 rubella cases were reported (Table). Of these cases, 3,936 (72.3%) were laboratory confirmed. Geographically, over 60% of rubella cases were reported from Kanto area, in the eastern part of Japan comprised of Tokyo and its surrounding prefectures. In recent weeks, the epidemic has expanded from Kanto to other parts of Japan, including Osaka, Hyogo, Aichi, Fukuoka, and Kagoshima. Of the 5,442 cases, males accounted for 4,213 cases (77.4%), of which 3,878 cases (92.0%) were in persons aged >20 years (Figure 2). Of the 4,834 cases in persons aged >20 years, 1,727 (36%) were in persons aged 30–39 years and 1,535 (32%) in persons aged 20–29 years. Among rubella cases, vaccination history was unknown in a majority of cases (3,538 [65%]). For the 1,904 reported rubella cases with known vaccination status, 1,566 (82%) occurred in persons who had not received rubella vaccine (Table). Virus genotypes were determined for 150 cases in 2012; of these, 123 (82.0%) and 26 (17.0%) were genotypes 2B and 1E, respectively (*3*).

During 2008–2011, three cases of CRS were reported nationwide. Since October 2012, 10 CRS cases have been reported from Hyogo (two), Aichi (two), Osaka (two), Tokyo (one), Kagawa (one), Saitama (one), and Kanagawa (one). Six of the mothers of infants with CRS had not received rubella vaccine, and four had unknown vaccination history.

Population immunity is measured by administrative coverage and seroprevalence surveys. In 2011, administrative measles-rubella (MR) vaccine coverage was 95.3% at age 1 year, 92.8% at age 5–6 years, 88.1% at age 12–13 years, and 81.4% at age 17–18 years. Population immunity for eight vaccine-preventable diseases is measured by the National Epidemiological Surveillance of Vaccine Preventable Diseases, an annual, national seroepidemiologic survey conducted among a representative sample of the Japanese population. In 2012, 14 prefectures in Japan joined this serologic survey by measuring rubella hemagglutination inhibition antibody levels in 5,094 healthy persons. Among adults aged 30–50 years, seropositivity for rubella antibody (1:8) was 73%–86% among males and 97%–98% among females (*4*).

In response to the current outbreak, Japan's Ministry of Health, Labor, and Welfare provided guidance to health-care authorities (*5*). The guidance is to provide information on rubella disease and CRS for pregnant women and their households and encouraged vaccination of the family members of pregnant women (because rubella vaccine is contraindicated in pregnant women) and vaccination for women who plan to get pregnant. The local governments in approximately 100 cities, including several districts in the Tokyo metropolitan area that had high numbers of reported rubella cases, have provided partial funding to help with the cost of MR vaccine or a single rubella vaccine for women planning pregnancy and for men who are living with a pregnant woman. In addition, mass media agencies in Japan have provided information about the rubella epidemic, including rubella disease and CRS, which has helped increase awareness about the importance of rubella vaccination.

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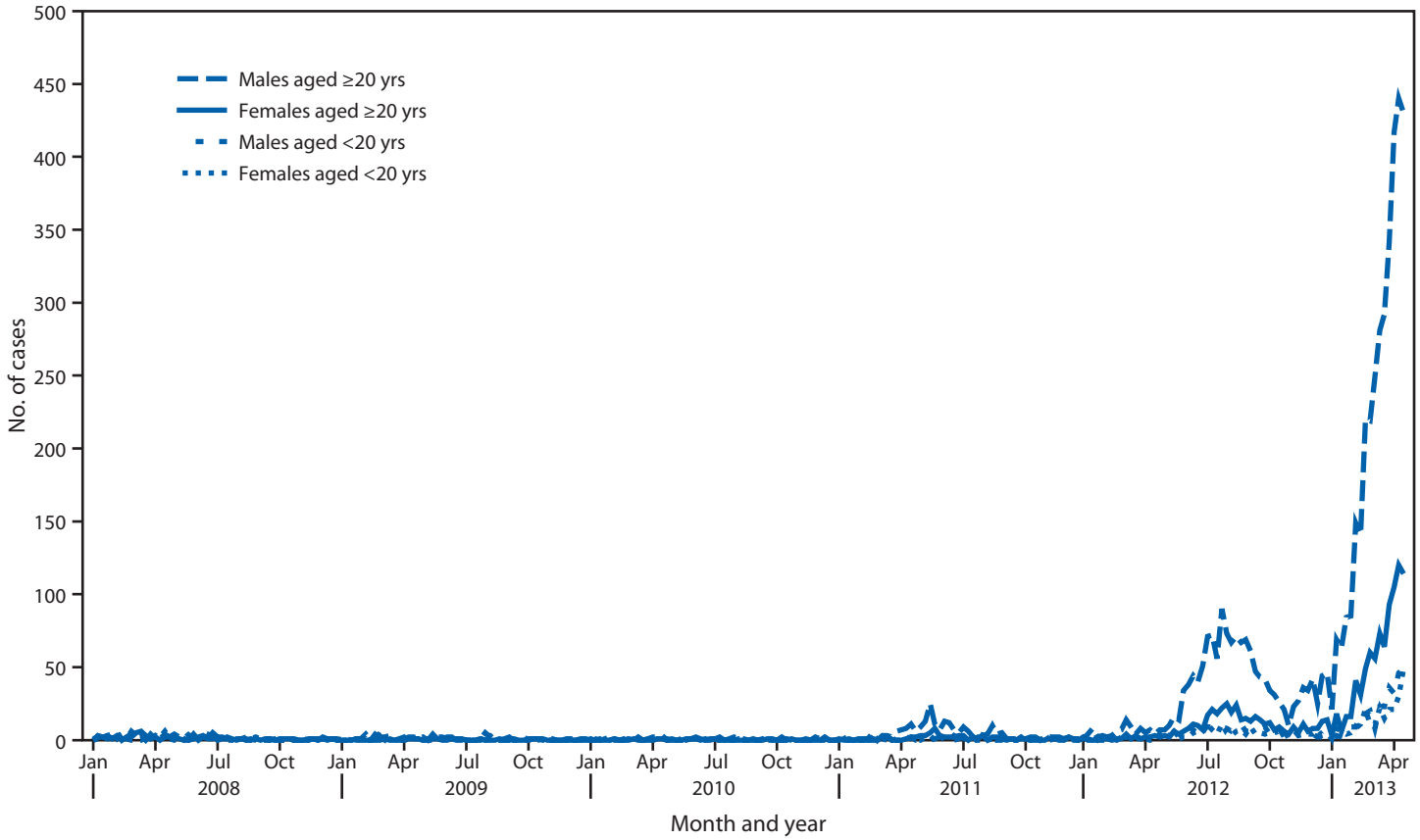
FIGURE 1. Number of rubella cases, by sex and age group — Japan, 2009–2013*



* As of April 24, 2013.

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Editorial Note

The primary purpose of rubella vaccination is to prevent congenital rubella virus infection, including CRS. In WPR, the Immunization Technical Advisory Group endorsed a regional accelerated rubella control and CRS prevention goal to decrease rubella incidence to <10 cases per million population and CRS incidence to <10 cases per million live births each year by 2015 (*6*). In 2012, Japan reported 18.7 rubella cases per million population, a rate higher than the WPR annual incidence target. As of May 2013 (4 months into the year), the number of reported rubella cases is already double the total number of cases in 2012.

In 1976, Japan established a goal to prevent CRS and introduced single-antigen rubella vaccine in its national immunization program, targeting girls in junior high school. In 1989, an MMR vaccine was introduced, targeting children aged 12–72 months, but this combination vaccine was withdrawn in 1993 after reports of aseptic meningitis related to the mumps component. In 1995, vaccination policy was changed to make all vaccines strongly recommended but not mandatory, and in 2006, the MR combined vaccine was introduced, with a 2-dose schedule administered at 1–2 years and 5–7 years.

TABLE. Number and percentage of rubella cases, by year and selected characteristics — Japan, 2009–2013

Characteristic	2009		2010		2011		2012		2013*	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Total	**147**	**(100)**	**87**	**(100)**	**378**	**(100)**	**2,392**	**(100)**	**5,442**	**(100)**
Rubella cases per 1,000,000 population	1.2		0.7		3.0		18.7		42.5	
Sex										
Male	98	(66.7)	54	(62.1)	278	(73.5)	1,797	(75.1)	4,213	(77.4)
Female	49	(33.3)	33	(37.9)	100	(26.5)	595	(24.9)	1,229	(22.6)
Age group (yrs)										
<1	4	(2.7)	1	(1.1)	2	(0.5)	16	(0.7)	24	(0.4)
1–4	22	(15.0)	11	(12.6)	23	(6.1)	69	(2.9)	94	(1.7)
5–9	13	(8.8)	10	(11.5)	10	(2.6)	37	(1.5)	68	(1.2)
10–14	17	(11.6)	8	(9.2)	18	(4.8)	56	(2.3)	118	(2.2)
15–19	19	(12.9)	5	(5.7)	29	(7.7)	217	(9.1)	304	(5.6)
20–29	22	(15.0)	20	(23.0)	114	(30.2)	741	(31.0)	1,535	(28.2)
30–39	30	(20.4)	16	(18.4)	94	(24.9)	681	(28.5)	1,727	(31.7)
40–49	13	(8.8)	14	(16.1)	59	(15.6)	430	(18.0)	1,103	(20.3)
50–59	4	(2.7)	1	(1.1)	22	(5.8)	124	(5.2)	396	(7.3)
>59	3	(2.0)	1	(1.1)	7	(1.9)	21	(0.9)	73	(1.3)
Diagnosis										
Clinically diagnosed	63	(42.9)	26	(29.9)	83	(22.0)	599	(25.0)	1,506	(27.7)
Laboratory confirmed	84	(57.1)	61	(70.1)	295	(78.0)	1,793	(75.0)	3,936	(72.3)
Vaccination status										
Unvaccinated	46	(31.3)	17	(19.5)	96	(25.4)	605	(25.3)	1,566	(28.8)
Once	41	(27.9)	14	(16.1)	29	(7.7)	180	(7.5)	263	(4.8)
Twice	4	(2.7)	4	(4.6)	9	(2.4)	49	(2.0)	75	(1.4)
Uncertain	56	(38.1)	52	(59.8)	244	(64.6)	1,558	(65.1)	3,538	(65.0)
Total CRS* cases	**2**	**(100)**	**0**	**—**	**1**	**(100)**	**5**	**(100)**	**5**	**(100)**
CRS cases per 1,000,000 live births	2.0		0.0		1.0		4.8		4.8	

Abbreviation: CRS = congenital rubella syndrome.
* As of May 1, 2013.

What is already known about this topic?

Congenital rubella syndrome (CRS) is caused by fetal infection with rubella virus from the mother and is characterized by birth defects such as hearing impairment, heart defects, and cataracts. Several countries that initially vaccinated only adolescent or adult women, then later introduced rubella vaccine into their routine programs or conducted mass campaigns in adolescent and adult females, have experienced large rubella outbreaks among adolescent and young adult males, with a concomitant increase in infants with CRS.

What is added by this report?

In 2012, the number of rubella cases in Japan sharply increased to 2,392, with the rise in cases continuing into 2013 and resulting in a cumulative total of 5,442 cases from January 1 to May 1, 2013. Of these cases, 72% were laboratory confirmed, and 23% were in females. Since October 2012, 10 CRS cases have been reported.

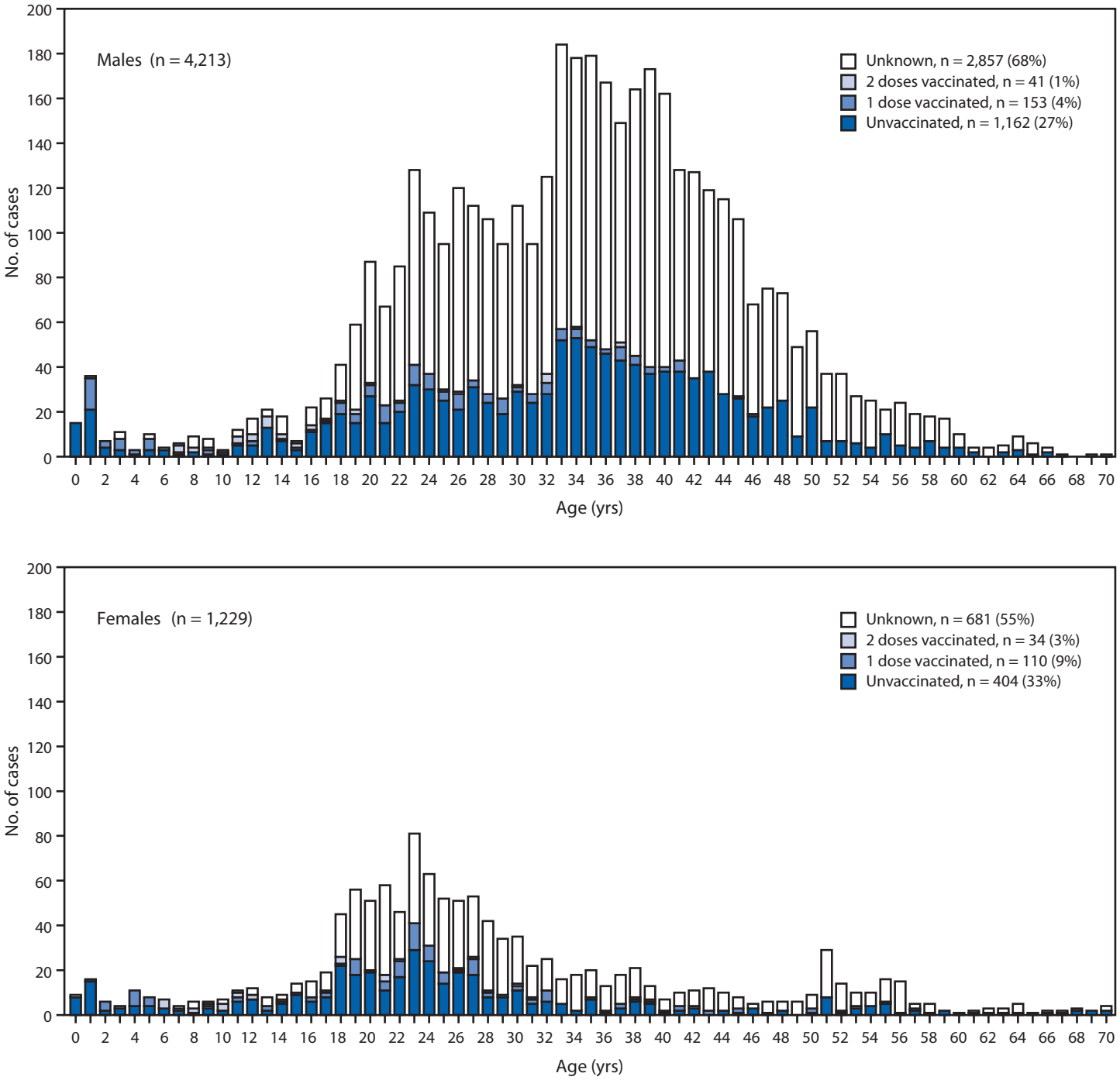
What are the implications for public health practice?

Countries using rubella vaccine should aim to prevent rubella outbreaks (i.e., achieve and maintain interruption of rubella virus transmission) by ensuring high rubella immunity across all age groups (both males and females). In cohorts born since the introduction of rubella vaccine, this immunity is achieved primarily through uniformly high vaccination coverage.

After a large measles outbreak in 2007 and 2008, a catch-up MR vaccination program was implemented, targeting two age cohorts (those aged 12 years and those aged 17 years) each year during 2008–2013 to ensure high population immunity among persons aged 12–22 years in 2013.

In the current outbreak, males aged 20–39 years, who were not included in the initial rubella vaccination program, accounted for 68% of the reported cases. However, with the introduction of 2 doses of MR vaccine into the national vaccination schedule in 2006 for both boys and girls and the successful catch-up vaccination program, children who currently are aged <15 years account for only 5.6% of the cases. In other countries (e.g., Brazil, Chile, and Argentina), where only adolescent or adult females have been targeted through national immunization programs or as part of mass vaccination campaigns, similar large outbreaks have occurred among adolescent and adult males, with a concomitant increase in CRS cases. These types of outbreaks emphasize that national immunization programs should ensure high levels of immunity in all cohorts born since the introduction of rubella vaccine (both males and females) either through the routine program or high-quality mass campaigns that are sufficient to interrupt rubella virus transmission

FIGURE 2. Number of rubella cases among males and females, by age and vaccination history — Japan, surveillance week 1 to 17, 2013*



* As of May 1, 2013.

and prevent CRS cases. In addition, programs should implement high-quality, case-based rubella and CRS surveillance and respond promptly and rapidly to outbreaks.

The effects of this outbreak have been wide-ranging, both within Japan and internationally. In the Region of the Americas, where endemic rubella virus transmission has been interrupted, importations have occurred in the United States and Canada in 2013. The international spread of rubella virus from Japan provides a reminder that countries in regions that have eliminated rubella need to maintain high levels of vaccination coverage and high-quality surveillance to limit the spread and detect imported rubella virus.

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Local public health centers and local public health institutes in Japan. Louis Cooper, MD, Technical Advisory Group on Immunization, International Pediatric Association.

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Update to Interim Guidance for Preexposure Prophylaxis (PrEP) for the Prevention of HIV Infection: PrEP for Injecting Drug Users

On June 12, 2013, the Thailand Ministry of Health and CDC published results from a randomized controlled trial of a daily oral dose of 300 mg of tenofovir disoproxil fumarate (TDF) that showed efficacy in reducing the acquisition of human immunodeficiency virus (HIV) infection among injecting drug users (IDUs) (*1*). Based on these findings, CDC recommends that preexposure prophylaxis (PrEP) be considered as one of several prevention options for persons at very high risk for HIV acquisition through the injection of illicit drugs.

Background

Among the approximately 50,000 new HIV infections acquired each year in the United States, 8% were attributed to injection-drug use in 2010 (*2*). The National HIV Behavioral Surveillance System, surveying IDUs in 20 U.S. cities in 2009, found high frequencies of both injection-drug use and sexual practices that are associated with HIV acquisition (*3*). Among IDUs without HIV infection, 34% reported having shared syringes in the preceding 12 months, and 58% reported having shared injection equipment; 69% reported having unprotected vaginal sex and 23% reported having unprotected male-female anal sex. Among HIV-uninfected male IDUs, 7% reported previous male-male anal sex, and 5% reported unprotected male-male anal sex. However, only 19% of male and female IDUs reported participating in an intervention to reduce risk behaviors. These findings underscore a need to provide effective interventions to further reduce HIV infections among IDUs in the United States.

Several clinical trials have demonstrated safety and efficacy of daily oral antiretroviral PrEP for the prevention of HIV acquisition among men who have sex with men (MSM) (*4*) and heterosexually active men and women (*5,6*), although two trials were unable to show efficacy, likely because of low adherence (*7,8*) (Table). CDC previously has issued interim guidance for PrEP use with MSM (*9*) and heterosexually active adults (*10*) and now provides interim guidance for PrEP use in IDUs.

During 2009–2013, CDC convened workgroup meetings and consulted with external subject matter experts, including clinicians, epidemiologists, academic researchers, health department policy and program staff members, community representatives, and HIV and substance abuse subject matter experts at federal health agencies, to 1) review the results of PrEP trials and other data as they became available and 2) deliberate and recommend content for interim guidance and comprehensive U.S. Public Health Service guidelines for PrEP use in the United States. The expert opinions from the IDU workgroup and other workgroups were used to develop this interim guidance on PrEP use with IDUs.

Rationale and Evidence

The Bangkok Tenofovir Study enrolled HIV-uninfected persons who reported injecting illicit drugs in the prior year into a phase-III randomized, double-blind, placebo-controlled trial to determine the safety and efficacy of daily oral TDF to reduce the risk for HIV acquisition. In all, 2,413 eligible, consenting men and women aged 20–60 years were randomized to receive either daily oral doses of 300 mg of TDF (n = 1,204) or a placebo tablet (n = 1,209). Participants could elect to receive tablets daily by directly observed therapy or receive a 28-day supply of daily doses to take home; they could switch medication supply method at their monthly follow-up visits. At follow-up visits every 28 days, individualized adherence and risk-reduction counseling, HIV testing, pregnancy testing for women, and assessment for adverse events were conducted. An audio computer-assisted self-interview was conducted every 3 months to assess risk behaviors. Blood was collected at enrollment; months 1, 2, and 3; and then every 3 months for laboratory testing to screen for adverse reactions to the medication. At study clinics (operated by the Bangkok Metropolitan Administration), social services, primary medical care, methadone, condoms, and bleach (for cleaning injection equipment) were provided free of charge.

The study was conducted during 2005–2012, with a mean follow-up time of 4.6 years (maximum: 6.9 years) and a 24% loss to follow-up or voluntary withdrawal in the TDF group and a 23% loss in the placebo group. Participants took their study drug an average of 83.8% of days and were on directly observed therapy 86.9% of the time.

After enrollment, 50 patients acquired HIV infection: 17 in the TDF group and 33 in the placebo group. In the modified "intent-to-treat" analysis (excluding two participants later found to have been HIV-infected at enrollment), HIV incidence was 0.35 per 100 person-years in the TDF group and 0.68 per 100 person-years in the placebo group, representing a 48.9% reduction in HIV incidence (95% confidence interval [CI] = 9.6%–72.2%). Among those in an unmatched case-control study that included the 50 persons with incident HIV infection (case-patients) and 282 HIV-uninfected participants from four clinics (controls), detection of tenofovir in plasma was associated with a 70% reduction in the risk for HIV infection (CI = 2.3%–90.6%).

TABLE. Results from randomized, placebo-controlled, clinical trials of the efficacy of daily oral antiretroviral preexposure prophylaxis (PrEP) for preventing human immunodeficiency virus (HIV) infection

Clinical trial	Participants	Type of medication	mITT efficacy*		Adherence-adjusted efficacy based on TDF detection in blood	
			%	(95% CI)	%	(95% CI)
Bangkok Tenofovir Study	Injecting drug users	TDF	49	(10–72)	70	(2–91)
Partners PrEP	HIV discordant couples	TDF	67	(44–81)	86	(67–94)
		TDF/FTC	75	(55–87)	90	(58–98)
TDF2	Heterosexually active men and women	TDF/FTC	62	(22–83)	84	NS
iPrEx	Men who have sex with men	TDF/FTC	42	(18–60)	92	(40–99)
Fem-PrEP	Heterosexually active women	TDF/FTC	NS	—	NA	—
VOICE	Heterosexually active women	TDF	NS	—	NA	—
		TDF/FTC	NS	—	NA	—

Abbreviations: mITT = modified intent to treat analysis, excluding persons determined to have had HIV infection at enrollment; CI = confidence interval; TDF = tenofovir disoproxil fumarate; FTC = emtricitabine; NS = not statistically significant; NA = data not available.
* % reduction in acquisition of HIV infection.

The rates of adverse events, serious adverse events, deaths, grade 3–4 laboratory abnormalities, and elevated serum creatinine did not differ significantly between the two groups. Reports of nausea and vomiting were higher in the TDF group than the placebo group in the first 2 months of medication use but not thereafter. No HIV infections with mutations associated with TDF resistance were identified among HIV-infected participants.

Comparing rates at enrollment with rates at 12 months of follow-up, risk behaviors decreased significantly for injecting drugs (from 62.7% to 22.7%), sharing needles (18.1% to 2.3%), and reporting multiple sexual partners (21.7% to 11.0%), and these risk behaviors remained below baseline throughout the entire period of the trial (all three comparisons, $p<0.001$). Rates were similar in the TDF and placebo groups.

PrEP Recommendation for IDUs

On July 16, 2012, based on the results of trials in MSM and heterosexually active women and men, the Food and Drug Administration approved a label indication for the use of the fixed dose combination of TDF 300 mg and emtricitabine (FTC) 200 mg (Truvada) as PrEP against sexual HIV acquisition by MSM and heterosexually active women and men (*11*). These trials did not evaluate safety and efficacy among injecting-drug users.

CDC recommends that daily TDF/FTC be the preferred PrEP regimen for IDUs for the following reasons: 1) TDF/FTC contains the same dose of TDF (300 mg) proven effective for IDUs, 2) TDF/FTC showed no additional toxicities compared with TDF alone in PrEP trials that have provided both regimens, 3) IDUs also are at risk for sexual HIV acquisition for which TDF/FTC is indicated, and 4) TDF/FTC has an approved label indication for PrEP to prevent sexual HIV acquisition in the United States. Its use to prevent parenteral HIV acquisition in those without sexual acquisition risk is currently an "off-label" use. Reported injection practices that place persons at very high risk for HIV acquisition include sharing of injection equipment, injecting one or more times a day, and injection of cocaine or methamphetamine. CDC recommends that prevention services provided for IDUs receiving PrEP include those targeting both injection and sexual risk behaviors (12).

In all populations, PrEP use 1) is contraindicated in persons with unknown or positive HIV status or with an estimated creatinine clearance <60 mL/min, 2) should be targeted to adults at very high risk for HIV acquisition, 3) should be delivered as part of a comprehensive set of prevention services, and 4) should be accompanied by quarterly monitoring of HIV status, pregnancy status, side effects, medication adherence, and risk behaviors, as outlined in previous interim guidance (*9,10*). Adherence to daily PrEP is critical to reduce the risk for HIV acquisition, and achieving high adherence was difficult for many participants in PrEP clinical trials (Table).

Comment

Providing PrEP to IDUs at very high risk for HIV acquisition could contribute to the reduction of HIV incidence in the United States. In addition, if PrEP delivery is integrated with prevention and clinical care for the additional health concerns faced by IDUs (e.g., hepatitis B and C infection, abscesses, and overdose), substance abuse treatment and behavioral health care, and social services, PrEP will contribute additional benefits to a population with multiple life-threatening physical, mental, and social health challenges (*12,13*). CDC, in collaboration with other federal agencies, is preparing comprehensive U.S. Public Health Service guidelines on the use of PrEP with MSM, heterosexually active men and women, and IDUs, currently scheduled for release in 2013.

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Mass Drug Administration for the Elimination of Lymphatic Filariasis — Port-au-Prince, Haiti, 2011–2012

Lymphatic filariasis (LF), also known as elephantiasis, results from mosquito-borne infection with filarial worm parasites, predominantly *Wuchereria bancrofti*, and can lead to severe disfigurement from lymphedema and hydrocele. The World Health Organization (WHO) has called for the elimination of LF using the strategy of annual mass drug administration (MDA). WHO defines adequate MDA coverage (the percentage of all residents of an endemic area who swallow the drugs) as ≥65%. By late 2011, all areas in Haiti where LF is endemic had received MDA, except Port-au-Prince, which was considered the most challenging area. The first MDA in Port-au-Prince was conducted from November 2011 through February 2012. To evaluate coverage, a stratified, three-stage cluster-sample survey was conducted. In all, 71% (95% confidence interval = 69%–74%) of persons swallowed the MDA tablets, according to their own or a proxy respondent's recall. Coverage was highest (77%) among internally displaced persons (IDPs) in camps, and <65% in two of the remaining six survey strata (urban communes). Among the 1,976 adults asked additional questions, 88% said they heard about the MDA before it happened, 74% that they were given tablets, and 71% that they swallowed the tablets. Only 50% of those who did not hear about the MDA in advance swallowed the tablets. The MDA was a large step toward the elimination of LF in Haiti but must be followed by MDA rounds that maintain adequate coverage.

In 2010, WHO estimated that 120 million persons were infected with LF globally (*1*). In the Americas, Haiti is one of four countries where LF is still endemic, accounting for 78.7% of 12.4 million persons at risk in this region (*2*). In 2000, WHO called for the elimination of LF by 2020, based on a strategy of annual MDA with drugs that clear microfilaria, the circulating stage of the parasite in humans (*3*). LF elimination guidelines are based on the expectation that five consecutive annual MDA rounds, each achieving ≥65% coverage in the total population, will result in interruption of transmission (*3*). By late 2011, at least one round of MDA using albendazole and diethylcarbamazine had been conducted throughout all endemic areas of Haiti except the capital, Port-au-Prince. Port-au-Prince includes the communes of Cité Soleil, Carrefour, Delmas, Pétion-Ville, Port-au-Prince, and Tabarre, and is considered the most challenging area in which to conduct an MDA (*4*). During November 2011–February 2012, an MDA was conducted for the first time in these communes. Based on reports of doses administered divided by the estimated population of this area, the National Program for the Elimination of Lymphatic Filariasis estimated that 92% coverage had been achieved, varying from 79% to 160% by commune. After the MDA, a household survey was conducted by the Ministry of Public Health and Population and partners as an independent means of assessing coverage and to identify ways of increasing coverage and improving coverage evaluation of MDAs in subsequent years.

A stratified, three-stage cluster sample design was used to select households in seven strata: the IDP camps located within the six communes (one stratum) and non-IDP camp households in each of the six communes (six strata). The first-stage sampling frame for the IDP camps was a list of camps and their sizes in households from administrative records updated every 2–3 months. For non-IDP camp households, the sampling frame was a list of census enumeration areas (sections démographiques d'énumeration [SDEs]), with SDE sizes in households taken from a 2011 update (without enumeration) of the 2003 national census. In all, 35 IDP camps and 30 SDEs in each of the remaining strata were selected, with probability proportional to estimated camp and SDE size. Each selected SDE and camp was divided into two or more segments of approximately equal size in households based on natural lines of division. A single segment was randomly chosen within each selected SDE and camp and survey teams then selected a systematic sample of households within the segment using a sampling interval calculated so that all households in the same stratum had the same overall probability of selection and provided the target sample size.

Within each selected household, a parent or guardian provided responses for children aged <10 years, and this person or another adult provided responses for older children and adults who were absent. Persons asked about swallowing the tablets were first shown the tablets. A knowledge, attitudes, and practices (KAP) questionnaire was administered to persons aged ≥18 years who were present at the time of the survey visit. Coverage and KAP survey data were collected using questionnaires on smart phones and were cleaned and analyzed using statistical software. Children aged <2 years, pregnant women, and severely ill persons were ineligible for treatment during the MDA. However, coverage was defined as the percentage of all persons who swallowed the tablets (*3*). Coverage estimates for the Port-au-Prince population as a whole (all seven strata) were calculated using sampling weights derived from the overall selection probabilities of households.

A total of 2,102 households were selected for the survey sample during the survey fieldwork, which took place during May 3–21, 2012. In 78% of these households, with a total of 6,345

household members, an adult member was present and agreed to participate in the survey. In all, 63% of persons aged ≥10 years answered the question about swallowing the MDA tablets themselves; for the remaining 37%, the question was answered by a proxy adult household member. In a weighted analysis of all seven strata, the answer to the question about swallowing the MDA drugs was "yes" for 71% (95% confidence interval = 69%–74%), "no" for 23%, and "don't know" for 6% (Table) of household members in the sample. In all, 97% of "don't know" answers were from proxy respondents for household members who were absent. "Yes" answers, by stratum, ranged from 60% in Tabarre Commune to 77% in the IDP camps. By this measure, two of the strata, Tabarre and Pétion-Ville Communes, did not achieve adequate (≥65%) coverage. Coverage by sex was nearly the same (71% among females, 72% among males.) Among persons aged ≥2 years, coverage was lowest (55%) among children aged 2–4 years and highest (83%) among children aged 5–14 years, declining gradually in older age groups to 62% overall among persons aged ≥65 years. The coverage-by-age group curve for non-IDP camp residents was slightly lower, but generally paralleled the curve for IDP camp residents, except for the oldest age group, for which non-IDP coverage declined and IDP-camp resident coverage increased (Figure).

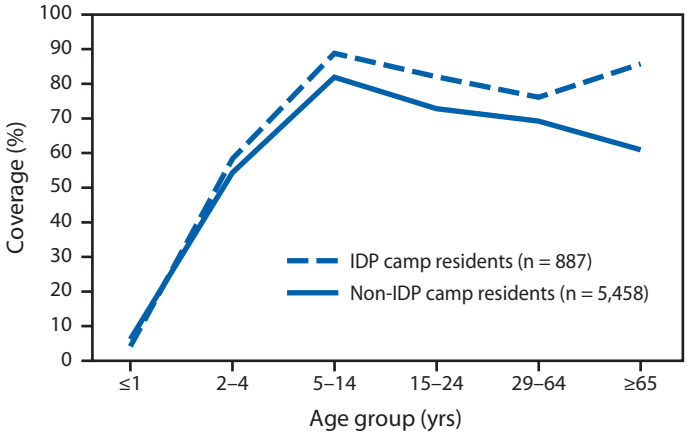
A total of 1,976 adults were interviewed with the KAP questionnaire. Because 70% of the respondents were women, who were more often at home than men, the following results were weighted according to selection probabilities and nonresponse rates by gender. In all, 88% of respondents said they heard about the MDA before it began; 74% said they were given tablets during the MDA, and 71% said they swallowed the tablets. Only 50% of those who did not hear about the MDA in advance swallowed the tablets, compared with 74% among those who heard about the MDA in advance. The most commonly mentioned preferred means of communication for those who did not hear about the MDA in advance were television (30%), radio (28%), community resource persons (17%), and a vehicle with loudspeaker (15%).

Most respondents who received tablets got them at a distribution post (85%); less common sites were home (8%) and school (4%). When asked about the distance to the nearest distribution point from their home, 77% of those who did not receive tablets answered that they did not know or were not aware of a distribution point, as compared with 6% of those who received tablets. The most common reason for not swallowing tablets that were received was concern about safety or becoming ill (61%). Among all persons given tablets at a distribution post, 76% swallowed them at the post; 13% reported that no water was available at the post (because of the threat of cholera, the program sought to offer a source of safe drinking water at distribution posts by purchasing water in small plastic bags from commercial sources; persons seeking treatment were given the tablets to swallow at home when distributors ran out of the plastic bags of water). Among all those who swallowed the drugs, 34% reported having adverse events within a day, most often nausea or vomiting (62%), and fatigue (42%).

TABLE. Estimated treatment coverage resulting from mass drug administration for lymphatic filariasis during December 2011–February 2012 — household survey, Port-au-Prince, Haiti, May 2012

Survey stratum	"Did you [or name of person for whom respondent answered] swallow tablets for lymphatic filariasis during the last mass drug distribution?" (%)			Sample size
	Yes	No	Do not know	
Carrefour Commune	75	20	5	1,111
Cité Soleil Commune	75	20	4	855
Delmas Commune	71	23	6	829
Pétion-Ville Commune	62	31	7	911
Port-au-Prince Commune	72	22	6	827
Tabarre Commune	60	29	11	925
Internally displaced person camps within the six communes	77	19	4	887
All strata (weighted averages and total)	71	23	6	6,345

FIGURE. Estimated treatment coverage resulting from mass drug administration for lymphatic filariasis, December 2011–February 2012, by age group and residence in internally displaced person (IDP) camps — household survey, Port-au-Prince, Haiti, May 2012



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What is already known on this topic?

Haiti is one of four countries in the Americas where lymphatic filariasis is still endemic. Approximately 9.7 million persons are at risk for lymphatic filariasis in Haiti. By late 2011, at least one round of mass drug administration (MDA) with albendazole and diethylcarbamazine had been conducted in all endemic parts of the country except the capital, Port-au-Prince.

What is added by this report?

A household survey conducted after the first MDA in Port-au-Prince showed that overall coverage with albendazole and diethylcarbamazine was 71% and that five of the seven populations within Port-au-Prince surveyed (residents of six communes and of camps for internally displaced persons) achieved adequate coverage (≥65%). The survey also showed that informing a greater percentage of adults in advance about the MDA and more effectively addressing concerns about safety and side effects might increase coverage. In addition, it showed that coverage estimates for the Port-au-Prince area based on tallies of the number of persons treated and population estimates were inaccurate.

What are the implications for public health practice?

Haiti's National Program for the Elimination of Lymphatic Filariasis will intensify the dissemination of specific health education messages before subsequent MDAs in Port-au-Prince and rely on household surveys to measure the coverage achieved in the Port-au-Prince area.

Editorial Note

The 71% MDA coverage calculated by the household survey in Port-au-Prince demonstrates that despite substantial obstacles posed by recent natural disasters and public health emergencies, Haiti has taken an important step toward meeting the challenge of LF elimination. Future MDA efforts should incorporate strategies that were identified in this analysis as potentially important to increase coverage and sustain program success.

MDA coverage, as determined by survey results, was inadequate (<65%) among permanent residents of Tabarre Commune (60%) and Pétion-Ville Commune (62%). This classification is conservative because these communes had the highest proportions of "don't know" answers to the coverage question (11% and 7%, respectively), the consequence of accepting adults as proxy respondents for household members not available when the survey team visited. If only persons who responded "yes" or "no" are considered, then the coverage estimates for these communes would be ≥65%. For future MDA coverage surveys in Port-au-Prince, survey teams could reduce the percentage of "don't know" answers by making repeat visits, including in the evening and on subsequent days, if needed, even if doing so within resource constraints requires smaller sample sizes or combining strata.

Although the coverage survey results might have been lowered slightly by "don't know" answers, they likely present a more accurate estimate of coverage than the 92% derived from reports of doses administered and estimated population sizes. Such estimates of coverage (sometimes called "administrative") can be in error because of inaccurate denominators, inaccurate reporting of doses administered, and treatment of persons outside their area of residence. The administrative result of 160% for Tabarre Commune clearly reflects one or more of these problems. At present, administrative coverage appears to be too inaccurate to be of value in Port-au-Prince; additional household surveys are planned to track MDA coverage.

Coverage estimates among adult respondents who stated that they heard about the MDA before it began were higher than among those who had not heard about it, suggesting that broadening the reach of pre-MDA communication, including by the means preferred by those who did not hear about the MDA in advance, might increase coverage. The survey also showed that the majority of respondents who did not receive tablets either were not aware of a distribution point or did not know how far away it was. Guidance on narrowing this knowledge gap might be provided by a follow-up study focused on the reasons for the lack of awareness, in particular, on whether post locations were systematically announced by megaphone throughout each post's catchment area daily during the MDA, as intended. Further efforts to disseminate information on the safety of the drugs also might increase coverage by addressing concerns about safety and becoming ill, which were the most common reasons for not swallowing tablets that had been received. These interventions for increasing coverage might help sustain progress toward national LF elimination. The 2011–2012 MDA in Port-au-Prince demonstrated that Haiti has the capacity to achieve this goal.

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Emergency Department Visits by Patients with Mental Health Disorders — North Carolina, 2008–2010

Patients with mental health disorders (MHDs) use the emergency department (ED) for acute psychiatric emergencies, for injuries and illnesses complicated by or related to their MHD, or when psychiatric or primary-care options are inaccessible or unavailable (*1,2*). An estimated 5% of ambulatory-care visits in the United States during 2007–2008 were made by patients with primary mental health diagnoses (*3*). To measure the incidence of ED visits in North Carolina with MHD diagnostic codes (MHD-DCs), the Carolina Center for Health Informatics (University of North Carolina at Chapel Hill) analyzed ED visits occurring during the period 2008–2010 captured by the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). This report describes the results of that analysis, which indicated that nearly 10% of ED visits had one or more MHD-DCs assigned to the visit and the rate of MHD-DC-related ED visits increased seven times as much as the overall rate of ED visits in North Carolina during the study period. Those with an MHD-DC were admitted to the hospital from the ED more than twice as often as those without MHD-DCs. Stress, anxiety, and depression were diagnosed in 61% of MHD-DC-related ED visits. The annual rate of MHD-DC-related ED visits for those aged ≥65 years was nearly twice the rate of those aged 25–64 years; half of those aged ≥65 years with MHD-DCs were admitted to the hospital from the ED. Mental health is an important component of public health (*4*). Surveillance is needed to describe trends in ED use for MHDs to develop strategies to prevent hospitalization, improve access to ambulatory care, and develop new ways to provide ED care for the elderly with MHDs.

ED visit data for the period 2008–2010 were extracted from NC DETECT, a population-based, statewide public health surveillance system that contains ED visit data (*5,6*) for 99% of ED visits in North Carolina occurring during the study period. ED visits were characterized by sex and age group, ED disposition, and type of MHD. MHD-DCs were identified from the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) codes for mental disorders (290–299); symptoms, signs, and ill-defined conditions (787–789.9); and supplementary codes (V11–79). ICD-9-CM codes for poisoning and overdose, metabolic or structural encephalopathies that are classified as psychiatric diagnostic codes by ICD-9-CM, substance abuse disorders, and tobacco use disorder were excluded. For each ED visit, a mental health ICD-9-CM diagnostic code in any one of up to 11 positions classified that visit as MHD-DC-related. Visit records with more than one MHD-DC were counted as a single MHD-DC-related visit. Using the first-listed MHD-DC for the ED visit, MHDs were subcategorized into 11 groups of clinically similar diagnostic categories for calculating rates. For purposes of regression analyses, all MHD-DCs were classified as present or absent for each ED visit. Data were extracted and stratified for univariate and two-way descriptive analyses, and annual rates were calculated per 10,000 population. Risk ratios were computed using log binomial regression with Poisson robust variances.

From 2008 to 2010, the annual number of ED visits in North Carolina increased by 5.1%, from 4,190,911 to 4,405,676, and MHD-DC-related ED visits increased by 17.7%, from 347,806 to 409,276 (Table 1). By 2010, ED visits with MHD-DCs accounted for 9.3% of all ED visits; 31.1% of ED visits with MHC-DCs resulted in hospital admission, compared with 14.1% of all ED visits.

For each ED visit, up to 11 diagnostic codes are captured by NC DETECT. One quarter of first-listed MHD-DCs were in the first-listed diagnostic code position, 56% of the MHD-DCs were within the first three diagnostic code positions, and 77% were within the first five. "Stress/Anxiety/Depressive disorders" was the MHD-DC category with the highest number of ED visits (Table 2).

Increasing age was associated with an increase in hospital admission, with 14% of children aged <15 years admitted and 51% of adults aged ≥65 years admitted (Table 3). The highest admission proportion was for ED visits associated with dementia (60.5%) (Table 2). Population-based rates of MHD-DC related visits for those aged ≥65 years were very high for any MHD diagnosis compared with all other age groups, driven primarily by higher rates of schizophrenia/delusions/psychoses, dementia, and stress/anxiety/depression (Table 4).

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Editorial Note

The ED is an important link between outpatient and inpatient services for the care of patients with MHDs. ED visits by patients with MHD-DCs are increasing more rapidly than

TABLE 1. Number and percentage of emergency department (ED) visits related to mental health disorders (MHDs) compared with all other ED visits, overall and among those resulting in hospital admission — North Carolina, 2008–2010

	2008			2009			2010		
	ED visits overall			ED visits overall			ED visits overall		
Type of ED visit	No.	(%)	Rate per 10,000 population	No.	(%)	Rate per 10,000 population	No.	(%)	Rate per 10,000 population
MHD-related visits	347,806	(8.3)	376	381,700	(8.7)	407	409,276	(9.3)	430
All other ED visits	4,190,911	(100.0)	4,532	4,382,028	(100.0)	4,670	4,405,676	(100.0)	4,628

	2008		2009		2010	
	ED visits resulting in hospital admission		ED visits resulting in hospital admission		ED visits resulting in hospital admission	
Type of ED visit	No.	(%)	No.	(%)	No.	(%)
MHD-related visits	116,936	(35.7)	123,429	(34.1)	126,808	(31.1)
All other ED visits	580,655	(14.8)	597,177	(14.2)	619,831	(14.1)

TABLE 2. Mental health disorders (MHDs) resulting in emergency department (ED) visits and hospital admissions, by diagnostic category — North Carolina, 2008–2010

		% of MHD-related ED visits in this category†				
Type of MHD*	ICD-9-CM codes	2008	2009	2010	Risk ratio for hospital admission§	Mean % admitted 2008–2010
Stress/Anxiety/Depression	300 (excluding 300.9), 306, 308, 309, 311, 313.1, V11.2, V69.8, V79.0	60.78	61.70	62.33	0.91 (0.90–0.92)	28.89
Schizophrenia/Delusional/Psychosis	294.0, 294.8, 294.9, 295, 297, 298, V11.0	19.89	19.37	19.49	1.08 (1.07–1.09)	42.99
Bipolar	296, V11.1	17.96	18.26	18.32	1.28 (1.27–1.29)	37.32
Suicidal/Homicidal ideation	300.9, V62.84, V62.85	6.69	6.87	6.82	1.44 (1.42–1.45)	40.01
Dementia	290, 294.1, 294.2	5.99	5.53	5.21	1.26 (1.25–1.27)	60.54
Personality/Conduct disorder	301, 312	3.03	2.93	2.05	1.37 (1.35–1.39)	48.38
Miscellaneous/Other¶	302, 307 (excluding 307.1, 307.5, 307.8), V11.8, V11.9, V15.4 (excluding V15.41)	1.61	1.47	1.41	0.81 (0.79–0.83)	24.49
Psychiatric examination	V70.1, V70.2, V71.0	1.02	1.06	1.03	0.49 (0.47–0.52)	13.35
Mental disorders from brain damage	310	0.74	0.69	0.68	0.86 (0.83–0.89)	23.81
Developmental disorders originating in childhood	299	0.64	0.75	0.71	0.96 (0.91–1.01)	15.87
Eating disorders	307.1, 307.5	0.20	0.44	0.16	1.01 (0.95–1.06)	32.36

Abbreviation: ICD-9-CM = *International Classification of Diseases, Ninth Revision, Clinical Modification*.

* Up to 11 ICD-9-CM diagnostic codes were examined to classify presence or absence of categories of MHDs.

† Percentages in each column sum to more than 100% because 16% of MHD-related ED visits during 2008–2010 were counted in more than one MHD category.

§ Risk ratio for the presence of each condition versus its absence, controlling for number of diagnostic codes of any type (classified as either 6–11 codes or 1–5 codes), tobacco use, and presence or absence of nine comorbidities (substance abuse, injury, asthma/chronic obstructive pulmonary disorder, cancer, diabetes/hypoglycemia, heart failure, hepatic failure, renal failure, and obesity). Computed using log binomial regression with Poisson robust variances.

¶ Includes sexual and gender-identity disorders, personal history of other or unspecified mental disorder, personal history of psychiatric trauma, and special symptoms or syndromes not elsewhere classified.

general ED visits (*3,7*). Only minor changes in ICD-9-CM codes have been issued since October 2000 (*8*), so coding procedures for MHD likely did not change greatly during the course of the study. In this study, population-based rates of MHD-DC-related ED visits in North Carolina increased progressively from 2008 to 2010, by 14.4%, whereas the rate of all ED visits increased by only 2.1%. The rate of MHD-DC-related ED visits by patients of all ages is increasing but is especially high for those aged ≥65 years, who have the highest MHD-DC-related ED visit rate of any age group and the highest risk ratio (2.2) for hospital admission. Patients with stress/anxiety/depression accounted for the majority (60.8%) of the MHD-DC related ED visits, an unanticipated finding because such disorders often are more appropriately treated in an office setting. Hospital admissions for ED visits with MHD-DCs decreased from 35.7% in 2008 to 31.1% in 2010. The reasons for this decrease are unclear.

TABLE 3. Risk for hospital admission after emergency department (ED) visits related to mental health disorders (MHDs) versus all ED visits, by age group — North Carolina, 2008–2010

Age group (yrs)	Risk ratio for hospital admission after an MHD-related ED visit*	% of MHD-related ED visits occurring in this age group	% of MHD-related ED visits in this age group resulting in hospital admission	% of all ED visits in this age group resulting in hospital admission
0–14	1.00 (referent)	2.30	14.03	3.73
15–24	1.22 (1.18–1.26)	10.99	17.70	4.70
25–44	1.36 (1.31–1.40)	31.12	22.19	7.84
45–64	1.79 (1.73–1.86)	28.33	36.52	20.01
≥65	2.21 (2.13–2.28)	27.25	51.19	38.76

* Computed using log binomial regression with Poisson robust variances, controlling for other MHDs, tobacco use, and presence or absence of nine comorbidities (substance abuse, injury, asthma/chronic obstructive pulmonary disorder, cancer, diabetes/hypoglycemia, heart failure, hepatic failure, renal failure, and obesity).

TABLE 4. Population-based rates* of emergency department (ED) visits related to mental health disorders (MHDs), by diagnostic category, age group, and year — North Carolina, 2008–2010

	Diagnostic category†											
Age group and year	Any MHD diagnosis (all categories combined)	Stress/ Anxiety/ Depression	Schizophrenia/ Delusional/ Psychosis	Bipolar	Suicidal/ Homicidal ideation	Dementia	Personality/ Conduct disorder	Miscellaneous/ Other	Psychiatric examination	Mental disorders from brain damage	Developmental disorders originating in childhood	Eating disorders
0–14 yrs												
2008	43.7	15.5	1.7	8.3	2.8	0.1	4.1	1.7	1.4	1.0	6.8	0.3
2009	50.2	16.2	1.9	8.4	3.4	0.2	4.2	1.8	1.1	1.1	8.8	3.1
2010	48.1	16.8	1.9	8.8	3.5	0.2	4.4	1.8	1.2	1.3	7.8	0.4
15–24 yrs												
2008	288.3	170.8	18.5	57.0	17.4	0.4	7.7	4.0	4.9	3.5	3.2	0.7
2009	316.6	183.9	18.1	66.6	20.1	0.3	8.2	4.4	5.5	4.0	3.8	1.7
2010	331.3	192.1	20.7	68.3	22.7	0.2	8.8	4.0	5.5	3.9	4.2	0.8
25–44 yrs												
2008	415.4	260.8	32.4	87.4	18.1	0.2	4.9	3.8	4.0	2.6	0.7	0.6
2009	455.4	288.2	31.8	95.2	21.0	0.4	5.5	4.1	4.1	2.8	1.1	1.3
2010	482.0	308.1	34.2	97.5	23.5	0.3	5.6	4.2	4.0	3.0	1.2	0.5
45–64 yrs												
2008	410.8	267.1	48.2	66.6	12.5	3.4	3.8	3.7	3.2	1.9	0.3	0.3
2009	451.0	296.9	50.9	71.2	14.8	3.7	3.9	3.5	3.2	2.0	0.3	0.7
2010	483.0	318.1	52.6	77.1	17.6	4.0	3.8	4.5	3.1	2.0	0.3	0.3
≥65 yrs												
2008	840.4	308.2	321.0	34.0	3.2	158.5	2.2	6.5	1.4	4.6	0.0	0.6
2009	865.3	324.0	336.1	34.1	4.0	152.5	2.2	6.0	1.6	3.7	0.1	1.1
2010	905.8	344.1	355.7	35.4	5.4	150.5	2.3	8.0	1.6	3.8	0.1	0.3

* Per 10,000 population.
† Diagnostic category for each MHD-related ED visit based on the category of the first-listed MHD *International Classification of Diseases, Ninth Revision, Clinical Modification* code.

Good mental health services require a system of care that includes EDs, hospitals, and ambulatory-care clinics that are adequately resourced. If the trends reported in this study continue to escalate, EDs, hospitals, and (most importantly) patients will be further burdened. The high numbers of ED visits and hospital admissions for patients with any type of MHD-DCs, for those aged ≥65 years (especially with dementia), and for those with low-acuity MHDs, indicate a need for system adjustment. Strategies are needed to counteract the effects of inpatient bed shortages and the increased volume of MHD-DC-related visits to EDs. Surveillance is the first step, because identifying trends in ED use by patients with MHDs can guide policies and procedures designed to reduce hospitalization, improve access to ambulatory care services, and develop new ways to care for the elderly with MHDs in the ED.

The findings in this report are subject to at least four limitations. First, ED visit data in NC DETECT are secondary data from hospital administrative and clinical data sources; diagnostic codes typically are extrapolated by hospital coders from the patient record. Second, the percentage of ED visits identified as having associated MHD-DCs probably is an underestimate; other coding studies have reported underestimation of medical disorders when relying solely on diagnostic codes. Third, some types of ED visits by patients with MHDs, such as visits attributed to involuntary commitment or those initiated by law enforcement, likely would not be prevented by better outpatient access. Finally, coder training and experience, clinician documentation, and billing practices affect diagnosis coding for all types of medical conditions (*9*). For this study, MHD-DCs were categorized into clinically coherent groups

What is already known on this topic?

The number of emergency department (ED) visits associated with mental health disorders (MHDs) is increasing in the United States. Patients with mental health disorders (MHDs) use the emergency department (ED) for acute psychiatric emergencies, for injuries and illnesses complicated by or related to their MHD, or when psychiatric or primary-care options are inaccessible or unavailable. EDs are an important part of the overall system providing health care for patients with MHDs.

What is added by this report?

In North Carolina during 2008–2010, 8.8% of ED visits were assigned at least one MHD diagnosis code (MHD-DC) among 11 possible, with a 2010 rate of 430 MHD-DC-related ED visits per 10,000 population. The rate of MHD-DC-related ED visits increased by 14.4%, whereas the rate of all ED visits increased by 2.1%, and the proportion of MHD-DC-related ED visits resulting in hospital admission was 2.3 times greater than that for all ED visits. Persons aged ≥65 years with MHD-DC-related diagnoses had the highest ED visit and admission rate of any age group.

What are the implications for public health practice?

The increasing numbers and rates of ED visits by patients with MHDs, especially the elderly, indicate a growing burden on the health-care delivery system. Standardized surveillance is needed to identify trends in ED use and the impact of any interventions.

by clinicians on the study team. A study reviewing ED visits for MHDs in New South Wales, Australia, using a similar classification methodology, resulted in almost identical ICD-9-CM categorization and frequencies of disorders (*10*).

Additional information about NC DETECT and ED visit data for North Carolina is available at http://www.ncdetect.org.

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Influenza Activity — United States, 2012–13 Season and Composition of the 2013–14 Influenza Vaccine

During the 2012–13 influenza season in the United States, influenza activity* increased through November and December before peaking in late December. Influenza A (H3N2) viruses predominated overall, but influenza B viruses and, to a lesser extent, influenza A (H1N1)pdm09 (pH1N1) viruses also were reported in the United States. This influenza season was moderately severe, with a higher percentage of outpatient visits for influenza-like illness (ILI), higher rates of hospitalization, and more reported deaths attributed to pneumonia and influenza compared with recent years. This report summarizes influenza activity in the United States during the 2012–13 influenza season (September 30, 2012–May 18, 2013) as of June 7, 2013, and reports the recommendations for the components of the 2013–14 Northern Hemisphere influenza vaccine.

Viral Surveillance

During September 30, 2012–May 18, 2013, World Health Organization and National Respiratory and Enteric Virus Surveillance System collaborating laboratories in the United States tested 311,333 specimens for influenza viruses; 73,130 (23%) were positive (Figure 1). Of the positive specimens, 51,675 (71%) were influenza A viruses, and 21,455 (29%) were influenza B viruses. Among the seasonal influenza A viruses, 34,922 (68%) were subtyped; 33,423 (96%) were influenza A (H3N2) viruses, and 1,497 (4%) were pH1N1 viruses. In addition, two variant influenza A (H3N2v) viruses were identified.†

Typically the influenza season is said to begin when certain key indicators remain elevated for a number of consecutive weeks. One of these indicators is the percent of respiratory specimens testing positive for influenza. The proportion of specimens testing positive for influenza during the 2012–13 season first exceeded 10% during the week ending November 10, 2012 (week 45), and peaked at 38% during the week ending December 29, 2012 (week 52).

Since the start of the 2012–13 season, influenza A (H3N2) viruses have predominated nationally, followed by influenza B viruses; pH1N1 viruses have been identified less frequently. The relative proportion of each type and subtype varied by geographic U.S. Department of Health and Human Services region§ and week. Influenza A viruses predominated until the end of February, with influenza B viruses predominating from the week ending February 23, 2013 (week 8) through the week ending May 18, 2013 (week 20).

Regional differences were observed in the timing of influenza activity and the relative proportions of circulating viruses. Using the percentage of specimens testing positive for influenza to determine the peak of influenza activity, Region 4 activity peaked earliest, during the week ending December 8, 2012 (week 49), and Region 9 activity peaked latest, during the week ending January 26, 2013 (week 4). The highest proportion of influenza B viruses was observed in Region 6 (42%) and the lowest proportion of influenza B viruses was detected in Region 1 (15%).

Novel Influenza A Viruses

During the 2012–13 influenza season, one case of human infection with a variant influenza A (H3N2) (H3N2v) virus was reported in each of two states, Minnesota and Iowa. Both infections occurred in children, one with known exposure to swine. Both patients recovered fully.

Antigenic Characterization

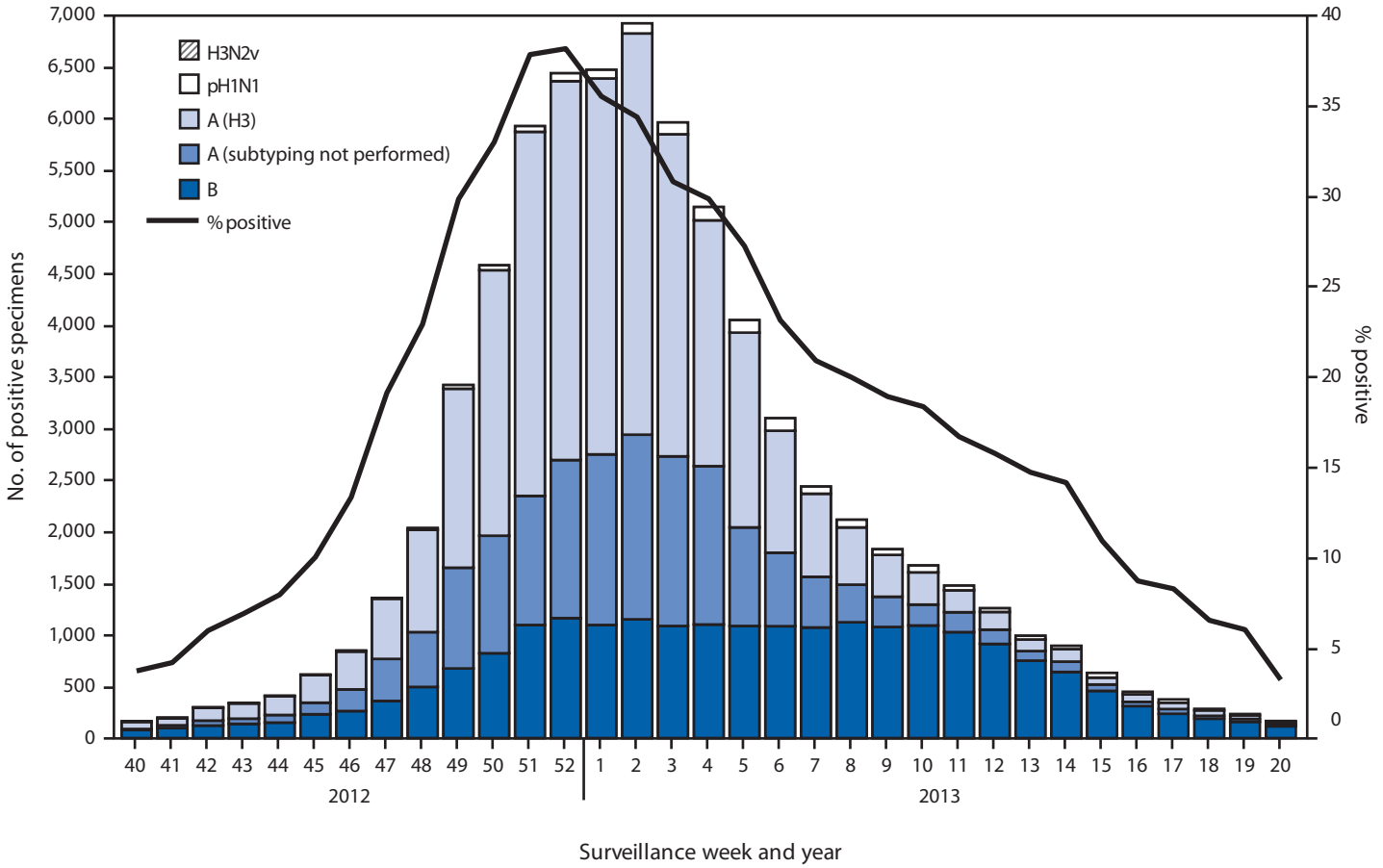
CDC has antigenically characterized 2,452 influenza viruses collected since October 1, 2012, and submitted by U.S. laboratories, including 252 pH1N1 viruses, 1,324 influenza A (H3N2) viruses, and 876 influenza B viruses. Of the 252 pH1N1 viruses tested, 249 (98.8%) were characterized as A/California/7/2009-like, the influenza A(H1N1) component of the 2012–13 influenza vaccine. Three viruses (1.2%) of the 252 tested showed reduced titers with ferret antiserum raised against A/California/7/2009. Of the 1,324 influenza A (H3N2) viruses, 1,319 (99.6%) were antigenically similar to the cell-propagated A/Victoria/361/2011 reference virus; most viruses tested were cell-propagated. The H3N2 vaccine component for the 2012–13 Northern Hemisphere season was egg-propagated A/Victoria/361/2011; the use of egg-propagated vaccine viruses is a current regulatory requirement for vaccine production. Five (0.4%) of the 1,324 tested showed reduced titers with antiserum produced against cell-propagated A/Victoria/361/2011.

* Additional information on influenza surveillance and reporting systems in the United States, methods, and levels of activity is available at http://www.cdc.gov/flu/weekly/overview.htm.

† Influenza viruses that normally circulate in pigs are called "variant" viruses when they are found in humans. Influenza A (H3N2) variant viruses ("H3N2v" viruses) with the matrix (M) gene from the 2009 H1N1 pandemic virus were first detected in humans in July 2011. Since then, 319 cases of H3N2v infection have been confirmed in humans, mostly associated with prolonged exposure to pigs at agricultural fairs.

§ Additional information available at http://www.hhs.gov/about/regionmap.html.

FIGURE 1. Number and percentage of respiratory specimens testing positive for influenza reported to CDC, by type and surveillance week and year — World Health Organization and National Respiratory and Enteric Virus Surveillance System collaborating laboratories, United States, September 30, 2012–May 18, 2013



Of the 876 influenza B viruses tested, 581 (66.3%) belonged to the B/Yamagata lineage, and were characterized as B/Wisconsin/1/2010-like, the influenza B component for the 2012–13 Northern Hemisphere influenza vaccine. A total of 295 (33.7%) viruses tested belonged to the B/Victoria lineage.

Resistance to Antiviral Medications

Since October 1, 2012, a total of 3,626 influenza virus specimens have been tested for antiviral resistance. All 961 influenza B viruses tested were sensitive to both oseltamivir and zanamivir. Among 2,123 influenza A (H3N2) viruses tested, one (0.05%) was found to be resistant to oseltamivir alone and one (0.05%) to both oseltamavir and zanamivir. Among the 542 pH1N1 viruses tested for resistance to oseltamivir, two (0.4%) were resistant, and all of the 258 viruses tested for resistance to zanamivir were sensitive. High levels of resistance to the adamantanes (amantadine and rimantadine) persist among influenza A viruses currently circulating globally (the adamantanes are not effective against influenza B viruses).

Composition of the 2013–14 Influenza Vaccine

The Food and Drug Administration's Vaccines and Related Biological Products Advisory Committee has recommended that the 2013–14 influenza trivalent vaccines used in the United States contain an A/California/7/2009(H1N1) pdm09-like virus, an A(H3N2) virus antigenically like the cell-propagated A/Victoria/361/2011 virus (A/Texas/50/2012), and a B/Massachusetts/2/2012-like (B/Yamagata lineage) virus. A/Texas/50/2012 is an egg-propagated A(H3N2) virus antigenically similar to cell-propagated A/Victoria/361/2011. The committee recommended that A/Texas/50/2012 be used as the H3N2 vaccine component because of antigenic changes in A/Victoria/361/2011 vaccine virus resulting from mutations acquired during growth in eggs. The committee also recommended that quadrivalent vaccines contain a B/Brisbane/60/2008-like (B/Victoria lineage) virus (*1*). These recommendations were based on global influenza virus surveillance data related to epidemiology, antigenic and genetic characteristics, and serological responses to 2012–13 seasonal vaccines, and the availability of candidate strains and reagents.

Outpatient Illness Surveillance

Nationally, the weekly percentage of outpatient visits for ILI[¶] to health-care providers participating in the U.S. Outpatient Influenza-Like Illness Surveillance Network (ILINet) exceeded the national baseline level of 2.2% for 15 weeks during the 2012–13 influenza season (Figure 2). The peak percentage of outpatient visits for ILI was 6.1%, and occurred in the week ending December 29, 2012 (week 52). In contrast, the peak percentage of outpatient visits for ILI during the previous influenza season (2011–12) was 2.4% and occurred in mid-March. During the 2007–08 and 2010–11 influenza seasons, both of which had influenza A (H3N2) virus as the predominant circulating virus, the peak percentage of outpatient visits for ILI was 6.0% and 4.6%, respectively; both peaks occurred in mid-February. During the 2012–13 season, on a regional level, the percentage of visits for ILI exceeded region-specific baselines in all 10 regions. ILINet data are used to produce a weekly state-level measure of ILI activity varying from minimal to high: the number of states experiencing high ILI activity peaked during the week ending December 29, 2012 (week 52) with 35 states.

State-Specific Activity Levels

State and territorial epidemiologists report the geographic distribution of influenza in their states through a weekly influenza activity code. The geographic distribution of influenza activity was most extensive during the week ending January 12, 2013 (week 2), when 48 states reported widespread influenza activity and two states reported regional influenza activity. The week ending May 18, 2013 (week 20) was the first week no state or territory reported regional or widespread influenza activity. The number of states reporting widespread or regional activity during the peak week of activity has ranged from 20 to 50 states during the previous four influenza seasons (Influenza Division, CDC, unpublished data, 2013).

Influenza-Associated Hospitalization

CDC monitors hospitalizations associated with laboratory-confirmed influenza virus infections using the FluSurv-NET** surveillance system. Cumulative hospitalization rates (per 100,000 population) were calculated by age group based on 12,337 total hospitalizations resulting from influenza during October 1, 2012–April 30, 2013. Among 12,293 cases with influenza type specified, 9,767 (79.2%) were associated with influenza A and 2,492 (20.2%) with influenza B; and 34 (0.3%) were associated with influenza A and influenza B co-infections; 44 (0.4%) had no virus type information available. Persons aged ≥65 years accounted for approximately 50% of reported cases. The cumulative incidence[††] for all age groups since October 1, 2012, was 44.3 per 100,000 (Figure 3). The cumulative hospitalization rate (per 100,000 population) by age group for this period was 66.2 (0–4 years), 14.5 (5–17 years), 16.4 (18–49 years), 41.2 (50–64 years), and 191.2 (≥65 years). During the past four influenza seasons, age-specific hospitalization rates ranged from 15.8 to 72.8 (0–4 years), 4.0 to 27.3 (5–17 years), 3.6 to 23.1 (18–49 years), 5.1 to 30.8 (50–64 years), and 13.5 to 65.9 (≥65 years).

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 influenza activity varies by geographic location and season.

What is added by this report?

During the 2012–13 influenza season, influenza A (H3N2), influenza A (H1N1)pdm09, and influenza B viruses cocirculated. In addition, two cases of infection with variant influenza A viruses were reported in the United States. Compared with recent influenza seasons, this season had a higher percentage of outpatient visits for influenza-like illness, higher rates of hospitalizations, and more deaths attributed to pneumonia and influenza.

What are the implications for public health practice?

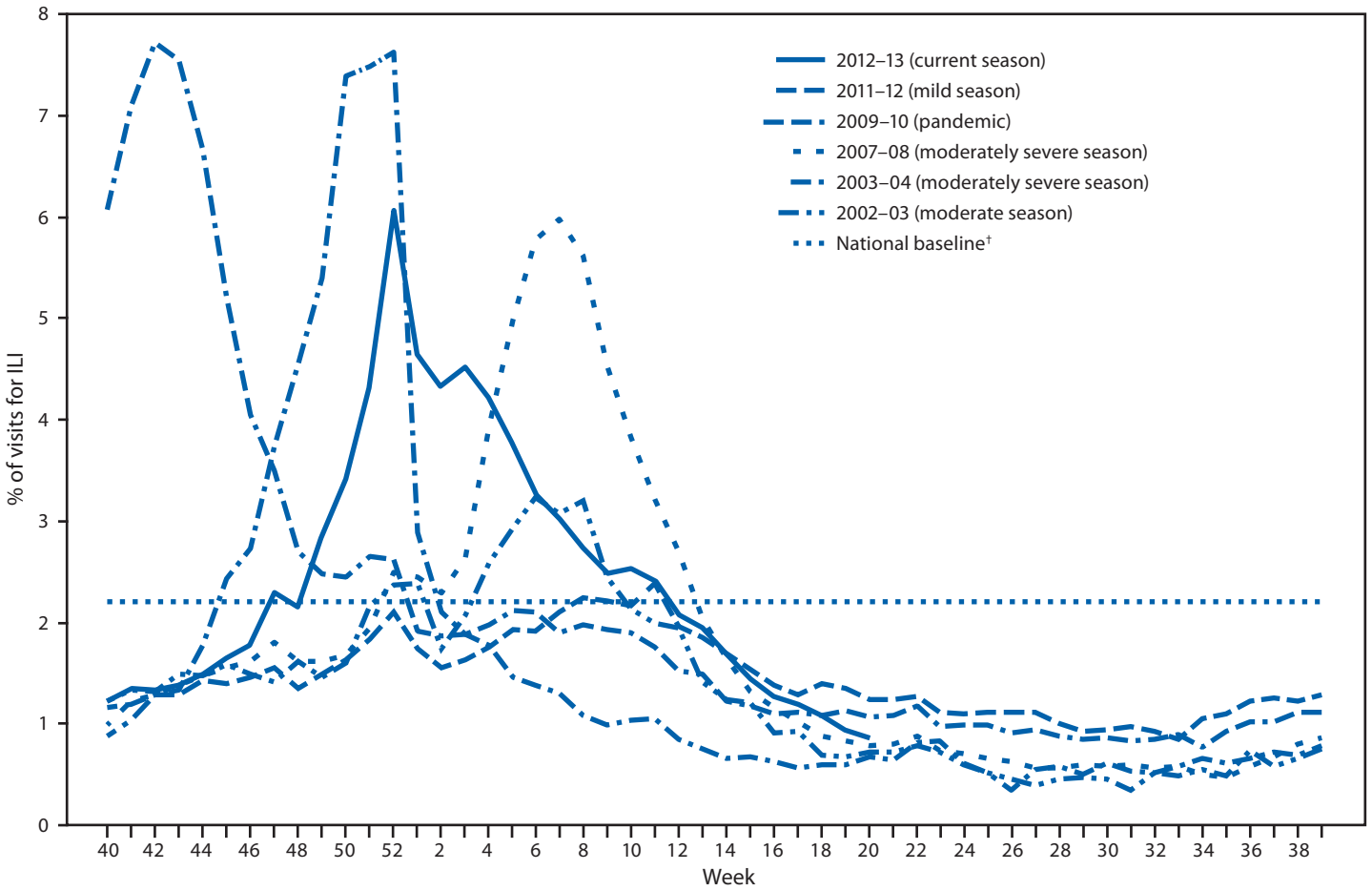
All unvaccinated persons aged ≥6 months should be offered influenza vaccine throughout the influenza season. In addition, timely empiric antiviral treatment is recommended for patients with severe, complicated, or progressive influenza illness; those at higher risk for influenza complications; or those for whom treatment can be started within 48 hours of illness onset. In addition, influenza surveillance, including for novel influenza viruses, should continue through the summer months, and physicians should consider influenza as a cause of respiratory illness outside of the typical season.

[¶] Defined as a temperature of ≥100.0°F (≥37.8°C), oral or equivalent, and cough or sore throat, in the absence of a known cause other than influenza.

** FluSurv-NET covers approximately 80 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 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; and Iowa, Michigan, Ohio, Rhode Island, and Utah during the 2012–13 season.

[††] Incidence rates are calculated using 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 underused because of the poor reliability of rapid test results and greater reliance on clinical diagnosis for influenza. As a consequence, cases identified as part of influenza hospitalization surveillance likely are an underestimation of the actual number of persons hospitalized with influenza.

FIGURE 2. Percentage of visits for influenza-like illness (ILI)* reported to CDC, by surveillance week and year — U.S. Outpatient Influenza-Like Illness Surveillance Network, United States, September 30, 2012–May 18, 2013, and selected previous seasons



* Defined as a temperature of ≥100.0°F (≥37.8°C), oral or equivalent, and cough or sore throat, in the absence of a known cause other than influenza.

† The national baseline is 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 two or more consecutive weeks in which each week accounted for <2% of the season's total number of specimens that tested positive for influenza. Use of the national baseline for regional data is not appropriate.

As of June 1, 2013, among the FluSurv-NET adult patients for whom medical chart data were available, the most frequent underlying conditions were chronic lung disease (27%), cardiovascular disease (45%), and metabolic disorders (39%). Among children hospitalized with laboratory-confirmed influenza and for whom medical chart data were available, 46% did not have any recorded underlying conditions, and 22% had underlying asthma or reactive airway disease. Among the 819 hospitalized women of childbearing age (15–44 years), 233 (28%) were pregnant.

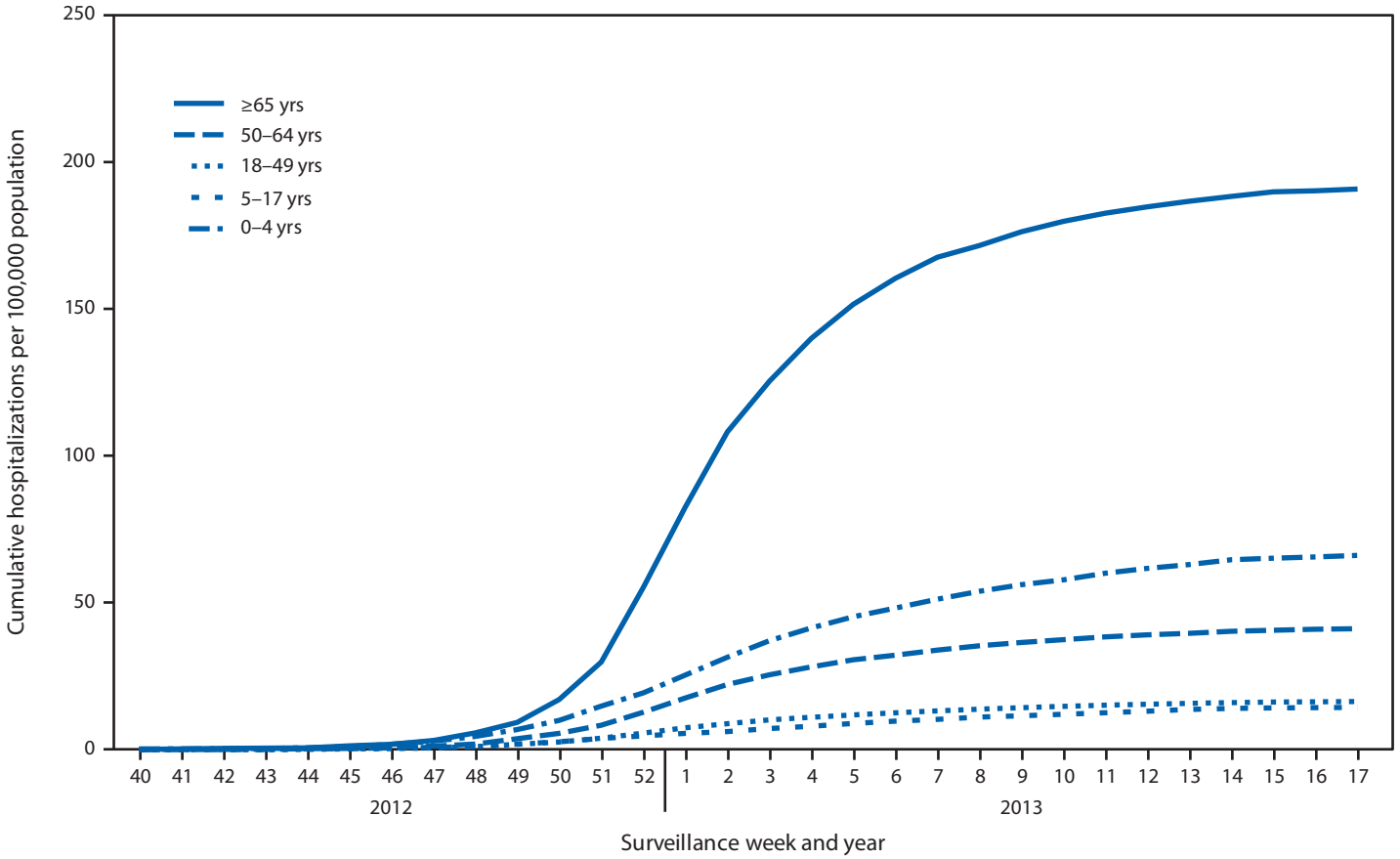
Pneumonia- and Influenza-Related Mortality

During the 2012–13 influenza season, the percentage of deaths attributed to pneumonia and influenza (P&I) exceeded the epidemic threshold for 13 consecutive weeks spanning December 30, 2012 to March 30, 2013 (weeks 1–13). The percentage of deaths attributed to P&I peaked at 9.9% during the week ending January 19, 2013 (week 3) (Figure 4). From the 2008–09 season through the 2011–12 season, the peak percentage of P&I deaths ranged from 7.9% to 9.1%, and the total number of consecutive weeks at or above the epidemic threshold ranged from 1 to 13 (Influenza Division, CDC, unpublished data, 2013).

Influenza-Related Pediatric Mortality

For the 2012–13 influenza season, 149 laboratory-confirmed, influenza-associated pediatric deaths were reported. These deaths were reported from 38 states. The states with the greatest numbers of deaths were Texas (18), New York (14), and Florida (eight). The deaths included 11 children aged <6 months, 20 aged 6–23 months, 20 aged 2–4 years, 52 aged 5–11 years, and 46 aged 12–17 years; mean and median ages were 8.2 years and 8.1 years, respectively. Among the 149 deaths, 79 were associated with influenza B viruses,

FIGURE 3. Cumulative hospitalization rates for laboratory-confirmed influenza, by age group and surveillance week and year — FluSurv-NET* surveillance system, United States, October 1, 2012–April 30, 2013



32 with influenza A (H3) viruses, four with pH1N1 viruses, 31 with an influenza A virus for which the subtype was not determined, one with an influenza virus for which the type was not determined, and two with both an influenza B and influenza A virus.

Since influenza-associated pediatric mortality became a nationally notifiable condition in 2004, the total number of influenza-associated pediatric deaths has previously ranged from 34 to 123 per season; this excludes the 2009 pandemic, when 348 pediatric deaths were reported to CDC during April 15, 2009, through October 2, 2010.

Reported by

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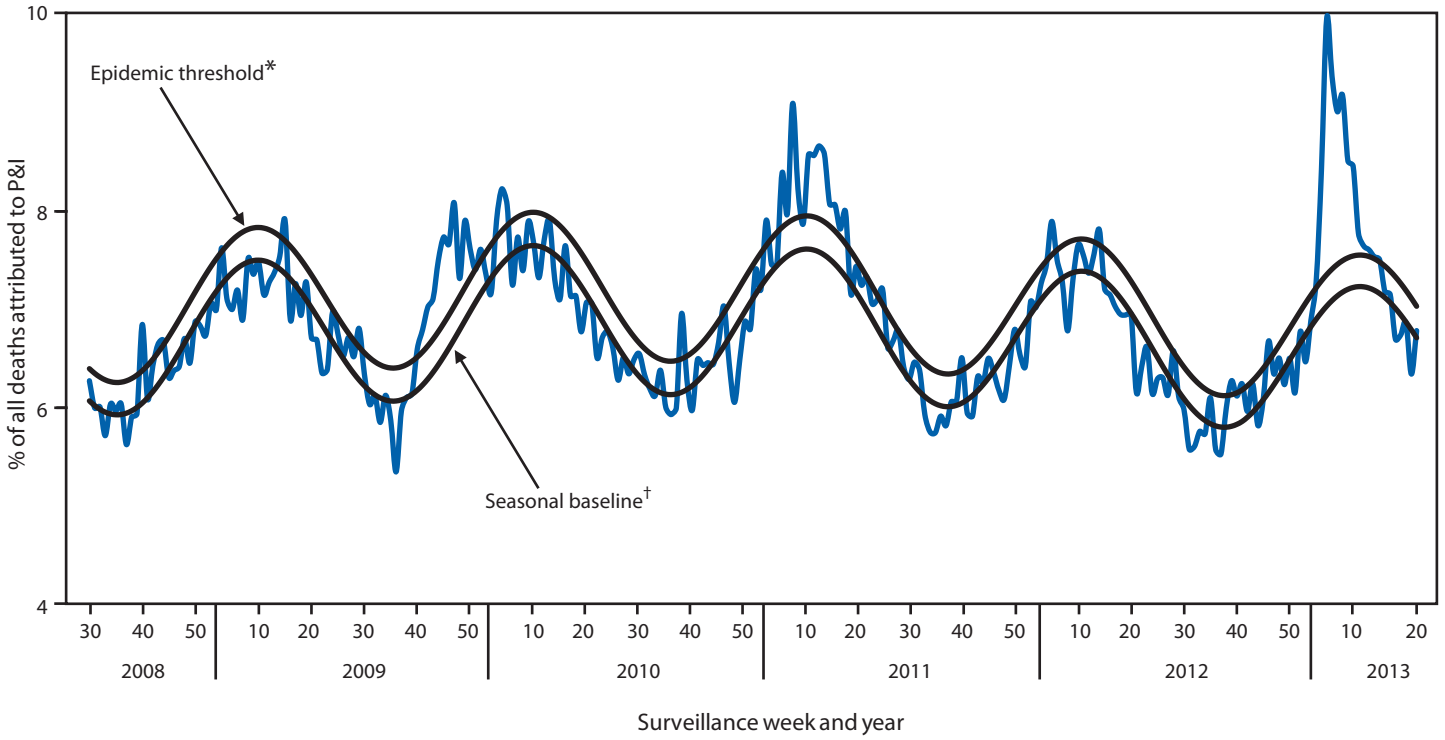
Editorial Note

The 2012–13 influenza season peaked early and was a moderately severe season, with influenza A (H3N2) viruses predominating. Activity peaked in late December, and influenza A (H3N2) viruses were most commonly reported through the week ending February 16, 2013 (week 7). From the week ending February 23, 2013 (week 8), through the end of the season, influenza B viruses were more commonly reported. The majority of all influenza viruses in specimens sent to CDC for further antigenic characterization were similar to the components of the 2012–13 Northern Hemisphere vaccine.

The peak percentage of outpatient visits for ILI (6.1%) was one of the highest reported since the system began in its current format in 1997. For comparison, the peak percentage of visits for ILI during those 15 seasons ranged from 2.4% for the 2011–12 season to 7.7% during the 2009 H1N1 pandemic. The number and rate of influenza-associated hospitalizations

FIGURE 4. Percentage of all deaths attributable to pneumonia and influenza (P&I), by surveillance week and year — 122 Cities Mortality Reporting System, United States, 2008–May 18, 2013



* The epidemic threshold is 1.645 standard deviations above the seasonal baseline.
† The seasonal baseline is projected using a robust regression procedure that applies a periodic regression model to the observed percentage of deaths from P&I during the preceding 5 years.

among adults aged ≥65 years during the 2012–13 influenza season are the highest since systematic data collection on laboratory-confirmed, influenza-associated hospitalization in adults began in the 2005–06 season. Hospitalization rates for those aged ≥65 years were 191 per 100,000 population, two and a half times the highest rate previously reported for this age group. With the exception of the 2009 H1N1 pandemic, the number of influenza-associated pediatric deaths reported to CDC for the 2012–13 season was the highest reported since data collection began in 2004. Reported P&I mortality exceeded the epidemic threshold for 13 consecutive weeks. Based on the percentage of specimens testing positive for influenza, the peak of influenza activity for the 2012–13 season, occurring during the week ending December 29, 2012 (week 52), was similar to the 2003–04 season, which peaked during the week ending November 30, 2003 (week 48), and was the earliest since the 2009 H1N1 pandemic, when activity peaked during the week ending October 24, 2009 (week 42).

On March 31, 2013, Chinese health authorities reported a novel avian influenza A (H7N9) virus causing human infection. As of June 7, 2013, 132 cases have been confirmed; many of the infected people are reported to have had close contact with poultry. The virus has only been seen in mainland China and Taiwan; no cases have been reported in the United States. Unlike the variant influenza A (H3N2)v virus associated with swine exposure in the United States, which generally caused mild illness, the avian influenza A (H7N9) virus has caused severe illness in the majority of cases in humans, and approximately 27% of identified cases have been fatal (*2*).

Testing for seasonal influenza viruses and monitoring for novel influenza A virus infections should continue year-round, as should specimen submission to CDC for further antigenic and genetic analysis and antiviral resistance monitoring. A total of 308 infections with variant influenza viruses (304 H3N2v viruses, three H1N2v viruses, and one H1N1v virus) were reported from 10 states during the summer and fall of 2012, before the start of the 2012–13 influenza season, and two cases of H3N2v were detected during the 2012–13 season. The H3N2v virus circulated in pigs in 2010 and was first detected in humans in 2011, when 12 cases were identified. Most of these infections occurred in children with prolonged exposure to pigs at agricultural fairs. Limited human-to-human spread of this virus was detected, but no sustained community spread of H3N2v was identified (*3*). However, this increase in H3N2v cases in 2012,

and the recent emergence of the novel avian influenza A (H7N9) virus in China, further emphasizes the importance of continuing to monitor for novel influenza A viruses.

Although summer influenza activity in the United States typically is low, cases of influenza and even sporadic outbreaks are detected in the United States throughout the summer. Health-care providers should remain vigilant and consider influenza as a potential cause of summer respiratory illnesses. They also should consider novel influenza viruses in persons with ILI and swine exposure, and those with severe acute respiratory infection after travel to China. Public health laboratories should immediately send to CDC virus specimens that they cannot type or subtype using standard methods and submit all specimens that are otherwise unusual, including all summer specimens, as soon as possible after identification.

Since 2010, CDC has recommended annual influenza vaccination for all persons aged ≥6 months, preferably in the fall before the U.S. influenza season begins (*4*). However, during other times of the year, persons who have not received the vaccine for the current season should be vaccinated before traveling to parts of the world where influenza activity is ongoing. This is particularly important for persons at high risk for influenza-related complications.[§§] This recommendation also applies to persons traveling within the temperate regions of the Southern Hemisphere or as part of large tourist groups (e.g., on cruise ships) that might include persons from other parts of the world where influenza activity is ongoing (*5*). Persons should be vaccinated at least 2 weeks before travel for immunity to develop. Travelers also should be aware that all Northern Hemisphere influenza vaccine manufactured for the 2012–13 season expires by June 30, 2013, after which influenza vaccines will not be available in the United States until the 2013–14 vaccine is available in the fall.

As a supplement to vaccination, influenza antiviral drugs are an important adjunct to reduce the impact of influenza. Based on recommendations of the Advisory Committee on Immunization Practices, antiviral treatment is recommended as soon as possible 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-related complications (*6*). Antiviral treatment also may be considered for outpatients with confirmed or suspected influenza who do not have known risk factors for severe illness if treatment can be initiated within 48 hours of illness onset. In addition, if a clinician does suspect that a patient might have an infection caused by a novel influenza virus, prompt empiric antiviral therapy is recommended. Recommended antiviral medications include oseltamivir and zanamivir. Recent viral surveillance and resistance data indicate that the majority of currently circulating influenza viruses are sensitive to these medications. Amantadine and rimantadine should not be used because of sustained high levels of resistance to these drugs among circulating influenza A viruses.

[§§] Additional information available at http://www.cdc.gov/flu/about/disease/high_risk.htm.

Acknowledgments

Participating state, city, county, and territorial health departments and public health laboratories; US World Health Organization collaborating laboratories; National Respiratory and Enteric Virus Surveillance System collaborating laboratories; US Outpatient Influenza-Like Illness Surveillance Network; Influenza Hospitalization Surveillance Network; Influenza-Associated Pediatric Mortality Surveillance System; 122 Cities Mortality Reporting System.

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Update: Severe Respiratory Illness Associated with Middle East Respiratory Syndrome Coronavirus (MERS-CoV) — Worldwide, 2012–2013

On June 7, 2013, this report was posted as an MMWR *Early Release on the* MMWR *website (http://www.cdc.gov/mmwr).*

CDC continues to work in consultation with the World Health Organization (WHO) and other partners to better understand the public health risk posed by the Middle East Respiratory Syndrome Coronavirus (MERS-CoV), formerly known as novel coronavirus, which was first reported to cause human infection in September 2012 (*1–4*). The continued reporting of new cases indicates that there is an ongoing risk for transmission to humans in the area of the Arabian Peninsula. New reports of cases outside the region raise concerns about importation to other geographic areas. Nosocomial outbreaks with transmission to health-care personnel highlight the importance of infection control procedures. Recent data suggest that mild respiratory illness might be part of the clinical spectrum of MERS-CoV infection, and presentations might not initially include respiratory symptoms. In addition, patients with comorbidities or immunosuppression might be at increased risk for infection, severe disease, or both. Importantly, the incubation period might be longer than previously estimated. Finally, lower respiratory tract specimens (e.g., sputum, bronchoalveolar lavage, bronchial wash, or tracheal aspirate) should be collected in addition to nasopharyngeal sampling for evaluation of patients under investigation. An Emergency Use Authorization (EUA) was recently issued by the Food and Drug Administration (FDA) to allow for expanded availability of diagnostic testing in the United States.

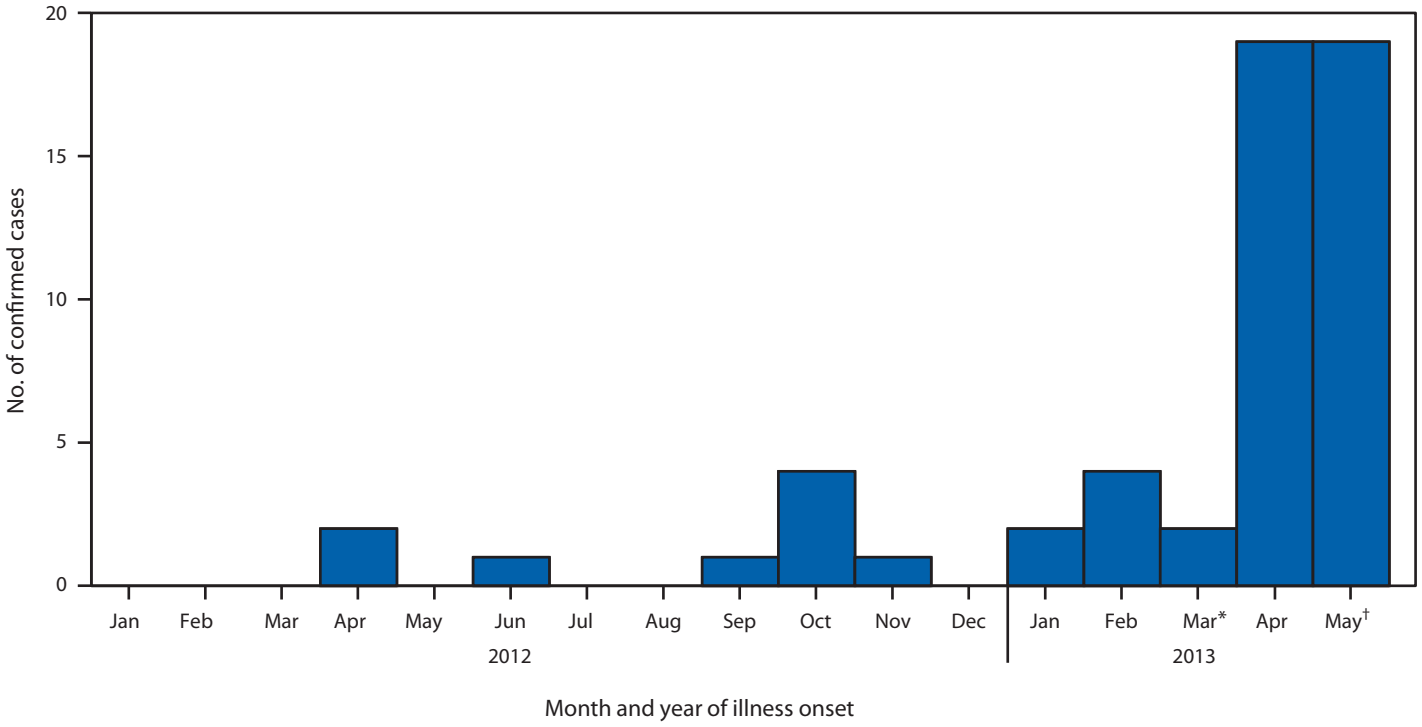
As of June 7, 2013, a total of 55 laboratory-confirmed cases have been reported to WHO. Illness onsets have occurred during April 2012 through May 29, 2013 (Figure 1). All reported cases were directly or indirectly linked to one of four countries: Saudi Arabia, Qatar, Jordan, and the United Arab Emirates (Figure 2). Most cases (40) were reported by Saudi Arabia. Four countries, the United Kingdom (UK), Italy, France, and Tunisia, have reported cases in returning travelers and their close contacts (*5–8*). Ill patients from Qatar and the United Arab Emirates have been transferred to hospitals in the UK and Germany. To date, no cases have been reported in the United States. WHO and CDC have not issued any travel advisories at this time; updated information for travelers to the Arabian Peninsula is available at http://wwwnc.cdc.gov/travel/notices/watch/coronavirus-arabian-peninsula.

The median age of patients is 56 years (range: 2–94 years), with a male-to-female ratio of 2.6 to 1.0. All patients were aged ≥24 years, except for two children, one aged 2 years and one aged 14 years. All patients had respiratory symptoms during their illness, with the majority experiencing severe acute respiratory disease requiring hospitalization. Thirty-one of the 55 patients are reported to have died (case-fatality rate: 56%) (*5–8*). Two cases in Tunisia, in siblings whose father's illness was a probable case, and a case from the UK, were in persons with mild respiratory illnesses who were not hospitalized (*5,9*). Information was not available for all cases; however, several patients had accompanying gastrointestinal symptoms, including abdominal pain and diarrhea, and many cases occurred among persons with chronic underlying medical conditions or immunosuppression, as reported to WHO (*5,9*).

The original source(s), route(s) of transmission to humans, and the mode(s) of human-to-human transmission have not been determined. Eight clusters (42 cases) have been reported by six countries (France, Italy, Jordan, Saudi Arabia, Tunisia, and the UK) (*5*) among close contacts or in health-care settings and provide clear evidence of human-to-human transmission of MERS-CoV. The first documented patient-to-patient nosocomial transmission in Europe was confirmed recently in France (*10*). The first French patient, a man aged 64 years with a history of renal transplantation, became ill on April 22, 2013, within 1 week after returning from Dubai. He presented with fever and diarrhea. Pneumonia was diagnosed incidentally on radiographic imaging, and he subsequently died with severe respiratory disease. The secondary case is in a man aged 51 years on long-term corticosteroids who shared a room with the index patient during April 26–29 and who remains hospitalized on life support. The incubation period for the secondary case was estimated to be 9–12 days; this is longer than the previously estimated 1–9 days (*10*). A larger cluster, consisting of 25 cases including 14 deaths, ongoing since April 2013 in the region of Al-Ahsa in eastern Saudi Arabia, also has included cases linked to a health-care facility (*5*). Cases have included health-care personnel and family contacts. An additional five cases, not linked to the cluster in Al-Ahsa, were reported recently in another region of eastern Saudi Arabia (*5*). Thus far, no evidence of sustained community transmission beyond the clusters has been reported in any country.

In some instances, sampling with nasopharyngeal swabs did not detect MERS-CoV by polymerase chain reaction (PCR); however, MERS-CoV was detected by PCR in lower respiratory tract specimens from these same patients. In the two patients reported by France, nasopharyngeal specimens were weakly positive or inconclusive, whereas bronchoalveolar lavage and induced sputum were positive (*10*).

FIGURE 1. Number of confirmed cases of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) (N = 55) reported as of June 7, 2013, to the World Health Organization, by month of illness onset — worldwide, 2012–2013



* Case count for March assumes that the two cases included in the March 23, 2013 WHO announcement had symptom onset during March 2013.
† Case count for May 2013 assumes that six recently reported cases had symptom onset during May 2013.

CDC Guidance

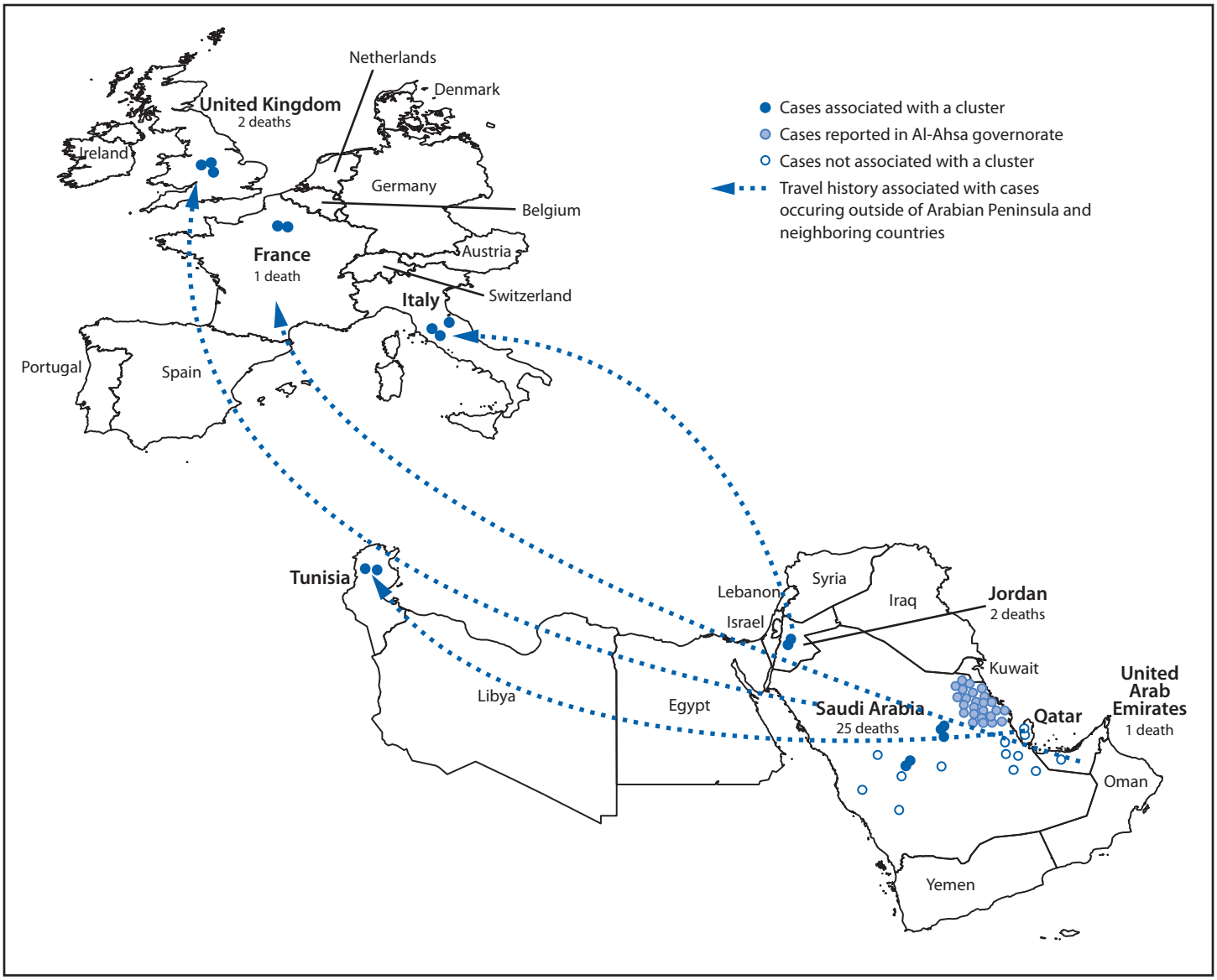
In consultation with WHO, the period for considering evaluation for MERS-CoV infection in persons who develop severe acute lower respiratory illness days after traveling from the Arabian Peninsula or neighboring countries* has been extended from within 10 days to within 14 days of travel. Persons who develop severe acute lower respiratory illness within 14 days after traveling from the Arabian Peninsula or neighboring countries should be evaluated according to current guidelines (available at http://www.cdc.gov/coronavirus/mers/case-def.html). Persons whose respiratory illness remains unexplained and who meet criteria for "patient under investigation" should be reported immediately to CDC through state and local health departments. Persons who develop severe acute lower respiratory illness who are close contacts† of a symptomatic traveler who developed fever and acute respiratory illness within 14 days of traveling from the Arabian Peninsula or neighboring countries may be considered for evaluation for MERS-CoV. In addition, CDC recommends that clusters of severe acute respiratory illness be investigated and, if no obvious etiology is identified, local public health officials be notified and testing for MERS-CoV conducted, if indicated.

To increase the likelihood of detecting MERS-CoV, CDC recommends collection of specimens from different sites (e.g., a nasopharyngeal swab and a lower respiratory tract specimen, such as sputum, bronchoalveolar lavage, bronchial wash, or tracheal aspirate). Specimens should be collected at different times after symptom onset, if possible. Lower respiratory tract specimens should be a priority for collection and PCR testing; stool specimens also may be collected. Specimens should be collected with appropriate infection control precautions (available at http://www.cdc.gov/coronavirus/mers/case-def.html).

Testing of specimens for MERS-CoV currently is being conducted at CDC. FDA issued an EUA on June 5, 2013, to authorize use of CDC's novel coronavirus 2012 real-time reverse transcription–PCR assay (NCV-2-12 rRT-PCR assay) to test for MERS-CoV in clinical respiratory, blood, and stool specimens. This EUA is needed because, at this time, there are no FDA-approved tests that identify MERS-CoV in clinical specimens. This assay will be deployed to Laboratory Response

* Countries considered to be on or neighboring the Arabian Peninsula include Bahrain, Iraq, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Palestinian Territories, Qatar, Saudi Arabia, Syria, the United Arab Emirates, and Yemen.
† Close contacts are defined as 1) persons who provided care for the patient, including health-care personnel and family members, or who had other similarly close physical contact, or 2) persons who stayed at the same place (e.g., lived with or visited) as the patient while the patient was ill.

FIGURE 2. Confirmed cases* of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) (N =55) reported as of June 7, 2013, to the World Health Organization, and history of travel from the Arabian Peninsula or neighboring countries within 14 days of illness onset — worldwide, 2012–2013



* Dots representing the cases are not geographically representative of the exact location of the residence of the patient.

Network (LRN) laboratories in all 50 states over the coming weeks. Updated information about laboratories with the capacity to conduct MERS testing with the NCV-2-12 rRT-PCR assay will be provided on CDC's MERS website (http://www.cdc.gov/coronavirus/mers/case-def.html).

In consultation with WHO, the definition of a probable case of MERS-CoV infection has been updated to also include persons with severe acute respiratory illness with no known etiology with an epidemiologic link to a confirmed case of MERS-CoV infection. Until the transmission characteristics of MERS-CoV are better understood, patients under investigation and probable and confirmed cases should be managed in health-care facilities using standard, contact, and airborne precautions. As information becomes available, these recommendations will be reevaluated and updated as needed.

Recommendations and guidance on case definitions, infection control (including use of personal protective equipment), case investigation, and specimen collection and testing, are available at the CDC MERS website (http://www.cdc.gov/coronavirus/mers/index.html). The MERS website contains the most current information and guidance, which is subject to change. State and local health departments with questions should contact the CDC Emergency Operations Center (770-488-7100).

Reported by

Div of Global Migration and Quarantine, Div of Healthcare Quality Promotion, National Center for Emerging and Zoonotic Infectious Diseases; Office for Emergency Preparedness and Response, National Institute of Occupational Safety and Health; Div of Global Health Protection (proposed), Center for Global Health; Div of Viral Diseases, National Center for Immunization and Respiratory Diseases; Paul A. Gastañaduy, MD, EIS Officer, CDC. ***Correspondence:*** *eocreport@cdc.gov, 770-488-7100.*

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Notes from the Field

Outbreak of Poliomyelitis — Somalia and Kenya, May 2013

On May 9, 2013, the Somalia Ministry of Health and the World Health Organization (WHO) reported a confirmed wild poliovirus type 1 (WPV1) case in a girl aged 32 months from Mogadishu (Banadir Region), with onset of acute flaccid paralysis (AFP) on April 18, 2013. Subsequently, eight additional WPV1 cases have been confirmed in Somalia, seven in Banadir Region and one in Bay Region. These are the first reported polio cases in Somalia since March 2007.

On May 16, 2013, the Kenya Ministry of Public Health and Sanitation and WHO reported a confirmed WPV1 case with onset on April 30, 2013, in a girl aged 4 months from the Dadaab refugee camps near the Somalia border. Four additional cases were confirmed in the camps. These are the first reported polio cases in Kenya since July 2011. All data are as of June 11, 2013.

Genetic sequence analysis of isolates from both countries indicates the isolates are closely related, with evidence of a single introduction of virus into the region and subsequent local transmission before detection. These viruses are both closely related to WPV1 currently circulating in West Africa.

In Somalia, a rapid response polio supplementary immunization activity (SIA) was conducted May 14–17 in all 16 districts of Banadir Region. A subsequent SIA was conducted May 26–29 in a larger geographic area of Somalia, and SIAs are planned for June, July, and August. In Kenya, the first SIA in the Dadaab refugee camps and the surrounding three districts was conducted May 27–30. Subsequent SIAs with increasing geographic coverage in Kenya are planned for June, July, and August. Preventive SIAs are being conducted in areas of Ethiopia and Yemen, and surveillance for AFP is being strengthened in all countries in the Horn of Africa.

Poliovirus is spread person-to-person through fecal-oral contact and through contaminated water. For every WPV1 case with paralysis, approximately 200 asymptomatic infected susceptible persons are also shedding poliovirus (*1*). In 2012, only 223 polio cases were reported globally, the fewest ever reported in a calendar year (*2*). As of June 11, a total of 50 polio cases had been reported in 2013 globally, compared with 67 cases reported during the same period in 2012 (*3*).

CDC recommends that all international travelers complete polio vaccination before travel. For travelers to countries with designated polio risk, including Ethiopia, Kenya, and Somalia, CDC recommends an additional polio vaccine booster dose (*4*). CDC has issued guidelines requiring that all refugees from Kenya scheduled for U.S. resettlement receive 3 doses of oral polio vaccine regardless of age before departure for the United States, with a 2-week hold after the third dose. CDC also recommends that all refugees from Kenya who have arrived since the beginning of April 2013 receive 1 inactivated poliovirus vaccine dose regardless of vaccination history.

Reported by

World Health Organization. Div of Global Migration and Quarantine, National Center for Emerging and Zoonotic Infectious Diseases; Div of Viral Diseases, National Center for Immunization and Respiratory Diseases; Global Immunization Div, Center for Global Health, CDC. ***Corresponding contributors:*** *Derek Ehrhardt, dehrhardt@cdc.gov, 404-310-5650; Nina Marano, nmarano@cdc.gov, 404-319-9618.*

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Announcement

Recommendations Regarding Tobacco Use and Secondhand Smoke Exposure from the Community Preventive Services Task Force

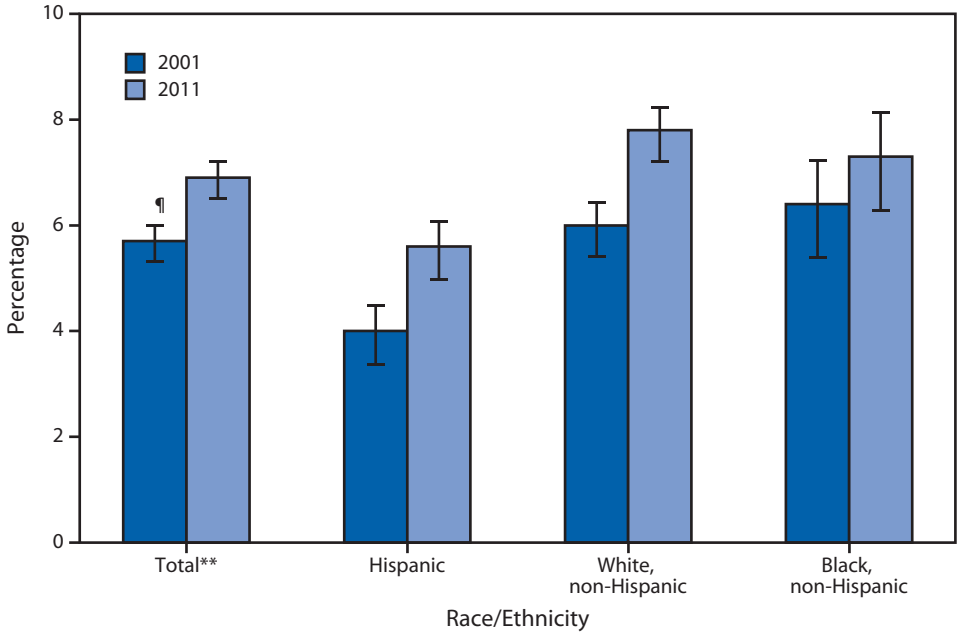
The Community Preventive Services Task Force recently posted new information about two recommendations: 1) "Reducing Tobacco Use and Secondhand Smoke Exposure: Reducing Out-of-Pocket Costs for Evidence-Based Tobacco Cessation Treatments," available at http://www.thecommunityguide.org/tobacco/outofpocketcosts.html, and 2) "Reducing Tobacco Use and Secondhand Smoke Exposure: Quitline Interventions," available at http://www.thecommunityguide.org/tobacco/quitlines.html.

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

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Persons Aged <18 Years Who Received Special Educational or Early Intervention Services,* by Race/Ethnicity† — National Health Interview Survey, United States, 2001 and 2011§



* Based on response to the question, "Do any of the following [family members aged <18 years] receive special educational or early intervention services?" Special educational and early intervention services are designed to meet the needs of a child with special needs or disabilities and are provided by the state or school system at no cost to the parent. Early intervention services might include, but are not limited to, medical and social services, parental counseling, and therapy.

† Persons of Hispanic ethnicity might be of any race or combination of races.

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

¶ 95% confidence interval.

** Includes other races not shown separately.

From 2001 to 2011, the percentage of children aged <18 years who were receiving special educational or early intervention services increased overall and among Hispanic and non-Hispanic white children, no change was observed among non-Hispanic black children. In 2001 and 2011, Hispanic children were less likely than non-Hispanic white and non-Hispanic black children to receive these services.

Sources: Barnes PM, Adams PF, Schiller JS. Summary health statistics for the U.S. population: National Health Interview Survey, 2001. Vital Health Stat 2003;10(217). Available at http://www.cdc.gov/nchs/data/series/sr_10/sr10_217.pdf.

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Data presented by the Notifiable Disease Data Team and 122 Cities Mortality Data Team in the weekly *MMWR* are provisional, based on weekly reports to CDC by state health departments. Address all inquiries about the *MMWR* Series, including material to be considered for publication, to Editor, *MMWR* Series, Mailstop E-90, CDC, 1600 Clifton Rd., N.E., Atlanta, GA 30333 or to *mmwrq@cdc.gov.*

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