Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Weekly / Vol. 62 / No. 24
June 21, 2013

National HIV Testing Day — June 27, 2013

National HIV Testing Day, June 27, promotes the importance of testing in detecting, treating, and preventing human immunodeficiency virus (HIV) infection. HIV testing is the essential entry point to a continuum of prevention, health-care, and social services that improve the quality of life and the length of survival for persons with HIV (*1*). Persons with HIV who receive appropriate treatment, monitoring, and health care also reduce their chances of transmitting HIV to others. CDC recommends that all persons aged 13–64 years be screened for HIV in health-care settings located in areas where the prevalence of undiagnosed HIV infection is >0.1%, and that persons with increased risk for HIV be retested at least annually (*2*).

In April 2013, the U.S. Preventive Services Task Force updated its 2005 guidelines on HIV screening, to recommend that clinicians screen all persons aged 15–65 years for HIV infection at least once, regardless of their risk; that younger adolescents and older adults with increased risk also be screened; and that persons with increased risk be screened more frequently (*3*). These updated recommendations are based on increasing evidence of the benefits of early antiretroviral therapy for HIV-infected persons and its effectiveness in preventing HIV transmission. Additional information is available at http://www.uspreventiveservicestaskforce.org/uspstf13/hiv/hivfinalrs.htm#summary, http://www.cdc.gov/features/hivtesting, and http://www.hivtest.cdc.gov.

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Detection of Acute HIV Infection in Two Evaluations of a New HIV Diagnostic Testing Algorithm — United States, 2011–2013

The highly infectious phase of acute human immunodeficiency virus (HIV) infection, defined as the interval between the appearance of HIV RNA in plasma and the detection of HIV-1–specific antibodies, contributes disproportionately to HIV transmission (*1*). The current HIV diagnostic algorithm consists of a repeatedly reactive immunoassay (IA), followed by a supplemental test, such as the Western blot (WB) or indirect immunofluorescence assay (IFA). Because current laboratory IAs detect HIV infection earlier than supplemental tests, reactive IA results and negative supplemental test results very early in the course of HIV infection have been erroneously interpreted as negative (*2*). To address this problem, CDC has been evaluating a new HIV diagnostic algorithm (*3*). This report describes two evaluations of this algorithm. An HIV screening program at a Phoenix, Arizona emergency department (ED) identified 37 undiagnosed HIV infections during July 2011–February 2013. Of these, 12 (32.4%) were acute HIV infections. An ongoing HIV testing study in three

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sites identified 99 cases with reactive IA and negative supplemental test results; 55 (55.6%) had acute HIV infection. CDC and many health departments recognize that confirmatory supplemental tests can give false-negative results early in the course of HIV infection. This problem can be resolved by testing for HIV RNA after a reactive IA result and negative supplemental test result.

Early HIV IAs used either viral lysate antigens (first generation) or synthetic peptides and recombinant antigens (second generation) and detected only immunoglobulin G (IgG)-class antibodies. Most laboratories now use either third-generation IAs that detect both immunoglobulin M-class and IgG-class antibodies or fourth-generation combination antigen/antibody IAs that detect both classes of antibody and also p24 antigen (a major core protein of HIV). The p24 antigen can be detected early, before antibody appears, allowing the fourth-generation IAs to identify some HIV infections in the acute phase. In this report, fourth-generation, IA-reactive specimens with a negative supplemental test but detectable HIV-1 RNA were classified as acute HIV infection.

The current laboratory diagnostic algorithm for HIV cannot detect acute infections and misclassifies approximately 60% of HIV-2 infections as HIV-1, based on HIV-1 WB results (*4*). The new diagnostic algorithm evaluated in this study replaces the WB with an HIV-1/HIV-2 antibody differentiation assay as the supplemental test and includes an RNA test to resolve reactive IA with negative supplemental test results (Figure 1). In retrospective studies, this algorithm performed better than the WB at identifying HIV-antibody–positive persons, detecting acute HIV-1 infections, and diagnosing unsuspected HIV-2 infections (*5,6*). In this report, data from two evaluations of this algorithm are analyzed, one from an HIV testing program in Phoenix, Arizona, and the other from an ongoing HIV testing study in three sites.

In 2011, the Arizona Department of Health Services collaborated with Maricopa Integrated Health Systems* to 1) screen all adult ED patients (aged 18–64 years) for HIV who had phlebotomy for other reasons as a part of their medical care and 2) validate the new algorithm. Specimens were screened with a fourth-generation IA (Architect HIV Ag/Ab Combo Assay [Architect], Abbott Diagnostics) from July 2011 through February 2013. From July 2011 through February 2012, 10 specimens with repeatedly reactive Architect results were tested with both a WB and a Food and Drug Administration (FDA)-approved HIV-1/HIV-2 antibody differentiation assay (Multispot HIV-1/HIV-2 Rapid Test [Multispot], Bio-Rad Laboratories), and from March 2012 through February 2013, only with a Multispot (27 specimens). Specimens negative by either WB or Multispot were tested for HIV-1 RNA (m2000 RealTime HIV-1 Quantitative Assay, Abbott Diagnostics).

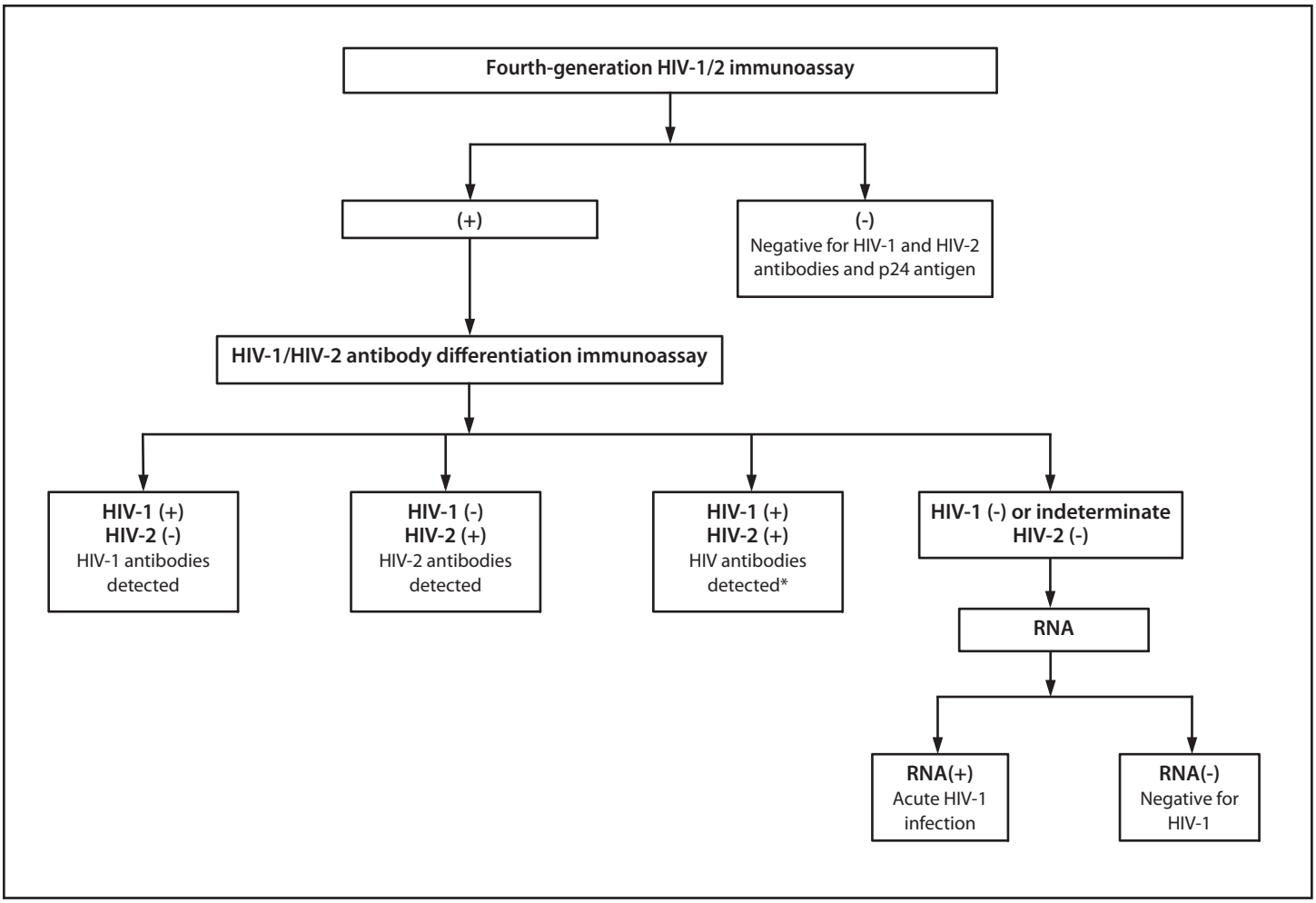
The Screening Targeted Populations to Interrupt On-going Chains of HIV Transmission with Enhanced Partner Notification (STOP) study is evaluating 1) methods to detect

* Maricopa Integrated Health Systems is a public health-care system in Maricopa County, Arizona, that provides hospital- and clinic-based medical care to area residents.

The *MMWR* series of publications is published by the Office of Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30333.

Suggested citation: Centers for Disease Control and Prevention. [Article title]. MMWR 2013;62:[inclusive page numbers].

FIGURE 1. New HIV diagnostic testing algorithm evaluated — United States, 2011–2013



Abbreviation: HIV = human immunodeficiency virus.
* Additional testing required to rule out dual infection with HIV-1 and HIV-2.

acute HIV infection and enhance partner services in New York, New York; North Carolina; and San Francisco, California, and 2) the new diagnostic algorithm. Participants aged >12 years who received HIV testing at one of 12 venues from September 2011 through September 2012 were screened with Architect. Repeatedly reactive specimens were tested with Multispot and either an HIV-1 WB (Bio-Rad Laboratories) or an in-house IFA. Specimens with negative Multispot, WB, or IFA results were tested for HIV-1 RNA (either Aptima HIV-1 RNA Qualitative Assay [Gen-Probe] or m2000 RealTime HIV-1 Quantitative Assay).

Routine HIV screening with Architect in the Phoenix ED from July 2011 through February 2013 detected previously undiagnosed HIV infection in 37 patients (Table). The diagnosis of acute HIV infection was established by a negative supplemental test but a detectable HIV-1 RNA in 12 (32.4%) of these 37 patients. The other 25 HIV diagnoses were antibody-positive by Multispot, WB, or both. The median HIV-1 viral load among patients with acute infection was 3,636,176 copies/mL (interquartile range: 614,164 to >10,000,000), compared with 27,125 copies/mL (9,519–78,084) among patients with established infection.

In the STOP study, Architect results were repeatedly reactive in 654 (1.7%) of 37,876 patients screened from September 2011 through September 2012 (Figure 2). Multispot was reactive for HIV-1 in 554 (84.7%) patients and for both HIV-1 and HIV-2 in one (0.2%). In the 99 (15.1%) patients with a negative or HIV-1 indeterminate Multispot result, HIV-1 RNA was present in 55 (55.6%), representing 8.4% of all those with repeatedly reactive Architect results. Traditional supplemental tests (either HIV-1 WB or IFA) were negative in 37 (67.3%) and indeterminate in seven (12.7%) of these 55 Architect-reactive specimens from patients with acute HIV-1 infection (Figure 2).

TABLE. Demographic characteristics, clinical symptoms, and HIV test results of patients who had HIV infection diagnosed in an emergency department (ED) using a reactive fourth-generation immunoassay — Phoenix, Arizona, 2011–2013

Patient	Sex	HIV infection status	ED encounter date	Differentiation IA	Western blot	HIV-1 viral load (RNA copies/mL)
Patient 7	Male	Acute	Oct 2011	Nonreactive	Negative	>10,000,000
Patient 8	Male	Acute	Dec 2011	Nonreactive	Negative	5,370,318
Patient 11	Male	Acute	Jan 2012	Nonreactive	Inconclusive	1,141,782
Patient 19	Female	Acute	Apr 2012	Nonreactive	ND	>10,000,000
Patient 25	Male	Acute	Jun 2012	Nonreactive	ND	>10,000,000
Patient 36	Male	Acute	Sep 2012	Nonreactive	ND	>10,000,000
Patient 23	Male	Acute	May 2012	Nonreactive	ND	4,357,922
Patient 39	Male	Acute	Sep 2012	Nonreactive	ND	691,343
Patient 57	Male	Acute	Jan 2013	Nonreactive	ND	382,628
Patient 31	Female	Acute	Jul 2012	Nonreactive	ND	309,139
Patient 27	Male	Acute	Jun 2012	Nonreactive	ND	64,163
Patient 3	Male	Acute	Aug 2011	HIV-1 reactive	Negative	2,914,430
Patient 13	Male	Established	Jan 2012	HIV-1 reactive	Positive	86,910
Patient 6	Male	Established	Oct 2011	HIV-1 reactive	Positive	29,476
Patient 5	Female	Established	Oct 2011	HIV-1 reactive	Positive	18,822
Patient 4	Male	Established	Sep 2011	HIV-1 reactive	Positive	15,608
Patient 12	Male	Established	Jan 2012	HIV-1 reactive	Positive	11,209
Patient 2	Male	Established	Aug 2011	HIV-1 reactive	Positive	6,460
Patient 40	Female	Established	Sep 2012	HIV-1 reactive	ND	<40
Patient 56	Male	Established	Jan 2013	HIV-1 reactive	ND	764,498
Patient 32	Male	Established	Aug 2012	HIV-1 reactive	ND	690,951
Patient 16	Male	Established	Mar 2012	HIV-1 reactive	ND	632,488
Patient 59	Male	Established	Feb 2013	HIV-1 reactive	ND	602,878
Patient 42	Male	Established	Oct 2012	HIV-1 reactive	ND	130,248
Patient 28	Female	Established	Jun 2012	HIV-1 reactive	ND	78,084
Patient 58	Male	Established	Jan 2013	HIV-1 reactive	ND	67,808
Patient 61	Male	Established	Feb 2013	HIV-1 reactive	ND	65,105
Patient 29	Male	Established	Jul 2012	HIV-1 reactive	ND	49,873
Patient 24	Male	Established	Jun 2012	HIV-1 reactive	ND	44,816
Patient 48	Female	Established	Dec 2012	HIV-1 reactive	ND	27,125
Patient 41	Male	Established	Oct 2012	HIV-1 reactive	ND	20,692
Patient 38	Male	Established	Sep 2012	HIV-1 reactive	ND	14,925
Patient 30	Male	Established	Jul 2012	HIV-1 reactive	ND	9,519
Patient 22	Female	Established	May 2012	HIV-1 reactive	ND	4,334
Patient 37	Male	Established	Sep 2012	HIV-1 reactive	ND	1,537
Patient 49	Female	Established	Dec 2012	HIV-1 reactive	ND	1,225
Patient 47	Female	Established	Nov 2012	HIV-1 reactive	ND	757

Abbreviations: HIV = human immunodeficiency virus; IA = immunoassay; ND = not done.

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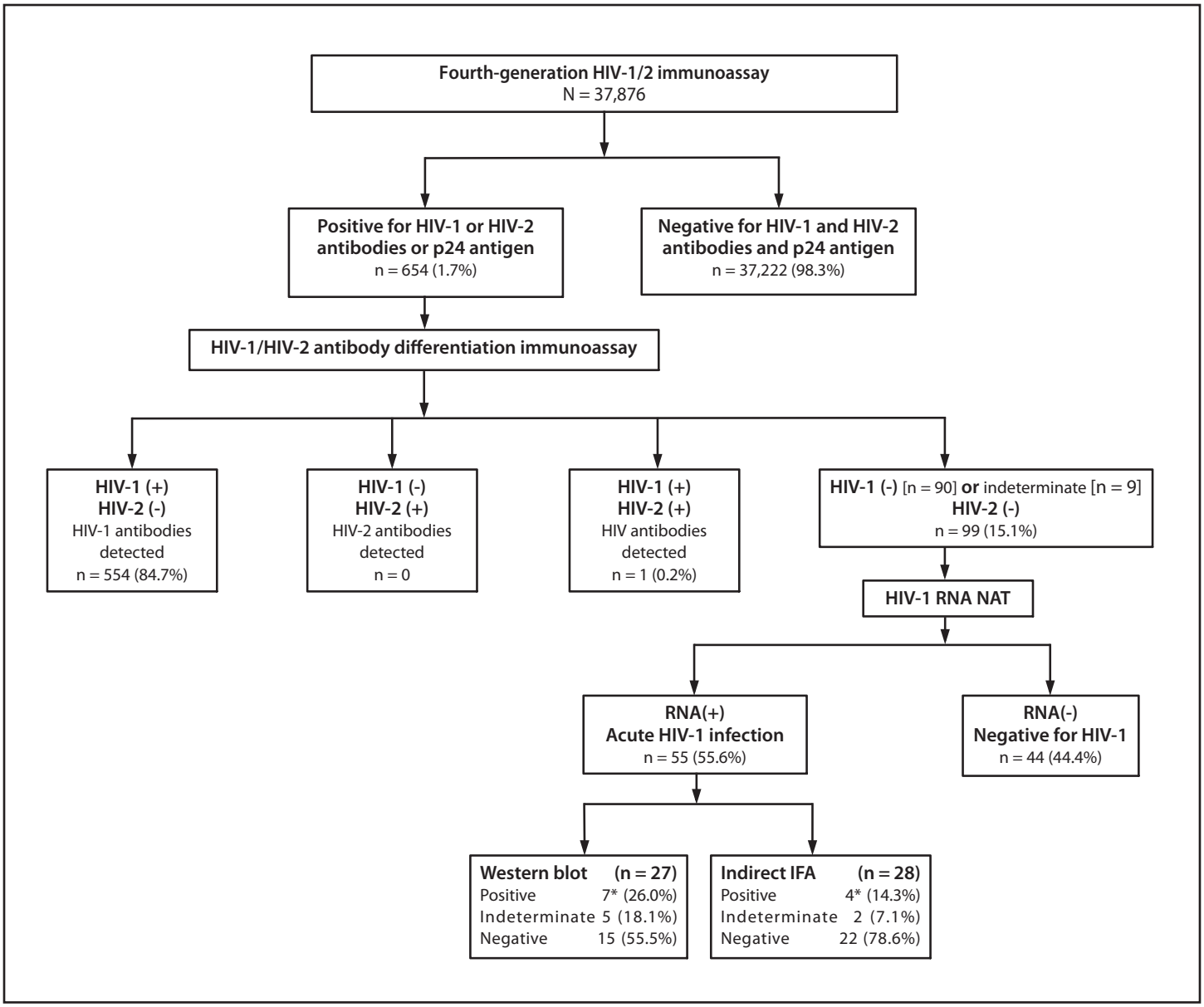
Editorial Note

Improved HIV IAs enhance the ability to detect HIV infection earlier, even during the acute phase of infection, when substantial HIV transmission occurs. However, specimens with reactive IA and negative supplemental test results must undergo further testing to differentiate acute HIV infection from false-positive results. This report demonstrates that acute HIV infections detected with third- or fourth-generation IAs often are misclassified as HIV-negative by WB or IFA, potentially leading to adverse clinical outcomes for patients and further HIV transmission within the community (*1*). Applying the HIV testing algorithm evaluated in this analysis averted missed diagnoses in 32% of the HIV-infected patients in the Phoenix ED and 9% of those in the STOP study. With FDA's approval of the Multispot HIV-1/HIV-2 rapid test for use as the second test in this algorithm in March 2013, laboratories can adopt this algorithm, which is a recommended option in the Clinical and Laboratory Standards Institute's *Criteria for Laboratory Testing and Diagnosis of Human Immunodeficiency Virus Infection; Approved Guideline* (*7*). The fast turnaround time for test results from most third- and fourth-generation IAs (<1 hour) and the Multispot rapid test (15 minutes) affords the opportunity

FIGURE 2. Fourth-generation HIV-1/2 immunoassay test results with the new HIV diagnostic testing algorithm — New York, New York; San Francisco, California; and North Carolina, September 2011–2012



Abbreviations: HIV = human immunodeficiency virus; NAT = nucleic acid test; IFA = immunofluorescence assay.

* Five of the seven Western blot positive results and two of the four IFA positive results occurred with specimens that were HIV-1 indeterminate on the differentiation assay. The differentiation assay has four reaction spots, including 1) control, 2) HIV-2 peptide, 3) recombinant HIV-1, and 4) HIV-1 peptide. When used in a diagnostic algorithm, both HIV-1 spots (recombinant and peptide) must be reactive for a specimen to be interpreted as positive for HIV-1 antibodies. The presence of only one HIV-1 spot is interpreted as indeterminate for HIV-1 antibodies.

to deliver same-day definitive test results to the majority of HIV-infected persons who are antibody-positive. Regardless of which supplemental test is used, clinicians and laboratories might want to consider further HIV RNA testing for patients whose supplemental antibody test results are negative after a reactive third- or fourth-generation IA result (*8*).

The ED at Maricopa Integrated Health Systems adopted routine, opt-out HIV screening consistent with CDC's 2006 recommendations (*9*), using a fourth-generation IA. As a result, an additional 37 patients with HIV infection, including 12 with acute infection, were identified. Because most currently available FDA-approved rapid HIV tests are second-generation format (i.e., they detect only IgG-class antibodies), these acute HIV infections likely would have been missed if point-of-care rapid tests had been used for screening. The high percentage of HIV infections that were acute among these ED patients was unexpected;

What is already known on this topic?

The highly infectious phase of acute human immunodeficiency virus (HIV) infection, before the appearance of HIV-1-specific antibodies, contributes disproportionately to HIV transmission. Improved HIV laboratory immunoassays (IAs) can detect HIV infection during this acute phase, when traditional HIV supplemental tests (e.g., Western blot) are still negative. Some discordant HIV test results (reactive IA and negative supplemental test) have been erroneously interpreted as HIV-negative.

What is added by this report?

Using an HIV testing algorithm that included RNA testing for all specimens with reactive IA and negative supplemental antibody test results led to the diagnosis of acute HIV infections in various HIV testing settings. Using an HIV IA to screen patients in an Arizona emergency department identified 37 undiagnosed HIV infections, of which 32.4% were acute and would have been misclassified as HIV-negative by current testing practices that rely on antibody tests such as Western blot. An ongoing multisite study of a convenience sample of persons at high risk identified 99 cases with reactive IA and negative supplemental test results; 44.4% were in patients who were not infected, but 55.6% had acute HIV infection. These acute HIV infections would have been misclassified as HIV-negative without RNA testing, potentially leading to adverse clinical outcomes for patients and further HIV transmission within the community.

What are the implications for public health practice?

For patients with a reactive HIV IA result and negative supplemental antibody test results, additional testing for HIV-1 RNA is necessary to identify patients with acute HIV infection. If RNA testing is not available, a follow-up IA should be conducted in 2–4 weeks.

however, consistent with observations that 50%–90% of persons with acute HIV infection develop symptoms that prompt them to seek medical care (*10*), this finding suggests that acute HIV infection in persons who seek care for its nonspecific symptoms in EDs and other urgent-care venues might go undiagnosed unless HIV screening is conducted with fourth-generation HIV IAs. Currently, only one RNA assay, the Aptima HIV-1 RNA Qualitative Assay, is FDA-approved for HIV diagnosis, but it is available in far fewer laboratories than quantitative HIV-1 (viral load) RNA assays. To facilitate prompt diagnosis of acute HIV infection when faced with discordant screening and supplemental antibody test results, clinicians can order a viral load test to differentiate acute HIV-1 infection from false-positive IA results.

The findings in this report are subject to at least two limitations. First, results might not be generalizable to all HIV screening programs. Although the goal of the Phoenix ED was to screen for HIV as many patients as possible, HIV tests might have been ordered on some patients because of clinical suspicion, potentially increasing the number of HIV or acute HIV infections identified. Second, participants in the STOP study were a convenience sample of persons at high risk for HIV infection attending sexually transmitted infection clinics or community-based HIV testing programs serving men who have sex with men. Therefore, the percentage of HIV-1 infections that were acute might be higher than that observed in other populations.

Third- and fourth-generation IAs are important advances for HIV testing that improve the ability to detect HIV infections earlier. In the two prospective evaluations described in this report, the new diagnostic testing algorithm performed better than the current algorithm for identifying HIV infections. CDC's recommendation for a new HIV diagnostic algorithm, which will incorporate the findings of this analysis, is under development. Clinicians can use the findings from this report by remaining vigilant for discordant IA and supplemental test results and either ordering an HIV-1 nucleic acid test or obtaining follow-up HIV testing (in 2–4 weeks) to accurately determine whether HIV infection is present.

Acknowledgments

Amy Edmonds, Joy Jenkins, Robert McGuire, Maricopa Integrated Health Systems, Phoenix, Arizona. Jennifer A. Embry, Univ of North Carolina at Chapel Hill. Brian Louie, San Francisco Dept of Public Health, California. Jie Fu, Francesca R. Giancotti, New York City Dept of Health and Mental Hygiene, New York. Jason Craw, Laura Hall, S. Michele Owen, Pragna Patel, Div of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC.

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Routine HIV Screening During Intake Medical Evaluation at a County Jail — Fulton County, Georgia, 2011–2012

Fulton County Jail (FCJ) in Atlanta, Georgia, is one of the 50 largest jails in the nation, with an average daily census of 2,269 detainees (*1*). During January 1, 2011–March 15, 2012, FCJ implemented a demonstration project to integrate routine rapid human immunodeficiency virus (HIV) screening into the medical intake process. This report summarizes the results. Nearly 59% of persons booked (22,920 of 39,073) received an intake medical evaluation, and voluntary oral fluid HIV rapid screening was offered, except to those who disclosed a previous HIV diagnosis (473 [2.1%]) or were not able to provide consent. An HIV test was offered on 18,869 visits, and 12,141 HIV tests were conducted. All persons with a reactive result (120 [1.0%]) underwent confirmatory HIV testing unless they subsequently disclosed a previous HIV diagnosis. This project identified 52 persons with newly diagnosed HIV infection; 48 by rapid testing (0.4% of those tested) during the study period. All received medical care in the facility and referral for community services on release. Without this HIV screening project, these persons likely would have been diagnosed later in the course of their infection, resulting in delayed access to care and treatment, and possible transmission of HIV to their partners. Linkage to community services is critical, and coordination with the public health system and community-based organizations are essential to ensure access to HIV care and retention in treatment for persons with HIV released from jail.

Jail nursing staff provided opt-out, rapid HIV testing by oral mucosal swab as a standard component of medical services 24 hours a day, 7 days a week, except for a 6-week period (June 30–August 15, 2011) after a change in the contractor providing medical services for FCJ, when only limited, conventional HIV testing was available. A total of 39,073 bookings into FCJ occurred during the HIV screening project period, representing 31,314 persons, because some persons (17.0%) were booked more than once during this period. A newly diagnosed case of HIV was defined by Western blot laboratory confirmation of infection in a person with no record of a previous HIV diagnosis in either the Fulton County or Georgia Department of Public Health HIV surveillance registry or a FCJ medical chart. The cost per new diagnosis in this program was approximately $7,000 (*2*). Before implementing the demonstration project, syphilis was the only sexually transmitted infection routinely screened for during the intake medical evaluation, and HIV testing was only available on an opt-in basis. Detainees who requested an HIV test had an additional tube of blood drawn and sent to an outside laboratory for enzyme immunoassay (EIA) with reflex Western blot confirmatory testing, with results available within 14 days. During a 3-month period in 2010, when testing required phlebotomy and conventional testing, the acceptance of HIV screening was 43.2% (2,253 of 5,218 jail entrants). During this demonstration project, acceptance of HIV testing increased by 49%, to 64.3% (12,141 of 18,869), when routine rapid HIV testing of oral fluid, rather than conventional testing, was offered ($p<0.001$).

FCJ recorded HIV test data to determine the number and characteristics of persons newly diagnosed with HIV from January 1, 2011, through March 15, 2012. Two of 52 newly diagnosed persons received venipuncture alone in early August 2011, when rapid testing was unavailable, and two of the positive oral mucosal swabs occurred on December 29, 2010 (Table). All 52 new diagnoses were among non-Hispanic black men (n = 47) and women (n = 5). Among men with a newly diagnosed HIV infection, 38% (n = 18) reported ever having sex with men. Approximately 69% (36 of 52) of newly diagnosed persons reported a previous HIV test (range: 4 months–4 years earlier); 42% (22 of 52) reported a negative HIV test result in the past 2 calendar years, and one person had a negative HIV test result at FCJ admission 4 months earlier. Obtaining a CD4 count often was delayed until a formal medical evaluation was conducted up to 2 weeks after intake, so only 42% (22 of 52) of the cases had a CD4 cell count recorded in the medical record, with a mean of 372 cells/mm^3. Of persons newly diagnosed with HIV, approximately 17% (nine) were detained for ≤48 hours, and nearly 58% (30) were detained ≤14 days.

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TABLE. Demographic and clinical characteristics of persons newly diagnosed with HIV upon entry to Fulton County Jail — Atlanta, Georgia, 2011–2012

	Male (n = 47)		Female (n = 5)	
Characteristic	**No.**	**(%)**	**No.**	**(%)**
Mean age (yrs) (SD)	33.7 (10.7)		33.3 (12.2)	
Black race	47	(100.0)	5	(100)
Sexual behavior				
Heterosexual sex	29	(61.7)	5	(100)
Men having sex with men	14	(29.8)	NA	—
Male and female partners	4	(8.5)	ND	—
Documented narcotics use	40	(85.1)	4	(80)
Previous HIV test				
Never tested	14	(29.8)	2	(40)
Ever tested for HIV	33	(70.2)	3	(60)
Calendar years since most recent HIV test				
1	8	(24.2)	—	—
2	13	(39.4)	1	(33)
3	9	(27.3)	—	—
4	3	(9.1)	2	(67)
Any CD4 count in jail	21	(44.7)	1	(20)
Mean first CD4 (cells/mm^3) (SD)	372 (250)		374	
Range	31–950			
<200	4	—	0	—
200–349	7	—	0	—
350–499	5	—	1	—
≥500	5	—	0	—

Abbreviations: HIV = human immunodeficiency virus; SD = standard deviation; NA = not applicable; ND = not determined.

What is already known on this topic?

Integrating human immunodeficiency virus (HIV) screening as a routine component of the intake medical evaluation process in jails located in communities with a high prevalence of HIV infection facilitates case finding of persons who do not regularly access HIV testing from community sources, and helps reduce the stigma of HIV testing, thereby increasing awareness of HIV status and diagnosis among highly stigmatized groups, especially black men who have sex with men.

What is added by this report?

An HIV screening demonstration project conducted at the Fulton County Jail in Atlanta, Georgia, during 2011–2012 identified 0.4% of all tested jail entrants with newly diagnosed HIV infection, all of whom were provided medical care in the facility and referred to community services on release. Without this HIV screening project, these persons likely would have been diagnosed later in the course of their infection, resulting in delayed access to care and treatment, and possible transmission of HIV to their partners.

What are the implications for public health practice?

Public health administrators might consider collaborating with jail administrators to incorporate routine, opt-out HIV screening into the intake medical evaluation process of jails in communities with a high prevalence of HIV. In addition, because jail stays typically are short, linkage to community services is critical. An opportunity exists for the public health system and community-based organizations to collaborate with jails to ensure access to HIV care and retention in treatment for persons with HIV upon their release from jail.

Editorial Note

Diagnosis of HIV infection is the first step in accessing care and treatment services and preventing future cases of HIV infection. Providing HIV screening during the medical intake process in detention facilities can identify cases of HIV infection among persons who have not been diagnosed through other clinical or nonclinical community-based HIV testing (*3*). Incorporating routine HIV screening into the FCJ medical intake process resulted in 52 persons being newly diagnosed with HIV infection during the 15-month period. Consistent with findings from a previous jail study (*3*), available first CD4 counts were high (mean: 372 cells/mm^3), indicating diagnosis relatively early in the course of disease. Without this HIV screening project, these persons would likely have been diagnosed later in the course of their infection, resulting in delayed access to care and treatment, and possible transmission of HIV to their partners.

HIV testing is a critical component of the National HIV/AIDS Strategy (*4*), and an estimated 49% of new infections each year are acquired from persons who are unaware of their infection (*5*). To prevent new cases of HIV infection in the United States, persons at-risk for HIV infection should be screened for HIV at least annually (*6*). However, approximately 58% of detainees at FCJ with newly diagnosed HIV infection had not been tested in the past 2 calendar years; only 15% (eight of 52) reported being tested in the past calendar year, and 31% (16 of 52) stated that they had never been tested for HIV. One person seroconverted during the period when the project was being implemented in FCJ, which warrants a strategy of routinely testing persons returning to jail after an interval of >3 months. The cost per new diagnosis in this project is lower than the cost incurred in many screening programs set in other venues (*2*).

Black men who have sex with men (MSM) are disproportionately infected with HIV, and an estimated 59% of black MSM are unaware of their infection (*7*). Nearly 40% of the black men newly diagnosed with HIV in this project reported sex with men. Making HIV screening a routine, rather than an exceptional, part of the medical evaluation process in jails in high HIV-prevalence, inner-city communities might help to decrease the stigma of HIV testing in jails and ultimately could decrease the number of persons in all risk categories who are unaware of their infection. There is no evidence of a disproportionate rate of incarceration among MSM compared with other men; however, minority populations, particularly blacks and Hispanics, are disproportionately incarcerated

compared with whites (*1*). Hence, the integration of opt-out HIV screening into the intake process might decrease the number of black MSM who are unaware of their infection.

A study of routine, jail-based HIV testing conducted during 2000–2007 in Rhode Island revealed that 0.17% of tests resulted in new diagnoses (*8*). Although the number of newly diagnosed cases at Rhode Island's jail declined during this observation period to 10 cases per year, the Rhode Island correctional HIV testing program was responsible for identifying 15% of all new HIV diagnoses in Rhode Island during the period. Rhode Island has one jail for the entire state; Georgia has more than 150 jails. However, the new HIV cases found at FCJ, where 41 of the 52 new cases of HIV were identified during 2011, represented approximately 5.4% (41 of 759) of all new HIV cases linked to Fulton County addresses and approximately 1.1% (41 of 3,621) of cases diagnosed in the state of Georgia that year (Jane M. Kelly; National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC; personal communication; 2013). Four additional large jails in the Atlanta metropolitan statistical area have average daily censuses of approximately 2,000–3,500 detainees (*1*), and none routinely screen for HIV during the medical intake evaluation. Routine, opt-out HIV testing in each of the other jails, if each had a similar rate of cases, might have identified an additional 164 persons in the Atlanta metropolitan statistical area in 2011.

The findings in this report are subject to at least three limitations. First, cases might have been misclassified as new if they previously had been diagnosed in another state and the patients failed to disclose their previous diagnosis to FCJ staff; only the state and local registry was checked. Second, the mean CD4 count at diagnosis might have been higher or lower than the value reported because the majority of newly diagnosed persons left jail before a CD4 count was obtained. Finally, the percentage of newly diagnosed persons who subsequently were linked to care after release is unknown; however, a previous demonstration project suggests that with adequate case management, a substantial percentage of these persons access care in the community (*3*).

The FCJ HIV screening project demonstrated that when a large jail in a high-prevalence community incorporated routine, opt-out HIV screening into the intake medical evaluation process, screening resulted in the diagnosis of persons previously unaware of their HIV infection. However, because of the very short detention period for most inmates, detainees with newly diagnosed HIV infection might be released before completion of pretreatment evaluation and initiation of HIV therapy. Linkage to community services is critical, and an opportunity exists for the public health system and community-based organizations to collaborate with jails to ensure access to HIV care and retention in treatment for persons with HIV released from jail (*9,10*). Research is needed to determine whether screening this population reduces transmission and prolongs survival, and whether interventions to increase linkage to community services are cost-effective.

Acknowledgments

Craig B. Borkowf, Kathy K. Byrd, Jane M. Kelly, Jonathan Mermin, Farah Parvez, Cynthia Prather, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC.

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Homemade Chemical Bomb Incidents — 15 States, 2003–2011

Homemade chemical bombs (HCBs) are made from commonly found chemicals. The volume of news reports of HCB explosions suggests they are not uncommon. To determine the number of events involving HCBs in the United States and describe the factors associated with them, the Agency for Toxic Substances and Disease Registry (ATSDR) analyzed data from its surveillance system that tracks spills and leaks of hazardous substances. This report describes the results of that analysis, which indicated that, during 2003–2011, a total of 134 events involving HCBs were reported from 15 states. Among those events, 21 (16%) resulted in adverse health effects (i.e., respiratory symptoms, burns, and skin irritation) for 53 persons. The majority (35 [66%]) of these persons were youths. HCBs are hazardous and especially dangerous if detonated in public areas. Increasing awareness of HCBs and their dangers (particularly during summer months) among first-responders, parents, school staff members and others who work with youths might help reduce injuries associated with HCBs.

HCBs are explosives made from readily available chemicals, and instructions for making them are accessible on the Internet. Typically, HCB ingredients are combined in a container, such as a soft drink bottle, which is then sealed and shaken. HCBs explode when the pressure from gases produced by the chemical reaction ruptures the container. The resulting explosion can be unpredictable in both timing and magnitude. Potential hazards include exposure to the blast, shrapnel, and hazardous substances. This report uses data from the ATSDR Hazardous Substances Emergency Events Surveillance (HSEES) system and the National Toxic Substance Incidents Program (NTSIP), which replaced HSEES in 2010 (*1*), and updates a previous report (*2*). ATSDR has maintained a state-based surveillance program since 1990. The purpose of these surveillance systems is to track the public health consequences (e.g., morbidity and mortality) from acute toxic substance releases.

Incident records from states that participated in the surveillance program for at least 3 years during 2003–2011 were searched for the keywords "bottle," "bomb," or "homemade" in database fields that contain a synopsis of the event and health department comments. The resulting records were then reviewed, and those containing the keywords but not involving an HCB were excluded. Exclusions included events involving pesticide "bug bombs" or chemical bottles inadvertently broken during shipping. Events involving commercial or other, improvised explosives (e.g., pipe bombs) also were excluded.

During 2003–2011, a total of 134 events involving an HCB (0.2% of all HSEES/NTSIP events for the same period) were detected (Table). The number of participating states varied during the reporting period from 15 in 2003 to six in 2011. Notably, New York, Wisconsin, and Minnesota reported 77% of the events. Following are three illustrative case reports on HCB incidents with injuries.

Case Reports

Incident A. A high school janitor found students mixing calcium hypochlorite and other chemicals in a bottle. The janitor seized the bottle, which exploded, releasing chlorine gas. The janitor became ill and vomited, and 12 students and three school workers were treated for respiratory problems. Approximately 1,640 persons were evacuated for 5 hours while a hazardous materials team cleaned and ventilated the school.

Incident B. Two adults were preparing an HCB from hydrochloric acid and aluminum when it prematurely exploded. First responders found one adult unconscious, and both adults sustained physical trauma, respiratory symptoms, and chemical burns. They were treated at a local hospital.

Incident C. An adult picked up an HCB he found outside his home. Without warning, the HCB exploded in his hand. The man sustained trauma and chemical burns to his hand and chest.

Epidemiologic Findings

Twenty-one (16%) of the 134 events identified for the period 2003–2011 resulted in 53 persons with adverse health effects. Thirteen events had one injured person, three events had two, two events had four, two events had five, and one event (incident A) had 16 injured persons. The proportion of HCB events resulting in adverse health effects was 45% greater than that of all other HSEES/NTSIP events during the same period (16% versus 11%). The majority of injured persons were male (29 [55%]); eight (15%) were female, and sex was unknown for 16 (30%). Thirty-five injured persons (66%) were youths; 17 (32%) were adults, and age was unknown for one. Twenty-one injured persons (40%) were students at school; 20 (38%) were members of the public; seven (13%) were employees at the site of the incident, and five (9%) were police officers.

Several injured persons reported more than one adverse health effect; the total number of reported adverse health effects was 62. Respiratory symptoms were most common (26 [42%]), followed by burns (14 [23%]), skin irritation (13 [21%]), and physical trauma (six [10%]). A total of 29 injured persons (55%) were treated on the scene. Fifteen (28%) were treated at the hospital and released; five (9%) were treated at the hospital and admitted; three (6%) had untreated injuries; and treatment data were missing for one. Among all 53 injured

TABLE. Number and annualized incidence of events involving homemade chemical bombs, years of state participation, and annualized incidence by state — Hazardous Substances Emergency Events Surveillance/National Toxic Substance Incidents Program (HSEES/NTSIP), 15 states, 2003–2011

State	Period of state participation	No.	No. of years of state participation	Annualized incidence
Total	—	**134**	**106**	**1.26***
Colorado	2003–2009	0	7	0.00
Florida	2005–2009	4	5	0.80
Iowa	2003–2009	6	7	0.86
Louisiana	2003–2011	0	9	0.00
Michigan	2005–2009	3	5	0.60
Minnesota	2003–2009	13	7	1.86
Missouri	2003–2005	2	3	0.67
North Carolina	2003–2011	6	9	0.67
New Jersey	2003–2005, 2007	1	4	0.25
New York	2003–2011	67	9	7.44
Oregon	2003–2011	1	9	0.11
Texas	2003–2009	1	7	0.14
Utah	2003–2011	3	9	0.33
Washington	2003–2009	4	7	0.57
Wisconsin	2003–2011	23	9	2.56

* Average.

persons, 21 (40%) required decontamination at the scene or at a medical facility. No fatalities occurred in any of these events. In two events, first responders who were not injured (eight and four, respectively) were decontaminated at the scene.

The most common chemicals in these events were acids or bases mixed with a metal. Commercial household products, such as toilet bowl cleaners containing sulfuric or hydrochloric acid or drain openers containing sodium hydroxide or potassium hydroxide, were the most common sources of acids and bases. Aluminum was the most common metal. One event involved carbon dioxide (i.e., dry ice) as the main bomb ingredient.

Most HCB explosions were reported in schools, mail boxes, and residential backyards. Facility evacuations ordered by an official occurred in 17 (13%) of the 134 events. Some evacuations resulted in significant disruptions; four events, all in schools, involved evacuations of 600 or more persons for up to 8 hours.

A total of 48 events (36%) occurred within a quarter mile of a school. Summer was the season with the greatest number of events 49 [37%]), followed by fall (34 [25%]), spring (28 [21%]), and winter (23 [17%]).

Reported by

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What is already known on this topic?

Homemade chemical bombs (HCBs) are made from readily available chemicals. Instructions for making HCBs are accessible on the Internet. Potential hazards from HCB explosions include exposure to the blast, shrapnel, and hazardous substances. Reports of HCB explosions are not uncommon in the United States news media; however, few data on them exist in the scientific literature.

What is added by this report?

Surveillance data from 15 states during 2003–2011 identified 134 events involving HCBs. Twenty-one (16%) events resulted in 53 injured persons with adverse health effects. The majority of these injured persons were youths with health effects associated with exposure to HCB contents, including respiratory symptoms, burns, and skin irritation.

What are the implications for public health practice?

HCBs are hazardous and especially dangerous if detonated in public areas such as schools. It is important for parents, school staff members, and law enforcement to be aware of the potential hazards of HCBs and how to respond if an HCB is found.

Editorial Note

For the period January 1996–March 2003, ATSDR reported 29 events involving HCBs (*2*). Standardized by state-surveillance year, the rate of HCB events in that report was 0.21 (29 events per 137 state-years). In the present report, that rate was 1.26 (134 events per 106 state-years), suggesting an increase in HCB events. This increase might be the result of greater availability of materials and Internet instructions for making HCBs, the ease with which they are made, and copycatting inspired by other incidents. However, improved HSEES/NTSIP event ascertainment also might have contributed to this increase. Participating states rely heavily on media news reports for HCB event ascertainment; for 50% of HCB events the primary reporting source was the media, versus only 5% for other hazardous substance events. In addition, HCB incidents are more likely to appear in news reports if they involve injured persons or property damage. Thus, the number of HCB incidents in HSEES/NTSIP likely is less than the actual number of events, and HCB incidents with injured persons or property damage might be overrepresented.

Although unlikely to have the injury patterns associated with high-order explosive denotations, HCB explosions have the potential to result in serious injury. In addition to blast-induced trauma, injured persons can be exposed to the chemicals released from the HCB. The most common injuries reported were respiratory symptoms, burns, and skin irritation, and these are consistent with exposure to the acids or bases frequently used in these devices. Acid and base solutions are corrosive to skin and other tissues, and both form fumes

that can irritate respiratory tissues when inhaled. Symptoms associated with inhalation of fumes of acids or bases include irritation of the nose, throat, and larynx; cough; and pulmonary edema (*3*).

The findings in this report are subject to at least three limitations. First, searching the HSEES/NTSIP databases might not capture all events involving HCBs. Second, variability in the number of HCB incidents by state might be explained by differences in state surveillance sources or by copycatting inspired by other incidents. Finally, the number of participating states is limited, and their data might not be representative of the entire United States.

These data indicate that the majority of HCB-injured persons were youths or young adults. Consequently, it is important for parents, school staff members, and law enforcement to be aware of the potential hazards of HCBs and how to respond if an HCB is found. If a suspected or actual HCB is discovered, the surrounding area should be isolated until the situation is assessed by authorities (*4*). Only trained bomb squad personnel should approach, handle, or attempt to neutralize these devices (*2*). Persons whose clothing is contaminated with the contents of a bomb, whether as a result of the container bursting or from leakage, should remove contaminated clothing immediately (*2,5*). If the contents of a bomb come in contact with skin, the affected area should be rinsed with large amounts of water for 3–5 minutes (*5*). If severe adverse health effects (e.g., trauma, chemical burns, or respiratory irritation) occur, medical attention should be sought immediately.

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The Global Polio Eradication Initiative Stop Transmission of Polio (STOP) Program — 1999–2013

In 1988, the Global Polio Eradication Initiative (GPEI) was established through a partnership between the World Health Organization (WHO), Rotary International, CDC, and the United Nations Children's Fund (UNICEF). By 2012, the annual incidence of polio had decreased by >99%, compared with 1988, and the number of countries in which wild poliovirus (WPV) circulation has never been interrupted was reduced to three: Afghanistan, Nigeria, and Pakistan (*1*). However, because of the persistence of endemic WPV transmission and recurring outbreaks in polio-free countries after the original polio eradication target date of 2000 (*2–4*), the World Health Assembly in 2012 declared the completion of polio eradication a programmatic emergency (*5*). A key component of GPEI is the Stop Transmission of Polio (STOP) program, which was developed and initiated by CDC with WHO in 1999 to mobilize additional human resources and technical assistance for countries affected by WPV transmission. During 1999–2013, 1,563 volunteers were identified, trained, and deployed for 2,221 assignments in 69 countries. The number of volunteers increased from 90–120 per year during 1999–2011 to 287 in 2012 and 378 in 2013, and the number of volunteer person-months in the field per year increased from 273 in 1999 to 1,456 in 2012. The STOP program has aided GPEI by strengthening the capacity of country-level immunization programs and by allowing a large cohort of volunteers to gain valuable field experience that prepares them well for subsequent work as staff members of WHO, UNICEF, and other public health agencies.

Development and Implementation of the STOP Program

A key factor contributing to the success of the global smallpox eradication program in the 1970s was the deployment of international public health field staff to assist national programs with smallpox outbreak investigation, surveillance, and planning of vaccination activities in endemic countries (*6*). In 1999, STOP was developed to support GPEI in a similar fashion. STOP teams typically comprise a diverse mix of health professionals, including nurses, physicians, epidemiologists, veterinarians, and information systems and communication specialists. The first STOP volunteers were recruited from CDC staff; however, recruitment was rapidly expanded to include public health professionals from around the world to meet the demand for assistance. STOP volunteers receive daily subsistence allowances, but no other financial remuneration. (Recently, only a small proportion of volunteers are otherwise supported by their employers.) WHO and UNICEF are responsible for assigning volunteers to specific countries to provide technical assistance and training for immunization programs at national, state/province, or district levels and volunteers are supervised by WHO and UNICEF country teams during the assignment.

The initial objectives of STOP field assignments were to conduct and support acute flaccid paralysis (AFP) surveillance and to plan, monitor, and evaluate large-scale supplementary polio immunization campaigns. Field assignment objectives were expanded in 2002 to support accelerated progress toward measles mortality reduction and development of data management systems for disease surveillance. The objectives were further expanded in 2003 to support strengthening routine childhood immunization activities, a key GPEI strategic component; in 2006 to support polio program communications and social mobilization at UNICEF country offices; and in 2011 to support the management needs of immunization and eradication teams at country level.

The STOP program recruits and deploys three types of volunteers: field staff and data managers who work with WHO country teams, and communications officers who work with UNICEF teams. Since 2009, an "enhanced" STOP program component has placed senior, experienced volunteers at the district level in the highest priority areas. All volunteers undergo 10 days of intense technical, security, and cross-cultural training at CDC in Atlanta before being deployed on field assignments of 3–5 months duration. Additional training beyond the 10 days is provided for communication and data management volunteers; volunteers assigned to Nigeria, Pakistan, and Democratic Republic of Congo receive special management training.

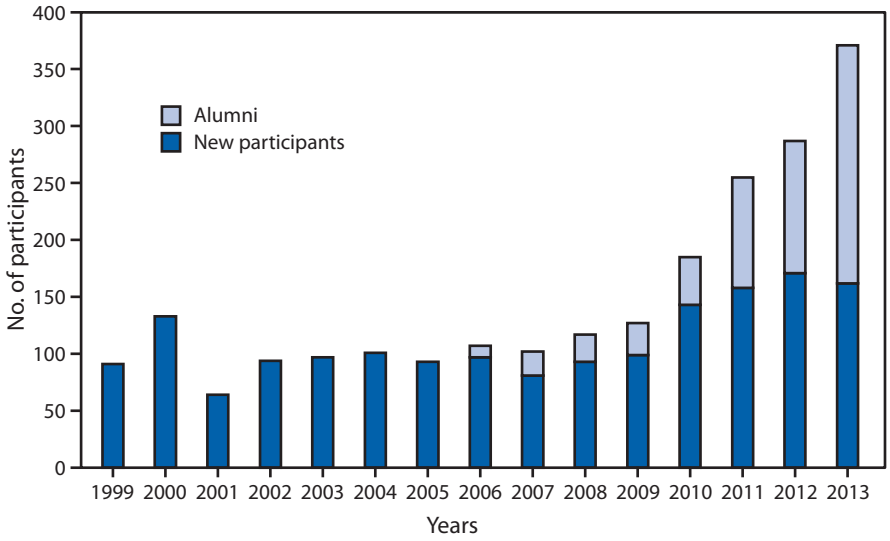
Scope of Volunteer Assignments

From January 1999 through June 2013, a total of 1,563 volunteers were identified, trained, and deployed for 2,221 STOP assignments to 69 countries.* Among those volunteers, 456 (23%) were from the United States (256 were CDC employees). The assignments included 1,802 field assignments, 217 communications assignments, and 202 data management assignments; 558 (25%) assignments were to polio endemic countries (Afghanistan, Nigeria, Pakistan, and previously,

* Additional information on the STOP program and countries to which volunteers have been assigned (including map) is available at http://www.cdc.gov/polio/stop.

India). Among the assignments, 1,592 (72%) have been to English-speaking countries, 520 (23%) to French-speaking countries, and 109 (5%) to Portuguese-speaking countries. With the declaration of polio eradication as a programmatic emergency by the World Health Assembly in 2012, the number of STOP volunteers deployed increased from 90–120 per year during 1999–2011 to 287 in 2012 and 371 in 2013 (Figure); the number of volunteer person-months in the field per year increased from 273 in 1999 to 1,456 in 2012. Part of this growth in the number of person-months has resulted from an increasing number of volunteers serving on multiple assignments: 56% of the volunteers in 2013 had served in previous assignments. The STOP team deployed in February 2013 had 168 volunteers; the team deploying in July 2013 will be the largest to date, with an estimated 203 volunteers.

FIGURE. Annual numbers of new and returning Stop Transmission of Polio (STOP) volunteers — Global Polio Eradication Initiative, 1999–2013



Field Assignment Activities

In February 2013, a survey of 458 volunteers from STOP teams deployed at any time since February 2011 was conducted to assess activities conducted in field assignments. Among 312 (68%) volunteers who returned questionnaires, an average of 51% of their time deployed was reported to be spent on capacity-filling polio eradication activities, (e.g., active surveillance for AFP cases, AFP case verification, and updating supplemental immunization activity microplans), and an average of 49% of their time was spent on capacity-building activities (e.g., training health-care workers). The distribution of time spent on specific activities varied by country. For example, among 82 volunteers with field assignments in polio-endemic countries, an average of 68% of their time was reported to be spent conducting polio-related activities, 22% on routine childhood immunization strengthening activities, and 10% on other health programs. By comparison, among 230 volunteers with field assignments in nonendemic countries, an average of 54% of their time was spent on polio-related activities, 31% on routine immunization strengthening activities, and 15% on other health initiative activities.

Reported by

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What is already known on this topic?

Since the Global Polio Eradication Initiative (GPEI) was established in 1988, the annual incidence of polio has decreased >99%, and the number of countries in which wild poliovirus (WPV) circulation had never been interrupted has been reduced to three: Afghanistan, Nigeria, and Pakistan. The Stop Transmission of Polio (STOP) program was developed and initiated by CDC with the World Health Organization in 1999 to mobilize skilled personnel and technical resources to assist countries affected by WPV transmission.

What is added by this report?

The STOP program has become a large human resources deployment mechanism that has worked successfully for GPEI over an extended period. During 1999–2013, 1,563 volunteers were identified, trained, and deployed for 2,221 assignments as part of 42 STOP teams in 69 countries. The number and length of assignments has increased since the World Health Assembly declared the completion of polio eradication a programmatic emergency in 2012. The number of volunteers increased from 90–120 per year during 1999–2011 to 378 in 2013.

What are the implications for public health practice?

GPEI partnership will continue the STOP program throughout the period of eradication, certification, and progressive withdrawal of oral poliovirus vaccines, as outlined in the *Polio Eradication and Endgame Strategic Plan 2013–2018*. The STOP model has been replicated within Nigeria and Pakistan as a public health capacity-building mechanism; national field epidemiology programs have been recruiting, training, and deploying qualified national staff members to supervise and implement GPEI activities at country level. These staff members enhance national polio eradication programs overall, and particularly in areas that are not accessible to staff of international organizations because of security concerns.

Editorial Note

The STOP program has made an important contribution to the mission of GPEI by providing countries with critical technical support to strengthen polio eradication activities. In response to requests from countries and WHO regional offices, STOP was expanded to provide a broader range of technical support for immunization programs, and the number of volunteers was increased over time. The flexibility of the STOP program enables volunteers to fill human resource gaps or build local capacity as needed by the country in which they are working. The effectiveness of STOP field assignments might be further enhanced through management training of some STOP supervisors and consistent development of clear work plans by field supervisors, in collaboration with STOP volunteers.

The STOP program concept has served as a model for training programs elsewhere. In Pakistan (since 2011) and in Nigeria (since 2012), for example, national STOP teams of local health professionals have been specifically trained to enhance the implementation of polio eradication activities. National STOP staff members aid national GPEI programs overall, and particularly in areas that are not accessible to staff of international organizations because of security concerns.

The STOP program is a coordinated effort of multiple GPEI partners. During 2000–2012, the Canadian Public Health Association, funded by the government of Canada, collaborated with CDC to identify, recruit, and deploy French-speaking participants for the STOP program. Rotary International and the Bill and Melinda Gates Foundation have contributed to funding for STOP volunteer field assignments. WHO and UNICEF organize field assignments through their regional and country offices. In addition, partners assist during the Atlanta-based training, providing technical and logistical support. The GPEI partnership will continue the STOP program throughout the period of eradication, certification, and progressive withdrawal of oral poliovirus vaccines, as outlined in the *Polio Eradication and Endgame Strategic Plan, 2013–2018* (*7*).

Acknowledgments

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Ongoing Dengue Epidemic — Angola, June 2013

On June 17, this report was posted as an MMWR *Early Release on the* MMWR *website (http://www.cdc.gov/mmwr).*

On April 1, 2013, the Public Health Directorate of Angola announced that six cases of dengue had been reported to the Ministry of Health of Angola (MHA). As of May 31, a total of 517 suspected dengue cases had been reported and tested for dengue with a rapid diagnostic test (RDT). A total of 313 (60.5%) specimens tested positive for dengue, including one from a patient who died. All suspected cases were reported from Luanda Province, except for two from Malanje Province. Confirmatory diagnostic testing of 49 specimens (43 RDT-positive and six RDT-negative) at the CDC Dengue Branch confirmed dengue virus (DENV) infection in 100% of the RDT-positive specimens and 50% of the RDT-negative specimens. Only DENV-1 was detected by molecular diagnostic testing. Phylogenetic analysis indicated this virus has been circulating in the region since at least 1968, strongly suggesting that dengue is endemic in Angola. Health-care professionals throughout Angola should be aware of the ongoing epidemic, the recommended practices for clinical management of dengue patients, and the need to report cases to MHA. Persons in Angola should seek medical care for acute febrile illness to reduce the risk for developing complications. Laboratory-confirmed dengue also has been reported from seven countries on four continents among persons who had recently traveled to Luanda, including 79 persons from Portugal. Angola is the third of four African countries to report a dengue outbreak in 2013. Persons returning from Africa with acute febrile illness should seek medical care, including testing for DENV infection, and suspected cases should be reported to public health authorities.

Background

Luanda, the capital city of Angola, has a population estimated at 5–20 million. No census has been conducted in Angola for several decades, primarily because of civil war during 1975–2002. A large proportion of the residents of Luanda live in densely populated urban slums and tenement housing. Access to health care is limited. Luanda is visited by many international business travelers, primarily because of commerce in oil.

Weak centralized surveillance for illnesses of public health importance has made it difficult for MHA to focus resources on populations in need. Although malaria is the greatest cause of morbidity and mortality in Angola (*1*), incidence is comparatively low in Luanda (*2*); however, an increase in malaria cases was detected in Luanda in 2012. Dengue was reported in travelers recently returned from Angola in 1986 and during 1999–2002 (*3*). Surveys conducted by the National Malaria Control Program during 2010–2012 showed that *Aedes aegypti* is the only DENV vector in Angola, and is present in all 18 provinces except Moxico.

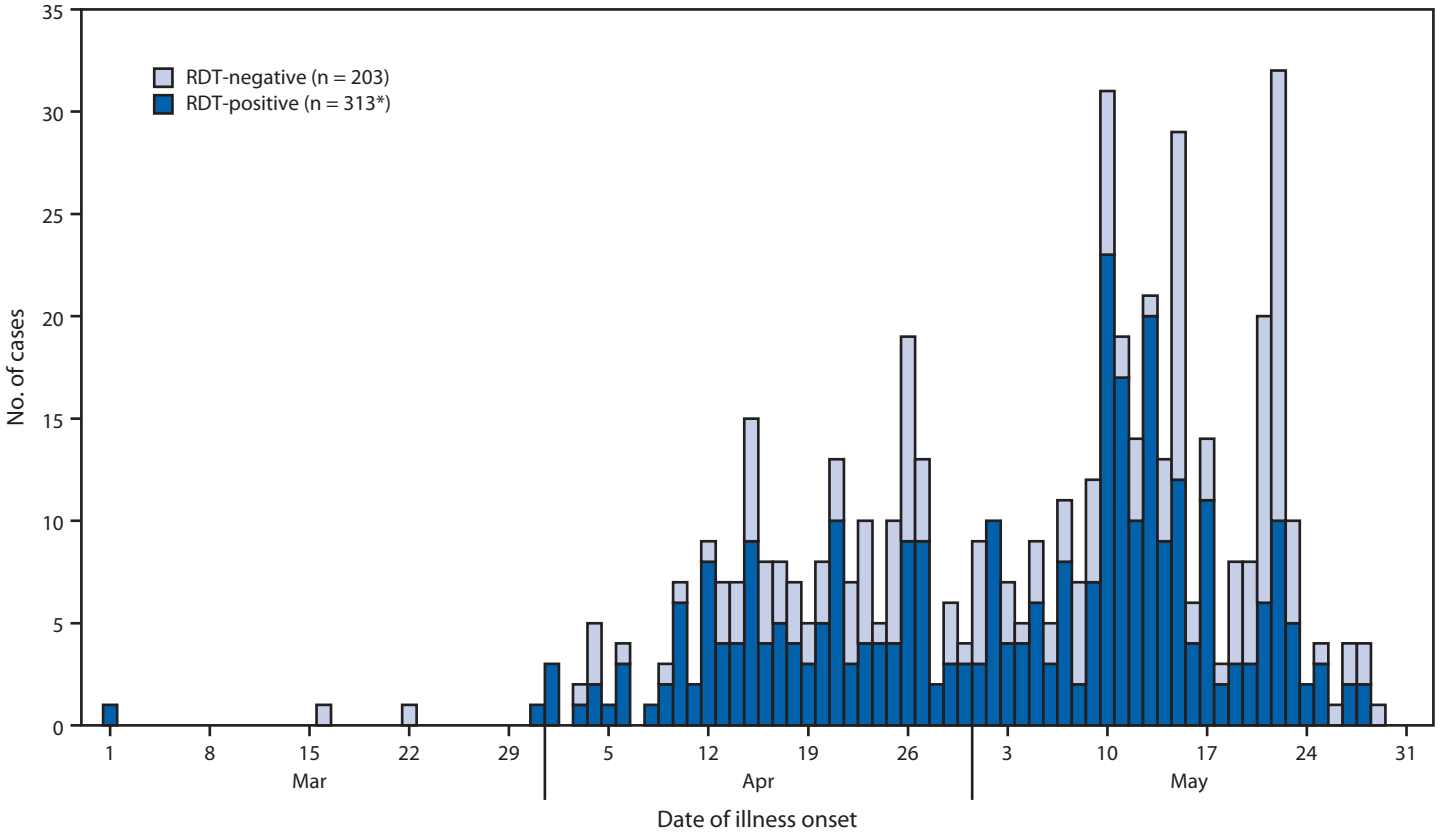
Epidemiologic and Laboratory Investigation

Because routine surveillance for acute febrile illnesses, including dengue, is not well established in Angola, the number of reported fatal and nonfatal cases likely underestimates the actual number. Anecdotal reports from clinicians and residents of Luanda suggest that the number of nonmalaria acute febrile illnesses increased beginning in late January 2013, at which time dengue was included in the differential diagnosis. Testing of these cases with an RDT (Dengue Duo, Standard Diagnostics) that detects DENV nonstructural protein 1 (NS1) and anti-DENV immunoglobulin M (IgM), at the National Public Health Institute identified the first reported RDT-positive case with illness onset on March 1 (Figure 1).

The numbers of RDT-positive and RDT-negative cases began to increase noticeably in early April. A total of 517 suspected dengue cases had been reported to the National Public Health Institute with illness onset dates through May 31, of which 313 (60.5%) had specimens with RDT-positive results. RDT-positive patients were aged 0.8–77 years (median: 25 years), and 184 (59.9%) were male. Two suspected dengue cases were reported from outside Luanda Province, both from Malanje Province, including one with a specimen that was RDT-positive. Although detailed clinical information is unavailable for reported cases, one RDT-positive case has been reported with clinically significant hemorrhagic manifestations (e.g., hematemesis). In addition, one fatal RDT-positive case has been reported; however, anecdotal reports from clinicians and the public suggest that additional fatal cases occurred but were not reported to MHA.

Serum specimens from 49 suspected dengue cases with RDT results from the National Public Health Institute were sent to the CDC Dengue Branch for confirmatory diagnostic testing. Of these 49 specimens, 43 were RDT-positive (41 NS1-positive, 14 IgM-positive, and 12 positive for both NS1 and IgM) and six were RDT-negative. All specimens were tested by real-time reverse transcriptase–polymerase chain reaction (rRT-PCR) (DENV 1–4 Real-Time RT-PCR Assay, CDC) and immunoassay for anti-DENV IgM (DENV Detect IgM Capture ELISA, InBios International). Specimens testing NS1-positive only by RDT and not confirmed by rRT-PCR were submitted to an NS1 test (Panbio Dengue Early ELISA, Alere). Current or recent DENV infection was confirmed in all of the RDT-positive specimens and in three

FIGURE 1. Number of reported dengue cases, by rapid diagnostic test (RDT) status and date of illness onset — Angola, March 1–May 31, 2013



* Two RDT-positive cases had no date of illness onset or specimen collection available.

of the RDT-negative specimens. Only DENV-1 was detected by rRT-PCR. Direct nucleic acid sequencing from five serum specimens and subsequent phylogenetic analysis showed that the DENV-1 currently circulating in Luanda belongs to the American-African lineage (Figure 2). The closest identified ancestor of the virus was isolated from a specimen collected in Nigeria in 1968.

Entomologic Investigation

Household surveys of container-breeding mosquitoes were conducted throughout Luanda. A total of 862 households were surveyed, of which 385 (44.7%) had at least one container with mosquito larvae present. Of 3,103 containers examined, 724 (23.3%) were colonized by mosquitoes. Most (63.1%) colonized containers were found indoors, and most were uncovered water-storage containers. The predominant mosquito species identified was *Aedes aegypti*.

Public Health Response

Public health messages to alert the population of Luanda to the epidemic have been issued since April. Because public awareness of dengue in Angola is low, messaging has focused on the signs and symptoms of dengue, including how to identify warning signs of severe disease. The public also has been made aware of the need to clean up refuse and empty or cover water containers that can serve as mosquito breeding sites. Proposed biologic and chemical vector-control measures to be conducted by the National Malaria Control Program include fumigation to kill adult mosquitoes using organophosphates (fenitrothion or malathion), indoor residual spraying of households, and treating larval habitats with *Bacillus thuringiensis israelensis*.

MHA worked with teams from the World Health Organization and CDC, each composed of one epidemiologist and one entomologist, to guide the public health response to the epidemic. Activities included conducting a rapid assessment of mosquito populations in Luanda, improving clinical awareness of dengue and patient management by conducting training for health-care professionals, and encouraging clinicians to use RDTs to diagnose suspected cases and send the results to the MHA. As a result, increases in case reporting were observed starting in mid-May.

Reported by

Ministry of Health of Angola. Angola Country Office, World Health Organization. Div of Global HIV/AIDS, Div of Global Health Protection (proposed), Center for Global Health; Div of Global Migration and Quarantine, Div of Vector-Borne Diseases, National Center for Emerging and Zoonotic Infectious Diseases; CDC. ***Corresponding contributor:*** *Tyler M. Sharp, PhD, tsharp@cdc.gov, 787-706-2245.*

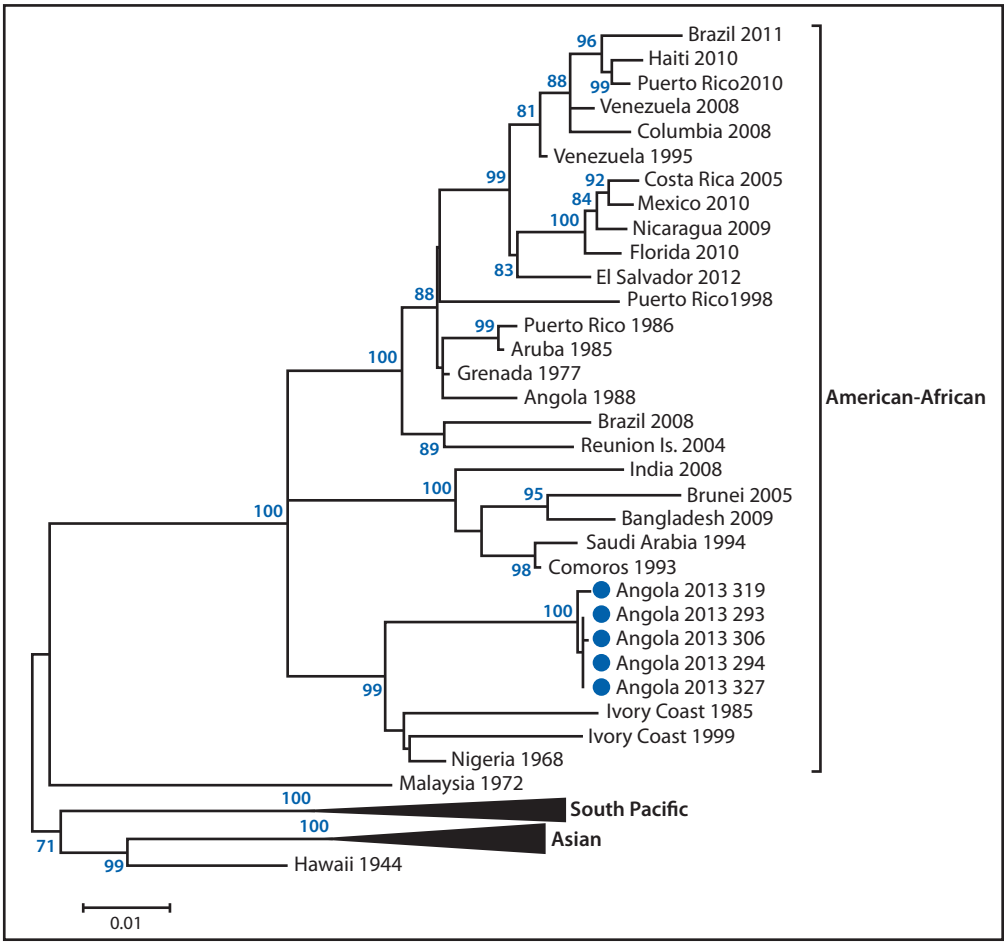
Editorial Note

Recent data suggest that approximately 390 million DENV infections occurred worldwide in 2010, of which 96 million resulted in symptomatic illness (*4*). Most persons with symptomatic DENV infection will experience an acute febrile illness characterized by fever; headache; joint, muscle, and eye pain; and minor hemorrhagic manifestations (e.g., petechiae and epistaxis) that will resolve within 1 week with bed rest, oral rehydration, and avoidance of aspirin and nonsteroidal anti-inflammatory medications (*5*). Approximately 5% of persons with symptomatic infections can experience severe manifestations around the time of defervescence because of an increase in vascular permeability leading to plasma leakage and the potential for clinically significant pleural effusions and ascites, hypovolemic shock, severe hemorrhage (e.g., hematemesis and melena), and death. The primary factors that affect the case-fatality rate for severe dengue, which can range from <0.1% to 5%, are the timing and quality of clinical care that patients receive. Life-saving care depends on close monitoring of hemodynamic status and judicious use of intravenous fluids, especially in the 24–48 hours after fever has resolved (*5*).

Reporting of suspected and RDT-positive dengue cases should continue to be strengthened in Angola. However, because of deficiencies in the national reporting system, direct communication between hospitals and MHA might be the most effective means to monitor dengue activity. Of particular concern from a surveillance viewpoint is the low number of reported fatal cases, given the size of the population of Luanda and lack of experience with clinical management of severe dengue. The apparent lack of fatal case reporting might be explained by deaths that occurred outside the hospital, lack of accurate case diagnosis, lack of postmortem tissue to diagnose suspected dengue-related deaths, and lack of familiarity with how to report cases to MHA.

At least 91 laboratory-confirmed dengue cases have been reported recently in seven countries (Canada, France, Germany, Israel, Portugal, South Africa, and the United States) among persons who had recently traveled to Luanda (*6,7*). On May 24, CDC posted a travel notice on the Travelers' Health website,* informing travelers and U.S. citizens living in Angola of the current dengue epidemic and reminding them to employ mosquito avoidance strategies and seek medical care for dengue-like illness. Four countries (Seychelles, Kenya, Angola, and Tanzania) thus far have reported dengue outbreaks in 2013. If travelers to Africa develop signs or symptoms of dengue during

FIGURE 2. Phylogenetic tree* depicting the dengue virus-type 1 circulating in Angola in 2013



* Blue dots indicate viruses circulating in Angola in 2013 for which the envelope gene was sequenced; blue numbers reflect the bootstrap percentage likelihood that the indicated node exists.

* Available at http://wwwnc.cdc.gov/travel/notices/watch/dengue-angola.

What is already known on this topic?

Dengue is believed to be endemic in much of Africa, where an estimated 64 million dengue virus (DENV) infections occurred in 2010. Dengue has been documented previously in travelers returning from Angola, but information on the epidemiology of dengue in Angola has not been available.

What is added by this report?

This report documents an ongoing dengue epidemic in Angola that at present appears to be primarily affecting Luanda. Only DENV-1 has thus far been detected, and phylogenetic analysis indicated that the most closely related virus was isolated in Nigeria in 1968, demonstrating that this virus has been circulating in the region for at least 45 years and strongly suggesting that dengue is endemic in Angola.

What are the implications for public health practice?

Physicians and public health professionals should be aware that dengue is endemic in Angola and throughout much of Africa and that timely initiation of care of dengue patients can be life-saving. Clinicians in Africa and those examining patients with acute febrile illness and recent travel to Africa should suspect dengue and report cases to public health authorities.

or ≤14 days after their visit, they should seek medical treatment and inform their doctor of their recent travel. Clinicians in the United States are reminded that dengue is a nationally reportable condition, and cases should be reported to local public health authorities. Clinicians can obtain dengue diagnostic testing from several national testing laboratories or state public health laboratories. Residents of and travelers to areas with endemic dengue can reduce their risk for DENV infection by using mosquito repellent, wearing long-sleeved shirts and pants, and sleeping in locations with air conditioning or screens on doors and windows. Up-to-date, destination-specific dengue activity reports can be found on CDC's DengueMap.[†] Additional information on dengue and dengue prevention activities can be found at the CDC dengue site.[§]

[†] Available at http://www.healthmap.org/dengue.
[§] Available at http://www.cdc.gov/dengue.

The molecular phylogeny of the DENV-1 currently circulating in Luanda indicates that the virus likely has been circulating in the region since at least 1968. This finding, in combination with reports of dengue in travelers to Angola since the 1980s, strongly suggests that dengue is endemic in Angola, as it is in much of the rest of Africa (*3*,*4*). In support of these observations, a recent study predicted that approximately 16% of all DENV infections worldwide occur in sub-Saharan Africa (*4*). This suggests that dengue in Africa is on par with that of the Americas, where the widespread nature of the illness is recognized. Public health and health-care professionals should be aware that dengue is endemic in Africa and should test suspected cases with available diagnostic tests, including RDTs, and ensure that test results are confirmed at reference laboratories experienced in dengue diagnostic testing. Diagnostic and confirmatory testing should be performed to confirm cases and initiate appropriate clinical treatment, enable early detection of outbreaks or epidemics, and identify the DENV-types circulating in the region.

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Erratum

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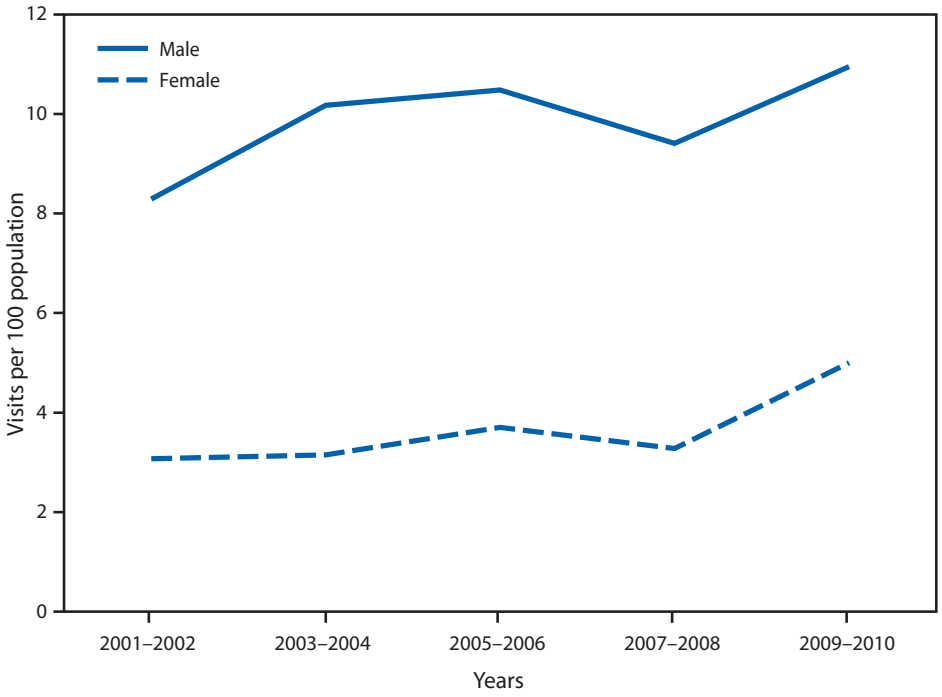
In the report, "Notes from the Field: Outbreak of Poliomyelitis — Somalia and Kenya, May 2013," the last sentence should have read as follows: "CDC also recommends that all refugees **aged <18 years** who have arrived from Kenya since the beginning of April 2013 receive 1 inactivated poliovirus vaccine dose regardless of vaccination history."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Rate of Ambulatory-Care Visits* for Attention Deficit Hyperactivity Disorder (ADHD)† by Persons Aged ≤18 Years, by Sex — United States, 2001–2002 to 2009–2010



* Visits to hospital outpatient departments and physician offices per 100 population. Rates were calculated using U.S. Census Bureau 2000–based postcensal civilian population estimates.

† Defined as having a first-listed diagnosis of 314.00 or 314.01, as coded according to the *International Classification of Diseases, Ninth Revision, Clinical Modification*.

From 2001–2002 to 2009–2010, the ambulatory-care visit rate for ADHD for females aged ≤18 years increased by 63%, from 3.1 to 5.0 visits per 100 population. Over the same period, the change in the visit rate for males did not follow a consistent pattern; in 2009–2010, the visit rate for males was 11.0 per 100. Throughout the period, males were more likely than females to have an ambulatory-care visit for ADHD.

Sources: National Ambulatory Medical Care Survey 2001–2010. Available at http://www.cdc.gov/nchs/ahcd.htm.

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U.S. Government Printing Office: 2013-623-030/01011 Region IV ISSN: 0149-2195