Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Weekly / Vol. 63 / No. 13
April 4, 2014

CDC Grand Rounds: Global Tobacco Control

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During the 20th century, use of tobacco products contributed to the deaths of 100 million persons worldwide (*1*). In 2011, approximately 6 million additional deaths were linked to tobacco use, the world's leading underlying cause of death, responsible for more deaths each year than human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), tuberculosis, and malaria combined (*1*). One third to one half of lifetime users die from tobacco products, and smokers die an average of 14 years earlier than nonsmokers (*2,3*). Manufactured cigarettes account for 96% of all tobacco sales worldwide. From 1880 to 2009, annual global consumption of cigarettes increased from an estimated 10 billion cigarettes to approximately 5.9 trillion cigarettes (Figure 1), with five countries accounting for 58% of the total consumption: China (38%), Russia (7%), the United States (5%), Indonesia (4%), and Japan (4%). Among the estimated 1 billion smokers worldwide, men outnumber women by four to one. In 14 countries, at least 50% of men smoke, whereas in more than half of these same countries, fewer than 10% of women smoke (*4*). If current trends persist, an estimated 500 million persons alive today will die from use of tobacco products. By 2030, tobacco use will result in the deaths of approximately 8 million persons worldwide each year (*4*). Yet, every death from tobacco products is preventable.

The Tobacco Industry

Tobacco plants are grown in 124 countries. China, which produces 43% of the world's tobacco, has seen a 200% increase in production over the past 30 years. Other leading producers include Brazil, India, the United States, Argentina, Malawi, and Indonesia. There are five major, private tobacco companies throughout the world and 16 state-owned companies. The largest state-owned company, China National Tobacco Corporation, produces one third of the cigarettes sold worldwide. In 2010, the combined total revenue of the top six tobacco companies in the world was approximately $346 billion with a combined profit of $35 billion (*4*). In the United States, marketing expenditures for cigarette advertising and promotion reached $9.9 billion in 2008; 83% of this total was spent on price discounts, coupons, and retail value–added promotions (*5*).

Global Public Health Interventions and Proven Strategies to Reduce Tobacco Use

In 2005, the World Health Organization's Framework Convention on Tobacco Control (WHO FCTC) was codified

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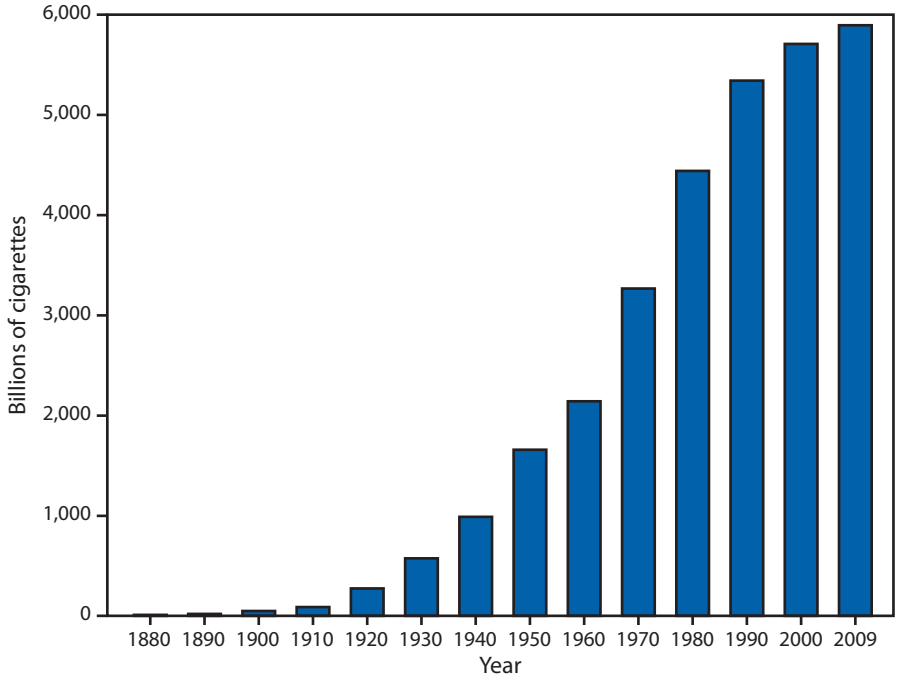
as the world's first international public health treaty. Ratified by 178 parties, WHO FCTC calls for global, coordinated actions aimed at reducing tobacco use (*6*).

In 2008, WHO introduced its MPOWER measures as practical, cost-effective ways to scale up global implementation of specific WHO FCTC provisions. The six measures of MPOWER are 1) monitoring tobacco use and prevention programs and policies; 2) protecting persons from secondhand smoke through establishment of smokefree public places; 3) offering persons help to quit tobacco use; 4) warning about the dangers of tobacco use through mass media campaigns and labels on tobacco packages; 5) enforcing bans on tobacco advertising, promotion, and sponsorship; and 6) raising taxes on tobacco products (*2*) (Figure 2).

CDC has focused much of its global contribution to MPOWER on monitoring and surveillance through the Global Tobacco Surveillance System (GTSS), a set of globally standardized surveys designed to monitor tobacco use as well as progress in tobacco control policy measures.* GTSS enhances countries' capacity to design, implement, monitor, and evaluate tobacco control policies.

FIGURE 1. Annual global cigarette consumption — 1880–2009



Source: Eriksen M, Mackay J, Ross H. The tobacco atlas. Fourth ed. Atlanta, GA: American Cancer Society; New York, NY: World Lung Foundation; 2012. Available at http://www.tobaccoatlas.org.

Monitoring tobacco use and control. GTSS includes surveys designed for youths (the Global Youth Tobacco Survey

*GTSS data are available by country, WHO region, or MPOWER indicator at http://apps.nccd.cdc.gov/gtssdata/default/default.aspx.

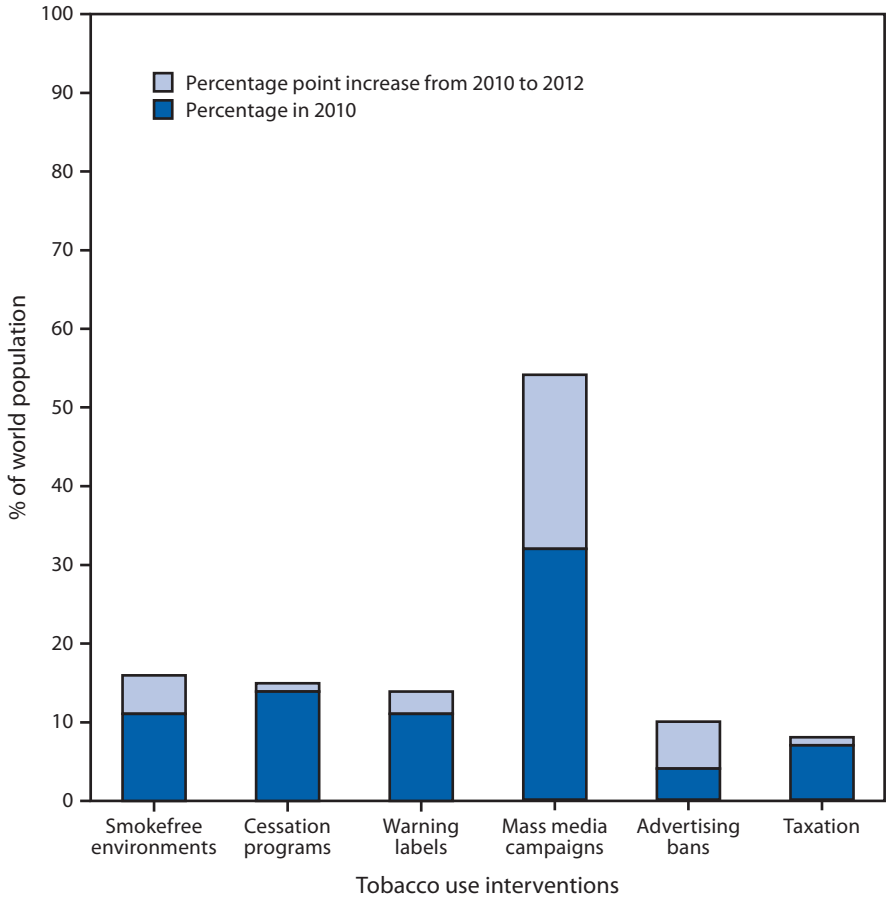
The *MMWR* series of publications is published by the Center for Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30329-4027.

Suggested citation: [Author names; first three, then et al., if more than six.] [Report title]. MMWR 2014;63:[inclusive page numbers].

[GYTS]) and adults (the Global Adult Tobacco Survey [GATS]), as well as Tobacco Questions for Surveys (TQS). GYTS is a school-based survey of students aged 13–15 years that uses a standard protocol. Since 1999, GYTS has been conducted in approximately 180 countries. Many countries have conducted the survey multiple times, providing comparable results within and among countries over time. Key GYTS results include the finding that 10% of students aged 13–15 years currently smoke cigarettes, and 10% use other tobacco products. Additionally, 25% of smokers in this age group first tried cigarettes by the age of 10 years, and two thirds want to quit. Approximately 40% of students are exposed to secondhand smoke in the home, and 50% are exposed in public places (*7*).

GATS is a nationally representative, household survey of adults (aged ≥15 years) that is used to track tobacco use and evaluate tobacco control policies. Since 2008, it has been completed in 22 countries, covering 61% of the world's adult population and 63% of the world's smokers. Findings from the 19 GATS countries with publicly available data indicate that approximately 875 million adults currently use tobacco, although 19% of smokers plan to or are thinking about quitting. At least 391 million adults are exposed to secondhand smoke at the workplace, and 15% of adults noticed cigarette marketing in stores where cigarettes are sold (*8*).

FIGURE 2. Percentage of the world population covered by MPOWER interventions against tobacco use — 2010 and 2012



Source: World Health Organization. WHO report on the global tobacco epidemic 2013: enforcing bans on tobacco advertising, promotion, and sponsorship. Geneva, Switzerland: World Health Organization; 2013. Available at http://www.who.int/tobacco/global_report/2013/en.

TQS contains a list of 22 survey questions that can be integrated into national, subnational, and international surveys to promote data comparability within and across countries over time. It has been implemented in 20 countries.

Smokefree laws and regulations. Comprehensive and well-enforced smokefree policies result in changes in social norms and attitudes toward smoking, with concomitant decreases in cigarette consumption and increases in quitting (*9*). The number of smokefree areas in the United States and around the world doubled from 2008 to 2010. Besides being a simple and low-cost way to protect populations from exposure to secondhand smoke, smokefree laws receive strong public support, which typically increases after the policies go into effect, even among smokers, and do not harm businesses (*9,10*).

Cessation programs. The majority of smokers quit without assistance (*11*); however, cessation interventions can greatly increase quit rates. Persons who discontinue tobacco use receive immediate and significant health benefits and have most of their excess health risks reduced within a few years. GATS results from 19 countries show that the two countries with the highest proportions of persons who have quit smoking are Brazil and Uruguay, both of which have implemented comprehensive tobacco control programs, including cost-covered cessation services (*2,8*).

Warning labels. Requiring graphic warning labels on cigarette packages is another effective tobacco control strategy (*12*). Warning labels should be large with dramatic images, include specific health warnings, and should be changed periodically. In Brazil, where graphic warning labels have been required since 2002 (*13*), more than 70% of smokers approved of these labels, with over half of those surveyed reporting that they had changed their opinions about the health consequences of smoking, and nearly 70% of smokers stating that they wanted to quit as a result of the labels (*1*). To further limit the attractiveness and appeal of cigarette packages, in December 2012 Australia became the first country to adopt plain, standard packaging that eliminates all color, imagery, and brand appeal (*2*).

Tobacco advertising, promotion, and sponsorship bans. Comprehensive tobacco marketing bans that regulate advertising, promotion, and sponsorship can also reduce tobacco's appeal (*2*). Comprehensive bans have been shown to reduce average cigarette consumption by 9% within the 10 years after implementation, compared with just 1% in countries without such bans (*14*). In addition, aggressive antismoking media campaigns (sometimes conducted in conjunction with providing access to cessation services) prevent tobacco use initiation and encourage smokers to quit (*15*).

Raising taxes. Raising the consumer price of tobacco products is one of the most effective ways to reduce tobacco use; for every 10% increase in price, there is an estimated 4%–7% decrease in consumption (*16*). This effect of tobacco price increase on consumption has been found throughout the world (*16,17*). WHO recommends reaching or exceeding a tax rate that corresponds to at least 75% of the total cigarette price. GATS data have shown that tobacco products tend to be most affordable (measured as the ratio of tobacco price to per capita income) in countries where taxes on these products are low (e.g., cigarettes in Russia or bidis in India) (*18*). Higher taxes can reduce the relative affordability of tobacco products, discouraging consumption. However, the affordability of tobacco products has been on the rise in most of the world (*4*).

The Years Ahead

Governments worldwide collect nearly $133 billion in tobacco excise tax revenue each year (*4*). Despite this, less than $1 billion is spent globally on tobacco control, with 97% of such spending occurring in high-income countries (*2*). In contrast, tobacco use costs the world economy an estimated $500 billion each year in health-care expenditures, productivity losses, fire damage, and other costs (*19*). Without effective global tobacco control efforts, low-income and middle-income countries with high population densities will continue to suffer the most harm. Even a modest decline in smoking prevalence from 25% to 20%, achieved through broader implementation of MPOWER strategies, could prevent 100 million global deaths from tobacco use by the end of the century (*20*).

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References

1. World Health Organization. WHO report on the global tobacco epidemic, 2008: the MPOWER package. Geneva, Switzerland: World Health Organization; 2008. Available at http://www.who.int/tobacco/mpower/2008/en.
2. World Health Organization. WHO report on the global tobacco epidemic, 2013: enforcing bans on tobacco advertising, promotion and sponsorship. Geneva, Switzerland: World Health Organization; 2013. Available at http://www.who.int/tobacco/global_report/2013/en.
3. CDC. Smoking-attributable mortality, years of potential life lost, and productivity losses—United States, 2000–2004. MMWR 2008;57:1226–8.
4. Eriksen M, Mackay J, Ross H. The tobacco atlas. 4th ed. Atlanta, GA: American Cancer Society; New York, NY: World Lung Foundation; 2012. Available at http://www.tobaccoatlas.org.
5. Federal Trade Commission. Federal Trade Commission cigarette report for 2011. Washington, DC: Federal Trade Commission; 2013. Available at http://www.ftc.gov/os/2013/05/130521cigarettereport.pdf.
6. World Health Organization. WHO framework convention on tobacco control. Geneva, Switzerland: World Health Organization; 2014. Available at http://www.who.int/fctc.
7. CDC. Global youth tobacco surveillance, 2000–2007. MMWR 2008:57(No. SS-01).
8. CDC. Global Tobacco Surveillance System Data (GTSSData). Atlanta, GA: US Department of Health and Human Services, CDC; 2014. Available at http://nccd.cdc.gov/gtssdata/default/default.aspx.
9. World Health Organization. WHO report on the global tobacco epidemic, 2009: implementing smoke-free environments. Geneva, Switzerland: World Health Organization; 2009. Available at http://www.who.int/tobacco/mpower/2009/en.
10. Scollo M, Lal A. Summary of studies assessing the economic impact of smoke-free policies in the hospitality industry. Melbourne, Australia: VicHealth Centre for Tobacco Control; 2008. Available at http://www.vctc.org.au/tc-res/Hospitalitysummary.pdf.
11. Chapman S, Wakefield MA. Large-scale unassisted smoking cessation over 50 years: lessons from history for endgame planning in tobacco control. Tob Control 2013;22(Suppl 1):i33–5.
12. World Health Organization. WHO report on the global tobacco epidemic, 2011: warning about the dangers of tobacco. Geneva, Switzerland: World Health Organization; 2011. Available at http://www.who.int/tobacco/global_report/2011/en.
13. Canadian Cancer Society. Cigarette package health warnings: international status report. 3rd ed. Toronto, Canada: Canadian Cancer Society; 2012. Available at http://www.ensp.org/node/817.
14. Saffer H. Tobacco advertising and promotion. In: Jha P, Chaloupka FJ, eds. Tobacco control in developing countries. Oxford, United Kingdom: Oxford University Press; 2000.
15. US Department of Health and Human Services. The health consequences of smoking—50 years of progress. A report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, CDC; 2014. Available at http://www.surgeongeneral.gov/library/reports/50-years-of-progress.
16. International Agency for Research on Cancer. IARC handbooks of cancer prevention, tobacco control. Volume 14: effectiveness of tax and price policies for tobacco control. Lyon, France: International Agency for Research on Cancer; 2011. Available at http://www.iarc.fr/en/publications/pdfs-online/prev/handbook14/index.php.
17. Chaloupka FJ, Tauras JA. The power of tax and price. Tob Control 2011;20:391–2.
18. Kostova D, Chaloupka FJ, Yurekli A, et al. A cross-country study of cigarette prices and affordability: evidence from the Global Adult Tobacco Survey. Tob Control 2012;23:e3.
19. Shafey O, Eriksen M, Ross H, Mackay J. The tobacco atlas. 3rd ed. Atlanta, GA: American Cancer Society; Bookhouse Group; 2009.
20. Frieden TR, Bloomberg MR. How to prevent 100 million deaths from tobacco. Lancet 2007;369:1758–61.

National Capacity for Surveillance, Prevention, and Control of West Nile Virus and Other Arbovirus Infections — United States, 2004 and 2012

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In the first 5 years after its introduction in the United States in 1999 (*1*), West Nile virus (WNV) spread to the 48 contiguous states, resulting in 667 reported deaths (*1–3*). To establish detection and response capacity, WNV surveillance and prevention was supported through CDC Epidemiology and Laboratory Capacity (ELC) cooperative agreements with all 50 states and six large cities/counties.* In 2005, the Council of State and Territorial Epidemiologists (CSTE) conducted an assessment of ELC recipients and determined that, since 1999, all had developed WNV surveillance and control programs, resulting in a national arboviral surveillance infrastructure (*4*). From 2004 to 2012, ELC funding for WNV surveillance decreased by 61%. In 2012, the United States had its most severe WNV season since 2003 (*3*), prompting a follow-up assessment of the capacity of ELC-supported WNV programs. Since the first assessment, 22% of jurisdictions had stopped conducting active human surveillance, 13% had stopped mosquito surveillance, 70% had reduced mosquito trapping and testing, and 64% had eliminated avian mortality surveillance. Reduction in early detection capacity compromises local and national ability to rapidly detect changes in WNV and other arboviral activity and to initiate prevention measures. Each jurisdiction is encouraged to review its current surveillance systems in light of the local threat of WNV and emerging arboviruses (e.g., dengue and chikungunya) and ensure it is able to rapidly detect and respond to critical changes in arbovirus activity.

Using the 2005 CSTE assessment procedure that measured capacity in 2004; new CDC guidelines for WNV surveillance, prevention, and control (*5*); and technical assistance from CDC, a CSTE workgroup developed an assessment tool to describe human, mosquito, and laboratory surveillance capacity for WNV and other arboviruses in 2012 and to compare responses with those from 2004. The workgroup included representation from the Association of State and Territorial Health Officers (ASTHO), the National Association of County and City Health Officials (NACCHO), and the Association of Public Health Laboratories (APHL). CSTE distributed the assessment form electronically in August 2013. Responses were received from all 50 states and all six ELC-supported city/county health departments.

* Chicago, Illinois; Houston, Texas; Los Angeles County, California; New York, New York; Philadelphia, Pennsylvania; and the District of Columbia.

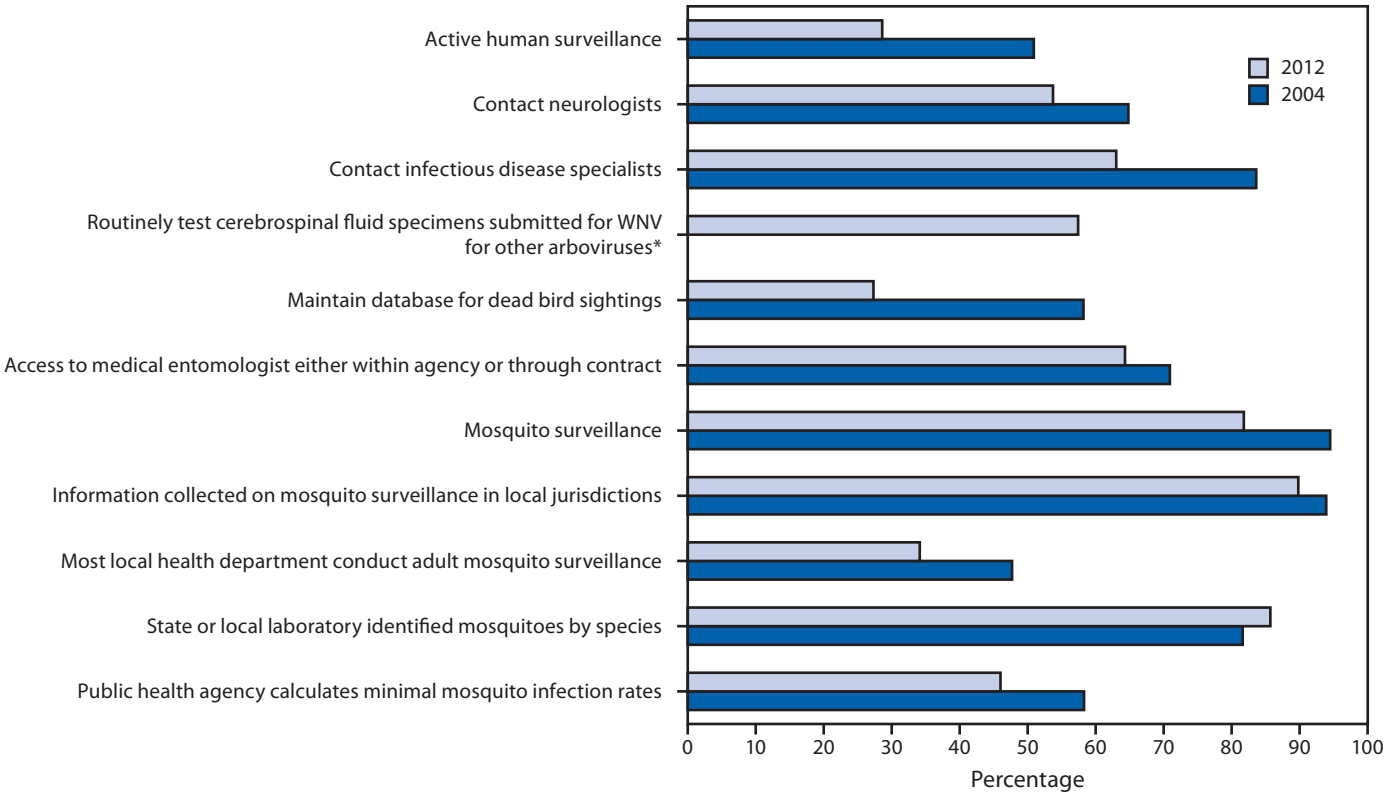
Surveillance Capacity

All 56 jurisdictions conducted surveillance for human WNV disease in 2012. Compared with 2004, they were less likely to have an active component to human surveillance (16 of 56 [29%] versus 28 of 55 [51%]) and were less likely to report contacting neurologists (29 of 54 [54%] versus 35 of 54 [65%]) or infectious disease specialists (34 of 54 [63%] versus 46 of 55 [84%]) by telephone, fax, mail, or electronic health alerts to encourage disease reporting (Figure 1). In 2012, 27 of 47 (57%) responding public health laboratories routinely tested human specimens submitted for WNV testing for other arboviruses, but of these, only six routinely tested for arboviruses other than St. Louis or eastern equine encephalitis viruses.

Mosquito surveillance capacity also decreased between 2004 and 2012. Fewer jurisdictions had their own mosquito surveillance systems (45 of 55 [82%] in 2012 versus 52 of 55 [95%] in 2004) and access to a medical entomologist either within the agency or through contract with another agency (36 of 56 [64%] versus 39 of 55 [71%]). Also decreasing were the number of states collecting information about mosquito surveillance in local health departments in their state (44 of 49 [88%] versus 46 of 49 [94%]), the number responding that ≥50% of local health departments in their state conduct adult mosquito surveillance (15 of 44 [34%] versus 21 of 44 [48%]), and the number of surveyed jurisdictions that calculated minimum mosquito infection rates (23 of 50 [46%] versus 28 of 48 [58%]). Only the number of jurisdictions that received information about the species of trapped mosquitoes increased (42 of 49 [86%] versus 40 of 49 [82%]) (Figure 1).

The assessment measured current staffing levels for WNV and other mosquito-borne virus surveillance in two ways: 1) the number of persons (direct hires or contractors) working as ≥50% full-time equivalents (FTEs) on WNV surveillance in the health department by funding source and 2) the total number of FTEs currently working by function (epidemiologist, laboratory staff, mosquito/other environmental surveillance, and "other"). The assessment also gathered information on additional staffing needs by function to be able to "achieve full epidemiology and laboratory capacity to conduct WNV and

FIGURE 1. West Nile virus (WNV) surveillance capacity in state and Epidemiology and Laboratory Capacity–supported city/county health departments, by selected indicators — United States, 2012 and 2004



* Not assessed in 2004.

other mosquito-borne disease surveillance."[†] Compared with 2004, the number of persons working as ≥50% FTEs on WNV in 2012 decreased 38%, from 382 to 235. Overall, 236.8 FTEs (including <50% FTEs) were working in the 56 jurisdictions at the time of the assessment, with 18% working as epidemiologists, 28% working in laboratory positions, 31% working on mosquito/environmental surveillance, and 24% working as support staff. Forty (80%) of the 50 states and four of the six local jurisdictions reported needing at least one additional FTE, for a total of 137.6 FTEs needed, 58% more than are currently employed (Table).

Jurisdictions were asked how they had managed reductions to ELC funding for WNV surveillance during the past 5 years. Among respondents to specific questions, 30 of 47 (64%) eliminated dead bird surveillance, 32 of 48 (67%) decreased the number of mosquito trap sites, 35 of 50 (70%) decreased the number of mosquito pools tested, and 23 of 51 (45%) decreased the number of WNV tests done on human specimens (Figure 2). Jurisdictions identifying a need for additional laboratory staff were less likely than those with no additional need to test mosquito pools for WNV (25 of 33 [76%] versus 18 of 21 [86%]) and to test human cerebrospinal fluid specimens submitted for WNV testing for other arboviruses (15 of 28 [54%] versus 11 of 17 [65%]). They were more likely to have decreased the number of mosquito pools tested (22 of 32 [69%] versus 11 of 17 [65%]). Those identifying a need for additional mosquito surveillance staff were more likely than those without a need to have decreased the number of mosquito trapping sites (24 of 31 [77%] versus six of 15 [40%]).

Prevention

In 2012, 51 of 56 (91%) jurisdictions posted prevention information about WNV on their websites compared with 54 of 55 (98%) in 2004. As of 2012, 33 of 53 (62%) jurisdictions had a formal plan for killing adult mosquitoes in the event of a WNV disease outbreak, and 15 of 47 (32%) states financially supported larviciding in at least some of their local health departments; at least another 14 would have supported larviciding if given sufficient funding.

[†] Defined as 1) ability to complete a standard case report form on every suspected/confirmed mosquito-borne arboviral disease case and report it to ArboNet, 2) ability to test by immunoglobulin M for all relevant arboviruses (including dengue) on any cerebrospinal fluid or serum specimen submitted to the state or city/county laboratory on a suspected case of arboviral disease), and 3) have an environmental surveillance system that includes mosquito surveillance to routinely monitor arboviral activity in both larval and adult mosquitoes in all parts of the jurisdiction in which there is the potential for human outbreaks of arboviral disease based on past experience.

TABLE. Current staff working as full-time equivalents (FTEs) and additional staff needed to achieve full capacity for West Nile virus and other arboviral surveillance, by functional category — 50 states and six Epidemiology and Laboratory Capacity–funded city/county health departments,* August 2013

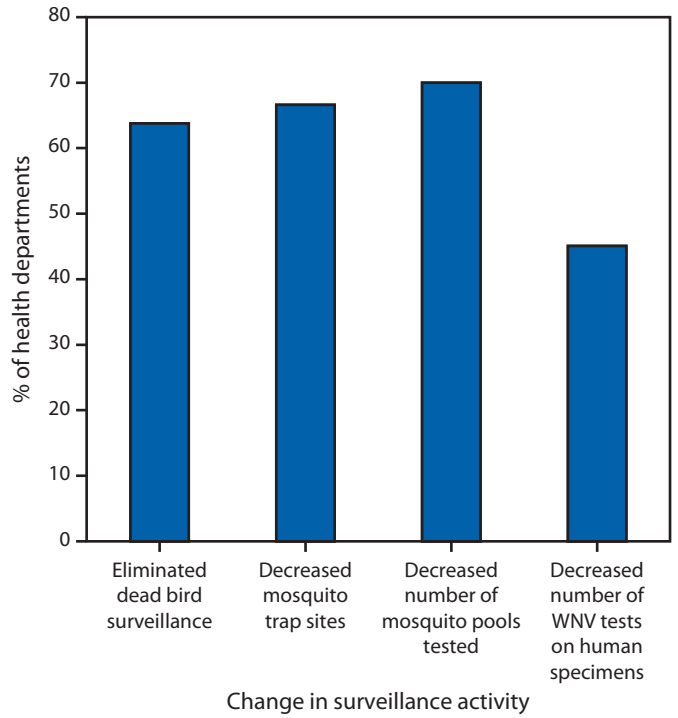
Functional category	2013 actual FTEs	Additional staff needed to achieve full capacity†	Increase needed (%)
Epidemiologist	41.5	28.1	(67.7)
Laboratory	66.5	29.4	(44.2)
Mosquito/Environmental	72.8	60.6	(83.2)
Other§	56.0	19.5	(34.8)
Total	**236.8**	**137.6**	**(58.1)**

* Chicago, Illinois; Houston, Texas; Los Angeles County, California; New York, New York; Philadelphia, Pennsylvania; and the District of Columbia.

† Defined as 1) ability to complete a standard case report form on every suspected/confirmed mosquito-borne arboviral disease case and report it to ArboNet, 2) ability to test by immunoglobulin M for all relevant arboviruses (including dengue) on any cerebrospinal fluid or serum specimen submitted to the state or city/county laboratory on a suspected case of arboviral disease), and 3) have an environmental surveillance system that includes mosquito surveillance to routinely monitor arboviral activity in larval and adult mosquitoes in all parts of the jurisdiction in which there is the potential for human outbreaks of arboviral disease based on past experience.

§ Other includes "other surveillance, clerical, and administrative staff."

FIGURE 2. Percentage of Epidemiology and Laboratory Capacity (ELC)–funded state and city/county health departments modifying selected surveillance activities in the past 5 years in response to reduction in West Nile virus (WNV)–specific ELC funding, August 2013



What is already known on this topic?

In response to the emergence of West Nile virus (WNV) in 1999, CDC Epidemiology and Laboratory (ELC) cooperative agreement funding supported surveillance and prevention capacity building in every state to detect and respond to WNV and other arboviruses. By 2004, every state had a high level of surveillance and prevention capacity, as measured by an assessment conducted by the Council of State and Territorial Epidemiologists (CSTE), and a national surveillance system based on state capacity was well established.

What is added by this report?

From 2004 to 2012, ELC cooperative agreement funding for arboviral surveillance decreased 61%. A recent CSTE assessment found that state and local health department capacity for WNV and other arbovirus surveillance and control have decreased substantially, and that some health departments had lost all mosquito monitoring capability and laboratory capacity to test for emerging arboviruses.

What are the implications for public health practice?

The loss of arboviral surveillance capacity might have compromised local and national ability to rapidly detect and respond to changes in WNV and other arboviral activity. Based on the findings in this assessment and current arboviral threats to the United States, jurisdictions are encouraged to review their current surveillance systems and ensure they meet with current CDC guidance and are able to rapidly detect and respond to critical changes in arbovirus activity.

Discussion

Before the availability of WNV-specific ELC funding in 2000, no federal funding supported state and local arboviral surveillance, and no national arboviral surveillance infrastructure existed to respond to either introduced threats (e.g., WNV, dengue virus, and chikungunya virus) (*6,7*) or to potentially emerging endemic arboviruses (e.g., Powassan, LaCrosse, and Heartland viruses) (*8*). ArboNET, the national surveillance platform built to monitor WNV and expanded to include other arboviruses, is a distributed system dependent on each state and local health department having sufficient human, animal, and mosquito surveillance and reporting activities and supportive laboratory capacity to meet its prevention and control needs. Any change in state or local capacity affects both the local and national systems.

The findings of the recent CSTE assessment demonstrate that critical state-level monitoring capacity built for WNV has eroded since 2004, despite states having largely eliminated less critical activities such as avian mortality surveillance. With states having cut back on mosquito surveillance, active surveillance for human disease, and laboratory testing for WNV and other arboviruses, the ability to rapidly detect emerging and outbreak-threshold threats and to rapidly initiate prevention measures to minimize human morbidity and mortality (e.g., public notification and killing adult mosquitoes) might be compromised. This comes at a time when the need for a robust early detection system is high: 2012

was one of the most intense WNV seasons since 1999, with 2,873 cases of neuroinvasive disease and 286 deaths reported. The threat of dengue outbreaks is growing, with an average of 492 imported cases detected in more than 30 states annually during 2010–2012 (*9*). In 2013, local dengue transmission was documented in Florida, Texas, and New York (*9*), and chikungunya virus transmission was documented in the Americas for the first time (*10*). Monitoring also serves to detect and track alterations in transmission ecology and epidemiology, including those that might occur as a result of climate change, and currently less common endemic arboviruses (*8*). Although the ELC funding language for WNV capacity building was expanded in 2005 to include other arboviruses, ELC funding for arbovirus surveillance has decreased.

The findings in this report are subject to at least two limitations. First, not all respondents answered all questions. Second, some respondents might have interpreted some questions differently in 2012 than in 2004.

This assessment focused on capacity to conduct currently recommended priority arbovirus surveillance functions that have been demonstrated to be of the most value in predicting outbreaks: surveillance for human disease, mosquito trapping and testing, and laboratory testing (*5*). Based on the findings in this assessment and current arboviral threats to the United States, jurisdictions are encouraged to review their current surveillance systems and ensure they meet with current CDC guidance and are able to rapidly detect and respond to critical changes in arbovirus activity.

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References

1. CDC. Outbreak of West Nile-like viral encephalitis—New York, 1999. MMWR 1999;48:845–9.
2. Petersen LR, Hayes EB. Westward ho?—the spread of West Nile virus. N Engl J Med 2004;351:2257–9.
3. CDC. West Nile virus: final maps and data, 1999–2012. Atlanta, GA: US Department of Health and Human Services, CDC; 2013. Available at http://www.cdc.gov/westnile/statsmaps/final.html.
4. CDC. Assessing capacity for the surveillance, prevention, and control of West Nile virus infection—United States, 1999 and 2004. MMWR 2006;55:150–3.
5. CDC. West Nile virus in the United States: guidelines for surveillance, prevention, and control. 4th revision. Fort Collins, CO: US Department of Health and Human Services, CDC; 2013. Available at http://www.cdc.gov/westnile/resources/pdfs/wnvguidelines.pdf.
6. CDC. Locally acquired dengue—Key West, Florida, 2009–2010. MMWR 2010;59:577–81.
7. Ruiz-Moreno D, Vargas IS, Olson KE, Harrington LC. Modeling dynamic introduction of chikungunya virus in the United States. PLoS Negl Trop Dis 2012;6:e1918.
8. Ebel GD. Update on Powassan virus: emergence of a North American tick-borne flavivirus. Annu Rev Entomol 2010;55:95–110.
9. US Geological Survey. Dengue fever (imported, locally acquired)—human. Reston, VA: US Department of the Interior, US Geological Survey; 2013. Available at http://diseasemaps.usgs.gov/index.html.
10. World Health Organization. Chikungunya in the French part of the Caribbean isle of Saint Martin. Geneva, Switzerland: World Health Organization; 2013. Available at http://www.who.int/csr/don/2013_12_10a/en/index.html.

Progress Toward Measles Preelimination — African Region, 2011–2012

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In 2008, the 46 member states of the World Health Organization (WHO) African Region (AFR) adopted a measles preelimination goal to reach by the end of 2012 with the following targets: 1) >98% reduction in estimated regional measles mortality compared with 2000, 2) annual measles incidence of fewer than five reported cases per million population nationally, 3) >90% national first dose of measles-containing vaccine (MCV1) coverage and >80% MCV1 coverage in all districts, and 4) >95% MCV coverage in all districts by supplementary immunization activities (SIAs) (*1*). Surveillance performance objectives were to report two or more cases of nonmeasles febrile rash illness per 100,000 population, one or more suspected measles cases investigated with blood specimens in ≥80% of districts, and 100% completeness of surveillance reporting from all districts (*1*). This report updates previous reports (*2–4*) and describes progress toward the measles preelimination goal during 2011–2012. In 2012, 13 (28%) member states had >90% MCV1 coverage, and three (7%) reported >90% MCV1 coverage nationally and >80% coverage in all districts. During 2011–2012, four (15%) of 27 SIAs with available information met the target of >95% coverage in all districts. In 2012, 16 of 43 (37%) member states met the incidence target of fewer than five cases per million, and 19 of 43 (44%) met both surveillance performance targets. In 2011, the WHO Regional Committee for AFR established a goal to achieve measles elimination* by 2020. To achieve this goal, intensified efforts to identify and close population immunity gaps and improve surveillance quality are needed, as well as committed leadership and ownership of the measles elimination activities and mobilization of adequate resources to complement funding from global partners.

Immunization Activities

WHO and the United Nations Children's Fund (UNICEF) use data from administrative records and surveys reported annually by member states through the Joint Reporting Form (JRF)† to estimate MCV1 coverage among children aged 1 year. Since 2003, member states also have reported the proportion of districts reaching ≥80% MCV1 coverage. Estimates of MCV1 coverage in AFR were 74% in 2011 and 73% in 2012 (Table 1). The number of member states with >90% MCV1 coverage was 14 (30%) in 2011 and 13 (28%) in 2012 (Table 1). MCV1 coverage was >90% nationally and >80% in all districts in four (9%) of 44 member states reporting district coverage data in 2011 and three (7%) of 44 in 2012. By the end of 2012, 12 (26%) member states had introduced a second dose of measles containing-vaccine (MCV2) into the routine vaccination schedule.

During 2011–2012, approximately 133 million children were vaccinated during 35 measles SIAs (Table 2). Of these SIAs, 23 (66%) had >95% national level administrative coverage, and of the 27 with available information, four (15%) had >95% MCV administrative coverage in all districts. Among the 20 SIAs that had a post-SIA coverage survey, 19 (95%) had lower coverage estimated by survey than by administrative report (Table 2). At least one other child health intervention was delivered in 23 (66%) SIAs (Table 2).

Surveillance Activities

In 2012, the WHO Global Measles and Rubella Laboratory Network§ supported standardized methods and quality assurance measures in 44 laboratories in 42 member states. Measles case-based surveillance includes individual case investigation and blood specimen collection for laboratory testing (*5*). Suspected measles cases are confirmed on the basis of laboratory findings, an epidemiologic link, or clinical criteria.¶ During

* Measles elimination is defined as the absence of endemic measles virus transmission in a defined geographic area (e.g., region or country) for ≥12 months in the presence of a well-performing surveillance system.

† WHO and UNICEF jointly collect information through a standard questionnaire, the JRF, sent to all member states. Information collected in the JRF includes estimates of national immunization coverage, reported cases of vaccine-preventable diseases, immunization schedules, and indicators of immunization system performances. Additional information available at http://www.who.int/immunization/monitoring_surveillance/routine/reporting/reporting/en. JRF data are available at http://www.who.int/immunization_monitoring/data/data_subject/en/index.html.

§ This network includes 44 national laboratories; three are also regional reference laboratories (in Abidjan, Cote d'Ivoire; Entebbe, Uganda; and Johannesburg, South Africa). Member states currently not participating in case-based surveillance and without national laboratories are Mauritius, Sao Tome and Principe, and Seychelles.

¶ Cases that meet the WHO clinical case definition of measles for which no adequate specimen was collected and cannot be epidemiologically linked to a laboratory-confirmed case of measles.

TABLE 1. Reported coverage with the first dose of measles-containing vaccine (MCV1), number of confirmed measles cases, confirmed measles incidence, and proportion of measles cases in children aged <5 years, by member state — World Health Organization (WHO) African Region, 2011 and 2012

	2011					
Member state	% coverage with MCV1 (WHO-UNICEF estimate)*	No. of confirmed† measles cases (case-based surveillance)	Measles incidence per million population (case-based surveillance)	No. of measles cases (JRF)*	Measles incidence per million population (JRF)*	Proportion of measles cases in children aged <5 yrs (%) (case-based surveillance)§
Algeria	95	126	3.3	112	3.0	27.8
Angola	88	190	9.4	1,449	71.8	65.3
Benin	72	431	44.1	426	43.6	69.1
Botswana	94	7	3.5	8	4.0	NA
Burkina Faso	89	285	17.8	860	53.8	47.4
Burundi	93	65	6.8	129	13.5	76.9
Cameroon	76	914	43.2	504	23.8	66.1
Cape Verde	96	0	0.0	0	0.0	NA
Central African Republic	49	679	153.1	679	153.1	59.3
Chad	54	146	12.1	8,650	716.1	41.4
Comoros	87	3	4.3	3	4.3	NA
Cote d'Ivoire	49	631	32.5	628	32.4	70.4
DRC	74	1,519	23.8	133,802	2,092.9	75.0
Equatorial Guinea	51	0	0.0	0	0.0	NA
Eritrea	99	14	2.4	48	8.1	7.1
Ethiopia	68	3,556	39.8	3,255	36.4	30.4
Gabon	72	2	1.3	2	1.3	NA
Gambia	91	0	0.0	0	0.0	NA
Ghana	91	137	5.5	120	4.8	28.2
Guinea	58	7	0.6	11	1.0	NA
Guinea-Bissau	69	0	0.0	0	0.0	NA
Kenya	87	2,461	58.6	2,395	57.0	41.1
Lesotho	85	0	0.0	172	84.7	NA
Liberia	71	24	5.9	279	68.4	41.7
Madagascar	70	1	0.0	0	0.0	NA
Malawi	96	21	1.4	26	1.7	42.9
Mali	56	25	1.7	24	1.7	40.0
Mauritania	67	188	50.8	234	63.2	24.5
Mauritius	99	NR	NR	2	1.6	NR
Mozambique	82	155	6.3	177	7.2	50.0
Namibia	74	86	38.8	79	35.6	40.7
Niger	76	775	46.9	771	46.7	35.7
Nigeria	57	15,970	97.3	18,843	114.8	74.6
Republic of the Congo	90	142	33.6	315	74.6	62.0
Rwanda	95	28	2.5	31	2.8	57.1
Sao Tome and Principe	91	NR	NR	0	0.0	NR
Senegal	84	22	1.7	18	1.4	40.9
Seychelles	99	NR	NR	0	0.0	NR
Sierra Leone	80	16	2.7	1,865	318.0	62.5
South Africa	78	155	3.0	92	1.8	69.0
Swaziland	98	0	0.0	0	0.0	NA
Togo	72	168	26.0	187	28.9	59.5
Uganda	75	126	3.6	3,312	94.2	80.2
Tanzania	93	1,570	33.9	1,622	35.0	65.6
Zambia	83	13,153	964.7	13,234	970.7	48.0
Zimbabwe	90	2	0.1	0	0.0	NA
Regional total	**74**	**43,800**	**50.4**	**194,364**	**223.6**	**58.3**

See table footnotes on page 287.

TABLE 1. (*Continued*) Reported coverage with the first dose of measles-containing vaccine (MCV1), number of confirmed measles cases, confirmed measles incidence, and proportion of measles cases in children aged <5 years, by member state — World Health Organization (WHO) African Region, 2011 and 2012

	2012					
Member state	% coverage with MCV1 (WHO-UNICEF estimate)*	No. of confirmed† measles cases (case-based surveillance)	Measles incidence per million population (case-based surveillance)	No. of measles cases (JRF)*	Measles incidence per million population (JRF)*	Proportion of measles cases in children aged <5 yrs (%) (case-based surveillance)§
Algeria	95	6	0.2	18	0.5	NA
Angola	97	4,416	212.1	4,458	214.1	70.8
Benin	72	286	28.5	288	28.7	62.2
Botswana	94	10	5.0	7	3.5	NA
Burkina Faso	87	815	49.5	7,362	447.3	35.8
Burundi	93	49	5.0	49	5.0	83.7
Cameroon	82	630	29.0	609	28.1	71.4
Cape Verde	96	0	0.0	0	0.0	NA
Central African Republic	49	68	15.0	141	31.2	58.8
Chad	64	140	11.2	120	9.6	48.2
Comoros	85	0	0.0	1	1.4	NA
Cote d'Ivoire	85	153	7.7	137	6.9	50.5
DRC	73	2,353	35.8	72,029	1,096.2	68.5
Equatorial Guinea	51	8	10.9	1,190	1,616.8	NA
Eritrea	99	95	15.5	194	31.6	7.4
Ethiopia	66	4,514	49.2	4,347	47.4	40.6
Gabon	71	5	3.1	2	1.2	NA
Gambia	95	0	0.0	0	0.0	NA
Ghana	88	354	14.0	1,613	63.6	50.0
Guinea	58	7	0.6	6	0.5	NA
Guinea-Bissau	69	5	3.0	0	0.0	NA
Kenya	93	2,380	55.1	NR	NR	44.6
Lesotho	85	0	0.0	179	87.2	NA
Liberia	80	4	1.0	43	10.3	NA
Madagascar	69	3	0.1	2	0.1	NA
Malawi	90	10	0.6	11	0.7	NA
Mali	59	365	24.6	341	23.0	45.0
Mauritania	75	4	1.1	35	9.2	NA
Mauritius	99	NR	NR	0	0.0	NR
Mozambique	82	135	5.4	145	5.8	49.6
Namibia	76	97	42.9	86	38.1	58.1
Niger	73	311	18.1	272	15.9	47.9
Nigeria	42	5,938	35.2	6,447	38.2	48.6
Republic of the Congo	80	257	59.3	260	59.9	66.8
Rwanda	97	79	6.9	75	6.5	29.1
Sao Tome and Principe	92	NR	NR	0	0.0	NR
Senegal	84	54	3.9	46	3.4	57.1
Seychelles	98	NR	NR	0	0.0	NR
Sierra Leone	80	41	6.9	678	113.4	56.1
South Africa	79	38	0.7	32	0.6	63.2
Swaziland	88	0	0.0	0	0.0	NA
Togo	72	263	39.6	238	35.8	52.1
Uganda	82	723	19.9	2,027	55.8	71.5
Tanzania	97	738	15.4	1,668	34.9	49.9
Zambia	83	558	39.6	896	63.7	57.7
Zimbabwe	90	0	0.0	0	0.0	NA
Regional total	**73**	**25,905**	**29.0**	**106,052**	**118.8**	**53.9**

Abbreviations: UNICEF = United Nations Children's Fund; JRF = Joint Reporting Form; NA = not applicable; DRC = Democratic Republic of the Congo; NR = not reported.

* Data available at http://www.who.int/immunization_monitoring/data/data_subject/en/index.html.

† Confirmed cases were defined by laboratory criteria, epidemiologic linkage, and/or clinical criteria: laboratory-confirmed was defined as having measles-specific immunoglobulin M–positive test result and not receiving a measles vaccination during the 30 days before rash onset; epidemiologically linked was defined as meeting the suspected measles case definition and having contact (i.e., lived in the same district or an adjacent district, with plausibility of transmission) with a patient with a laboratory-confirmed measles case with rash onset within the preceding 30 days; clinically compatible was defined as meeting the case definition of measles, with no sample available for laboratory testing and no evidence of epidemiologic linkage to a laboratory-confirmed case. A suspected measles case was defined as an illness characterized by rash, fever, and one or more of the following symptoms: conjunctivitis, coryza, and cough, or any patient in whom the clinician suspected measles.

§ Countries with ≥10 cases with available age information.

TABLE 2. Characteristics of measles supplementary immunization activities (SIAs),*† by year and member state— World Health Organization African Region, 2011 and 2012

Year	Member state§	Age group targeted (mos)	Children reached (administrative coverage) in targeted age group		Proportion of districts with ≥95% coverage (%)	Post-SIA coverage survey (%)	Other interventions
			No.	(%)			
2011	Angola	9–59	4,635,248	(85)	(17)		OPV, vitamin A, anthelminthics
	Benin	9–59	1,411,065	(104)	(93)	(83)	
	Burkina Faso	9–59	2,865,517	(113)	(100)		
	Central African Republic	9–47	515,452	(84)	(33)		OPV, vitamin A, anthelminthics
	Cote d'Ivoire	9–59	5,820,653	(95)	(72)	(91)	OPV
	DRC						
		6–59	7,368,047	(98)			
		6–179	9,280,981	(100)			
	Equatorial Guinea	9–47	11,658	(50)			
	Ethiopia				(91)	(88)	OPV, vitamin A, anthelminthics
	Rollover campaigns¶	9–47	757,421	(98)			
	Outbreak response immunization	6–179	7,034,264	(96)			
	Gambia	9–59	307,613	(95)	(31)	(93)	Vitamin A
	Liberia	6–59	572,981	(103)	(60)	(99)	OPV, vitamin A, anthelminthics
	Mali	9–59	4,616,957	(94)	(62)		
	Mauritania	9–59	510,155	(96)		(90)	
	Mozambique	6–59	3,985,564	(104)	(86)	(81)	OPV, vitamin A, anthelminthics
	Nigeria	9–59	28,435,589	(100)	(52)	(94)	OPV, vitamin A, anthelminthics
	Tanzania	9–59	6,686,663	(97)	(60)	(92)	OPV and tetanus toxoid vaccine, vitamin A, anthelminthics
2012	Burundi	6–59	1,459,304	(102)	(82)		Vitamin A, anthelminthics
	Cameroon	9–59	3,562,478	(102)	(78)	(78)	OPV, vitamin A, anthelminthics
	Chad	9–59	2,270,772	(111)	(83)		OPV
	DRC						
		6–59	2,972,570	(104)			
		6–179	3,605,069	(101)			
	Equatorial Guinea	9–59	49,578	(58)			
	Eritrea	9–47	277,928	(74)	(16)	(96)	Vitamin A
	Gabon	6–59	169,999	(67)	(20)		Vitamin A, anthelminthics
	Guinea	9–59	2,275,245	(103)	(92)	(91)	OPV
	Guinea-Bissau	9–59	220,826	(89)	(18)	(68)	Vitamin A, anthelminthics
	Kenya	9–59	5,554,153	(92)	(64)	(88)	OPV, vitamin A
	Namibia	9–179	885,259	(91)	(100)	(89)	OPV and tetanus toxoid vaccine, vitamin A, anthelminthics
	Niger	9–179	7,780,724	(100)	(93)	(97)	Anthelminthics
	Sao Tome and Principe	9 –59	22,476	(105)	(100)		
	Sierra Leone	9–59	1,179,605	(102)	(100)	(96)	Vitamin A, anthelminthics
	Uganda	6–59	6,283,441	(100)	(73)	(95)	OPV, vitamin A, anthelminthics
	Zambia	9–179	7,503,515	(116)	(93)	(96)	OPV, vitamin A, anthelminthics
	Zimbabwe	6–59	1,613,437	(103)	(84)	(95)	OPV, vitamin A

Abbreviations: OPV = oral poliovirus vaccine; DRC = Democratic Republic of the Congo.

* Data available at http://www.who.int/immunization/monitoring_surveillance/data/subject.

† SIAs generally are carried out using two approaches. An initial, nationwide catch-up SIA targets all children aged 9 months–14 years; it has the goal of eliminating susceptibility to measles in the general population. Periodic follow-up SIAs then target all children born since the last SIA. Follow-up SIAs generally are conducted nationwide every 2–4 years and generally target children aged 9–59 months; their goal is to eliminate any measles susceptibility that has developed in recent birth cohorts and to protect children who did not respond to the first measles vaccination. The exact age range for follow-up SIAs depends on the age-specific incidence of measles, coverage with measles-containing vaccine through routine services, and the time since the last SIA.

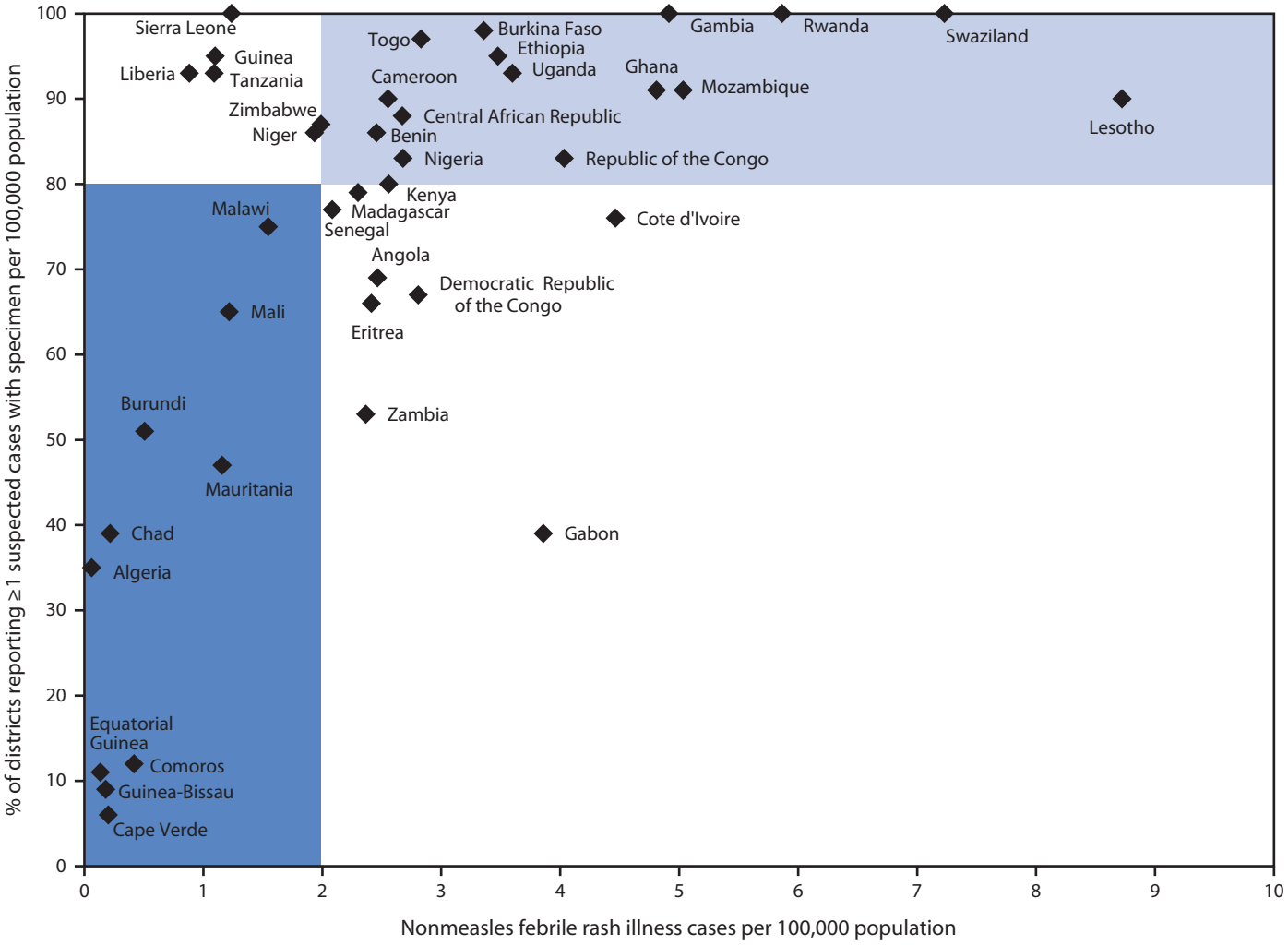
§ Type of SIA is national if not indicated otherwise.

¶ Rollover campaigns were conducted in phases and spread out during >1 calendar year.

outbreaks, nasopharyngeal swab specimens are collected to identify measles virus genotypes.

During 2011–2012, 43 (93%) member states reported measles case-based surveillance data, and all member states reported annually through the JRF the number of measles cases. In 2012, 19 (44%) member states met both targets of two or more cases of nonmeasles febrile rash illness per 100,000 population and one or more suspected measles cases investigated with blood specimens in ≥80% of districts, 14 (33%) met one of the targets but did not meet the other target, and 10 (23%) did not meet either of the targets (Figure).

FIGURE. Measles surveillance performance, by member state* — World Health Organization African Region, 2012



* In the light blue area, member states met both targets of two or more cases of nonmeasles febrile rash illness per 100,000 population and one or more suspected measles cases investigated with blood specimens in ≥80% of districts. In white areas, member states met at least one target. In the dark blue area, member states did not meet any of the two targets. Not shown: Botswana (percentage of districts reporting one or more suspected measles cases with specimen per 100,000 population = 96; nonmeasles febrile rash illness rate per 100,000 population = 15.7), Namibia (94 and 15.5, respectively), and South Africa (100 and 12.7, respectively).

Measles Incidence and Measles Virus Genotypes

On the basis of measles case-based surveillance data, the number of confirmed measles cases decreased from 43,800 in 2011 to 25,905 in 2012, and confirmed measles incidence per million population decreased from 50.4 to 29.0 (Table 1). In 2012, 16 of 43 (37%) member states met the incidence target of fewer than five cases per million. The number of measles cases reported through the JRF was 194,364 in 2011 and 106,052 in 2012. Measles incidence per million population was 223.6 in 2011 and 118.8 in 2012 (Table 1). During 2011–2012, measles virus genotype results were reported from 20 (43%) member states; the predominant genotypes detected were B3 in all 20 reporting member states; B2 in Angola, the Democratic Republic of the Congo (DRC), and Namibia; and D4 in Uganda.**

** Measles genotypes contributed by WHO Global Measles and Rubella Laboratory Network (Measles Nucleotide Surveillance Database, available at http://www.who-measles.org/Public/Web_Front/main.php); National Institute for Communicable Diseases, Johannesburg, South Africa (Sheilagh Smit); Institute Pasteur, Abidjan, Cote d'Ivoire (Herve Kadjo); National Laboratory Democratic Republic of the Congo (Elisabeth Simbu Pukuta); CDC Measles Team, Atlanta, Georgia, United States (Raydel Anderson and Paul Rota); Uganda Virus Institute, Entebbe, Uganda (Barnabas Bakamutumaho, Prossy Namuwulya).

What is already known on this topic?

During 2001–2008, measles cases reported through the World Health Organization–United Nations Children's Fund (WHO-UNICEF) Joint Reporting Forms (JRF) decreased in the African Region (AFR) by 92%, from 492,116 to 37,012; however, during 2009–2010, the region was affected by major measles outbreaks, and the number of officially reported cases increased to 199,174 in 2010.

What is added by this report?

The numbers of JRF-reported measles cases in AFR were 194,364 in 2011 and 106,052 in 2012. By the end of 2012, the first dose of measles vaccine coverage in AFR was 73% (WHO-UNICEF estimate), 13 (28%) member states reported >90% first dose of measles vaccine coverage, and 16 (37%) member states had met the incidence target of fewer than five cases per million. Of 35 measles supplementary immunization activities (SIAs) conducted during 2011–2012, 23 (66%) reported administrative coverage rates >95%. Despite this progress, the region fell short of the 2012 measles preelimination goal.

What are the implications for public health practice?

To achieve the measles elimination target in AFR by 2020, efforts must be intensified at the global and national levels to implement strategies that include 1) closing gaps in population immunity through adopting and implementing updated policy recommendations to decrease missed opportunities, including routine immunization of unvaccinated older children, 2) sustaining implementation of the "reaching every district" approach to increase the coverage and quality of routine immunization services, 3) conducting high-quality SIAs, and 4) using SIAs to improve routine immunization services.

Discussion

Despite substantial progress and an 88% reduction in estimated measles mortality in AFR (from 354,900 to 41,400) during 2000–2012 (*6*), the measles 2012 preelimination goal was not reached. Major outbreaks occurred during 2009–2010, and reported measles cases have remained above the historic low of 37,012 cases in 2008 (*2,3*). During 2011–2012, large outbreaks occurred in a small number of member states; 89% of cases in 2011 were from four member states (Chad, DRC, Nigeria, and Zambia), and 88% of cases in 2012 were from five member states (Angola, Burkina Faso, DRC, Ethiopia, and Nigeria). Various outbreak investigation activities conducted in these outbreaks indicated that the primary causes were an accumulation of susceptible older children and adolescents, shifting susceptibility towards older age groups, and continued gaps in reaching all children with 2 doses of measles vaccine at national and subnational levels through routine vaccination or periodic follow-up SIAs.

Annual measles cases in AFR reported through the JRF have been consistently higher than those reported through case-based surveillance. According to WHO guidelines, the total number of confirmed cases reported to the measles case-based surveillance system should match the total number of measles cases reported through the JRF. In 2012, 13 member states reported considerably more cases through the JRF than case-based surveillance.[††] These differences might be attributable to classification errors, reporting errors, difficulties in capturing large outbreaks through the case-based system, or reliance on aggregate summary reporting of notifiable diseases through the Integrated Disease Surveillance and Response system.[§§] Limited implementation of case-based surveillance in some health facilities, incomplete preparation and reporting of line lists during outbreaks, and insufficient personnel to enter all surveillance data into databases might contribute to underreporting through measles case-based surveillance.

The proportion of member states meeting both case-based surveillance performance indicators increased from 35% in 2009 (*3*) to 44% in 2012. Measles surveillance systems in member states not attaining objectives for surveillance indicators might lack the sensitivity to allow rapid detection and response to outbreaks. Monitoring district-level surveillance performance indicators can help member states to identify and prioritize support for areas needing to improve performance; conducting adequate outbreak investigations could rapidly identify and characterize outbreaks and guide response activities.

The findings in this report are subject to at least three limitations. First, MCV coverage estimates likely include errors from inaccurate estimates of the size of target populations, inaccurate reporting of doses delivered, and inclusion of SIA doses given to children outside the target age group. Second, surveillance data underestimate the actual number of cases because not all patients with measles seek care and not all of those who seek care are reported. Finally, some member states maintain multiple reporting systems for measles and might, like DRC, report in the JRF aggregate, unconfirmed cases rather than confirmed cases generated from case-based surveillance.

The Global Vaccine Action Plan and the Measles and Rubella Initiative[¶¶] Strategic Plan provide key strategies and

[††] Burkina Faso, Central African Republic, DRC, Equatorial Guinea, Eritrea, Ghana, Lesotho, Liberia, Mauritania, Sierra Leone, Uganda, Tanzania, and Zambia.

[§§] The Integrated Disease Surveillance and Response Strategy was adopted in resolution AFR/RC48/R2 in September 1998 at the 48th session of the WHO Regional Committee for Africa as a strategy for improving the availability and use of data for public health action at all levels and for implementing comprehensive public health surveillance and response systems in countries in the region.

[¶¶] The Measles and Rubella Initiative is a partnership led by the American Red Cross, the United Nations Foundation, CDC, UNICEF, and WHO. Other member partners include the Bill and Melinda Gates Foundation; the Canadian International Development Agency; the Church of Jesus Christ of Latter-Day Saints, the GAVI Alliance, the International Federation of Red Cross and Red Crescent Societies, the United Kingdom Department for International Development, other foundations and organizations, and governments of countries affected by measles.

targets for measles elimination in five regions by 2020 (*7,8*). In September 2011, the WHO Regional Committee for AFR established a goal of measles elimination by 2020 (*9*). The regional strategic plan for measles elimination (2012–2020) outlines the key programmatic focus, and the approaches to follow to achieve measles elimination. In AFR member states, intensified efforts to increase coverage with 2 doses of MCV include implementing updated policies to decrease missed opportunities, including opening multidose vials even when few eligible children are present, immunizing unvaccinated children aged ≤5 years through routine immunization services, sustaining the implementation of the "reaching every district" approach (*10*), using SIAs to improve routine immunization services, and introducing a second dose in the routine immunization schedule once criteria are met.*** To ensure high population immunity, member states should also conduct high-quality, well-monitored SIAs that are routinely evaluated through coverage surveys. SIA target age groups should be based on national measles epidemiology determined by surveillance and immunization data.

Member states are encouraged to mobilize adequate additional resources to complement the funding from global partners to achieve their goal of measles elimination. In addition to funding from the Measles and Rubella Initiative and other organizations, the GAVI Alliance is providing funding to support the introduction of a second dose of measles vaccine in routine immunization; measles SIAs in Chad, DRC, Ethiopia, and Nigeria; and the introduction of rubella vaccine through wide–age range measles-rubella vaccination campaigns.

*** The 2008 AFR Measles Technical Advisory Group set criteria to consider the introduction MCV2: achievement of MCV1 coverage >80%, maintained for at least 3 consecutive years using WHO/UNICEF best estimates of vaccination coverage, and attainment of one of the two primary measles surveillance performance indicators for ≥2 consecutive years. The two indicators are 1) a nonmeasles febrile rash illness rate of two or more cases per 100,000 population per year (i.e., suspected measles cases investigated and discarded as nonmeasles cases), and 2) at least one suspected measles case investigated with blood specimens in >80% of districts per year. After successful introduction of MCV2, the implementation of periodic follow-up measles SIAs should continue until national MCV1 and MCV2 coverage reach and are sustained at ≥90% and the two primary measles surveillance performance indicators are met and sustained for ≥2 years.

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References

1. World Health Organization. Report of the second meeting of the African regional measles technical advisory group (TAG), recommendations. Addis Ababa, Ethiopia: World Health Organization, Regional Office for Africa; 2008. Available at http://www.afro.who.int/index.php?option=com_docman&task=doc_download&gid=3616.
2. CDC. Progress toward measles control—African Region, 2001–2008. MMWR 2009;58:1036–41.
3. Masresha BG, Fall A, Eshetu M, et al. Measles mortality reduction and pre-elimination in the African region, 2001–2009. J Infect Dis 2011;204(Suppl 1):S198–204.
4. CDC. Measles outbreaks and progress toward measles preelimination—African Region, 2009–2010. MMWR 2011;60:374–8.
5. World Health Organization. African regional guidelines for measles surveillance. Brazzaville, Congo: World Health Organization; 2011.
6. World Health Organization. Global control and regional elimination of measles, 2000–2012. Wkly Epidemiol Rec 2014;89:45–52.
7. World Health Organization. Global vaccine action plan: report by the Secretariat. Geneva, Switzerland: World Health Organization; 2012. Available at http://apps.who.int/gb/ebwha/pdf_files/wha65/a65_22-en.pdf.
8. World Health Organization. Global measles and rubella strategic plan: 2012–2020. Geneva, Switzerland: World Health Organization; 2012. Available at http://www.who.int/immunization/newsroom/Measles_Rubella_StrategicPlan_2012_2020.pdf.
9. World Health Organization. Measles elimination by 2020—a strategy for the African Region. Geneva, Switzerland: World Health Organization, Regional Office for Africa; 2011. Available at http://www.afro.who.int/en/downloads/doc_download/7189-afr-rc61-r1-measles-elimination-by-2020-a-strategy-for-the-african-region.html.
10. World Health Organization. The RED strategy. Geneva, Switzerland: World Health Organization, Regional Office for Africa; 2008. Available at http://www.who.int/immunization/programmes_systems/service_delivery/red.

Notes from the Field

Calls to Poison Centers for Exposures to Electronic Cigarettes — United States, September 2010–February 2014

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Electronic nicotine delivery devices such as electronic cigarettes (e-cigarettes) are battery-powered devices that deliver nicotine, flavorings (e.g., fruit, mint, and chocolate), and other chemicals via an inhaled aerosol. E-cigarettes that are marketed without a therapeutic claim by the product manufacturer are currently not regulated by the Food and Drug Administration (FDA) (*1*).* In many states, there are no restrictions on the sale of e-cigarettes to minors. Although e-cigarette use is increasing among U.S. adolescents and adults (*2,3*), its overall impact on public health remains unclear. One area of concern is the potential of e-cigarettes to cause acute nicotine toxicity (*4*). To assess the frequency of exposures to e-cigarettes and characterize the reported adverse health effects associated with e-cigarettes, CDC analyzed data on calls to U.S. poison centers (PCs) about human exposures to e-cigarettes (exposure calls) for the period September 2010 (when new, unique codes were added specifically for capturing e-cigarette calls) through February 2014. To provide a comparison to a conventional product with known toxicity, the number and characteristics of e-cigarette exposure calls were compared with those of conventional tobacco cigarette exposure calls.

An e-cigarette exposure call was defined as a call regarding an exposure to the e-cigarette device itself or to the nicotine liquid, which typically is contained in a cartridge that the user inserts into the e-cigarette. A cigarette exposure call was defined as a call regarding an exposure to tobacco cigarettes, but not cigarette butts. Calls involving multiple substance exposures (e.g., cigarettes and ethanol) were excluded. E-cigarette exposure calls were compared with cigarette exposure calls by proportion of calls from health-care facilities (versus residential and other non–health-care facilities), demographic characteristics, exposure routes, and report of adverse health effect. Statistical significance of differences ($p<0.05$) was assessed using chi-square tests.

During the study period, PCs reported 2,405 e-cigarette and 16,248 cigarette exposure calls from across the United States, the District of Columbia, and U.S. territories. E-cigarette exposure calls per month increased from one in September 2010 to 215 in February 2014 (Figure). Cigarette exposure calls ranged from 301 to 512 calls per month and were more frequent in summer months, a pattern also observed with total call volume to PCs involving all exposures (*5*).

E-cigarettes accounted for an increasing proportion of combined monthly e-cigarette and cigarette exposure calls, increasing from 0.3% in September 2010 to 41.7% in February 2014. A greater proportion of e-cigarette exposure calls came from health-care facilities than cigarette exposure calls (12.8% versus 5.9%) ($p<0.001$). Cigarette exposures were primarily among persons aged 0–5 years (94.9%), whereas e-cigarette exposures were mostly among persons aged 0–5 years (51.1%) and >20 years (42.0%). E-cigarette exposures were more likely to be reported as inhalations (16.8% versus 2.0%), eye exposures (8.5% versus 0.1%), and skin exposures (5.9% versus 0.1%), and less likely to be reported as ingestions (68.9% versus 97.8%) compared with cigarette exposures ($p<0.001$).

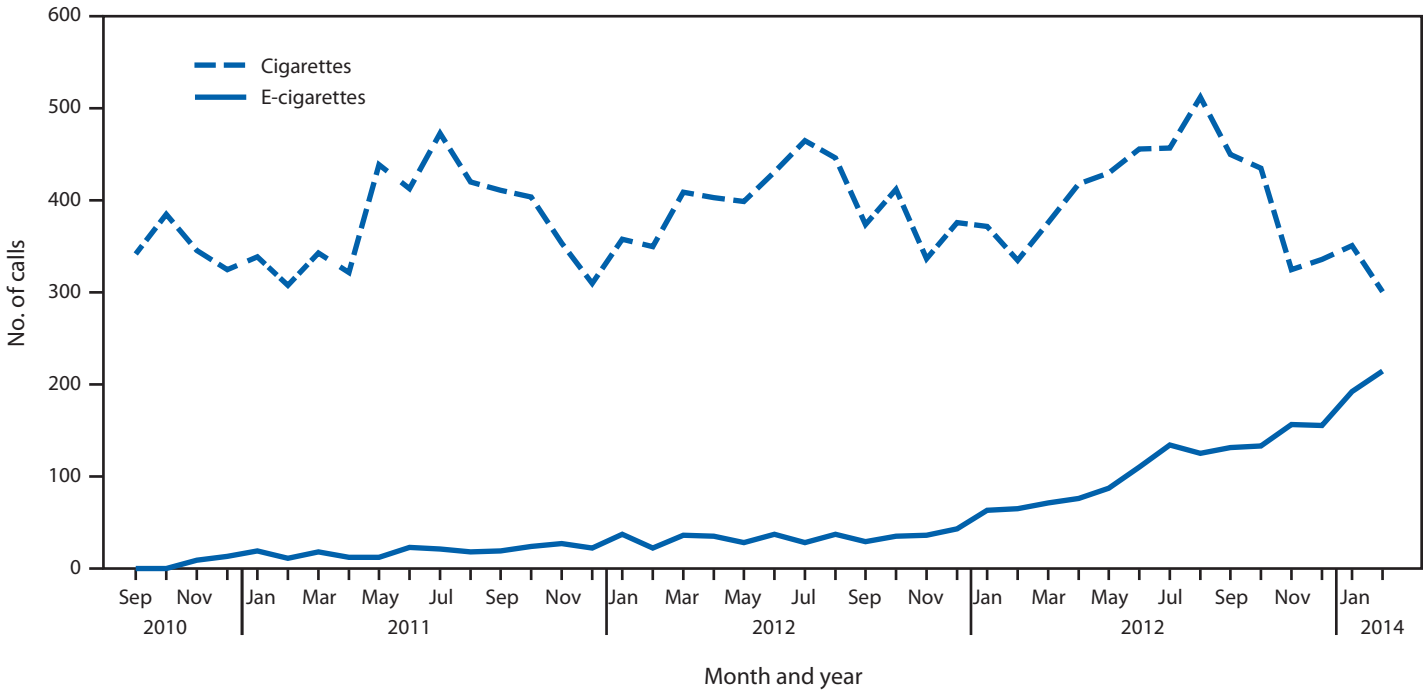
Among the 9,839 exposure calls with information about the severity of adverse health effects, e-cigarette exposure calls were more likely to report an adverse health effect after exposure than cigarette exposure calls (57.8% versus 36.0%) ($p<0.001$). The most common adverse health effects in e-cigarette exposure calls were vomiting, nausea, and eye irritation. One suicide death from intravenous injection of nicotine liquid was reported to PCs.

Calls about exposures to e-cigarettes, which were first marketed in the United States in 2007, now account for 41.7% of combined monthly e-cigarette and cigarette exposure calls to PCs. The proportion of calls from health-care facilities, age distribution, exposure routes, and report of adverse health effects differed significantly between the two types of cigarette.

This analysis might have underestimated the total number of e-cigarette and cigarette exposures for several reasons. Calls involving e-cigarettes or cigarettes and another exposure were excluded, and the code indicating a case of e-cigarette exposure might have been underused initially. In addition, health-care providers, including emergency department providers, and the public might not have reported all e-cigarette or cigarette exposures to PCs. Given the rapid increase in e-cigarette-related exposures, of which 51.1% were among young children, developing strategies to monitor and prevent future poisonings is

* Currently, e-cigarettes and their components, such as the nicotine they contain, that are intended for therapeutic purposes (e.g., for smoking cessation) are drug/device combination products. When they are marketed for therapeutic purposes they are regulated by the FDA's Center for Drug Evaluation and Research. FDA's Center for Tobacco Products currently regulates cigarettes, cigarette tobacco, roll-your-own tobacco, and smokeless tobacco. FDA has stated its intention to issue a proposed rule extending FDA's tobacco product authorities beyond these products to include other products like e-cigarettes not intended for therapeutic purposes.

FIGURE. Number of calls to poison centers for cigarette or e-cigarette exposures, by month — United States, September 2010–February 2014



critical. Health-care providers; the public health community; e-cigarette manufacturers, distributors, sellers, and marketers; and the public should be aware that e-cigarettes have the potential to cause acute adverse health effects and represent an emerging public health concern.

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References

1. Food and Drug Administration. News and events—electronic cigarettes (e-cigarettes). Silver Spring, Maryland: US Department of Health and Human Services, Food and Drug Administration; 2014. Available at http://www.fda.gov/newsevents/publichealthfocus/ucm172906.htm.
2. CDC. Notes from the field: electronic cigarette use among middle and high school students—United States, 2011–2012. MMWR 2013;62:729–30.
3. King BA, Alam S, Promoff G, Arrazola R, Dube SR. Awareness and ever-use of electronic cigarettes among U.S. adults, 2010–2011. Nicotine Tob Res 2013;15:1623–7.
4. Cobb NK, Byron MJ, Abrams DB, Shields PG. Novel nicotine delivery systems and public health: the rise of the "e-cigarette." Am J Public Health 2010;100:2340–2.
5. Mowry JB, Spyker DA, Cantilena LR Jr, Bailey JE, Ford M. 2012 annual report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 30th annual report. Clin Toxicol (Phila) 2013;51:949–1229.

Notes from the Field

Multistate Outbreak of Listeriosis Linked to Soft-Ripened Cheese — United States, 2013

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On June 27, 2013, the Minnesota Department of Health notified CDC of two patients with invasive *Listeria monocytogenes* infections (listeriosis) whose clinical isolates had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. A query of PulseNet, the national molecular subtyping network for foodborne disease surveillance, identified clinical and environmental isolates from other states. On June 28, CDC learned from the Food and Drug Administration's Coordinated Outbreak Response and Evaluation Network that environmental isolates indistinguishable from those of the two patients had been collected from Crave Brothers Farmstead Cheese during 2010–2011. An outbreak-related case was defined as isolation of *L. monocytogenes* with the outbreak PFGE pattern from an anatomic site that is normally sterile (e.g., blood or cerebrospinal fluid), or from a product of conception, with an isolate upload date during May 20–June 28, 2013. As of June 28, five cases were identified in four states (Minnesota, two cases; Illinois, Indiana, and Ohio, one each). Median age of the five patients was 58 years (range: 31–67 years). Four patients were female, including one who was pregnant at the time of infection. All five were hospitalized. One death and one miscarriage were reported.

Case–case analysis of *Listeria* Initiative* data (*1*) was conducted, comparing food exposure frequencies among the five outbreak-related cases identified by June 28 with food exposure frequencies in 1,735 sporadic listeriosis cases reported to CDC during 2004–2013. The analysis indicated that any soft cheese consumption during the month before illness onset was associated with outbreak-related listeriosis: five of five (100%) in the outbreak-related cases versus 569 of 1,735 (33%) in the sporadic cases (odds ratio = 10.8; 95% confidence interval = 1.8–∞).

The five patients were reinterviewed to assess their cheese exposures. All five patients had definitely or probably eaten one of three varieties of Crave Brothers soft-ripened cheese (Les Frères, Petit Frère, or Petit Frère with truffles). Three patients had purchased the cheese at three different restaurants, and two had purchased the cheese at two different grocery stores. The cheeses were shipped as intact wheels to the three restaurants and two grocery stores, where they had been cut and served or repackaged and sold to customers.

Testing at the Minnesota Department of Agriculture identified the outbreak pattern of *L. monocytogenes* in two cheese wedges (Les Frères and Petit Frère with truffles) collected from two different grocery stores in Minnesota. Inspection of the cheese-making facility revealed that substantial sanitation deficiencies during the cheese-making process itself, after the milk was pasteurized, likely led to contamination. On July 1, Crave Brothers halted production of Les Frères, Petit Frère, and Petit Frère with truffles. On July 3, Crave Brothers issued a voluntary recall of these products with a production date of July 1, 2013, or earlier. On July 11, the company voluntarily halted production of all cheese products manufactured at the facility. After product recall, one additional case was identified in Texas through whole genome sequencing, bringing the total case count for the outbreak to six.

This outbreak was linked to soft cheeses that were likely contaminated during the cheese-making process (*2,3*). Pasteurization eliminates *Listeria* in milk. However, contamination can occur after pasteurization. Cheese-making facilities should use strict sanitation and microbiologic monitoring, regardless of whether they use pasteurized milk.†

Persons at greater risk for listeriosis, including older adults, pregnant women, and those with immunocompromising conditions, should be aware that certain soft cheeses made with unpasteurized milk, or made under unsanitary conditions, regardless of whether the milk was pasteurized, have been shown to cause severe illness. These soft cheeses include fresh (unripened) cheeses, such as queso fresco (*4*), and soft-ripened cheeses, such as the cheeses implicated in this outbreak.

* The *Listeria* Initiative is an enhanced surveillance system that has routinely collected data regarding food consumption from all patients with listeriosis since 2004. Additional information is available at http://www.cdc.gov/listeria/pdf/listeriainitiativeoverview_508.pdf.

† Joint Food and Drug Administration/Health Canada quantitative assessment of the risk of listeriosis from soft-ripened cheese consumption in the United States and Canada: draft report. Available at http://www.fda.gov/downloads/food/foodscienceresearch/ucm338617.pdf.

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References

1. McCollum JT, Cronquist AB, Silk BJ, et al. Multistate outbreak of listeriosis associated with cantaloupe. N Engl J Med 2013;369:944–53.
2. CDC. Vital signs: *Listeria* illnesses, deaths, and outbreaks—United States, 2009–2011. MMWR 2013;62:448–52.
3. CDC. Multistate outbreak of listeriosis linked to imported Frescolina Marte brand ricotta salata cheese (final update). Atlanta, GA: US Department of Health and Human Services, CDC; 2012. Available at http://www.cdc.gov/listeria/outbreaks/cheese-09-12/index.html.
4. CDC. Outbreak of listeriosis associated with homemade Mexican-style cheese—North Carolina, October 2000–January 2001. MMWR 2001;50:560–2.

Announcement

STD Awareness Month — April 2014

April is STD Awareness Month, an annual event calling attention to the impact of sexually transmitted diseases (STDs) in the United States. This month-long observance provides individuals, doctors, and community-based organizations the perfect opportunity to address ways to prevent some of nearly 20 million new cases of STDs that occur in the United States each year (*1*), costing the U.S. health-care system nearly $16 billion in direct medical costs (*2*) and placing a significant human and economic burden on the nation.

Although most sexually transmitted infections will not cause serious harm, some can lead to major health problems, such as infertility. Infection with a sexually transmitted pathogen can also make a person more susceptible to infection with the human immunodeficiency virus (HIV).

Behaviors such as not using condoms, having multiple sex partners, having anonymous sex partners, or having sex while under the influence of drugs or alcohol increase the risk for infection with a sexually transmitted pathogen. Lifestyle changes that reduce risk, regular STD screening, and prompt disease treatment are the most effective tools available to protect one's health and prevent the spread of all STDs, including HIV.

During the month of April, CDC encourages clinicians to think about changes they might make to raise STD awareness among their patients and within their community. Learning resources for clinicians, patients, and community members about STDs are available from CDC at http://www.cdc.gov/std.

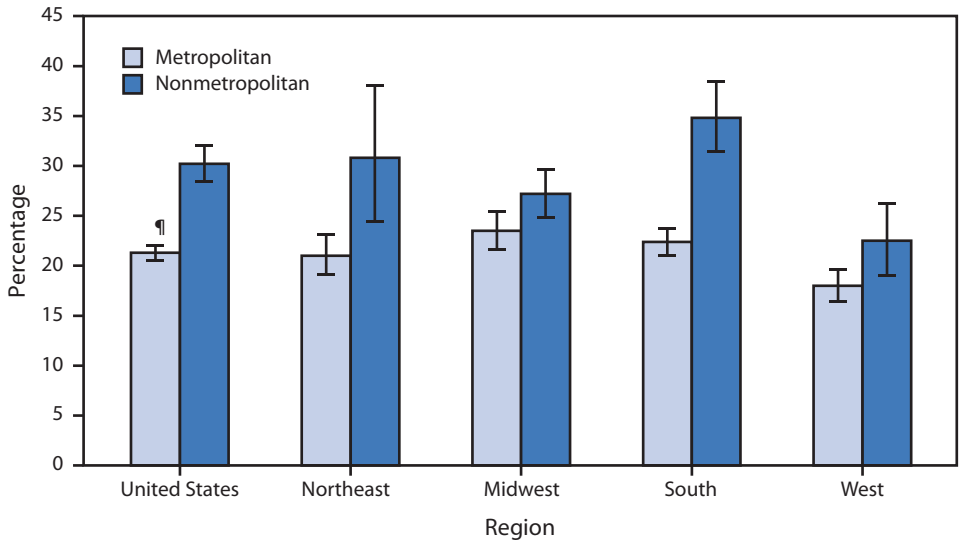
References

1. Satterwhite CL, Torrone E, Meites E, et al. Sexually transmitted infections among U.S. women and men: prevalence and incidence estimates, 2008. Sex Transm Dis 2013;40:187–93.
2. Owusu-Edusei K Jr, Chesson HW, Gift TL, et al. The estimated direct medical cost of selected sexually transmitted infections in the United States, 2008. Sex Transm Dis 2013;40:197–201.

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Adults Aged ≥65 Years Who Have Lost All Their Natural Teeth,* by Type of Locality† and Region — National Health Interview Survey, United States, 2010–2012§



* Based on response to the question, "Have you lost all of your upper and lower natural (permanent) teeth?"
† The designation of a place of residence as metropolitan or nonmetropolitan is determined by whether the household resides within a metropolitan statistical area, defined as a county or group of contiguous counties that contains at least one urbanized area of ≥50,000 population. Surrounding counties with strong economic ties to the urbanized area are also included. Nonmetropolitan areas do not include a large urbanized area and are generally thought of as more rural.
§ 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 sample adult component. Estimates are age-adjusted using the projected 2000 U.S. population as the standard population and three age groups: 65–74 years, 75–84 years, and ≥85 years.
¶ 95% confidence interval.

During 2010–2012, 30% of adults aged ≥65 years living in nonmetropolitan areas had no natural teeth, compared with 21% of those living in metropolitan areas. The percentage of adults aged ≥65 years with no natural teeth was higher in nonmetropolitan areas than in metropolitan areas in all regions of the United States. In both metropolitan and nonmetropolitan areas, the West had the lowest percentage of adults with no natural teeth.

Sources: National Health Interview Survey, 2010–2012. Available at http://www.cdc.gov/nchs/nhis.htm.

CDC. Health Data Interactive. Available at http://www.cdc.gov/nchs/hdi.htm.

Reported by: Ellen A. Kramarow, PhD, ekramarow@cdc.gov, 301-458-4325.

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

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U.S. Government Printing Office: 2014-723-032/01051 Region IV ISSN: 0149-2195