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Newborn Screening for Critical Congenital Heart Disease: Potential Roles of Birth Defects Surveillance Programs — United States, 2010–2011

In September 2011, the Secretary of the U.S. Department of Health and Human Services (HHS) approved the Secretary's Advisory Committee on Heritable Disorders in Newborns and Children (SACHDNC) 2010 recommendation that all newborns be screened for critical congenital heart disease (CCHD) using pulse oximetry, a noninvasive test of blood oxygenation, to prevent mortality and morbidity (*1*). CDC partnered with the National Birth Defects Prevention Network (NBDPN) to conduct a survey designed to assess state birth defect surveillance programs' potential roles, capabilities, and readiness to assist with newborn screening activities for CCHD. States were surveyed in November 2010, after the initial SACHDNC recommendation, and again in November 2011, after the Secretary's approval. From 2010 to 2011, the number of birth defects surveillance programs involved in CCHD screening increased from one to 10. Barriers exist, such as the lack of legislative authority, staffing, funding, and informatics infrastructure. Sixty-seven percent of programs take an average of more than 12 months to collect complete data on birth defect cases, including congenital heart defects. An assessment of state birth defects programs' existing data and capability to lead the evaluation of screening for CCHD is warranted.

Universal newborn screening is the practice of screening every newborn for certain serious genetic, endocrine, and metabolic conditions, as well as functional disorders that are not apparent at birth. Through early identification and treatment, newborn screening provides an opportunity for reduction in infant morbidity and mortality (*2,3*). SACHDNC provides national guidelines on newborn screening that are reviewed and endorsed by the HHS Secretary. The conditions for which screening is endorsed by SACHDNC, after a formal evidence review process, are known collectively as the Recommended Uniform Screening Panel (RUSP) (*3*). In 2012, a total of 31 conditions are included in RUSP. States use RUSP as guidance when establishing their state-specific screening panels.

The most recent addition to RUSP is CCHD (*1*). Congenital heart disease occurs in approximately eight in every 1,000 live births. Of these cases, approximately one quarter are considered to be CCHD, defined as requiring cardiac surgery or catheterization before age 1 year (*4*). Left undetected, infants with CCHD are at risk for the development of serious complications (e.g., end-organ damage, motor function impairments, and cognitive impairments) within the first few days or weeks of life. The seven CCHDs that are primary targets for screening are hypoplastic left heart syndrome, pulmonary atresia (with intact septum), transposition of the great arteries, truncus arteriosus, tricuspid atresia, tetralogy of Fallot, and total anomalous pulmonary venous return (*4*). In September 2010, SACHDNC recommended that screening for CCHD by pulse oximetry be included in RUSP. This recommendation was endorsed by the HHS Secretary in September 2011 (*1*). Screening for CCHD is a point-of-care test that will occur in hospitals before an infant's discharge from the nursery, with results entered into the hospital medical record. State birth defects surveillance programs often draw from hospital medical records; therefore, these programs could assist in tracking and evaluating screening outcomes. Most state surveillance programs already collect data to calculate CCHD prevalence; however, differences exist across states in resources

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and case ascertainment methodologies that might affect how state programs can provide assistance with the implementation and evaluation of CCHD screening and follow-up.

To assess the differences between state birth defect surveillance programs, in October 2010, after the SACHDNC recommendation to add screening for CCHD to RUSP, CDC collaborated with the National Birth Defects Prevention Network, a national network of state and population-based programs for birth defects surveillance and research, to create and distribute an electronic survey to birth defects surveillance program primary contacts (*6*) in all 50 states, the District of Columbia, and Puerto Rico. The purpose of the survey was to assess state birth defect surveillance programs' potential roles, capabilities, and readiness to assist with newborn screening activities for CCHD to strengthen CCHD screening and follow-up. In November 2011, following the HHS Secretary's approval of the addition of screening for CCHD to RUSP, the survey was revised and redistributed to state programs, requesting confirmation or revision of the responses received in 2010. Nonresponders were contacted via e-mail and telephone. The 2010 and 2011 surveys were distributed to the same person in each program, with no changes in personnel occurring in the 1-year interval between the surveys. Multiple-choice and open-ended questions were asked to assess state CCHD screening activities, ways in which state birth defects surveillance programs could lead the evaluation of CCHD newborn screening, the confirmation of CCHD cases, and barriers to involvement with CCHD newborn screening.

The 2010 and 2011 surveys were completed in all 50 states, the District of Columbia, and Puerto Rico, for a response rate of 100%. In both surveys, 43 states responded that they had a birth defects surveillance program. CCHD activities increased from one state in 2010 to 10 states in 2011 (Table). State birth defects surveillance programs reported ways in which they could lead the evaluation of CCHD screening. In 2011, 28 states reported the ability to evaluate mortality associated with CCHD, 16 could evaluate morbidities associated with CCHD, and 11 could evaluate interventions associated with CCHD. States were asked to identify programs that might get involved in screening for CCHD, other than birth defects surveillance programs. Ten states identified their state's newborn screening program, and four identified children's medical services/Title V programs. Other responses included genetic services programs, hearing screening programs, and private pediatric hospitals. State birth defects surveillance programs reported varying relationships with state newborn screening programs, with five programs reporting they have no relationship with the state newborn screening program. Eight of the 10 states that reported being involved in CCHD screening activities in 2011 reported insufficient funds, nine reported inadequate staffing, and five reported lack of legislation or regulatory authority as barriers to involvement in newborn screening for CCHD. One of the 10 states reported legislatively mandated screening activities; nine were still in the planning stages. Sixty-seven percent of programs reported that it took

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TABLE. Survey of state birth defects surveillance programs — United States, 2010 and 2011

Survey question	No. of state programs 2010	2011
Does your state have a birth defects surveillance program?		
Yes	43	43
No	8	8
If your state adopts newborn screening for CCHD, how could the birth defects surveillance program assist with the confirmed cases of CCHD?*		
Link children identified by screening to support services	24	24
Report on health-care utilization by affected children	12	11
Report on support services utilization by affected children	10	10
Report on enrollment of affected children into special education services	0	1
How could the birth defects surveillance program assist with evaluation of CCHD newborn screening?*		
Evaluate mortality associated with CCHD	33	28
Evaluate morbidities associated with CCHD	14	16
Evaluate interventions associated with CCHD	12	11
Compare outcomes of children with CCHD	8	14
Evaluate all true and false-positive screens†	NA	13
Evaluate false-negative screens†	NA	13
Assist with economic evaluation of screening†	NA	8
What are the likely barriers in your state to your program's involvement with newborn screening for CCHD?*		
Inadequate staffing	34	29
Insufficient funds	32	27
Lack of legislative/regulatory authority	19	19
Information technology/data linkage needs	19	19
What is the average time lag for collection of complete data (≥95%) for all major birth defects under surveillance in your state?		
0–6 mos	5	3
7–12 mos	9	6
13–24 mos	13	12
25–36 mos	9	8
≥37 mos	5	4
Unknown	2	4
Does your program have access to hospital-based point-of-care pulse oximetry screening records?		
Yes	10	11
No	30	24
Has your state been involved with pilot programs to conduct newborn screening for CCHD using pulse oximetry or another method?		
Yes	1	10
No	30	21
Unknown	12	3
Is your state engaged in pulse oximetry screening for CCHD?†		
Yes	NA	10
No	NA	21
Don't know	NA	3
If yes, is the screening*†		
Universal, statewide?	NA	4
Regional?	NA	1
Hospital-based?	NA	9
If yes, what components are included?†		
Screening only	NA	4
Screening and follow-up of positive screens	NA	5
What is the working relationship between your state's birth defects surveillance program and newborn screening program?*†		
Organizationally located together	NA	11
Contained within the same bureau/program	NA	15
Physically located in the same building	NA	14
Currently share same database/data system	NA	8
None/No working relationship	NA	5

Abbreviations: CCHD = critical congenital heart disease; NA = not applicable.
* Multiple responses allowed.
† Question added for 2011 survey.

≥12 months to complete birth defects surveillance case records. Sixty-eight percent of programs did not have access to hospital point-of-care screening records.

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Editorial Note

State-level Title V maternal and child health programs and birth defects surveillance programs have potential roles in surveillance and evaluation of CCHD screening (*5*). These state programs routinely conduct public education, train health-care providers, and support newborn screening programs and services for children with special health-care needs. Many birth defects surveillance programs have the data and capabilities to lead the evaluation of newborn screening for CCHD. In addition to monitoring CCHD prevalence, state birth defects programs could incorporate data collection to evaluate false-positive and false-negative screens, because neonatal medical records are one of the key data sources for birth defects surveillance. Collecting data to reveal factors associated with false-positive and false-negative results also could help refine the nationally recommended screening algorithm (*5*) and screening activities.

The findings in this report are subject to at least two limitations. First, although 100% of states completed the survey, participants were not required to respond to every survey question; therefore, data are incomplete for some survey items. Second, only state birth defects surveillance programs were surveyed; no information on the capabilities of other state public health programs to participate in CCHD screening activities was sought.

State birth defects surveillance programs reported that they can lead evaluation of CCHD screening by evaluating sensitivity and specificity, reporting mortality and comorbidities, assisting with economic evaluation, and reporting service utilization by children with CCHDs. However, most state programs also report major barriers to their involvement in newborn screening for CCHD. Many state birth defects surveillance programs indicate that inadequate staffing and insufficient funds would hinder involvement with screening for CCHD. Given that 67% of programs reported that it took ≥12 months to complete birth defects surveillance case records, timeliness of data collection will need to be addressed before birth defects surveillance can truly maximize its potential.

States should evaluate infrastructure and resource needs before adoption of CCHD screening to ensure a successful screening program. Legislative mandates for universal newborn screening for CCHD began in June 2011, with New Jersey being the first state to implement legislatively mandated screening (*7*). Legislative activity increased in late 2011 and early 2012 (American Academy of Pediatrics, Division of State Government Affairs, unpublished data, 2012). Nineteen states reported that lack of legislative/public health authority required to obtain and collect CCHD screening data was a barrier to involvement with screening activities. Newborn screening for CCHD provides an opportunity for collaboration between state birth defects surveillance programs and state newborn screening programs.

What is already known on this topic?

Universal newborn screening is the practice of screening every newborn for certain serious but inapparent conditions so that early intervention can reduce morbidity and save lives. Birth defects surveillance programs collect data that are useful for research, program planning, and program evaluation.

What is added by this report?

Many birth defects surveillance programs have the data and capabilities to lead the evaluation of newborn screening for critical congenital heart disease (CCHD). From 2010 to 2011, the number of birth defects surveillance programs involved in CCHD screening increased from one to 10. During that period, 13 of 43 birth defects surveillance programs reported the capability to evaluate all true and false-positive screening results. Thirteen of 43 programs also reported the capability to evaluate all false-negative screening results.

What are the implications for public health practice?

Newborn screening for CCHD provides a unique opportunity for synergy among state public health programs. States should evaluate infrastructure and resource needs before adoption of screening for CCHD to ensure a successful screening program.

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Progress Toward Global Eradication of Dracunculiasis — January 2011–June 2012

Dracunculiasis (Guinea worm disease) is caused by *Dracunculus medinensis*, a parasitic worm. Approximately 1 year after initial infection from contaminated drinking water, the worm emerges through the skin of the infected person, usually on the lower limb. Pain and secondary bacterial wound infection can cause temporary or permanent disability that disrupts work and schooling for the entire family. In 1986, the World Health Assembly (WHA) called for dracunculiasis elimination (*1*) and the Guinea Worm Eradication Program, supported by The Carter Center, World Health Organization (WHO), United Nations Children's Fund (UNICEF), CDC, and other partners, was coalesced to assist ministries of health of endemic countries in meeting this goal. At that time, an estimated 3.5 million cases occurred annually in 20 countries in Africa and Asia (*1,2*). This report updates published (*3,4*) and previously unpublished surveillance data reported by ministries of health and describes progress toward global dracunculiasis eradication. In 2011, a total of 1,058 cases were reported. As of 2012, dracunculiasis remained endemic in only four countries. Through June 2012, worldwide reductions in reported cases continued, compared with the first 6 months of 2011. Failures in surveillance and containment, lack of clean drinking water, and insecurity in Mali and parts of South Sudan continue to challenge dracunculiasis eradication efforts.

Considerable progress has been made since 1986 in reducing the annual number of reported dracunculiasis cases. The 1991 WHA goal to eradicate dracunculiasis globally by 1995 was not achieved because of the limited funding then available from international organizations for support of technical and financial assistance to countries with endemic disease, and the limited time (4 years) to meet the WHA goal (*5*). In 2004, WHA established a new target date of 2009 for global eradication (*6*). Despite considerable progress, that target date also was not met. Nevertheless, progress toward eradication continues. The number of cases of dracunculiasis worldwide reported by disease endemic countries to WHO and partner organizations decreased 41%, from 1,797 cases in 2010 to 1,058 in 2011. As of June 2012, dracunculiasis remained endemic in four countries (Chad, Ethiopia, Mali, and South Sudan). The 395 cases reported and 219 villages reporting cases globally during January–June 2012 represent reductions of 51% and 39%, respectively, from the 807 cases reported and 358 villages that reported cases during January–June 2011. Of the 395 cases reported during January–June 2012, 99% were from South Sudan.

As a result of having an indigenous case* in 2012 for the third consecutive year following discovery of cases in 2010, Chad officially became endemic for dracunculiasis again. Ethiopia and Mali have reported two cases and one case, respectively, in the first 6 months of 2012. Active surveillance conducted by national eradication programs for cases in known endemic areas improved in Chad and deteriorated in Mali during January–June 2012.

In December 2011, WHO certified two additional, formerly endemic countries, Burkina Faso and Togo, as having eliminated dracunculiasis (i.e., zero cases reported for ≥36 consecutive months), based on the recommendation of the International Commission for the Certification of Dracunculiasis Eradication. As required by the resolution on eradication of dracunculiasis (WHA64.16) that was adopted by the WHA in May 2011 (*7*), the secretariat of WHO provided its first annual report regarding this eradication campaign to WHA in May 2012. The current target is to interrupt transmission in all four remaining countries as soon as possible. Currently, insecurity (e.g., sporadic violence or civil unrest) in parts of South Sudan, and especially Mali, poses the greatest threat to the success of the global dracunculiasis eradication campaign.

Persons become infected with the parasite by drinking water from stagnant sources (e.g., ponds) containing copepods (water fleas) that harbor *D. medinensis* larvae. No effective drug to treat or vaccine to prevent the disease is available, and persons who contract *D. medinensis* infections do not become immune. After a 1-year incubation period, adult female worms 24–40 inches (60–100 cm) long migrate under the skin and emerge, usually through the skin of the person's foot or lower leg. On contact with water, these worms release larvae that can then be ingested by copepods in the water and infect persons who drink the water. The emerging worm can be removed by manual traction and rolling it up on a stick or gauze a few centimeters each day. Complete removal requires an average of approximately 4 weeks. Disabilities caused by dracunculiasis are secondary to bacterial infections that develop at the site of worm emergence, which might lead to septicemia, and can result in debilitating pain and swelling, tetanus, arthritis, and contractures of the involved limb (*8,9*).

Dracunculiasis can be prevented by 1) educating residents in disease-endemic communities, and particularly persons from

* An indigenous case is defined as a Guinea worm protruding through a lesion on the skin in a person who had no history of travel outside his or her residential locality during the preceding year.

whom worms are emerging, to avoid immersing affected parts in sources of drinking water, 2) filtering potentially contaminated drinking water through a cloth filter, 3) treating potentially contaminated surface water with the larvicide temephos (Abate), and 4) providing safe drinking water from bore-hole or hand-dug wells (*5*). Containment of transmission,[†] achieved through 1) voluntary isolation of each patient to prevent contamination of drinking water sources, 2) provision of first aid, 3) manual extraction of the worm, and 4) application of occlusive bandages, is complementary to the four main interventions.

Countries enter the WHO precertification stage of eradication after completing 1 full calendar year without reporting any indigenous cases (i.e., one incubation period for *D. medinensis*). A case of dracunculiasis is defined as occurring in a person exhibiting a skin lesion or lesions with emergence of one or more Guinea worms. Each person is counted as a case only once during a calendar year. An imported case is an infection acquired in a place (another country or village within the same country) other than the community where it is detected and reported. Six countries where transmission of dracunculiasis previously was endemic (Cote d'Ivoire, Ghana, Kenya, Niger, Nigeria, and Sudan[§]) are in the precertification stage of eradication.

In each country affected by dracunculiasis, a national eradication program receives monthly reports of cases from each village that has endemic transmission. Reporting rates are calculated by dividing the number of villages with endemic dracunculiasis that report each month by the total number of villages with endemic disease. All villages with endemic dracunculiasis are kept under active surveillance, with daily searches of households for persons with signs and symptoms suggestive of dracunculiasis. These are conducted to ensure that detection occurs within 24 hours of worm emergence so that patient management can begin to prevent contamination of water. Villages where endemic transmission of dracunculiasis is interrupted (i.e., zero cases reported for ≥12 consecutive months) also are kept under active surveillance for 3 consecutive years.

[†] Transmission from a patient with dracunculiasis is contained if all of the following conditions are met: 1) the disease is detected <24 hours after worm emergence; 2) the patient has not entered any water source since the worm emerged; 3) a volunteer has managed the patient properly, by cleaning and bandaging the lesion until the worm has been fully removed manually and by providing health education to discourage the patient from contaminating any water source (if two or more emerging worms are present, transmission is not contained until the last worm is removed); and 4) the containment process, including verification of dracunculiasis, is validated by a supervisor within 7 days of emergence of the worm. All of these criteria must be achieved for each emerged worm for the case to be considered contained.

[§] On July 9, 2011, the former country of Sudan officially separated into two countries: the Republic of the Sudan and the Republic of South Sudan. Currently, South Sudan is endemic for dracunculiasis. The area comprising the new country of Sudan, located north of South Sudan, has been free from dracunculiasis since 2002.

WHO certifies a country free from dracunculiasis after that country maintains adequate nationwide surveillance for 3 consecutive years and demonstrates that no cases of indigenous dracunculiasis occurred during that period. As of the end of 2011, WHO had certified 192 countries and territories as free from dracunculiasis (*3*); 14 countries, including four with endemic disease, remain to be certified.

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South Sudan. The 10 southern states of the former Sudan became the independent Republic of South Sudan on July 9, 2011. The area of South Sudan reported all of the indigenous cases notified from the former Sudan since 2002. The South Sudan Guinea Worm Eradication Program (SSGWEP) reported 1,028 cases in 2011, of which 763 (74%) were contained (Table 1), which was a reduction of 39% from the 1,698 cases reported in 2010. For January–June 2012, SSGWEP reported a provisional total of 391 cases (66% contained) from 215 villages, compared with 794 cases (75% contained) reported from 358 villages during January–June 2011; a reduction of 51% in cases and 40% in the number of villages reporting cases (Table 2). Of all cases in South Sudan in the first 6 months of 2012, 81% were reported from only one county, Kapoeta East County in Eastern Equatoria State. In May 2012, the collapse of a key bridge on the only available road for transporting SSGWEP supplies and materials and humanitarian aid to communities in the eastern end of this county added a challenge to efforts to eradicate dracunculiasis in South Sudan. SSGWEP also faces on-going challenges in the seasonal movements of different age and gender groups among villages, gardens, farms, bull cattle camps, milking cow cattle camps, and grazing areas for smaller livestock, such as goats, plus unpredictable population displacements from interethnic cattle rustling raids. The program has continued to intensify interventions (e.g., temephos was used in 60% of endemic villages in 2010, 85% in 2011, and 96% in January–June 2012) and supervision (e.g., 45 national program officers and technical assistants in 2010, 58 in 2011, and 70 in 2012). The peak transmission season in South Sudan is March–July.

Mali. Mali's Guinea Worm Eradication Program reported 12 indigenous cases in 2011, which was a reduction of 79% from the 57 indigenous cases reported in 2010. Only five (42%) of the cases reported in 2011 were contained. One case, which was contained, was reported from Mali in January–June 2012, compared with three cases (one contained) reported in January–June 2011. This program suffered a severe setback because of a coup d'etat in March 2012, as a result of which subsequent reports include only four southern regions of the country. As of April 2012, Mali's Guinea Worm Eradication Program has not been operational in three endemic northern

TABLE 1. Number of reported dracunculiasis cases, by country and local interventions — worldwide, 2011

Country	Reported cases			Change in indigenous cases in villages/localities under surveillance during the same period in 2010 and 2011 (%)	Villages under active surveillance in 2011				
	Indigenous in 2011	Imported in 2011*	Contained during 2010 (%)		No.	Reporting monthly (%)	Reporting ≥1 cases	Reporting only imported cases†	Reporting indigenous cases
Sudan¶	1,028	0	(74)	(-39)	5,882	(100)	463	338	125
Mali	12	0	(42)	(-79)	102	(100)	6	0	6
Chad	10	0	(40)	(0)	42	(85)	9	0	9
Ethiopia	6	2	(88)	(-60)	67	(100)	5	2	3
Total	**1,056**	**2**	**(73)**	**(-41)**	**6,093**	**(99)**	**483**	**340**	**143**

See table footnotes below.

TABLE 1. (*Continued*) Number of reported dracunculiasis cases, by country and local interventions — worldwide, 2011

Country	Status of Interventions in endemic villages in 2011					
	Endemic villages 2010–2011	Reporting monthly§ (%)	Filters in all households§ (%)	Using temephos§ (%)	≥1 sources of safe water§ (%)	Provided health education§ (%)
Sudan¶	304	(100)	(100)	(85)	(25)	(95)
Mali	26	(100)	(100)	(92)	(40)	(100)
Chad	NA	NA	NA	NA	NA	NA
Ethiopia	6	(100)	(100)	(100)	(83)	(100)
Total	**336**	**(100)**	**(100)**	**(86)**	**(27)**	**(95)**

Abbreviation: NA = not applicable.
* Imported from another country.
† Imported from another country or from another in-country disease-endemic village.
§ The denominator is the number of villages/localities where the program applied interventions during 2010–2011.
¶ On July 9, 2011, the former country of Sudan officially separated into two countries: the Republic of the Sudan and the Republic of South Sudan. Currently, South Sudan is endemic for dracunculiasis. The area comprising the new country of Sudan, located north of South Sudan, has been free from dracunculiasis since 2002.

TABLE 2. Number of reported indigenous dracunculiasis* cases, by country — worldwide, January 2011–June 2012

Country	2010	2011	1-yr change (%)	January–June 2011*	January–June 2012	6-mos change (%)	Cases contained during January–June 2011 (%)
Sudan†	1,698	1,028	(-39)	794	391	(-51)	(66)
Mali	57	12	(-79)	3	1	(-67)	(100)
Chad	10	10	(0)	2	1	(-50)	(0)
Ethiopia	20	6	(-70)	6	2	(-67)	(50)
Total	**1,785**	**1,056**	**(-41)**	**805**	**395**	**(-51)**	**(69)**

* In 2011, two additional cases were imported into Ethiopia from South Sudan, for a total of eight cases (indigenous and imported) in Ethiopia that year. These two imported cases are not reflected in this table. No reports of cases imported from one country to another were reported during January–June 2012.
† On July 9, 2011, the former country of Sudan officially separated into two countries: the Republic of the Sudan and the Republic of South Sudan. Currently, South Sudan is endemic for dracunculiasis. The area comprising the new country of Sudan, located north of South Sudan, has been free from dracunculiasis since 2002.

regions (Timbuktu, Gao, and Kidal). Mali's peak Guinea worm transmission season is June–October.

Ethiopia. After 9 consecutive months with no known cases, Ethiopia reported one case in April and one case in May 2012. Only one of the cases was contained. Both cases in 2012 were linked to a case that occurred in one disease-endemic village in April–May 2011. Ethiopia reported eight cases in January–June 2011, of which seven cases were reportedly contained, and no cases in July–December 2011. This was a reduction of 60% from the 20 indigenous cases reported during 2010. All of the cases in 2011 and one of the cases in 2012 were from Gog District of Gambella Region. The other case in 2012 was from an adjacent district in the same region. The peak transmission season in Ethiopia is March–May.

Chad. After a decade with no reported cases, a visiting team from WHO investigated rumors of cases in 2010 and confirmed cases in Chad that eventually numbered 10 known cases (none contained) in eight villages during 2010 (*10*). Another 10 cases (four contained) were reported in nine other villages in 2011. The origin of these cases is unknown. Specimens taken from several patients in 2010 and 2011 were confirmed at CDC as *D. medinensis*. Chad reported one case, which was not contained, in June 2012, compared with two cases (one contained) reported during January–June 2011. The case of

What is already known on this topic?

The number of new cases of dracunculiasis (Guinea worm disease) occurring worldwide each year has decreased from an estimated 3.5 million to 1,058 since the 1986 World Health Assembly declared global elimination as a goal.

What is added by this report?

The number of dracunculiasis cases reported worldwide in 2011 declined by 41%, compared with 2010, and by 51% from January–June 2011 to January–June 2012. Transmission remains endemic in four countries, with just one, South Sudan, accounting for 99% of all reported cases during January–June 2012.

What are the implications for public health practice?

Although earlier target dates for global dracunculiasis eradication were missed, progress is accelerating, and eradication is likely within the next few years if disruption of program operations can be minimized, particularly in northern Mali.

dracunculiasis in 2012 is the first since 2010 that can be linked in time and place to a case in the preceding year. As a result of 3 continuous years of transmission, Chad met the definition for reestablishment of endemic transmission of dracunculiasis in a country.¶ By the end of May 2012, The Carter Center had helped the ministry of health to train 1,388 village volunteers and 180 supervisors to conduct active surveillance in the 723 at-risk villages associated with the cases in 2010–2012. The peak transmission season in Chad appears to be June–August.

¶ A country will be considered to have established or reestablished dracunculiasis endemicity if 1) the country has not reported a confirmed indigenous case of the disease for >3 years, and 2) subsequent indigenous transmission of cases (laboratory-confirmed) is shown to occur in that country for ≥3 consecutive calendar years.

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Editorial Note

Approximately $72 million in new pledges to the Guinea Worm Eradication Program were announced in 2011–2012 by the United Kingdom's Department for International Development, the Bill & Melinda Gates Foundation, His Highness Sheikh Khalifa bin Zayed Al Nayan of the United Arab Emirates, and the Children's Investment Fund Foundation. Together, those pledges completed the estimated remaining funding needed for The Carter Center's assistance to endemic countries for completing interruption of transmission, and for WHO's assistance to countries for surveillance during and after elimination of transmission and for certification of eradication.

Based on reported trends from 2011, during which three quarters of all cases of dracunculiasis were reported during the first half of that year, fewer than 500 cases likely will be reported globally for all of 2012, setting the stage for an all-out effort to stop transmission from every case that occurs in 2013. The main programmatic challenges requiring urgent attention by governments and partners include 1) failures in surveillance and containment (e.g., missed cases, unexplained sources of cases, and uncontained cases), 2) establishment and maintenance of surveillance in Guinea worm-free areas of all countries where the disease still occurs or was recently eliminated, and 3) providing clean drinking water quickly to as many targeted villages as possible. Insecurity in much of the endemic areas of Mali is now the main political barrier to complete eradication of dracunculiasis.

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Progress Toward Poliomyelitis Eradication — Chad, January 2011–August 2012

In 1988, the World Health Assembly launched the Global Polio Eradication Initiative (GPEI) to interrupt transmission of wild poliovirus (WPV). By January 2012, indigenous WPV transmission had been interrupted in all countries except Afghanistan, Pakistan, and Nigeria (*1*). However, importation of WPV caused outbreaks in 29 and reestablished transmission in four, previously polio-free African countries during 2003–2011 (*2,3*). Transmission after WPV importation is considered reestablished when it continues for ≥12 months (*2,3*); in Chad, transmissions of WPV type 3 (WPV3) and WPV type 1 (WPV1) were reestablished. WPV3 was imported from Nigeria in 2007 and continued to circulate (*2,3*); the latest reported WPV3 case occurred on March 10, 2011. Transmission of WPV1 continued after a WPV1 case was imported from Nigeria in September 2010; the latest reported WPV1 occurred on June 14, 2012 (*2*). This report updates previous reports (*1–3*) and describes polio eradication activities and progress in Chad during January 2011–August 2012, as of October 2, 2012. Five WPV1 cases were reported during January–August 2012, compared with 111 WPV1 cases and three WPV3 cases reported during the same period in 2011. Five circulating type 2 vaccine-derived poliovirus (cVDPV2) cases occurred during July–August 2012. Current progress suggests that Chad could interrupt reestablished WPV transmission in 2012, although limitations in surveillance hamper the ability to detect ongoing transmission. Furthermore, with ongoing endemic WPV transmission in Nigeria (*1,2*), Chad remains at risk for new WPV importations. Efforts to strengthen surveillance and enhance routine and campaign immunization performance will need to continue in Chad to ensure interruption of reestablished WPV transmission, limit circulation after any WPV importation, and interrupt transmission of cVDPV.

Immunization Activities

In Chad, the estimated national routine immunization coverage of infants with 3 doses of oral polio vaccine (OPV) in 2011 was 31% (*4*). A surrogate measure of coverage by routine and supplementary immunization activities (SIAs)* can be obtained from parental recall of dose histories for children with acute flaccid paralysis (AFP) not attributed to polio (nonpolio AFP).† Nationally, 8.1% of children aged 6–35 months with nonpolio AFP did not receive any OPV doses ("zero-dose children").

During January 2011–August 2012, house-to-house SIAs targeted children aged 0–59 months using different OPV formulations, including trivalent (tOPV) and bivalent types 1 and 3 (bOPV). During this period, 11 national immunization days (including a child health day that included measles vaccination)§ and nine subnational immunization days were conducted; bOPV was used exclusively in 15 SIAs, and tOPV was used in three SIAs. In addition to programmatic limitations in many areas, including the capital area of N'Djamena, SIAs often were unable to reach children living in areas inaccessible because of large distances and lack of infrastructure. Several smaller-scale, focal SIAs (mop-ups) were conducted to vaccinate these children. Two short-interval, additional-dose SIAs¶ in 2012 targeted nomadic children aged <15 years. Additionally, after the 2012 outbreak in Lac (the Lake Chad region bordering northeast Nigeria), outbreak response targeted children aged <15 years for the first three SIAs.

AFP Surveillance

Standard indicators are used to monitor AFP surveillance performance (*5*).** In 2011, the annual national nonpolio AFP rate (per 100,000 population aged <15 years) was 5.7 (range: 3.1–12.5 among the 19 of 21 regions with more than 100,000 children aged <15 years) (Table). During 2011, 81% of AFP cases reported nationally had adequate stool specimens collected (range: 65%–100%), compared with 67% of AFP cases reported nationally during 2010 (*5*). In N'Djamena, 67% of stool specimens collected from children with AFP were adequate. The proportion of specimens arriving at the laboratory in good condition varied substantially by region. During this reporting period, 41 AFP cases could not be confirmed and were classified as polio-compatible, as of October 2,

* Mass campaigns conducted for a brief period (days to weeks) in which 1 dose of OPV is administered to all children aged <5 years, regardless of vaccination history. Campaigns often are conducted nationally or in various regions of the country.

† Vaccination histories of children aged 6–23 months with AFP who do not test WPV-positive are used to estimate OPV coverage of the overall target population.

§ Child health days are national campaigns to provide various health interventions simultaneously, including deworming, nutrition-related interventions, and immunization.

¶ Short-interval, additional-dose SIAs are used to enhance access to children and seroconversion per child in which a monovalent OPV or bOPV dose is administered within 1–2 weeks of the previous dose.

** The quality of AFP surveillance is monitored by performance indicators that include 1) detection rate of nonpolio AFP cases and 2) the proportion of AFP cases with adequate stool specimen collection. World Health Organization (WHO) operational targets for countries with endemic polio transmission are a nonpolio AFP detection rate of at least two cases per 100,000 population aged <15 years and adequate stool specimen collection from >80% of AFP cases (in which two specimens are collected at least 24 hours apart, both within 14 days of paralysis onset, and shipped on ice or frozen packs to a WHO-accredited laboratory, arriving in good condition).

TABLE. Acute flaccid paralysis (AFP) surveillance indicators and reported wild poliovirus (WPV) cases, by region, period, and WPV type — Chad, January 2011–August 2012*

	AFP surveillance indicators (2011)			Reported WPV cases					
				WPV by period				WPV by type (Jan 2011–Aug 2012)	
Region	No. of AFP cases	Nonpolio AFP rate†	% with adequate specimens§	Jan–Jun 2011	Jul–Dec 2011	Total 2011	Jan–Aug 2012	WPV1	WPV3
Barh-Elgazal	7	4.5	86	0	1	**1**	0	1	0
Batha	22	5.5	77	4	2	**6**	0	6	0
Borkou-Tibesti¶	1	1.6	100	0	0	**0**	0	0	0
Chari-Baguirmi	17	6.0	65	0	0	**0**	1	1	0
Dar Sila	20	5.6	80	6	1	**7**	0	4	3
Ennedi¶	5	5.6	100	0	0	**0**	0	0	0
Guera	20	4.9	90	1	4	**5**	0	5	0
Hadjer Lamis	17	5.5	100	0	0	**0**	0	0	0
Kanem	7	3.3	86	1	0	**1**	0	1	0
Lac	8	3.4	88	0	0	**0**	2	2	0
Logone Occidental	42	7.1	79	14	1	**15**	0	15	0
Logone Oriental	107	12.5	80	47	11	**58**	2	60	0
Mandoul	28	7.6	89	0	2	**2**	0	2	0
Mayo-Kebbi-Est	24	4.8	75	0	1	**1**	0	1	0
Mayo-Kebbi-Ouest	20	5.8	85	2	0	**2**	0	2	0
Moyen-Chari	30	5.6	83	5	2	**7**	0	7	0
N'Djamena	21	3.3	67	0	1	**1**	0	1	0
Ouaddaï	11	1.3	100	2	1	**3**	0	3	0
Salamat	15	3.1	73	5	3	**8**	0	8	0
Tandjile	22	3.5	73	3	4	**7**	0	7	0
Wadi Fira	25	5.9	96	6	2	**8**	0	8	0
Overall	**469**	**5.7**	**81**	**96**	**36**	**132**	**5**	**134**	**3**

* Data as of October 2, 2012.
† Per 100,000 children aged <15 years, excluding AFP cases pending for classification as of October 2, 2012.
§ Two stool specimens collected at an interval of ≥24 hours within 14 days of paralysis onset and properly shipped to the laboratory and arriving in good condition.
¶ Population of children aged <15 years is <100,000.

2012, because of inadequate stool specimen collection. The laboratory processing stool specimens from Chad is located in Yaoundé, Cameroon. Transport of specimens from N'Djamena to Yaoundé frequently was delayed in 2010; however, no transport delays were reported during 2011–2012.

WPV and VDPV Incidence

In Chad, 132 WPV cases were reported in 2011 (129 WPV1 and three WPV3) (Table, Figure), compared with 26 WPV cases (11 WPV1 and 15 WPV3) in 2010. Five WPV cases (all WPV1) were reported in 2012 (through August), compared with 114 cases (111 WPV1 and three WPV3 cases) during the same period in 2011. The latest reported WPV3 case in Chad occurred in the Dar Sila region in eastern Chad in June 2011. During January 2011–August 2012, 91 (66.4%) WPV cases were among children aged <36 months. Of these 91 children, 14 (15.4%) received no OPV doses, 28 (30.8%) received 1–3 OPV doses, and 48 (52.7%) received ≥4 OPV doses (dose history was unknown for one child). During this period, WPV cases were reported in 18 (86%) of 21 regions. Distribution of WPV1 was widespread in 2011, sparing the two sparsely populated northern regions, with a concentration of cases clustered in Logone Orientale (Figure). During January–August 2012, five WPV1 cases were reported (two in Logone Orientale, one in Chari-Baguirmi, and two in Lac). During January 2011–August 2012, three WPV3 cases were reported, all in Dar Sila.

Five cVDPV2 cases from a single emergence have been confirmed during 2012 as of October 2 (Figure). Four of the cases were among children residing in N'Djamena, with onset from July 20 to August 18; the fifth related case was reported in a child residing in the eastern province of Ouaddaï, with onset on August 15. Immunization response activities are under way.

Reported by

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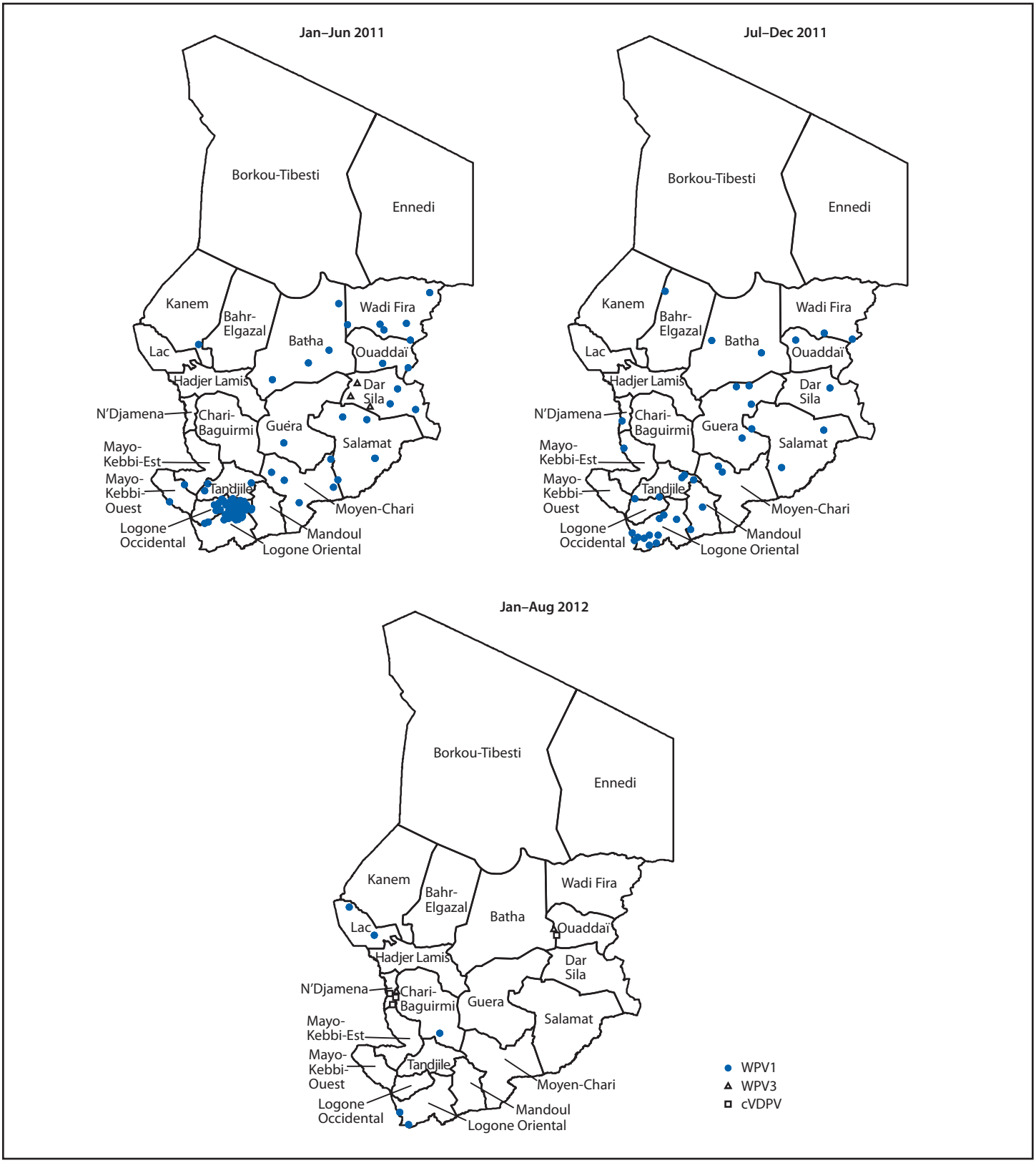
FIGURE. Reported wild poliovirus (WPV) and circulating vaccine-derived poliovirus (cVDPV) cases, by type and region — Chad, January 2011–August 2012*†



* As of October 2, 2012.
† Each instance of a symbol represents one case of poliovirus and is drawn at random within district boundaries.

What is already known on this topic?

Indigenous wild poliovirus transmission (WPV) has never been interrupted in Afghanistan, Nigeria, or Pakistan. Polio transmission was reestablished (defined as circulation for ≥12 months after importation) in four, previously polio-free countries in Africa, including Chad, in the 2000s.

What is added by this report?

WPV type 3 and WPV type 1 were imported into Chad in 2007 and 2010, and the latest reported cases occurred on March 10, 2011, and June 14, 2012, respectively. In addition, five cases of circulating vaccine-derived poliovirus type 2 occurred during July–August 2012. Current progress suggests that Chad could interrupt WPV transmission in 2012, although challenges remain.

What are the implications for public health practice?

WPV circulation during 2012 has continued only in Chad and the three remaining endemic countries. With ongoing WPV circulation in Nigeria and low routine immunization coverage, Chad remains at risk for new WPV importations and outbreaks. The polio program in Chad has made progress in 2012, and continued efforts will be required.

Editorial Note

Transmission after importations of WPV3 and WPV1 from Nigeria in 2007 and 2010, respectively, became reestablished in previously polio-free Chad because of chronically low routine immunization coverage and low-quality SIAs. After years of persistent weaknesses in the polio program in Chad, progress toward eradication has been made; cases increased fourfold in 2011 compared with 2010, but then decreased 96% during January–August 2012 compared with the same period in 2011. Circulation of reestablished WPV3 might have been interrupted.

Program improvements during 2012 follow the investment of considerable resources beginning in 2011 by the Chad Ministry of Health and GPEI partners to increase field personnel, training, planning, attention to nomadic and other chronically missed populations, supervision, and political oversight. In addition, innovative, short-interval, additional-dose SIAs have been used to improve population immunity. A prompt investigation of cases reported in Lac during 2012 was followed by timely and aggressive response immunization, including the innovative approach of expanding the SIA target age group to children aged <15 years, and might have substantially limited spread and shortened the outbreak (*6*). Efforts to improve the implementation of polio immunization activities and to strengthen AFP surveillance are increasingly supported by traditional, religious, and political leaders. The President of Chad launched the National Emergency Action Plan for polio eradication in 2011 (*6*), emphasizing the key role and responsibility of district and subdistrict authorities. To ensure interruption of reestablished WPV transmission and limit circulation after any WPV importation, Chad authorities will need to continue efforts to strengthen surveillance and enhance routine and campaign immunization planning, management, and supervision.

During 2009 and early 2010, monovalent type 3 OPV primarily was used in SIAs to preferentially raise type 3 immunity while WPV3 was in circulation (*1–3,7*). After the introduction of WPV1 in 2010, bOPV became the predominant vaccine used in SIAs. A high vulnerability to emergence of cVDPV2 exists in Chad (*8*), given the continued low levels of routine vaccination coverage and little use of tOPV in campaigns, and therefore low exposure to type 2–containing tOPV; five cVDPV2 cases have been reported to date during 2012. Outbreaks of cVDPV require the same mop-up response campaigns as WPV outbreaks, with use of tOPV.

There have been considerable challenges to achieve and maintain high-quality, sensitive AFP surveillance in Chad. After the provision of additional resources and increased supervisory attention towards stool specimen collection and transport, the overall proportion of AFP cases with collection of adequate stool specimens has increased, and specimen testing has become more timely. However, limitations in the sensitivity of surveillance and adequate specimen collection remain, especially for suspected AFP cases from remote and nomadic populations. As an indication of surveillance limitations, the WPV1 case most closely linked genetically to the Lac outbreak occurred more than 1 year earlier, in Chari-Baguirmi.

With ongoing endemic WPV transmission in Nigeria (*1,2*) and low routine immunization coverage estimates, Chad remains at risk for new WPV importations and outbreaks. With a recognized risk for failure in reaching the goal of polio eradication (*9*), the World Health Assembly declared the completion of polio eradication a programmatic emergency for global public health in 2012 (*10*). WPV circulation during 2012 has continued only in the three remaining endemic countries and in Chad, and the number of cases and of WPV-affected districts globally are at historic lows. In Nigeria, however, the number of cases in 2012 to date has increased from the same period in 2011.[††] Until polio is eradicated, all countries remain at risk for WPV importations. The success of GPEI depends on progress in maintaining and improving population immunity and surveillance quality in all countries, while maintaining the commitment of national and international partners.

[††] Additional information available at http://www.polioeradication.org.

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Announcements

World Stroke Day — October 29, 2012

Monday, October 29, is World Stroke Day 2012. Approximately 795,000 strokes occur annually in the United States. One of the leading causes of disability, stroke occurs among all age groups, including newborns, children, young adults, and older adults (*1*). One in six persons worldwide will have a stroke in his or her lifetime, and every 6 seconds someone will die from a stroke (*2*,*3*).

Although stroke is a common disease, it can be prevented. In addition, with timely care and support, most stroke survivors can recover and regain their quality of life. Everyone should take the following actions to reduce their likelihood of having a stroke: 1) know your personal risk factors, including high blood pressure, diabetes, obesity, high blood cholesterol, atrial fibrillation, and a history of having a transient ischemic attack or previous stroke; 2) engage in physical activity regularly; 3) maintain a healthy diet high in fruits and vegetables; 4) limit alcohol consumption; 5) avoid cigarette smoke (if you smoke, seek help to stop now); and 6) learn to recognize the warning signs of a stroke,* and call 9-1-1 right away if you think someone is having a stroke.

CDC addresses stroke prevention through state-based programs to prevent heart disease and stroke, through the Paul Coverdell National Acute Stroke Registry, and through many partnerships. Information on stroke prevention is available at http://www.cdc.gov/stroke, and additional information about World Stroke Day is available at http://www.worldstrokecampaign.org.

* Sudden numbness or weakness of the face, arm, or leg, especially on one side of the body; sudden confusion, trouble speaking or understanding; sudden trouble seeing in one or both eyes; sudden trouble walking, dizziness, loss of balance or coordination; and sudden severe headache.

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Childhood Agricultural Injury Survey Online

The Childhood Agricultural Injury Survey (CAIS) of the National Institute for Occupational Safety and Health (NIOSH) is a critical source of national injury data for youths aged <20 years on farms in the United States. NIOSH is introducing the release of e-tables to make these data publically accessible on the Internet. These e-tables present CAIS data for the years 2001, 2004, 2006, and 2009, and Minority Farm Operator Childhood Agricultural Injury Survey (M-CAIS) data for the years 2000, 2003, and 2008. NIOSH plans to add additional years of CAIS and M-CAIS data when they become available.

CAIS and M-CAIS injury and demographic data for youths who live on, work on, or visit farms can be accessed online from the NIOSH Childhood Agricultural Injury Prevention Initiative page at http://www.cdc.gov/niosh/topics/childag. This page also provides links to NIOSH childhood agriculture-related publications, reports of childhood agricultural fatality investigations, extramural funding and research opportunities, and other childhood agricultural injury prevention resources.

Announcement

MMWR iPad App Now Available

A new *MMWR* iPad application is now available for free download in the Apple store. This application provides access to the complete array of publications in the *MMWR* series, which includes the *MMWR Weekly*, plus *Recommendations and Reports*, *Surveillance Summaries*, *Supplements*, and the annual *Summary of Notifiable Diseases*.

MMWR publications have been in existence since 1952, and today *MMWR* remains CDC's primary vehicle for scientific publication of timely, reliable, authoritative, accurate, objective, and useful public health information and recommendations. *MMWR* readership predominantly consists of physicians, nurses, public health practitioners, epidemiologists and other scientists, researchers, educators, pharmacists, and laboratorians.

This application is one of an expanding collection of applications from CDC, each one optimized for mobile devices. Now topical CDC content is available whenever, wherever. When a mobile device is connected, the content is updated automatically, ensuring that users always have the most up-to-date information. Users also can personalize their experience with features such as highlighting, annotations, and bookmarks, and they can share the content with others via social media such as Facebook and Twitter. The application is available at https://itunes.apple.com/us/app/morbidity-mortality-weekly/id544772409?mt=8.

Errata

Vol. 61, No. 17

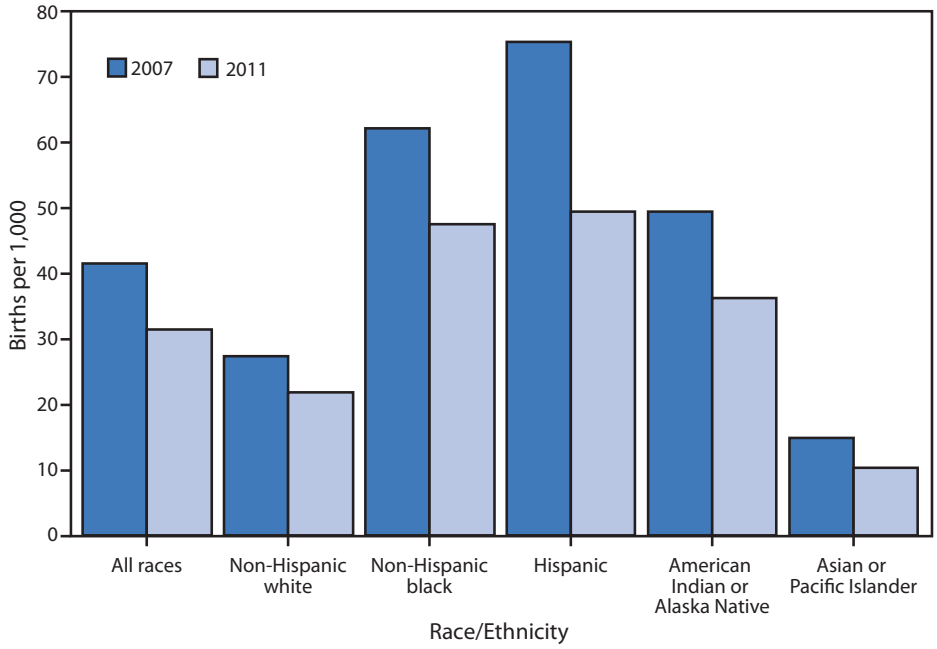
In the report, "Sexual Experience and Contraceptive Use Among Female Teens — United States, 1995, 2002, and 2006–2010," the analysis included some respondents who were using contraception but did not have sex during the interview month. Only respondents who had sex during the interview month should have been included. When limiting the analysis to respondents aged 15–19 years who had sex during the interview month, highly effective contraceptive use did not change significantly from 1995 (48.1% [95% confidence interval = 42.8%–53.4%]) to 2006–2010 (51.8% [95% confidence interval = 45.6%–57.9%]).

In addition, on page 300, the first sentence of the second paragraph of the Editorial Note should have cited reference 6, as follows: "**An earlier study (*6*) reported that** the proportion of female teens who never have had sex is now comparable across racial/ethnic groups, largely because of proportionately larger increases in delayed sexual debut observed since 1995 among black teens and Hispanic teens compared with white teens."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Birth Rates for Females Aged 15–19 Years, by Race/Ethnicity — National Vital Statistics System, United States,* 2007 and 2011†



* U.S. residents only.
† Data for 2011 are preliminary.

From 2007 to 2011, the birth rate for females aged 15–19 years declined 25%, from 41.5 to 31.3 births per 1,000, the lowest rate ever recorded for the country. Among racial/ethnic groups, declines ranged from 20% to 31% for non-Hispanic white, non-Hispanic black, American Indian or Alaska Native, and Asian or Pacific Islander teenagers. The birth rate for Hispanic teenagers fell 34%, from 75.3 to 49.4 births per 1,000, the largest decline of any population group. Despite the declines among all groups, teenage birth rates by race/ethnicity continue to reflect wide disparities.

Source: Hamilton BE, Martin JA, Ventura SJ. Births: preliminary data for 2011. Natl Vital Stat Rep 2012; 61(5). Available at http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_05.pdf.

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