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Hepatitis Awareness Month and National Hepatitis Testing Day — May 2015

This month marks the 20th anniversary of Hepatitis Awareness Month and the 4th National Hepatitis Testing Day (May 19) in the United States. Although care and treatment can be life-saving, many of the 3 million persons estimated to be living with hepatitis C virus (HCV) infection are unaware of their infection and are not receiving preventive services and medical management. In addition, an emerging epidemic of HCV infection among a new demographic of persons who inject drugs is unfolding in several areas throughout the nation. Guided by the goals of the 2014 U.S. Department of Health and Human Services *Action Plan for the Prevention, Care, and Treatment of Viral Hepatitis* (*1*), CDC continues its activities to expand access to HCV testing, care, and treatment to stem morbidity and mortality, and to reduce HCV infections caused by drug use behaviors. Efforts to address each of these strategic imperatives are highlighted by the two reports in this issue of *MMWR*.

The first report shows that trends in new cases of HCV infection are highly correlated with trends in substance abuse treatment admissions for opioid dependency and opioid injection in four states in the central Appalachian Region. The second report describes strategies for integrating HCV testing into primary care settings. These reports demonstrate how data can be used to identify patterns of risk for HCV transmission among persons who inject drugs and how programs can be successfully implemented to identify persons disproportionately affected by HCV infection and ensure they receive appropriate medical care and treatment.

Reference

1. US Department of Health and Human Services. Combating the silent epidemic of viral hepatitis: action plan for the prevention, care, and treatment of viral hepatitis. Updated 2014–2016. Washington, DC: US Department of Health and Human Services; 2015. Available at http://aids.gov/pdf/viral-hepatitis-action-plan.pdf.

Increases in Hepatitis C Virus Infection Related to Injection Drug Use Among Persons Aged ≤30 Years — Kentucky, Tennessee, Virginia, and West Virginia, 2006–2012

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Hepatitis C virus (HCV) infection is the most common blood-borne infection in the United States, with approximately three million persons living with current infection (*1*). Percutaneous exposure to contaminated blood is the most efficient mode of transmission, and in the United States, injection drug use (IDU) is the primary risk factor for infection. State surveillance reports from the period 2006–2012 reveal a nationwide increase in reported cases of acute HCV infection, with the largest increases occurring east of the Mississippi River, particularly among states in central Appalachia (*2*).

INSIDE

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Demographic and behavioral data accompanying these reports show young persons (aged ≤30 years) from nonurban areas contributed to the majority of cases, with about 73% citing IDU as a principal risk factor. To better understand the increase in acute cases of HCV infection and its correlation to IDU, CDC examined surveillance data for acute case reports in conjunction with analyzing drug treatment admissions data from the Treatment Episode Data Set-Admissions (TEDS-A) among persons aged ≤30 years in four states (Kentucky, Tennessee, Virginia, and West Virginia) for the period 2006–2012. During this period, significant increases in cases of acute HCV infection were found among persons in both urban and nonurban areas, with a substantially higher incidence observed each year among persons residing in nonurban areas. During the same period, the proportion of treatment admissions for opioid dependency increased 21.1% in the four states, with a significant increase in the proportion of persons admitted who identified injecting as their main route of drug administration (an increase of 12.6%). Taken together, these increases indicate a geographic intersection among opioid abuse, drug injecting, and HCV infection in central Appalachia and underscore the need for integrated health services in substance abuse treatment settings to prevent HCV infection and ensure that those who are infected receive medical care.

Confirmed cases of acute HCV infection* and associated demographic and risk characteristics were obtained from the National Notifiable Disease Surveillance System (NNDSS) for Kentucky, Tennessee, Virginia, and West Virginia for the period 2006–2012 for persons aged ≤30 years.† Surveillance case reports met the clinical and laboratory markers of confirmed cases of acute HCV infection as defined by CDC/CSTE.§ A case report was classified as "urban" if the person lived in a metropolitan county with ≥50,000 population and as "nonurban" if the person lived in a nonmetropolitan county with <50,000 population.¶ The percentage of cases reported for the period 2006–2012 among persons aged ≤30 years in the four states were examined by demographic and risk characteristics (IDU versus non-IDU) and by urbanicity. In addition, using the number of cases reported through NNDSS as the numerator

* From 2006 to 2012, acute hepatitis C was defined for surveillance as laboratory-confirmed infection with acute illness of discreet onset. Acute illness was considered as the presence of any sign or symptom of acute viral hepatitis plus either jaundice or elevated alanine aminotransferase >400 IU/L. In 2012, the surveillance case definition was expanded to include cases with negative HCV antibody followed by positive antibody within 6 months.

† Information available at http://wwwn.cdc.gov/nndss/conditions/hepatitis-c-acute/case-definition/2012.

§ Information available at http://www.cdc.gov/hepatitis/Statistics/2011Surveillance/PDFs/2011HepSurveillanceRpt.pdf.

¶ Information available at http://www.cdc.gov/nchs/data/series/sr_02/sr02_154.pdf.

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and the mid-year (July) population estimates for persons aged ≤30 years from U.S. Census Bureau as the denominator, annual incidence rates for the period 2006–2012 were calculated and analyzed by urbanicity. Linear trends in annual incidence were determined by the Spearman correlation trend test and were considered statistically significant at p<0.05.

TEDS-A contains data on admissions to substance abuse treatment facilities in the United States, by year and state, among patients aged ≥12 years.** For each admission, up to three "substances of abuse" with a corresponding route of administration and demographic characteristics might be reported. TEDS-A classifies opioids into three categories: heroin, nonprescription methadone, and opiates and synthetics. For this report, three types of admissions were defined: heroin admission, prescription opioid admission (includes nonprescription methadone and opiates and synthetics), and any opioid admission (includes heroin and prescription opioids). In addition, two types of drug injection were defined: any opioid injection (includes injection of heroin and/or prescription opioids) and nonopioid injection (includes injection of any substance not classified as an opioid [e.g., cocaine]). The annual percentage of patient admissions among persons aged 12–29 years in Kentucky, Tennessee, Virginia, and West Virginia was calculated by type of admission and by drug injection for the period 2006-2012. Denominators for all percentages were the total number of reported treatment admissions for persons aged 12–29 years in that year in the four states. Further, the difference in the percentage of each admission type from 2006 to 2012 was calculated. Significance of a monotonic trend for any-opioid and nonopioid injection was determined by the Mann-Kendall test. Trends were considered statistically significant at p<0.05.

During 2006–2012, a total of 1,377 cases of acute HCV infection were reported to CDC from Kentucky, Tennessee, Virginia, and West Virginia. Of the 1,374 cases with a recorded age and classified as either urban or nonurban, 616 (44.8%) were among persons aged ≤30 years. The median age of persons with acute infection was 25 years in both nonurban (range = 6–30 years) and urban (range = 6–30 years) counties (Table). Of the number of cases in persons aged ≤30 years in nonurban counties, 247 (78.4%) were in non-Hispanic whites, and 156 (49.5%) in males; in urban counties, 249 (82.7%) cases were in non-Hispanic whites, and 155 (51.5%) were in males. Among the 265 (43.0%) cases in both urban and nonurban counties with identified risks for HCV infection, 196 (73.1%) were among persons who reported IDU, with similar percentages by urbanicity (urban = 99 [71.7%], nonurban 95 [74.8%]). During 2006–2012, a significant increase occurred in the incidence of acute HCV infection among young persons in both nonurban (p=0.007) and urban counties (p<0.001) in the four states (Figure 1). However, in each year, incidence was more than twice the rate among persons who resided in nonurban compared with urban areas.

TABLE. Sociodemographic characteristics and risk factors for reported acute hepatitis C infection among adolescents and young adults aged <30 years, by urbanicity — Kentucky, Tennessee, Virginia, and West Virginia, 2006–2012

Characteristic	Urban*		Nonurban†	
	No.	(%)	No.	(%)
Median age (yrs)	**25**		**25**	
Sex				
Male	142	(47.2)	157	(49.8)
Female	155	(51.5)	156	(49.5)
Unknown	4	(1.3)	2	(0.6)
Race/Ethnicity				
Black, non-Hispanic	5	(1.7)	0	(0.0)
White, non-Hispanic	249	(82.7)	247	(78.4)
Hispanic	2	(0.7)	3	(1.0)
Other	7	(2.3)	5	(1.6)
Unknown	38	(12.6)	60	(19.0)
Injection drug use reported§	**99**	**(71.7)**	**95**	**(74.8)**
Total	**301**	—	**315**	—

* Median urban population during 2006–2012 in the four states was 6,347,762.
† Median nonurban population during 2006–2012 in the four states was 2,080,097.
§ Among cases in persons who reported any HCV risk factor (urban = 138, nonurban = 127).

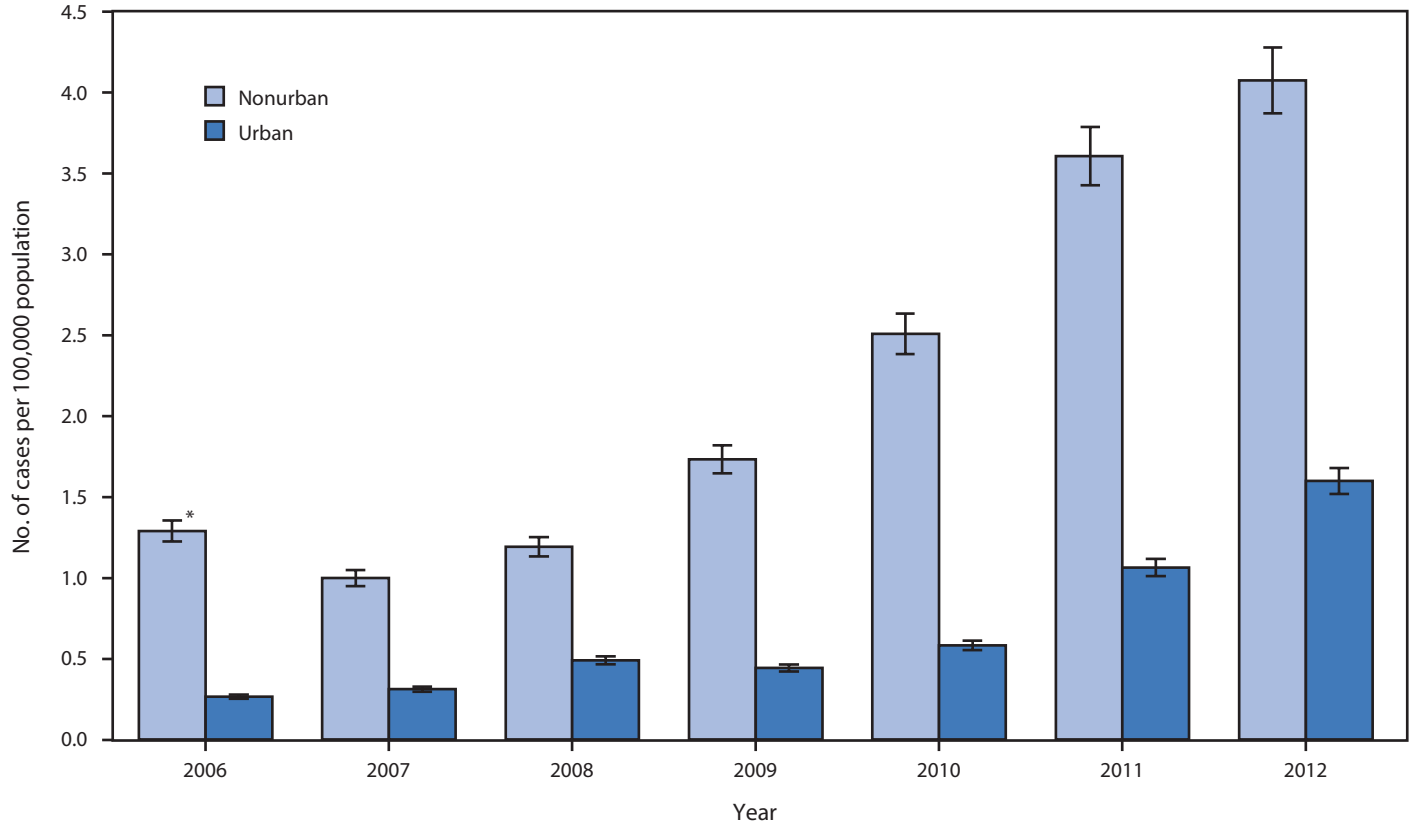
Among all treatment admissions for persons aged 12–29 years in the four states, the change in the proportion of any-opioid admissions increased by 21.1% from 2006 to 2012 (Figure 2). In addition, increases of 16.8% and 7.4% were observed in the proportion of prescription opioid admissions and heroin admissions, respectively. Further, from 2006 to 2012, the proportion of admissions related to any-opioid injection increased by 12.6%, and the proportion of admissions of a patient reporting nonopioid injection increased by 2.1%. Both trends (any-opioid and nonopioid injections) were significant (p<0.05) over the 7-year period (Figure 3).

Discussion

Surveillance data from four states (Kentucky, Tennessee, Virginia, West Virginia) showed a substantial increase (364%) in the number of cases of acute HCV infection from 2006 to 2012 among persons aged ≤30 years. Those affected were primarily non-Hispanic-white residents from both urban and nonurban areas, with more than double the rate of cases from nonurban areas. Urban and nonurban cases had the same distribution by sex. Among cases with identified risk information, IDU was most commonly reported (73%). Similar increases among persons with analogous demographic

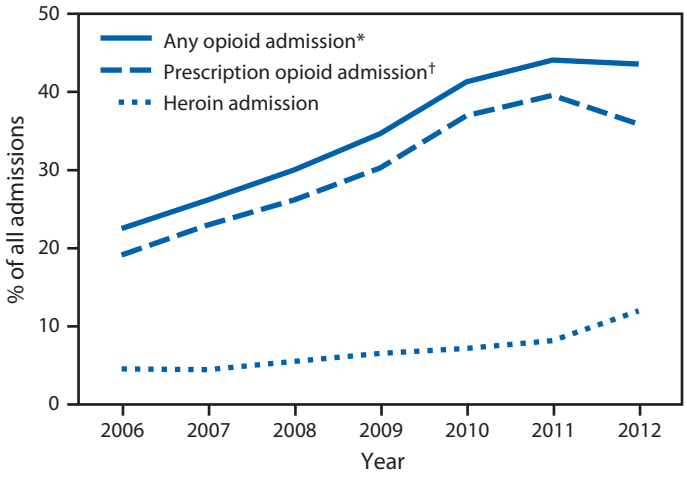
** Information available at http://doi.org/10.3886/ICPSR25221.v9.

FIGURE 1. Incidence of acute hepatitis C among persons aged ≤30 years, by urbanicity and year — Kentucky, Tennessee, Virginia, and West Virginia, 2006–2012



* 95% confidence interval.

FIGURE 2. Percentage of all admissions to substance abuse treatment centers by persons aged 12–29 years (N = 217,789) attributed to the use of opioids, prescription opioids, and heroin, by year — Kentucky, Tennessee, Virginia, and West Virginia, 2006–2012



* Any opioids include heroin and prescription opioids.
† Prescription opioids includes buprenorphine, codeine, hydrocodone, hydromorphone, meperidine, morphine, opium, oxycodone, pentazocine, propoxyphene, tramadol, illicitly obtained methadone, and any other drug with morphine-like effects.

characteristics have been reported over the period (2006–2012) in Massachusetts (*3*), Wisconsin (*4*) and upstate New York (*5*).

During this same period, these four states experienced an increase in the number of adolescents and young adults (aged 12–29 years) admitted to substance abuse treatment for opioid dependency (based on criteria of the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*), with prescription opioid abuse accounting for about one third of all treatment admissions (compared with 8.3% of admissions for heroin). However, during 2011–2012, the proportion of heroin admissions increased (from 8.6% to 12.0%) at the same time as the proportion of prescription opioid admissions decreased. This regional increase in heroin use is consistent with national survey reports estimating an increase in first-time heroin use from 90,000 persons in 2006 to 156,000 persons in 2012, with three out of four persons who used heroin and prescription opioids in the past year reporting prescription opioid misuse before initiating heroin, and a doubling of the number of persons reporting heroin dependency from 214,000 in 2002 to 467,000 in 2012 (*6*). The concomitant increase in the proportion of treatment admissions for prescription opioid abuse,

What is already known on this topic?

Data from 2006–2012 reveal a nationwide increase in reported cases of acute hepatitis C virus (HCV) infection, which is an important cause of morbidity and mortality in the United States. Adolescents and young adults (aged ≤30 years) from nonurban areas account for the majority of cases, with approximately 73% citing injection drug use as the principal risk factor.

What is added by this report?

From 2006 to 2012, there were significant increases in cases of acute HCV infections among persons aged ≤30 years in Kentucky, Tennessee, Virginia, and West Virginia. The increasing incidence among nonurban residents was at least double that of urban residents each year. Treatment admissions for opioid dependency increased 21.1% across the four states, with a significant increase in the proportion of persons admitted who report injecting drugs (a 12.6% increase). These increases indicate a strong correlation among opioid abuse, drug injecting, and HCV infection in these four states.

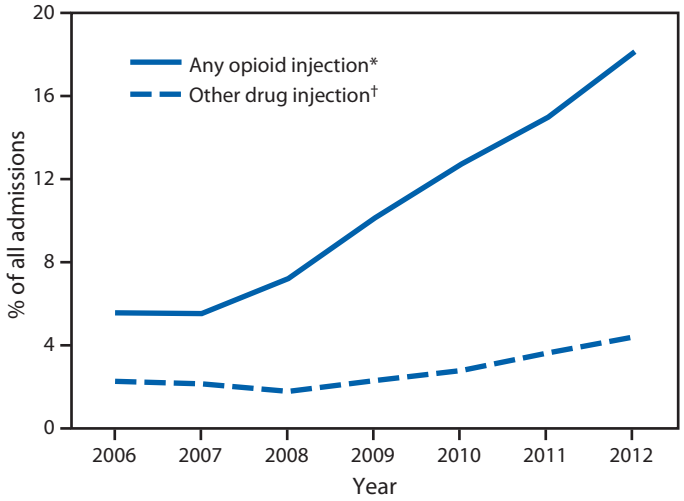
What are the implications for public health practice?

Evidence-based strategies as well as integrated-service provision are urgently needed in drug treatment programs to ensure patients are tested for HCV and persons found to be HCV-infected are linked to care and receive appropriate treatment. These efforts will require further collaboration among federal partners and state and local health departments to better address the syndemic of opioid abuse and HCV infection.

heroin abuse, and the number of admitted patients who report injecting suggests that the increase in acute HCV infections in central Appalachia is highly correlated with the region's epidemic of prescription opioid abuse (*7*) and facilitated by an upsurge in the number of persons who inject drugs in these four states. Increases in the incidence of HCV infection have the potential to thwart the nation's effort to control morbidity and mortality associated with HCV infection, in addition to undermining the U.S. Department of Health and Human Services' *Action Plan for the Prevention, Care, and Treatment of Viral Hepatitis* (*8*), which has set reducing HCV infections caused by drug use behaviors as a priority area.

The findings in this report are subject to at least seven limitations. First, the inability to link identified HCV cases to individual treatment admissions makes this analysis ecologic; therefore, the concomitant increase of acute HCV cases and prescription opioid admissions among persons reporting IDU should not be considered causally related. Still, IDU is the primary risk factor for HCV infection in the United States, and 73% of acute case reports with identified risks for HCV infection specify IDU. Second, the current surveillance case definition for acute HCV infection captures only persons with signs and symptoms of illness, and because acute infections are often asymptomatic, the underreporting of cases is likely.

FIGURE 3. Percentage of all admissions to substance abuse treatment centers by persons aged 12–29 years (N = 217,789) attributed to the injection of opioids and other drugs, by year — Kentucky, Tennessee, Virginia, and West Virginia, 2006–2012



* Any opioids include heroin and prescription opioids.
† Other drugs include cocaine/crack, alcohol, phencyclidine, other hallucinogens, methamphetamine, other amphetamines, other stimulants, benzodiazepines, other non-benzodiazepine tranquilizers, barbiturates, other non-barbiturate sedatives or hypnotics, over the counter medications, and other drugs not listed.

Third, because acute hepatitis C incidence by state and county were calculated from passive and voluntary case reporting to NNDSS, these data should not be interpreted as definitive state and county incidence estimates. Fourth, acute hepatitis C cases are reported by sources of past or present medical care; consequently, some populations at risk for HCV infection (e.g., incarcerated, homeless, and uninsured persons) with limited or no access to care are likely to be underrepresented in surveillance reporting. Fifth, multiple treatment admissions by a single individual (i.e., readmissions) might have occurred within and across years and/or states and cannot be excluded from the analysis of the TEDS-A dataset. Sixth, it was not possible to analyze admission data from TEDS-A by the urbanization classification scheme because geographic identifiers represented a treatment facility's location and not a patient's residence. Finally, reporting requirements for substance abuse admissions to TEDS-A vary by state. This report likely does not capture all substance abuse treatment admissions within a state, but TEDS-A is estimated to include 67% of all substance abuse admissions and 83% among TEDS-A–eligible admissions in the United States.††

Although the prevalence of human immunodeficiency virus (HIV) infection among young persons who inject drugs in central Appalachia is currently low, the regional increase in cases of acute HCV infection described in this report raises

†† Information available at http://wwwdasis.samhsa.gov/teds95/1995_rpt.pdf.

concerns about the potential for an increase in HIV infections because IDU is a risk factor for both HCV and HIV infection (*9*). Thus, integrated health care services are needed to treat substance abuse and prevent and treat blood-borne infections deriving from illicit drug use behaviors (*10*). Because persons who inject drugs underutilize health services, additional efforts are urgently needed to enlist them into substance abuse treatment, ensure they are tested for HCV, and link those with HCV infection into care to receive appropriate treatment. These efforts will require further collaboration among federal partners and state and local health departments, particularly in those regions most heavily impacted, to better address the syndemic of opioid abuse and HCV infection.

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Identification and Linkage to Care of HCV-Infected Persons in Five Health Centers — Philadelphia, Pennsylvania, 2012–2014

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Approximately three million persons in the United States are infected with hepatitis C virus (HCV), a blood-borne pathogen that is an increasing cause of liver disease and mortality in the United States (*1*,*2*). Treatments for HCV are curative, of short duration, and have few associated side effects (*3*), increasing the importance of identifying HCV-infected persons. Many persons with HCV infection were infected decades ago, before implementation of prevention measures and most are unaware of their infection, regardless of when it occurred (*4*). Most newly diagnosed cases are associated with injection drug use (*5*). Persons born during 1945–1965 have a fivefold higher risk of HCV infection than other adults and the highest risk for HCV-related morbidity and mortality (*6*). CDC recommends testing for this group, for persons who inject drugs, and others at risk for HCV infection (*6*,*7*). From October 2012 through July 2014, the National Nursing Centers Consortium (NNCC) carried out a project to integrate routine HCV testing and linkage-to-care in five federally qualified health centers in Philadelphia, PA, that primarily serve homeless persons and public housing residents. During the project period, 4,514 patients across the five centers were tested for HCV. Of these, 595 (13.2%) were HCV-antibody positive and 550 (92.4%) had a confirmatory HCV-RNA test performed. Of those who had a confirmatory HCV-RNA test performed, 390 (70.9%) were identified as having current (i.e., chronic) HCV infection (overall prevalence = 8.6%). Of those currently infected with HCV, 90% were informed of their status, 78% were referred to an HCV care specialist, and 62% went to the referred specialist for care. Replicable system modifications that improved HCV testing and care included enhancements to electronic medical records (EMRs), simplification of HCV testing protocols, and addition of a linkage-to-care coordinator. Findings from this project highlight the need for innovative strategies for HCV testing, care, and treatment, as well as the important role of community health centers in expanding access for patient populations disproportionately affected by HCV infection (*1*).

In 2012, the NNCC, a national membership organization functioning to advance nurse-led care, partnered with its parent company, Public Health Management Corporation (PHMC)*, to implement routine HCV testing and referral to care in PHMC's five federally qualified health centers (FQHCs) in Philadelphia, PA: 1) Mary Howard Health Center (exclusively serving homeless patients); 2) Rising Sun Health Center and 3) PHMC Health Connection (both family medicine clinics serving public housing residents); 4) Congreso Health Center (serving primarily Hispanic patients); and 5) PHMC Care Clinic (offering primary care and specialized health services to patients with unmet medical and social needs, including treatment for patients with human immunodeficiency virus (HIV) and HCV infection). All of these health centers integrated routine HCV testing through a medical assistant-initiated, opt-out, laboratory-based model with EMR modifications to prompt, track, report, and facilitate reimbursement for HCV tests.

Before testing began, the NNCC project manager and a local hepatitis C expert trained clinic personnel on HCV disease etiology, effects, and testing goals. The project manager assisted clinic staff with integrating testing into the existing clinic infrastructure to minimize disruption in routine services. Informational posters were placed in each health center to educate patients on prevalence, risk factors for HCV infection and recommendations for who should be tested. Patients eligible for testing included those born during 1945–1965 (i.e., "Baby Boomers"), those with other risks for HCV infection (e.g., injection drug use) (*6*,*7*), and those who were homeless. An automatic electronic reminder, (the first of four EMR enhancements), identified patients eligible for testing based on birth year. Mary Howard Health Center and PHMC Care Clinic tested all patients, because most of those seen at these two clinics were assumed to be at increased risk for HCV infection. At the other three sites, medical assistants interviewed patients and tested those with at least one identified risk factor for HCV infection.

Medical assistants notified patients that they would be tested for HCV unless they opted out. For patients who verbally agreed to be tested, a standing order was in place to initiate the requisition for HCV-antibody with reflex to an HCV-RNA test to detect current HCV infection. With reflex testing, the laboratory uses the same specimen to perform an HCV-RNA test on any positive HCV-antibody test specimen, thus eliminating the need for a second blood specimen to be collected from the patient. NNCC negotiated competitive pricing with commercial laboratories to perform HCV tests on uninsured

* The Public Health Management Corporation (PHMC) is a nonprofit public health institute that builds healthier communities through partnerships with government, foundations, businesses and community-based organizations (additional information available at http://www.phmc.org/site/index.php).

patients and an account was created and added to the EMR (second EMR enhancement). Selecting this account generated a separate invoice specifically for HCV tests performed on uninsured patients.

Weekly reports showing the number of patients, by health center, who were tested and the names of those whose results were HCV-antibody-positive and HCV-RNA-positive were generated by the EMR (third EMR enhancement). These reports were sent to the project manager who provided the information to the clinic directors, medical assistants, and linkage-to-care coordinator. The latter assisted all patients who were HCV-antibody-positive through the care process, which included providing all current HCV-infected patients with their test results, offering onsite posttest counseling, and referring patients to HCV-care specialists (primary-care providers trained to care for patients infected with HCV, as well as hepatologists or gastroenterologists from one of the local academic medical centers) for medical evaluation. An automatic reminder was generated by the EMR (final EMR enhancement) alerting health-care providers that an HCV-infected patient was eligible for linkage-to-care services, such as an escort to follow-up medical appointments, transportation reimbursements, reminder phone calls, and appointment scheduling. This report reflects data extracted from the EMR that was shared across all five health centers.

From October 1, 2012 through July 31, 2014, a total of 4,514 patients were tested for HCV across the five FQHCs; 595 (13.2%) had a positive HCV-antibody test result (Table). Among the HCV-antibody positive-patients, 550 (92.4%) had an HCV-RNA test performed and of these, 390 (70.9%) were identified with current HCV infection, for an overall prevalence of 8.6%. Most HCV-infected patients were male, non-Hispanic black, and had public insurance compared with others in these demographic subgroups. Although non-Hispanic blacks accounted for a greater proportion of persons with current infection than non-Hispanic whites (53.6% versus 29.5%), non-Hispanic whites had a greater overall prevalence of HCV infection compared with non-Hispanic blacks (21.1% versus 7.3%). Baby Boomers accounted for 62.6% of patients with current HCV infection. Among 352 patients reporting drug use, 205 (58.2%) reported having injected drugs in their lifetime. The two clinics conducting HCV testing for all patients, without ascertainment of risk (the PHMC Care Clinic and the Mary Howard Health Center), performed a greater number of tests compared with the other sites and had the highest proportion of patients who were HCV-antibody-positive and currently infected. Of the 390 persons with current HCV infection, 348 (89.2%) received their HCV-RNA positive results, 304 (78.0%) were referred to an HCV-care specialist for medical evaluation, and 240 (61.5%) were seen by the specialist (Figure). Of the 390 patients with current HCV infection, 25 (6.4%) began antiviral treatment during the data collection period of this project. The PHMC Care Clinic identified 247 HCV-infected patients and successfully linked 167 (67.6%) to medical care. Among the five FQHCs, the PHMC Care Clinic had the highest rates of linkage to care.

During the course of the project, HCV testing and care for patients at the FQHCs improved, as the result of a change in HCV-RNA test availability and additional system modifications. In March 2013, all commercial laboratories began conducting reflex testing. Before this, testing for HCV-RNA was more cumbersome, requiring a second blood specimen be obtained at the same or at a subsequent visit. In the 5 months before reflex testing was routinely available, only 83.6% of the clinics' patients with positive HCV antibody tests received confirmatory testing. From March through July 2013, early in the transition to reflex testing, this percentage increased to 84.8%. However, by July 2014, as use of the reflex test became more routinely used, the percentage of HCV-antibody-positive patients who received confirmatory testing increased to 96.3%.

Another system modification initiated during the project was a change from provider-initiated testing to medical assistant-initiated testing at the PHMC Care Clinic. At the beginning of the project, a nurse identified and reminded providers (with a chart note) of patients who were eligible for testing and the need to order an HCV test. An EMR prompt to identify Baby Boomers also was in place at this time. However, the process proved time intensive and inefficient: in clinics serving large patient populations with complex needs, chart notes were often overlooked and nurses had many other responsibilities. Medical assistant-initiated HCV testing resulted in a 6.3% increase in testing from an observation period of 11 months before compared with 11 months after implementing this procedural modification.

Beginning in September 2013, through funding from a public-private partnership, annual HIV testing for patients aged ≥13 years was implemented in the health centers, at which time the HCV testing protocol was modified to include HIV testing. Dual testing substantially increased the total number of HCV tests performed. A total of 1,786 HCV tests were performed during the 11-month project period leading up to this modification, whereas from September 2013 through July 2014, a total of 2,728 HCV tests were performed, representing a 52.7% increase.

A final modification that led to improved patient care was the addition of a linkage-to-care coordinator position. This coordinator was responsible for providing intensive services, including contacting patients who did not keep their appointments and addressing any barriers to care (e.g., affordable transportation). Between the 11 months before the addition

TABLE. Number, percentage, and prevalence of patients tested for HCV, and identified as HCV-antibody positive and currently infected*, by demographic characteristics and health centers† — Philadelphia PA, October 2012–July 2014

	HCV-Antibody Tested		HCV-Antibody Positive			Currently Infected§		
Characteristic	**No.**	**(%)**	**No.**	**(%)¶**	**Prevalence** (%)**	**No.**	**(%)††**	**Prevalence§§ (%)**
Sex								
Male	2,522	(55.9)	421	(70.8)	(16.7)	297	(76.2)	(11.8)
Female	1,992	(44.1)	174	(29.2)	(8.7)	93	(23.8)	(4.7)
Race/Ethnicity								
Non-Hispanic Black	2,862	(63.4)	309	(51.9)	(10.8)	209	(53.6)	(7.3)
Non-Hispanic White	545	(12.1)	173	(29.1)	(31.7)	115	(29.5)	(21.1)
Hispanic	724	(16.0)	81	(13.6)	(11.2)	48	(12.3)	(6.6)
Asian	136	(3.0)	5	(0.8)	(3.7)	5	(1.3)	(3.7)
Other	77	(1.7)	2	(0.3)	(2.6)	1	(0.3)	(1.3)
Missing	170	(3.8)	25	(4.2)	(14.7)	12	(3.1)	(7.1)
Birth Year Cohort								
<1945	53	(1.2)	2	(0.3)	(3.8)	2	(0.5)	(3.8)
1945–1965	1,890	(41.9)	366	(61.5)	(19.4)	244	(62.6)	(12.9)
>1965	2,571	(57.0)	227	(38.2)	(8.8)	144	(36.9)	(5.6)
Health Insurance Type								
Uninsured	1,495	(33.1)	126	(21.2)	(8.4)	77	(19.7)	(5.2)
Public Insurance	2,704	(59.9)	433	(72.8)	(16.0)	290	(74.4)	(10.7)
Private Insurance	315	(7.0)	36	(6.1)	(11.4)	23	(5.9)	(7.3)
Health Center								
Care Clinic	1,518	(33.6)	358	(60.2)	(23.6)	247	(63.3)	(16.3)
Mary Howard	1,079	(23.9)	159	(26.7)	(14.7)	108	(27.7)	(10.0)
PHMC Health Connection	837	(18.5)	31	(5.2)	(3.7)	11	(2.8)	(1.3)
Rising Sun	808	(17.9)	24	(4.0)	(3.0)	12	(3.1)	(1.5)
Congreso	272	(6.0)	23	(3.9)	(8.5)	12	(3.1)	(4.4)
Total	**4,514**	**(100)**	**595**	**(100)**	**(13.2)**	**390**	**(100)**	**(8.6)**

Abbreviation: HCV = hepatitis C virus

* Currently infected indicates a diagnosis of chronic infection with HCV based on positive results of HCV-RNA testing.

† Health centers are five federally qualified health centers owned and managed by the Public Health Management Corporation, Philadelphia, PA.

§ 550 (92.4%) of 595 persons with HCV-antibody positive tests received HCV-RNA testing.

¶ Percent positive among those tested.

** Percent positive among those tested in each demographic subgroup and health center.

†† Percent currently infected among those tested.

§§ Percent currently infected among those tested in each demographic subgroup.

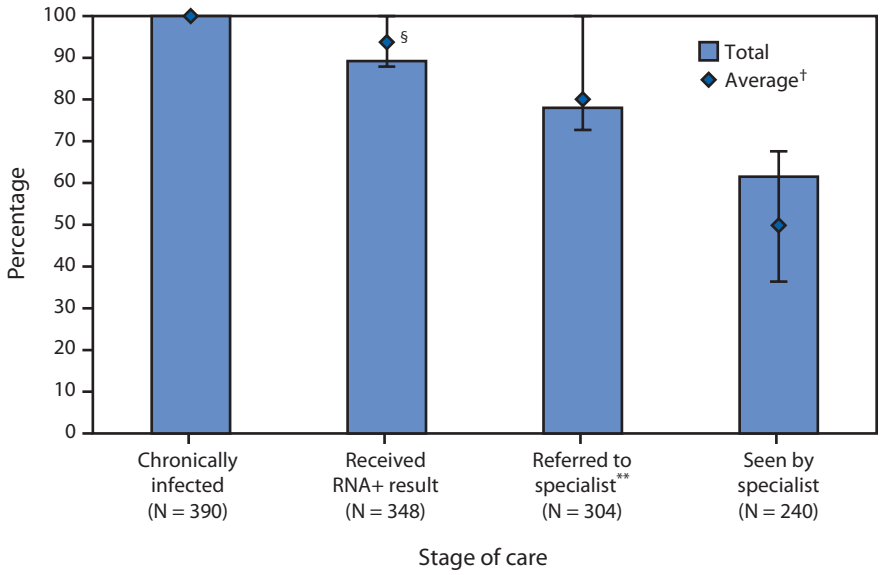
of the position and 11 months afterwards, these services increased the number of HCV-infected patients who received their positive HCV-RNA test results by 67.7% (from 130 to 218 patients); patient referrals by 49.2% (from 122 to 182); and the number of patients seen by an HCV care specialist by 28.6% (from 105 to 135).

Discussion

This project demonstrated that routine HCV testing can be successfully integrated into ambulatory care settings providing services for persons disproportionately affected by HCV infection. The project introduced six practices that could be replicated in other clinical settings. First, it tasked medical assistants with guiding patients through the HCV testing process, relieving the burden on clinicians and other health center staff. Second, reflex HCV testing technology was used to ensure that HCV-antibody positive patients received HCV-RNA testing necessary to detect current HCV infection. Such testing also allowed patients to receive test results and care referrals in one visit. Third, test costs associated with patients without insurance were eliminated as a barrier to testing. Fourth, modifying the HCV testing protocol to include HIV testing led to substantial increases in the number of HCV tests performed and currently infected patients identified (82.6% increase). Because more patients were eligible for HIV testing, the HCV test was easily added to the laboratory requisition.

Fifth, EMR modifications also improved patient care. The EMR prompted testing and the need for linkage-to-care services, all of which were monitored by the project manager and the linkage-to-care coordinator. Weekly reports tracked testing and patient progression through the HCV care continuum. EMR modifications also simplified the payment process for HCV tests performed on uninsured patients. Finally, intensive services carried out by the linkage-to-care coordinator increased the number of currently infected patients who received their results and were referred and seen by a specialist. This effort ensured that more patients received appropriate posttest counseling and medical evaluation for liver health and HCV treatment initiation.

FIGURE. Contiuum of care process for patients with chronic hepatitis C (HCV) infection* treated at five federally qualified health centers (FQHCs)† — Philadelphia, PA, October 2012–July 2014



Abbreviation: RNA+ = Patients whose specimens tested positive for HCV.

* Patients with chronic HCV infection are defined as those who are currently infected with HCV based upon a positive result to HCV-RNA test.

† All five FQHCs are owned and managed by Philadelphia-based Public Health Management Corporation.

§ Error bars are the range of percentages for each stage of care across all five FQHCs.

¶ Average = average of values at all five FQHCs.

** Specialists include primary care providers who were trained to care for patients infected with HCV, as well as hepatologists or gastroenterologists from one of the local academic medical centers.

The project successfully targeted patients at high risk for HCV infection; overall 8.6% of patients were infected with HCV, a higher proportion than previous estimates. Only 1% (0.8%–1.2%) of the general U.S. population is estimated to be infected with HCV (*1*). A geographically targeted community-based testing program also carried out in Philadelphia found that 2.8% of persons were estimated to be living with current HCV infection (*8*). The percentage of patients receiving an HCV-RNA test confirming their current infection status likewise was higher (92% versus 47%) than that reported by the Philadelphia Department of Public Health from routine surveillance of viral hepatitis (*9*). The higher percentage in this project is largely attributable to the use of reflex testing (*10*), which ensures that a greater number of persons are tested for current infection and can learn their infection status without returning to provide a second blood specimen.

A relatively small proportion of HCV-antibody-positive patients (7.6%) did not receive a confirmatory test during the project period. There are several possible reasons for this. Some patients submitted specimens early in the project, before the implementation of reflex testing, and might not have returned for confirmatory HCV-RNA test. Specimens submitted for confirmatory testing might not have met laboratory testing requirements because of insufficient quantity or improper handling. Providers might have inadvertently ordered the hepatitis panel that currently only includes an HCV-antibody test.

Linkage-to-care rates also were higher than those observed in Philadelphia surveillance data (*9*), an outcome likely attributed to creation of the linkage-to-care coordinator position. Initially, linkage services included reminder phone calls, public transportation tokens for patients to attend appointments, or patient escorts. However, some patients were found to require additional services. The linkage-to-care coordinator provided intensive support services: following up with patients who did not keep appointments; conducting off-site (e.g., home, shelters, and halfway houses) visits as necessary; acting as an intermediary point of contact between the patient and the FQHCs; and helping identify and resolve any barriers patients experienced in attending appointments. These services fostered trusting relationships with patients. Additionally, the linkage-to-care coordinator remained a point of contact for HCV-infected patients that had fallen out of care because of addiction, unstable housing, or distrust of health care systems. The linkage-to-care coordinator worked with these patients until they were ready to reengage in care, linked them to social and addiction support programs, and provided specialized care plans to ensure they attended their HCV medical appointments. Similar intensive linkage services in community-based HCV testing and linkage-to-care programs in Philadelphia also have proven successful in navigating HCV-infected patients into care (*8*).

The most successful linkage-to-care rates were seen at the PHMC Care Clinic, where HCV testing, care, and treatment are provided in the same setting. This test-and-treat model eliminates the need to refer patients to an outside care provider, except in extenuating circumstances (e.g., a patient with advanced liver disease or cirrhosis). Because of the high number of HCV-infected patients seen there, the Mary Howard Health Center plans to expand its services to include on-site HCV treatment. Linkage-to-care rates were lowest at health centers serving patients at low risk of HCV infection. Because they served fewer HCV-infected patients, providers at these sites might not be as aware of the HCV linkage-to-care protocol. To increase rates in these settings, HCV protocols will be updated and included in an automated centralized forum accessible by staff for training.

What is already known about this topic?

Hepatitis C virus (HCV) infection is a major cause of chronic liver disease and hepatocellular carcinoma and the leading indication for liver transplantation in the United States. Approximately three million persons in the United States are infected with HCV, and many are unaware of their status and are diagnosed late. As persons disproportionately affected by HCV (e.g., poor, homeless, born during 1945-1965, injection drug users) age, HCV-related morbidity, mortality, and spending are expected to increase.

What is added by this report?

Routine HCV testing and linkage-to-care for persons with current infection were successfully integrated into five federally qualified health centers in Philadelphia, PA. Across the centers, 595 (13.2%) of 4,514 patients tested were HCV-antibody positive and 550 (92.4%) received HCV-RNA testing. Of the 390 (70.9%) with current (chronic) HCV infection, 348 (89.2%) received their results, 304 (78.0%) were referred to and 240 (61.5%) were seen by a provider familiar with HCV care and treatment. This project demonstrated the feasibility of identifying low-income persons living with HCV infection and linking them to care.

What are the implications for public health practice?

In collaboration with public health agencies and other service providers, community health centers are optimally positioned to play a pivotal role in expanding access to recommended HCV testing, care, and treatment for populations disproportionately affected by hepatitis C. Delivering HCV-related care via trusted healthcare professionals, with the addition of embedded and intensive support services, at primary care settings can increase successful outcomes at every stage of the care continuum.

There were two main limitations of this project. The first was its relatively small size. HCV testing and linkage to care were integrated into a small network of health centers and therefore the practices and lessons learned from the project may not be applicable to larger settings, such as a large hospital system, or in other geographic areas. To address this, NNCC is exploring ways to replicate this model in larger health center networks in other cities. Second, the duration of the project did not follow patients through HCV treatment to cure. NNCC is working with offices of local HCV providers to collect data on treatment history and clinical outcomes.

The high rate of HCV infection among persons in disproportionately affected populations, like those seen at the five FQHCs, indicates a need for innovative models that can identify persons with HCV infection and ensure they receive appropriate care. Delivering care via trusted health care professionals at primary care settings can improve outcomes at every stage of the continuum of care, from reflex testing to providing timely test results and linking patients to HCV-focused care. In collaboration with public health agencies and other service providers, community health centers are optimally positioned to play an important role in expanding access to recommended HCV testing, care, and treatment for populations disproportionately affected by hepatitis C.

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Cancer Screening Test Use — United States, 2013

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Regular breast, cervical, and colorectal cancer (CRC) screening with timely and appropriate follow-up and treatment reduces deaths from these cancers. *Healthy People 2020* targets for cancer screening test use have been established, based on the most recent U.S. Preventive Services Task Force (USPSTF) guidelines (*1*). National Health Interview Survey (NHIS) data are used to monitor progress toward the targets. CDC used the 2013 NHIS, the most recent data available, to examine breast, cervical, and CRC screening use. Although some demographic subgroups attained targets, screening use overall was below the targets with no improvements from 2010 to 2013 in breast, cervical, or CRC screening use. Cervical cancer screening declined from 2010 to 2013. Increased efforts are needed to achieve targets and reduce screening disparities.

NHIS is an annual survey of a nationally representative sample of the civilian, noninstitutionalized U.S. population. The Sample Adult file was used, for which one adult was selected randomly from each family to provide information, and the Person and Imputed Income files. The 2013 sample adult response rate was 61.2%. Data from the 2013 NHIS survey (*2*) were used to examine recent breast, cervical, and CRC screening, defined according to USPSTF recommendations: mammography within 2 years among women aged 50–74 years, Papanicolaou (Pap) test within 3 years among women aged 21–65 years without hysterectomy, and either fecal occult blood test (FOBT) within 1 year, sigmoidoscopy within 5 years and FOBT within 3 years, or colonoscopy within 10 years among respondents aged 50–75 years, respectively.* The overall proportions of persons screened were presented as crude percentages and age standardized to the 2000 U.S. standard population. Screening use was compared by sociodemographic and access factors. Insurance includes public or private health care coverage, but excludes Indian Health Service coverage or single service plans (i.e., that pay for only one type of service). *Healthy People 2020* baseline estimates are based on 2008 NHIS data (the most recent data available in 2010 when the targets were set) (*1*). NHIS data from 2000, 2003, 2005, 2008, 2010, and 2013 were used to evaluate changes in screening percentages over time (*2*). Pearson Wald F tests were used to test for any differences across years. All statistics were weighted. Relative standard errors for all 2013 estimates were <30%.

In 2013, after adjusting for age, 72.6% of women aged 50–74 years reported recent mammography (Table 1), below the *Healthy People 2020* target of 81.1% (2008 baseline 73.7%) (*1*). Mammography use was lower among women aged 50–64 compared with 65–74 years, and lower among Hispanics compared with non-Hispanics. Use increased with increasing education and income. College graduates and those with income >400% of the federal poverty threshold met the target. Mammography use was lowest among those lacking insurance (38.5%) or a usual source of care (29.7%). Publicly insured women also were less likely to report screening than privately insured women. Mammography use was stable during 2000–2013 (p = 0.10) (Figure).

Overall, 80.7% of women aged 21–65 years reported a recent Pap test (age-adjusted), below the *Healthy People 2020* target of 93.0% (2008 baseline 84.5%) (*1*). Pap test use was lower for Asians, Hispanics, women aged 51–65 years, and foreign-born women. Uninsured and publicly insured women also were less likely than privately insured women to report screening. Use increased with increasing education and income. Use was lowest among women without a usual source of care (62.1%) or insurance (62.0%). Pap test use declined significantly by 5.5 percentage points from 2000 to 2013 (p<0.001) (Figure).

Overall, after adjusting for age, 58.2% of respondents aged 50–75 years reported recent CRC tests (Table 2), below the *Healthy People 2020* target of 70.5% (2008 baseline 52.1%) (*1*). CRC test use was lower among Asians and all Hispanic subgroups except Puerto Ricans compared with white and non-Hispanic respondents respectively. Use was lower among respondents aged 50–64 years (52.8%) compared with 65–75 years (69.4%) and increased with increasing education and income. Use was slightly lower among men than women (p = 0.047) and lower among foreign-born than U.S.-born respondents. Screening was particularly low among those without a usual source of care (17.8%) or insurance (23.5%). Publicly insured respondents also were less likely to report screening than privately insured respondents. Overall CRC test use increased significantly by 24.6 percentage points from 2000 to 2013 (p<0.001) (Figure). Use increased in every year assessed during 2000–2010, but not in 2013. This was true for men and women.

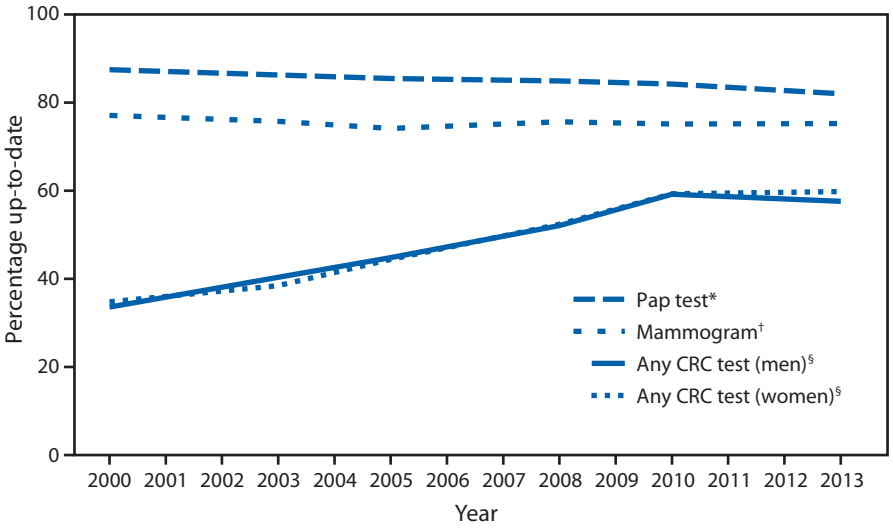
* Available at http://www.uspreventiveservicestaskforce.org.

TABLE 1. Percentage of women who received recent breast and cervical cancer screenings, by selected demographic and access to care characteristics — National Health Interview Survey, United States 2013

	Breast cancer			Cervical cancer		
	Mammogram ≤2 years			Pap test ≤3 years		
Characteristic	**No.**	**%***	**(95% CI)**	**No.**	**%***	**(95% CI)**
Overall						
Crude	7,012	72.5	(71.2–73.9)	11,857	80.5	(79.6–81.5)
Age-adjusted†	7,012	72.6	(71.2–73.9)	11,857	80.7	(79.7–81.6)
Race§		p = 0.996			p<0.001	
White	5,386	72.6	(71.0–74.1)	8,683	81.2	(80.1–82.2)
Black	1,179	72.6	(68.8–76.1)	2,082	82.2	(80.0–84.3)
American Indian/Alaska Native	84	73.4	(60.0–83.5)	145	83.1	(73.8–89.6)
Asian	336	72.0	(66.4–77.0)	851	70.1	(65.8–74.0)
Chinese	66	74.4	(60.4–84.7)	188	64.0	(55.4–71.8)
Filipino	106	67.7	(56.7–77.0)	224	82.9	(76.2–88.0)
Other Asian	164	73.2	(64.2–80.7)	439	66.8	(60.6–72.5)
Ethnicity¶		p = 0.001			p<0.001	
Non–Hispanic	6,135	73.2	(71.7–74.6)	9,420	81.3	(80.2–82.3)
Hispanic	877	66.5	(62.6–70.2)	2437	76.9	(74.7–78.9)
Puerto Rican	112	69.5	(60.2–77.5)	230	82.3	(76.3–87.0)
Mexican	246	63.3	(55.9–70.0)	955	73.9	(70.2–77.3)
Mexican-American	215	71.7	(63.4–78.8)	543	81.1	(76.9–84.6)
Central/South American	141	67.6	(56.9–76.7)	405	76.1	(70.5–80.9)
Other Hispanic	163	60.8	(50.9–69.9)	304	76.7	(70.7–81.8)
Age group (yrs)		p = 0.005			p<0.001	
21–30				3,075	79.9	(77.8–81.8)
31–40				3,118	83.1	(81.3–84.8)
41–50				2,410	82.2	(80.5–83.8)
51–65				3,254	77.6	(75.7–79.4)
50–64	4,619	71.4	(69.7–73.1)			
65–74	2,393	75.3	(73.1–77.3)			
Period of U.S. residence		p<0.001			p<0.001	
U.S.–born	5,875	73.0	(71.4–74.5)	9,247	82.2	(81.2–83.2)
In United States <10yrs	68	40.8	(25.5–58.2)	631	66.0	(61.5–70.1)
In United States ≥10yrs	1,054	71.9	(68.7–74.9)	1,943	76.7	(74.0–79.2)
Education		p<0.001			p<0.001	
Less than high school	1,010	59.8	(55.5–63.9)	1,532	69.8	(66.6–72.7)
High school graduate	1,936	69.1	(66.5–71.6)	2,553	75.1	(72.9–77.2)
Some college/Associate degree	2,169	72.8	(70.4–75.1)	3,787	81.4	(79.7–83.1)
College graduate	1,868	81.2	(78.7–83.6)	3,942	86.6	(85.0–88.0)
% of federal poverty threshold		p<0.001			p<0.001	
<139%	1,617	56.3	(53.2–59.5)	3,487	69.7	(67.7–71.5)
139%–250%	1,347	64.0	(60.4–67.4)	2,328	76.8	(74.4–79.1)
251%–400%	1,471	73.9	(70.8–76.7)	2,348	83.0	(80.8–85.0)
>400%	2,577	81.8	(79.9–83.6)	3,694	87.7	(86.4–88.9)
Usual source of care		p<0.001			p<0.001	
None or hospital emergency department	535	29.7	(25.1–34.7)	1,931	62.1	(59.4–64.7)
Has usual source	6,477	75.7	(74.4–77.0)	9,924	83.9	(82.9–84.8)
Health care coverage		p<0.001			p<0.001	
Private/Military	4,339	79.9	(78.5–81.3)	7,333	86.3	(85.2–87.2)
Public only	1,915	66.4	(63.8–68.9)	2,048	78.8	(76.3–81.1)
Uninsured	742	38.5	(34.2–43.0)	2,434	62.0	(59.5–64.5)

Abbreviations: CI = confidence interval; Pap = Papanicolaou.
* Weighted percentages. Overall percentages presented as crude and age–adjusted estimates. Other percentages are crude estimates.
† Age–standardized to the 2000 U.S. standard population.
§ p-value testing for differences across four primary race groups.
¶ p-value testing for differences between Hispanic and non-Hispanics.

FIGURE. Percentage of adults up-to-date with screening for breast, cervical, and colorectal cancers by test, sex, and year — United States 2000–2013



Abbreviations: CRC = colorectal cancer; Pap = Papanicolaou.
Source: National Health Interview Survey, 2000, 2003, 2005, 2008, 2010, and 2013.
* Among women aged 21–65 years with no previous hysterectomy. Pap test data for 2003 were excluded because hysterectomy status was not ascertained in that year.
† Among women aged 50–74 years.
§ Among persons aged 50–75 years.

Discussion

Progress toward meeting *Healthy People 2020* cancer screening targets was not observed in 2013 compared with 2010. Mammography use remained essentially stable, Pap test use declined, and CRC test use was essentially unchanged. Some subgroups attained or neared 2020 targets. The proportion of women in the highest education and income groups who were screened for breast cancer exceeded the target; the percentage of privately insured women screened was near the target value. The proportion of persons aged 65–75 years who were screened for CRC also was near the target value. Those furthest below targets were generally those without insurance or a usual source of care. For these groups, screening use was 42–53 percentage points below breast and CRC screening targets, and approximately 30 percentage points below the cervical cancer screening target. Reported screening for all three cancers was similar between whites and blacks and lower for Hispanics, with variation among racial and ethnic subgroups.

Those without insurance or usual sources of care have experienced persistent large screening disparities (*3*–*8*). Findings from the 2000 NHIS survey identified these groups as among those least likely to be up-to-date with and experiencing the greatest disparities in breast, cervical, and CRC screening (*7*). Based on 1987 and 1992 NHIS data, Pap test use among women aged ≥25 years was similar to these 2013 findings for those lacking a usual source of care or insurance (58% versus 62% and 65% versus 62%, respectively) (*7*). Moreover, although CRC test use increased from 2000 to 2008 for the uninsured aged 50–64 years and those without a usual source of care, use was low (16%–20%) and 35–40 percentage points lower than other groups (*9*). These 2013 data also show low screening use in these groups with disparities of similar magnitude. Only general comparisons across studies are possible because screening estimates might vary because of differences in samples, survey questions, screening definitions and recommendations over time. This trend analysis used consistent sample and screening definitions.

There are financial and nonfinancial barriers to receiving preventive services. The Affordable Care Act helps reduce financial barriers both by increasing access to insurance and by eliminating cost-sharing for breast, cervical, and CRC screening (among other preventive services) for many insured persons (*10*).† The National Breast and Cervical Cancer Early Detection Program§ and the Colorectal Cancer Control Program¶ reduce barriers by providing free or low-cost screening and linkages to diagnostic services for uninsured and underinsured low-income adults. The Colorectal Cancer Control Program also promotes screening through use of evidence-based interventions and health care system changes.

Efforts are needed to understand why screening percentages are not increasing, and, for Pap tests, are decreasing. In 2012, screening every 5 years with a combination of Pap and human papillomavirus (HPV) tests also was included as a screening option for some women aged 30–65 years. It is unknown whether screening intervals might have been lengthened for some women after the 2012 updated recommendation, and if so, whether this might have contributed to decreased screening use as measured in the 2013 findings. Information about HPV testing was not available. No changes in USPSTF recommendations for breast or CRC screening were made during 2010–2013. For CRC, USPSTF guidelines were updated in 2002 and 2008, and NHIS questions about endoscopy were modified in 2010. To what extent this might have contributed to changes in screening use prior to 2010 is uncertain. The National Colorectal Cancer Roundtable set a goal of 80% screened by 2018.** More than a 20 percentage-point improvement

† Additional information available at http://www.hhs.gov/healthcare/facts/timeline/timeline-text.html.
§ Additional information available at http://www.cdc.gov/cancer/nbccedp/.
¶ Additional information available at http://www.cdc.gov/cancer/crccp/.
** Additional information available at http://nccrt.org/tools/80-percent-by-2018/.

TABLE 2. Percentage of men and women who received recent colorectal cancer screenings, by selected demographic and access to care characteristics — National Health Interview Survey, United States 2013

Characteristic	Colorectal cancer*		
	No.	%†	(95% CI)
Overall			
Crude	13,045	57.8	(56.6–59.0)
Age–adjusted§	13,045	58.2	(57.0–59.3)
Sex		p = 0.047	
Men	5,873	56.7	(55.0–58.3)
Women	7,172	58.9	(57.3–60.5)
Race¶		p = 0.010	
White	10,135	58.4	(57.0–59.7)
Black	2,096	57.9	(54.7–61.0)
American Indian/Alaska Native	149	48.3	(36.4–60.5)
Asian	612	49.5	(44.1–54.9)
Chinese	117	52.2	(42.2–62.1)
Filipino	175	52.2	(43.3–61.0)
Other Asian	320	46.7	(39.3–54.3)
Ethnicity**		p<0.001	
Non–Hispanic	11,495	59.6	(58.4–60.8)
Hispanic	1,550	41.5	(38.3–44.8)
Puerto Rican	194	59.4	(50.5–67.8)
Mexican	490	32.4	(27.3–38.1)
Mexican American	342	49.0	(41.9–56.1)
Central/South American	259	36.9	(30.5–43.8)
Other Hispanic	265	41.2	(33.3–49.5)
Age group (yrs)		p<0.001	
50–64	8,527	52.8	(51.2–54.3)
65–75	4,518	69.4	(67.8–71.0)
Period of U.S. residence		p<0.001	
U.S.–born	10,996	59.9	(58.7–61.2)
In United States <10yrs	136	19.3	(12.3–28.9)
In United States ≥10yrs	1,887	48.3	(45.2–51.4)
Education		p<0.001	
Less than high school	2,008	43.6	(40.6–46.6)
High school graduate	3,573	53.4	(51.3–55.5)
Some college/associate degree	3,823	59.2	(57.1–61.3)
College graduate	3,596	66.7	(64.7–68.6)
% of poverty threshold		p<0.001	
<139%	2,891	44.2	(41.6–46.8)
139%–250%	2,445	52.6	(49.6–55.5)
251%–400%	2,736	56.0	(53.3–58.6)
>400%	4,973	65.6	(63.8–67.4)
Usual source of care		p<0.001	
None or hospital emergency department	1,226	17.8	(15.2–20.8)
Has usual source	11,819	61.5	(60.2–62.7)
Health care coverage		p<0.001	
Private/Military	8,141	63.0	(61.6–64.4)
Public only	3,438	58.7	(56.4–60.9)
Uninsured	1,435	23.5	(20.6–26.6)

Abbreviation: CI = confidence interval.
* Includes fecal occult blood test ≤1 year, flexible sigmoidoscopy ≤5 years and FOBT ≤3 years, or colonoscopy ≤10 years.
† Weighted percentages. Overall percentages presented as crude and age–adjusted estimates. Other percentages are crude estimates.
§ Age-standardized to the 2000 U.S. standard population.
¶ p-value testing for differences across four primary race groups.
** p-value testing for differences between Hispanic and non-Hispanics.

is needed to meet this goal. Colonoscopy is more commonly used than other recommended CRC screening options (*6*). Promotion of all recommended CRC testing options, including less invasive methods like home FOBT might increase use, particularly because the test completed (presumably reflecting patient preferences) varies among subgroups (*6*).

For this report, screening histories were examined only for persons in age groups recommended for routine screening.

However, nearly one fourth of persons aged 51–65 years and 30% of those aged 65–75 years reported no recent cervical cancer and CRC screening, respectively, thus some might reach upper age limits for routine screening without adequate prior screening. Although USPSTF does not recommend routine screening for cervical cancer among average-risk women aged >65 years or for CRC among adults aged 76–85 years,[††] screening might be indicated for some adults in these older groups who were not screened adequately when they were in a younger age group for which routine screening was recommended.

The findings in this report are subject to at least seven limitations. First, NHIS data are self-reported and not verified by medical records. Second, the response rate was 61%, and nonresponse bias is possible despite adjustments for nonresponse. Third, although age-adjusted percentages for screening are presented that are consistent with *Healthy People 2020* targets overall, percentages for subgroups are not age-adjusted. Fourth, Pap test data for 2003 were excluded because hysterectomy status was unknown. Fifth, screening guidelines and NHIS screening questions have changed over time. Sixth, confidence intervals were wide for some subgroups, indicating estimate imprecision. Finally, diagnostic tests rather than screening tests might have been reported by some respondents, possibly leading to overestimates of screening.

Increased efforts are needed to reach *Healthy People 2020* cancer screening targets and reduce disparities. More intensive or focused efforts might be required to overcome persistent barriers among specific population subgroups. Making available all recommended CRC screening options might increase alignment of tests with individual needs and preferences, and facilitate screening completion. Evidence-based interventions can increase screening use. Information about recommended interventions is available for communities and health systems from The Community Guide.[§§] Cancer Control PLANET[¶¶] provides resources for designing and implementing evidence-based programs. Such resources can help communities identify and implement effective interventions appropriate for their needs to increase use of these important services.

[††] Additional information available at http://www.uspreventiveservicestaskforce.org.
[§§] Additional information available at http://www.thecommunityguide.org/.
[¶¶] Additional information available at http://cancercontrolplanet.cancer.gov/.

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What is already known on this topic?

Screening is effective for detecting breast, cervical, and colorectal cancers early when the cancers can be more easily treated and deaths averted. *Healthy People 2020* established targets for breast, cervical, and colorectal cancer screening in the United States. Disparities in screening use related to several demographic and health care access factors have been observed.

What is added by this report?

The most recent data on screening use (from 2013) show no progress toward meeting *Healthy People 2020* targets for cancer screening. Mammography use in women aged 50–74 years was 72.6% (target 81.1%), Pap test use in women aged 21–65 years was 80.7% (target 93.0%), and CRC screening in persons aged 50–75 years was 58.2% (target 70.5%). Compared with 2000, mammography use was unchanged, Pap test use was lower and CRC screening was higher, although unchanged since 2010. Persons without a usual source of care or insurance generally were furthest below *Healthy People 2020* targets.

What are the implications for public health practice?

Progress toward *Healthy People 2020* targets requires efforts to increase breast, cervical and colorectal cancer screening use overall. Evidence-based interventions, such as client and provider reminders and others, can increase screening use.

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Vital Signs: Leading Causes of Death, Prevalence of Diseases and Risk Factors, and Use of Health Services Among Hispanics in the United States — 2009–2013

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Abstract

Background: Hispanics and Latinos (Hispanics) are estimated to represent 17.7% of the U.S. population. Published national health estimates stratified by Hispanic origin and nativity are lacking.

Methods: Four national data sets were analyzed to compare Hispanics overall, non-Hispanic whites (whites), and Hispanic country/region of origin subgroups (Hispanic origin subgroups) for leading causes of death, prevalence of diseases and associated risk factors, and use of health services. Analyses were generally restricted to ages 18–64 years and were further stratified when possible by sex and nativity.

Results: Hispanics were on average nearly 15 years younger than whites; they were more likely to live below the poverty line and not to have completed high school. Hispanics showed a 24% lower all-cause death rate and lower death rates for nine of the 15 leading causes of death, but higher death rates from diabetes (51% higher), chronic liver disease and cirrhosis (48%), essential hypertension and hypertensive renal disease (8%), and homicide (96%) and higher prevalence of diabetes (133%) and obesity (23%) compared with whites. In all, 41.5% of Hispanics lacked health insurance (15.1% of whites), and 15.5% of Hispanics reported delay or nonreceipt of needed medical care because of cost concerns (13.6% of whites). Among Hispanics, self-reported smoking prevalences varied by Hispanic origin and by sex. U.S.-born Hispanics had higher prevalences of obesity, hypertension, smoking, heart disease, and cancer than foreign-born Hispanics: 30% higher, 40%, 72%, 89%, and 93%, respectively.

Conclusion: Hispanics had better health outcomes than whites for most analyzed health factors, despite facing worse socioeconomic barriers, but they had much higher death rates from diabetes, chronic liver disease/cirrhosis, and homicide, and a higher prevalence of obesity. There were substantial differences among Hispanics by origin, nativity, and sex.

Implications for Public Health: Differences by origin, nativity, and sex are important considerations when targeting health programs to specific audiences. Increasing the proportions of Hispanics with health insurance and a medical home (patient-centered, team-based, comprehensive, coordinated health care with enhanced access) is critical. A feasible and systematic data collection strategy is needed to reflect health diversity among Hispanic origin subgroups, including by nativity.

Introduction

The Hispanic and Latino (Hispanic)* proportion of the population of the United States is projected to increase from 17.7% (56,754,000) in 2015 to 22.8% (84,543,000) by 2035. Hispanics are the largest racial/ethnic minority population in the United States (*1*). Recent longitudinal data from a seminal study showed important differences in several key health indicators among Hispanics by country or region of origin† subgroups (Hispanic origin subgroups) in four U.S. cities, including prevalence of coronary heart disease, obesity, chronic obstructive pulmonary disease, asthma, and current cigarette smoking (*2*). In addition, Hispanic life expectancy has been found to be higher for foreign-born Hispanics compared with U.S.-born Hispanics, suggesting that nativity (country of birth)

* According to the U.S. Office of Management and Budget, "Hispanic or Latino" refers to a "person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race. Hispanic origin can be viewed as the heritage, nationality group, lineage, or country of birth of the person or the person's parents or ancestors before their arrival in the United States."

† Hispanic origin here refers to self-reported Hispanic ethnic/cultural heritage, regardless of race(s) or place of birth. For example, in this analysis, "Mexicans" refers to persons who trace their cultural roots to Mexico, but who were not necessarily born in Mexico.

plays an important role in Hispanic health (*3*). However, published national health estimates stratified by Hispanic origin subgroup and nativity are lacking. The analysis presented in this report used recent mortality and nationally representative health surveillance data to compare death rates for leading causes of death and the prevalences of selected chronic diseases, key risk factors, and health care-related factors among Hispanics, non-Hispanic whites (whites), and Hispanic origin subgroups by nativity and sex to facilitate identification of subpopulations at greatest need of public health interventions.

Methods

Sociodemographic variables; age-adjusted death rates for the leading causes of death (as ranked for Hispanics overall); prevalences of selected chronic diseases and risk factors; and health insurance status and use of selected health care and preventive services were examined. Analyses were stratified by Hispanics compared with whites, nativity[§] (U.S.-born versus foreign-born), and sex. When possible, analyses also were stratified by Hispanic origin subgroups (e.g., Mexicans, Puerto Ricans, and Cubans).

Selected sociodemographic variables and median age were examined using self-reported data from the 2013 American Community Survey (ACS)[¶] (all ages, unless otherwise specified) (*4*).

National Vital Statistics System 2013 mortality data (all ages, 50 states and District of Columbia) were used to determine the leading 15 causes of death for Hispanics and whites, and age-adjusted death rates were calculated for the 15 Hispanic leading causes of death for the following groups: whites, Hispanics, and Hispanic origin subgroups, using methods previously described (*5*–*7*). Mortality data for Hispanics from Central America and South America were pooled into a single Central/South American category as some states did when reporting their data to CDC. Death rates for some Hispanic origin subgroups are not reported because of unstable estimates. Corrections were made for both misreporting of race/ethnicity on death certificates and missing data on age. Death rates were adjusted to account for racial/ethnic misclassification using the racial/ethnic-specific and sex-specific classification ratios that CDC derived from the National Longitudinal Mortality Study. Methods for adjustment have been previously described (*6*).

Data from the National Health Interview Survey (NHIS[**]) for the period 2009–2013 were used to analyze self-reported disease prevalence for cancer and heart disease, delay and/or nonreceipt of needed health services because of cost, and current cigarette smoking. To examine receipt of recommended cancer screening tests, data were combined from NHIS for 2010 and 2013, the 2 most recent years of available data, and included colorectal tests or procedures, mammograms, and Papanicolaou tests (for women with an intact cervix). Health insurance status was analyzed using NHIS data for the period 2011–2013 (*8*).

Data from the National Health and Nutrition Examination Survey (NHANES[††]) for the period 2009–2012 were used to analyze diabetes prevalence (diagnosed and undiagnosed) and the following selected risk factors for heart disease, cancer, and/or diabetes: hypertension, uncontrolled hypertension (among hypertensives), high total cholesterol, and obesity. NHANES data do not include Hispanic origin subgroups other than Mexicans, the only subgroup oversampled.

For NHIS and NHANES data, all variables and age ranges (adults aged 18–64 years except where indicated) are defined in the footnotes of the accompanying tables. The focus on ages 18–64 years, rather than all adults, was driven by the aim to provide data on those adults who could receive the most benefit from early intervention.

In addition, 95% confidence intervals (CIs) were calculated and, in making comparisons, nonoverlapping CIs (a conservative test for statistical significance at alpha = 0.05) were considered indicative of a statistically significant difference. Percentage differences were calculated by dividing the rate or prevalence of interest by the comparison rate (or prevalence), subtracting 1.0, and multiplying by 100%.

Results

In 2013, Mexicans, Puerto Ricans, and Central Americans together comprised 82.4% of all Hispanics living in the U.S. (64%, 9.5%, and 8.9%, respectively). Hispanics were on

[§] The definitions of "U.S.-born" and "foreign-born" differ slightly for the two major national health surveys used in this report (the National Health Interview Survey [NHIS] and the National Health and Nutrition Examination Survey [NHANES]). In NHIS, "U.S. born" refers to persons born in the 50 states, District of Columbia or U.S territories and includes children born outside the United States to U.S parents. In NHANES, "U.S.-born" refers to persons born in the 50 states or District of Columbia. In NHIS, "foreign born" refers to persons born outside the United States or its territories (except children of U.S. citizens), regardless of current citizenship. In NHANES, "foreign-born" refers to all persons born outside the United States, regardless of current citizenship.

[¶] The American Community Survey is "an ongoing survey conducted by the U.S. Census Bureau" that "uses a series of monthly samples to produce annually updated estimates for the census tracts and block groups formerly surveyed via the decennial census long-form sample." This provides "communities the current information they need to plan investments and services." Additional information available at http://www.census.gov/acs/www.

[**] NHIS is a survey of a representative sample of the civilian, noninstitutionalized U.S. household population. Only data from Hispanic origin groups having estimates with a relative standard error ≤30% are reported.

[††] NHANES is "a program of studies designed to assess the health and nutritional status of adults and children in the United States." "The survey is unique in that it combines interviews and physical examinations. The sample for the survey is selected to represent the U.S. population of all ages." Additional information available at http://www.cdc.gov/nchs/nhanes/about_nhanes.htm.

average nearly 15 years younger than whites and were twice as likely to live below the poverty line, four times as likely not to have completed high school, and 20 times as likely not to speak English proficiently. (Table 1).

The overall Hispanic all-cause mortality rate was 24% lower than for whites, and Hispanics overall had lower death rates than whites for most leading causes of death (Table 2); notably, this included the two leading causes of death: cancer (-28%) and heart disease (-25%). However, death rates were substantially higher for Hispanics than whites for diabetes (+51%), "chronic liver disease and cirrhosis" (+48%), and homicide (+96%); elevated for "essential hypertension and hypertensive renal disease" (+8%); and similar for "nephritis, nephrotic syndrome, and nephrosis" and "certain conditions originating in the perinatal period."

Hispanics and whites shared 13 of the 15 leading causes of death (Table 2); homicide and certain conditions originating in the perinatal period were leading causes for Hispanics but not for whites, and "pneumonitis due to solids/liquids" and Parkinson's disease were leading causes for whites but not for Hispanics. Two out of five deaths (41%) among Hispanics were the result of cancer and cardiovascular disease.

Hispanics had a 49% lower self-reported prevalence of cancer, a 35% lower prevalence of self-reported heart disease, and 133% higher prevalence of diabetes, compared with whites (Table 3). As for risk factors examined, Hispanics less often reported that they smoked, compared with whites (-43%). Hispanics showed a higher prevalence of obesity (+23%) (Table 4) but showed no significant differences for hypertension, uncontrolled hypertension, or high cholesterol. Hispanics were 28% less likely than whites to have had screening tests for colorectal cancer (Table 5). Hispanic women were less likely than whites to have received recommended screening for breast cancer (mammogram) and cervical cancer (Papanicolaou test); these differences were statistically significant but not as pronounced as for colorectal cancer screening (-7% for both) (Table 5). In all, 41.5% of Hispanics lacked health insurance (15.1% of whites), and 15.5% of Hispanics reported delay or nonreceipt of needed medical care because of cost concerns (13.6% of whites) (Table 5).

Stratification by Hispanic origin, sex, and nativity revealed variation in estimates for examined factors (Tables 2–5). For example, self-reported smoking prevalences varied by Hispanic origin as follows: 21.6% (Puerto Ricans), 18.2% (Cubans), 13.0% (Mexicans), and 9.2% (Central/South Americans) (Table 4). The prevalence among Puerto Ricans was similar to that of whites (23.8%) and Cubans. Smoking prevalence among Puerto Ricans was 66% greater than among Mexicans. Smoking prevalence varied significantly among Hispanics by sex: 8.9% among women and 17.7% among men. U.S.-born and foreign-born Hispanics showed significantly different smoking prevalences of 17.7% and 10.3%, respectively.

Compared with whites, Mexicans and Puerto Ricans showed 80% greater death rates for diabetes; Mexicans had an 80% greater death rate for chronic liver disease/cirrhosis (Table 2). Puerto Ricans had nearly twice the prevalences of self-reported cancer (+84%) and heart disease (+87%) compared with Mexicans (Table 3). As for differences by sex, although Hispanics overall had hypertension at a prevalence similar to that of whites, hypertensive Hispanic men were 48% more likely than hypertensive Hispanic women to have uncontrolled blood pressure (Table 4). Considering Hispanic origin and sex simultaneously, colorectal cancer screening varied by origin, and women were more likely to be screened (e.g., Cuban men 29%, Cuban women 49%, Puerto Rican men 54%, and Puerto Rican women 61%) (Table 5).

Key Points

- About one in six persons living in the United States are Hispanic or Latino ("Hispanic"). Hispanics on average have lower English proficiency, fewer years of formal education, and higher rates of being uninsured compared with whites.
- Hispanics are not all alike. Country of birth and cultural heritage can make a difference in health behaviors and outcomes.
- Like whites, Hispanics most frequently die from heart disease or cancer. Although Hispanics have lower death rates than whites for nine of the 15 leading causes of death, Hispanic death rates for diabetes and chronic liver disease including cirrhosis are higher by about 50%.
- Ways to improve the health of Hispanics include engaging lay community health workers ("promotores de salud") to guide persons to needed care by doctors and nurses. Having a medical home, which provides patient-centered, team-based, comprehensive, coordinated health care with enhanced access, is critical. Health education materials need to be written in Spanish and English using culturally appropriate language and situations.
- Additional information is available at http://www.cdc.gov/vitalsigns.

TABLE 1. Selected sociodemographic characteristics of the U.S. population, by nativity, race/ethnicity, and Hispanic/Latino subpopulation — American Community Survey, United States, 2013

Characteristic	Population	% of Hispanic/ Latino population	Median age (yrs)	(95% CI)	% with less than a high school diploma*	(95% CI)	% with language other than English spoken at home	(95% CI)	% who speak English less than "very well"	(95% CI)	% living below the poverty line	(95% CI)	% unemployed†	(95% CI)
U.S. population	**316,128,839**		**37.5**	**(37.4–37.6)**	**13.4**	**(13.3–13.5)**	**20.8**	**(20.7–20.9)**	**8.5**	**(8.4–8.6)**	**15.8**	**(15.7–15.9)**	**5.3**	**(5.2–5.4)**
U.S.-born§	274,780,773		35.9	(35.8–36.0)	10.1	(10.0–10.2)	10.7	(10.6–10.8)	1.8	(1.7–1.9)	15.4	(15.3–15.5)	5.4	(5.3–5.5)
Foreign-born¶	41,348,066		43.1	(43.0–43.2)	30.3	(30.1–30.5)	84.0	(83.9–84.1)	49.7	(49.5–49.9)	18.7	(18.6–18.8)	5.0	(4.9–5.1)
White, non-Hispanic	197,392,411		42.8	(42.7–42.9)	8.3	(8.2–8.4)	5.4	(5.3–5.5)	1.6	(1.5–1.7)	11.1	(11.0–11.2)	4.3	(4.2–4.4)
Hispanic/ Latino**	53,986,412	100.0	28.0	(27.9–28.1)	35.3	(35.1–35.5)	73.7	(73.5–73.9)	32.3	(32.1–32.5)	24.8	(24.6–25.0)	6.7	(6.6–6.8)
Hispanic/Latino subpopulation														
Mexican	34,586,088	64.1	26.2	(26.1–26.3)	40.9	(40.6–41.2)	73.7	(73.4–74.0)	32.3	(32.1–32.5)	26.2	(25.9–26.5)	6.6	(6.5–6.7)
Puerto Rican	5,138,109	9.5	28.9	(28.7–29.1)	22.6	(22.1–23.1)	61.9	(61.3–62.5)	17.4	(17.0–17.8)	26.2	(25.6–26.8)	8.0	(7.7–8.3)
Cuban	2,013,155	3.7	40.6	(40.4–40.8)	21.0	(20.3–21.7)	79.4	(78.7–80.1)	39.6	(38.8–40.4)	20.0	(19.1–20.9)	6.0	(5.7–6.3)
Dominican	1,757,961	3.3	29.0	(28.6–29.4)	31.6	(30.6–32.6)	88.6	(88.1–89.1)	42.2	(41.3–43.1)	28.3	(27.0–29.6)	8.7	(8.2–9.2)
Central American	4,802,410	8.9	29.8	(29.6–30.0)	44.9	(44.2–45.6)	87.2	(86.8–87.6)	48.7	(48.2–49.2)	23.3	(22.6–24.0)	6.5	(6.3–6.7)
South American	3,260,031	6.0	34.5	(34.2–34.8)	14.9	(14.3–15.5)	83.6	(83.2–84.0)	36.3	(35.7–36.9)	14.9	(14.3–15.5)	5.7	(5.4–6.0)

Source: U.S. Census Bureau, American FactFinder, available at http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml. Based on data from the American Community Survey for the United States, not including Puerto Rico.
Abbreviation: CI = confidence interval.
* Among those aged ≥25 years.
† Among those aged ≥16 years.
§ Persons born in the 50 states, District of Columbia, or U.S. territories and includes children born outside the United States to U.S. citizens.
¶ Foreign-born refers to persons born outside the United States or its territories (except for children of U.S. citizens), regardless of current citizenship.
** Persons of Hispanic/Latino ethnicity can be of any race or combination of races.

In most instances U.S.-born Hispanics had higher prevalences of risk factors and worse health outcomes than foreign-born Hispanics. U.S.-born Hispanics had a greater prevalence of obesity, hypertension, smoking, heart disease, and cancer than foreign-born Hispanics: 30%, 40%, 72%, 89%, and 93% respectively (Tables 3–4). However, prevalence of high total cholesterol was 45% greater among foreign-born than U.S.-born Hispanics (Table 4). Delay in or not getting medical attention or prescriptions because of cost considerations was similar among foreign-born and U.S.-born Hispanics (Table 5).

Conclusions and Comment

Compared with whites, Hispanics living in the United States overall had lower death rates for most leading causes of death and lower prevalences of self-reported cancer, heart disease, and current smoking. Hispanics had higher death rates from diabetes, chronic liver disease and cirrhosis, homicide, and essential hypertension and hypertensive renal disease, and they had higher prevalences of obesity and uncontrolled hypertension. They also had decreased access to health care and some preventive care services.

The findings in this report are consistent with previous reports that use the term "Hispanic paradox" (*9*) to describe Hispanics' projected longer life expectancy (by an estimated 2 years) (*10*) and lower overall mortality, despite potential barriers to good health such as higher rates of being uninsured and worse profiles for some social determinants of health. Social determinants of health are conditions "in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks" (*11*). Health care has been found to have a substantially lower impact on premature death compared with behavioral factors (*12*). Lower smoking rates among Hispanics, immigration of healthy immigrants, reverse migration of more ill or elderly immigrants, and higher levels of family support might help to explain this mortality advantage for some Hispanic origin groups (*3*,*9*). In addition, being born in the United States and increasing length of time since arrival in the United States are associated with many risk factors and poor health outcomes (*13*). This also is reflected in the overall poor health status of the United States compared with other developed nations (*12*).

The present findings, including the similarity of smoking rates among Puerto Ricans and whites (which contrasts with the pattern of lower smoking among Hispanics overall), illustrate the necessity of explicitly considering Hispanic origin subgroup as well as nativity and sex in surveillance and research, including research to better understand the Hispanic paradox and studies of how to intervene to maximize Hispanic health.

TABLE 2. Leading causes of death* for Hispanics/Latinos and associated death rates† for the U.S. population, non-Hispanic whites, Hispanics/Latinos, and Hispanic/Latino subpopulations — United States, 2013

	Race/Ethnicity¶						Hispanic/Latino subpopulation**					
	U.S. population		Whites, non-Hispanic		Hispanic/Latino		Mexicans		Puerto Ricans		Cubans	
Leading causes of death (ranked by death counts)§	Mean (per 100,000)	(95% CI)	Mean (per 100,000)	(95% CI)	Mean (per 100,000)	(95% CI)	Mean (per 100,000)	(95% CI)	Mean (per 100,000)	(95% CI)	Mean (per 100,000)	(95% CI)
All causes	**736.2**	**(735.7–736.8)**	**746.5**	**(745.9–747.1)**	**566.6**	**(564.9–568.2)**	**588.1**	**(585.7–590.5)**	**703.9**	**(698.1–709.6)**	**580.5**	**(575.1–585.9)**
1. Malignant neoplasms (2)	166.3	(166.0–166.5)	169.7	(169.4–170.0)	122.2	(121.4–122.9)	123.8	(122.7–124.8)	140.8	(138.3–143.3)	130.7	(128.1–133.3)
2. Diseases of the heart (1)	171.5	(171.2–171.7)	172.7	(172.4 173.0)	128.7	(127.9–129.6)	129.2	(128.1–130.4)	171.5	(168.5–174.4)	153.9	(151.2–156.7)
3. Unintentional injuries (4)	39.3	(39.2–39.4)	43.9	(43.7–44.0)	28.0	(27.6–28.3)	28.7	(28.2–29.1)	32.9	(31.9–34.0)	22.6	(21.5–23.8)
4. Cerebrovascular diseases (5)	37.0	(36.9–37.2)	35.7	(35.6–35.8)	31.7	(31.3–32.1)	35.5	(34.9–36.1)	33.3	(32.0–34.6)	28.3	(27.1–29.4)
5. Diabetes mellitus (7)	21.4	(21.3–21.5)	18.7	(18.6–18.8)	28.3	(27.9–28.6)	33.8	(33.2–34.4)	33.7	(32.4–34.9)	19.6	(18.6–20.6)
6. Chronic liver disease and cirrhosis (12)	10.0	(9.9–10.0)	10.0	(9.9–10.0)	14.8	(14.6–15.1)	18.1	(17.7–18.4)	14.1	(13.4–14.8)	6.5	(5.9–7.1)
7. Chronic lower respiratory diseases (3)	42.0	(41.9–42.1)	46.7	(46.5–46.8)	19.7	(19.4–20.0)	18.3	(17.8–18.7)	26.9	(25.7–28.0)	28.0	(26.8–29.2)
8. Alzheimer's disease (6)	24.0	(23.9–24.1)	25.3	(25.2–25.4)	18.5	(18.2–18.8)	20.3	(19.8–20.8)	22.2	(21.1–23.4)	19.2	(18.3–20.2)
9. Influenza and pneumonia (8)	15.4	(15.3–15.5)	15.3	(15.2–15.4)	13.6	(13.4–13.9)	14.5	(14.1–14.9)	19.7	(18.7–20.7)	9.5	(8.9–10.2)
10. Nephritis/Nephrotic syndrome and nephrosis (10)	13.3	(13.2–13.3)	12.0	(12.0–12.1)	11.8	(11.5–12.0)	13.5	(13.2–13.9)	13.1	(12.3–13.9)	10.2	(9.5–10.9)
11.Suicide (9)	12.5	(12.4–12.6)	15.6	(15.5–15.7)	6.0	(5.9–6.2)	5.5	(5.3–5.6)	6.9	(6.4–7.3)	8.9	(8.2–9.7)
12. Homicide (–††)	5.3	(5.3–5.4)	2.6	(2.5–2.6)	5.1	(4.9–5.2)	5.2	(5.0–5.3)	6.5	(6.1–6.9)	4.3	(3.7–4.8)
13. Septicemia (11)	10.5	(10.5–10.6)	10.0	(9.9–10.0)	8.7	(8.5–8.9)	9.6	(9.3–9.9)	11.5	(10.8–12.3)	8.0	(7.3–8.6)
14. Certain conditions originating during the perinatal period (–§§)	4.3	(4.2-4.3)	3.4	(3.3-3.4)	3.5	(3.4-3.5)	3.7	(3.6-3.8)	4.6	(4.3-4.9)	2.1	(1.7-2.5)
15. Essential hypertension and hypertensive renal disease (14)	8.3	(8.2–8.4)	7.4	(7.3–7.4)	8.0	(7.8–8.2)	9.2	(8.9–9.5)	8.9	(8.2–9.6)	6.2	(5.6–6.7)

Source: Vital Statistic Cooperative Program.
Abbreviation: CI = confidence interval.
* Mortality statistics are based on information from all death certificates filed in the 50 states the District of Columbia and provided to the National Center for Health Statistics (NCHS) through the Vital Statistics Cooperative Program. Only causes of death previously defined for ranking purposes by NCHS were ranked (additional information available at http://www.ncbi.nlm.nih.gov/pubmed/24364902). Rankings were based on unadjusted numbers of deaths (not shown in this table) for 2013, not on age-adjusted death rates.
† Age-adjusted rates and 95% confidence intervals were calculated based on average numbers of deaths occurring during 2011–2013. Numbers of persons in the population were based on estimates from the American Community Survey for 2012. The rates were adjusted to account for missing age and racial/ethnic misclassification using the racial/ethnic-specific and sex-specific classification ratios that NCHS derived from the National Longitudinal Mortality Study. Detailed methods for adjustment have been previously described in an NCHS report, available at http://www.cdc.gov/nchs/data/series/sr_02/sr02_148.pdf.
§ Presented in rank order for Hispanics/Latinos, with rank order for all non-Hispanic whites in parentheses for populations overall.
¶ Persons of Hispanic/Latino ethnicity can be of any race or combination of races.
** Because of instability caused by small numbers and the inability to uniquely identify Dominicans, Central Americans, South Americans, and other Hispanics/Latinos in some states, age-adjusted death rates could not be calculated for these Hispanic/Latino subpopulations. Because rates were based on adjusted numbers and were aggregated across the racial/ethnic groups, age-adjusted death rates reported in this analysis might not exactly match age-adjusted death rates calculated by NCHS for this same period.
†† The 13th leading cause of death for non-Hispanic whites (not shown in this table) is Parkinson's disease.
§§ The 15th leading cause of death for non-Hispanic whites (not shown in this table) is pneumonitis attributable to solids or liquids.

Of note, U.S. Hispanics are on average nearly 15 years younger than whites, so early intervention might have a broader impact on Hispanics in preventing chronic diseases that can manifest decades later. Compared with white students, Hispanic students report similar overall tobacco use rates and use of cigarettes and cigars in the past 30 days, and Hispanic middle schoolers report prevalences of 30-day e-cigarette use and hookah use that are two times and four times as high, respectively, as those of white middle school students (*14*). The health advantages resulting from lower smoking prevalence observed among Hispanics overall might be diminished without timely, culturally, linguistically, and age-appropriate tobacco prevention and cessation interventions for Hispanic youths.

This analysis shows some health disparities affecting Hispanics, including higher diabetes and obesity prevalence and higher death rates related to diabetes and chronic liver disease/cirrhosis compared with whites. In 2013, Hispanics were also shown to have higher proportions than whites of deaths from malignant neoplasms of the liver and intrahepatic bile ducts (1.8% versus 0.8%), and viral hepatitis (0.8% versus 0.3) (*15*). In both Hispanics and whites, deaths attributed to chronic liver disease and cirrhosis were almost equally divided between alcohol and non-alcohol related (*15*). Hispanics were recently shown to have

TABLE 3. Annualized, age-adjusted prevalence of self-reported cancer, self-reported heart disease, and total diabetes among adults aged 18–64 years, by sex, race/ethnicity, Hispanic/Latino subpopulation, and nativity — United States, National Health and Nutrition Examination Survey (NHANES) 2009–2012,* and National Health Interview Survey (NHIS), 2009–2013†

		Cancer§		Heart disease¶		Diabetes**	
Characteristic	**Population/Group**	**Prevalence (%)**	**(95% CI)**	**Prevalence (%)**	**(95% CI)**	**Prevalence (%)**	**(95% CI)**
U.S. population	Overall	3.4	(3.3–3.5)	7.0	(6.8–7.1)	8.1	(6.8–9.6)
	Males	2.2	(2.1–2.4)	7.3	(7.0–7.6)	9.2	(7.2–11.6)
	Females	4.4	(4.3–4.6)	6.6	(6.4–6.9)	7.0	(5.8–8.5)
	U.S.-born††	3.7	(3.5–3.8)	7.6	(7.4–7.8)		
	Foreign-born§§	1.7	(1.5–2.0)	3.7	(3.4–4.0)		
White, non-Hispanic	Overall	3.9	(3.7–4.1)	7.5	(7.2–7.7)	6.0	(4.6–7.8)
	Males	2.6	(2.4–2.8)	7.9	(7.6–8.3)	7.3	(5.0–10.5)
	Females	5.2	(4.9–5.4)	7.1	(6.8–7.4)	4.8	(3.4–6.6)
	U.S.-born	3.9	(3.8–4.1)	7.6	(7.3–7.8)		
	Foreign-born	3.0	(2.4–3.9)	5.0	(4.2–6.1)		
Hispanic/Latino¶¶	Overall	2.0	(1.8–2.2)	4.9	(4.6–5.3)	14.0	(11.8–16.5)
	Males	0.9	(0.8–1.2)	4.9	(4.4–5.4)	16.0	(13.5–19.0)
	Females	3.1	(2.7–3.5)	5.0	(4.6–5.5)	12.0	(9.0–15.8)
	U.S.-born	2.7	(2.4–3.1)	6.8	(6.3–7.5)	13.3	(10.1–17.4)
	Foreign-born	1.4	(1.2–1.7)	3.6	(3.2–4.0)	14.0	(11.2–17.5)
Mexican	Overall	1.9	(1.6–2.2)	4.7	(4.2–5.1)	15.3	(12.6–18.6)
	Males	0.7	(0.5–0.9)	4.6	(4.0–5.2)	17.9	(14.5–21.9)
	Females	3.2	(2.7–3.7)	4.8	(4.2–5.5)	12.7	(8.8–18.2)
	U.S.-born	2.5	(2.1–3.1)	6.0	(5.4–6.8)	13.3	(9.5–18.4)
	Foreign-born	1.4	(1.1–1.8)	3.6	(3.1–4.2)	16.3	(12.3–21.3)
Puerto Rican	Overall	3.5	(2.7–4.5)	8.8	(7.5–10.3)		
	Males	1.9	(1.2–3.2)	9.1	(7.1–11.6)		
	Females	4.9	(3.6–6.6)	8.4	(6.7–10.4)		
	U.S.-born	3.4	(2.6–4.4)	8.9	(7.6–10.5)		
	Foreign-born	—***	—***	—	—		
Cuban	Overall	1.5	(0.9–2.5)	4.7	(3.4–6.4)		
	Males	—***	—***	5.3	(3.5–8.0)		
	Females	—***	—***	4.1	(2.5–6.9)		
	U.S.-born	—***	—***	7.2	(4.4–11.6)		
	Foreign-born	—***	—***	3.6	(2.3–5.5)		
Central American or South American	Overall	1.4	(1.1–1.9)	3.1	(2.6–3.8)		
	Males	—***	—***	3.4	(2.5–4.7)		
	Females	2.2	(1.6–3.0)	2.9	(2.2–3.8)		
	U.S.-born	—***	—***	—***	—		
	Foreign-born	1.4	(1.0–1.8)	3	(2.4–3.7)		

Abbreviation: CI = confidence interval.

* Data from NHIS are age-adjusted to the 2000 U.S. standard population for ages 18–64 years using age groups 18–44, 45–54, and 55–64 years. All estimates are age-adjusted unless otherwise noted. In NHIS, estimates are based on household interviews of a sample of the noninstitutionalized civilian adult population. Unknowns for the columns were not included in the denominators when calculating percentages. Percentages might not add to totals because of rounding. "All adults" includes other races not shown separately.

† Data from NHANES are age-standardized by the direct method to the year 2000 U.S. Census population estimates using age groups 18–24, 25–44, and 45–64 years. In NHANES, estimates are for the noninstitutionalized resident population. "All adults" includes persons of other, non-Hispanic races not shown separately, including non-Hispanic multiracial. Hispanics/Latinos include Mexican-Americans and other Hispanics/Latinos not shown separately.

§ Cancer is based on self-reported responses to questions about whether respondents had ever been told by a doctor or other health professional that they had cancer or a malignancy of any kind. Excludes squamous cell and basal cell carcinomas.

¶ Heart disease is based on responses to questions about whether respondents had ever been told by a doctor or other health professional that they had coronary heart disease, angina (angina pectoris), a heart attack (myocardial infarction), or any other kind of heart disease or heart condition.

** Total diabetes (physician-diagnosed and undiagnosed diabetes). Physician-diagnosed diabetes was obtained by self-report and excludes women who reported having diabetes only during pregnancy. Undiagnosed diabetes is defined as a fasting plasma glucose ≥126 mg/dL or a hemoglobin A1c ≥6.5% and no reported physician diagnosis. Respondents had fasted for ≥8 hours and <24 hours.

†† The definition of "U.S.-born" differs slightly for NHIS and NHANES. In NHIS, "U.S.-born" refers to persons born in the 50 states, District of Columbia, or U.S territories and includes children born outside the United States to U.S citizens. In NHANES, "U.S.-born" refers to persons born in the 50 states or District of Columbia.

§§ The definition of "foreign-born" differs slightly for NHIS and NHANES. In NHIS, "foreign-born" refers to persons born outside the United States or its territories (except for children of U.S. citizens), regardless of current citizenship. In NHANES, "foreign-born" refers to persons born outside the United States, regardless of current citizenship.

¶¶ Persons of Hispanic/Latino ethnicity can be of any race or combination of races.

*** Estimate has a relative standard error >30%.

TABLE 4. Prevalence of disease risk factors among adults aged 18–64 years, by sex, race/ethnicity, Hispanic/Latino subpopulation, and nativity — United States, National Health and Nutrition Examination Survey (NHANES) 2009–2012,* and National Health Interview Survey (NHIS), 2009–2013†

Race/Ethnicity and Hispanic subpopulation	Population/ Group	Cigarette smoking§ NHIS (2009–2013) Prevalence (%)	(95% CI)	Hypertension¶ NHANES (2009–2012) Prevalence (%)	(95% CI)	Uncontrolled hypertension** NHANES (2009–2012) Prevalence (%)	(95% CI)	Obesity†† NHANES (2009–2012) Prevalence (%)	(95% CI)	Total high cholesterol§§ NHANES (2009–2012) Prevalence (%)	(95% CI)
U.S. population	Overall	21.1	(20.7–21.5)	20.5	(19.4–21.6)	57.7	(52.7–62.5)	34.5	(32.8–36.3)	12.4	(11.4–13.4)
	Males	23.7	(23.1–24.2)	21.8	(20.3–23.4)	65.2	(59.4–70.7)	34.1	(31.9–36.4)	12.0	(10.7–13.2)
	Females	18.5	(18.0–19.0)	19.1	(17.7–20.6)	46.6	(38.0–55.4)	34.9	(32.9–37.0)	12.8	(11.7–13.8)
	U.S.-born¶¶	23.2	(22.8–23.7)								
	Foreign-born***	11.0	(10.4–11.5)								
White, non-Hispanic	Overall	23.8	(23.3–24.4)	19.5	(18.1–21.0)	54.4	(47.9–60.7)	32.4	(30.0–34.8)	12.7	(11.4–14.0)
	Male	25.6	(24.9–26.4)	21.1	(18.9–23.4)	61.7	(54.0–68.8)	33.7	(30.9–36.5)	11.8	(10.3–13.3)
	Female	22.0	(21.4–22.7)	17.9	(16.0–19.9)	46.9	(39.6–54.3)	31.1	(27.7–34.5)	13.6	(12.1–15.0)
	U.S.- born	24.1	(23.6–24.7)								
	Foreign-born	17.4	(15.7–19.4)								
Hispanic†††	Overall	13.5	(12.9–14.0)	16.8	(15.1–18.6)	67.7	(60.0–74.7)	39.9	(37.1–42.6)	13.3	(11.4–15.2)
	Male	17.7	(16.9–18.6)	17.5	(15.1–20.3)	74.7	(65.8–82.0)	37.7	(34.5–40.9)	15.1	(12.4–17.8)
	Female	8.9	(8.3–9.6)	15.9	(14.1–18.0)	50.5	(36.9–64.0)	41.9	(38.7–45.1)	11.6	(9.5–13.7)
	U.S.-born	17.7	(16.8–18.7)	20.9	(18.2–23.8)	62.6	(50.3–73.4)	47.1	(43.5–50.6)	10.0	(8.5–11.5)
	Foreign-born	10.3	(9.6–11.0)	14.9	(13.0–17.0)	65.9	(56.0–74.6)	36.3	(33.3–39.2)	14.5	(11.9–17.1)
Mexican	Overall	13.0	(12.3–13.6)	17.5	(15.6–19.6)	72.4	(62.5–80.4)	42.4	(39.6–45.1)	12.1	(9.9–14.2)
	Male	17.5	(16.4–18.6)	17.2	(14.7–19.9)	79.4	(67.7–87.7)	39.2	(35.5–43.0)	13.7	(10.7–16.7)
	Female	8.0	(7.3–8.7)	17.8	(15.3–20.7)	56.8	(39.3–72.7)	45.7	(41.8–49.5)	10.4	(8.0–12.8)
	U.S.-born	16.0	(15.0–17.2)	21.7	(18.3–25.7)	65.5	(49.7–78.4)	46.8	(42.7–50.8)	9.5	(7.6–11.4)
	Foreign-born	10.6	(9.7–11.5)	14.9	(12.7–17.4)	74.7	(65.8–81.9)	40.0	(37.0–42.9)	13.3	(10.4–16.2)
Puerto Rican	Overall	21.6	(19.4–24.0)								
	Male	26.4	(22.8–30.4)								
	Female	17.4	(15.1–19.9)								
	U.S.- born	21.9	(19.7–24.3)								
	Foreign-born	—§§§	—§§§								
Cuban	Overall	18.2	(15.3–21.5)								
	Male	22.0	(17.7–27.0)								
	Female	13.6	(10.5–17.5)								
	U.S.-born	21.0	(15.6–27.6)								
	Foreign-born	16.2	(13.1–20.0)								
Central American or South American	Overall	9.2	(8.1–10.4)								
	Male	12.5	(10.8–14.3)								
	Female	5.7	(4.5–7.1)								
	U.S.-born	11.7	(8.8–15.4)								
	Foreign-born	9.0	(7.8–10.3)								

Abbreviation: CI = confidence interval.

* Data from NHIS are age-adjusted to the 2000 U.S. standard population for ages 18–64 years using age groups 18–44, 45–54, and 55–64 years. All estimates are age-adjusted unless otherwise noted. In NHIS, estimates are based on household interviews of a sample of the noninstitutionalized civilian adult population. Unknowns for the columns were not included in the denominators when calculating percentages. Percentages might not add to totals because of rounding. "All adults" includes other races not shown separately.

† Data from NHANES are age-standardized by the direct method to the year 2000 U.S. Census population estimates using age groups 18–24, 25–44, and 45–64 years. In NHANES, estimates are for the noninstitutionalized resident population. "All adults" includes persons of other, non-Hispanic races not shown separately, including non-Hispanic multiracial. Hispanics/Latinos include Mexican-Americans and other Hispanics/Latinos not shown separately.

§ Current cigarette smoking is based on two survey questions. All respondents were first asked, "Have you smoked at least 100 cigarettes in your entire life?" Respondents answering "yes" were then asked, "Do you now smoke cigarettes every day, some days, or not at all?" Current smokers have smoked at least 100 cigarettes in their lifetime and currently smoke every day or some days.

¶ Hypertension was defined as systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg or currently taking medication to lower blood pressure.

** Uncontrolled hypertension was defined as systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg among those with hypertension.

†† Obesity is defined as body mass index (BMI) ≥30.0 kg/m^2. BMI was calculated as weight in kilograms divided by height in meters squared (kg/m^2) rounded to the nearest tenth. Pregnant females excluded from analysis.

§§ High total cholesterol is defined as total cholesterol ≥240mg/dL.

¶¶ The definition of "U.S.-born" differs slightly for NHIS and NHANES. In NHIS, "U.S.-born" refers to persons born in the 50 states, District of Columbia, or U.S territories and includes children born outside the United States to U.S citizens. In NHANES, "U.S.-born" refers to persons born in the 50 states or District of Columbia.

*** The definition of "foreign-born" differs slightly for NHIS and NHANES. In NHIS, "foreign-born" refers to persons born outside the United States or its territories (except for children of U.S. citizens), regardless of current citizenship. In NHANES, "foreign-born" refers to persons born outside the United States, regardless of current citizenship.

††† Persons of Hispanic/Latino ethnicity can be of any race or combination of races.

§§§ Estimate has a relative standard error >30%.

TABLE 5. Annualized prevalence of lack of health insurance, nonutilization of medical care or prescription drugs, and use of preventive screening tests for cancer among adults, by sex, race/ethnicity, Hispanic/Latino subpopulation, and nativity — United States, National Health Interview Survey (NHIS), 2011–2013, 2009–2013, or 2010 and 2013*

Race/ Ethnicity and Hispanic/ Latino subpopulation	Population/ Group	Uninsured† (18–64 yrs, 2011–2013) Prevalence (%)	(95% CI)	Delay or nonreceipt of needed medical care during the past 12 months because of cost§ (age-adjusted¶) (18–64 yrs, 2009–2013) Prevalence (%)	(95% CI)	Nonreceipt of needed prescription drugs in the past 12 months because of cost** (age-adjusted) (18–64 yrs, 2009–2013) Prevalence (%)	(95% CI)	Use of colorectal tests or procedures (crude)†† (18–64 yrs, 2009–2013) Prevalence (%)	(95% CI)	Use of mammography in the past 2 years among women (crude)§§ (50–74 yrs, 2010–2013) Prevalence (%)	(95% CI)	Use of Pap tests in the past 3 years in women¶¶ (crude) (21–65 yrs, 2010 and 2013) Prevalence (%)	(95% CI)
U.S. population	Overall	20.8	(20.4–21.3)	13.9	(13.6–14.1)	10.2	(9.9–10.5)	58.7	(57.8–59.6)				
	Males	23.2	(22.6–23.7)	12.8	(12.5–13.1)	8.3	(7.9–8.6)	57.7	(56.3–59.0)				
	Females	18.6	(18.2–19.1)	14.9	(14.6–15.2)	12.1	(11.8–12.5)	59.6	(58.4–60.9)	72.5	(71.4–73.6)	81.7	(81.0–82.4)
	U.S.-born***	17.3	(16.9–17.7)	14.1	(13.8–14.3)	10.4	(10.1–10.8)	60.1	(59.2–61.1)	73.0	(71.8–74.2)	83.6	(82.8–84.3)
	Foreign-born†††	37.7	(36.6–38.9)	13.2	(12.7–13.6)	9.3	(8.8–9.8)	45.4	(43.2–47.7)	69.5	(66.8–72.0)	73.5	(71.7–75.3)
White, non-Hispanic	Overall	15.1	(14.6–15.5)	13.6	(13.3–13.9)	9.5	(9.1–9.9)	60.8	(59.8–61.9)				
	Male	16.5	(16.0–17.1)	12.5	(12.2–12.9)	7.6	(7.2–8.1)	60.0	(58.5–61.5)				
	Female	13.6	(13.2–14.1)	14.6	(14.2–15.0)	11.3	(10.9–11.8)	61.6	(60.1–63.0)	73.3	(72.0–74.6)	83.5	(82.6–84.3)
	U.S.-born	14.9	(14.4–15.3)	13.7	(13.3–14.0)	9.6	(9.3–10.0)	61.0	(59.9–62.0)	73.3	(71.9–74.6)	83.9	(83.0–84.8)
	Foreign-born	19.3	(17.6–21.1)	12.3	(11.3–13.4)	6.8	(5.6–8.1)	57.5	(52.3–62.6)	74.0	(67.8–79.3)	75.0	(69.6–79.8)
Hispanic/ Latino§§§	Overall	41.5	(40.4–42.6)	15.5	(15.1–15.9)	12.5	(11.9–13.1)	43.7	(41.4–46.1)				
	Male	45.3	(44.2–46.5)	14.5	(14.0–15.0)	10.4	(9.7–11.2)	39.4	(35.8–43.1)				
	Female	37.4	(36.3–38.6)	16.5	(16.0–17.0)	14.7	(13.8–15.6)	47.8	(44.7–50.8)	67.9	(64.9–70.8)	77.7	(76.0–79.3)
	U.S.-born	25.9	(25.1–26.8)	14.8	(14.3–15.4)	12.8	(11.9–13.8)	53.0	(49.4–56.7)	70.5	(66.0–74.7)	81.6	(79.4–83.7)
	Foreign-born	54.7	(53.3–56.1)	16.0	(15.5–16.6)	12.2	(11.5–13.0)	36.5	(33.5–39.6)	66.0	(61.9–69.8)	74.4	(72.0–76.7)
Mexican	Overall	45.6	(44.2–46.9)	15.3	(14.8–15.9)	12.8	(12.0–13.6)	41.6	(38.4–44.9)				
	Male	48.8	(47.3–50.2)	14.4	(13.8–15.0)	10.6	(9.6–11.7)	36.8	(32.9–41.8)				
	Female	42.1	(40.7–43.6)	16.4	(15.8–17.0)	15.2	(14.0–16.4)	46.3	(42.4–50.4)	66.8	(62.4–71.0)	76.6	(74.4–78.6)
	U.S.-born	28.6	(27.5–29.7)	14.3	(13.7–15.0)	12.6	(11.4–13.9)	50.7	(45.8–55.5)	70.5	(64.3–76.1)	81.1	(78.1–83.7)
	Foreign-born	59.7	(58.0–61.4)	16.2	(15.5–16.9)	12.9	(11.9–14.0)	33.6	(29.6–37.9)	63.5	(57.4–69.2)	72.9	(69.7–83.7)
Puerto Rican	Overall	20.7	(19.1–22.5)	15.9	(14.7–17.1)	15.1	(13.2–17.2)	57.5	(50.5–64.3)				
	Male	24.2	(21.8–26.7)	16.0	(14.4–17.8)	13.0	(10.4–16.1)	53.6	(42.6–64.3)				
	Female	17.5	(15.6–19.7)	15.8	(14.3–17.4)	17.0	(14.4–19.8)	61.1	(52.8–68.9)	71.7	(63.8–78.4)	83.8	(79.7–87.3)
	U.S.-born	20.2	(18.6–22.0)	15.9	(14.7–17.2)	15.1	(13.2–17.3)	57.9	(50.8–64.7)	72.0	(64.0–78.8)	83.5	(79.2–87.0)
	Foreign-born	38.4	(26.6–51.8)	17.0	(11.2–25.0)	—¶¶¶	—¶¶¶	—¶¶¶	—¶¶¶	—¶¶¶	—¶¶¶	96.7	(78.0–99.6)
Cuban	Overall	32.1	(28.7–35.7)	16.3	(14.5–18.4)	9.0	(7.2–11.3)	40.0	(32.1–48.5)				
	Male	35.8	(31.9–39.9)	14.2	(12.3–16.5)	8.0	(5.9–10.8)	29.1	(18.8–42.0)				
	Female	28.0	(24.0–32.4)	18.7	(16.2–21.5)	10.3	(7.4–14.2)	49.0	(37.0–61.1)	61.2	(50.1–71.2)	76.8	(69.2–83.0)
	U.S.-born	15.7	(12.3–19.8)	15.8	(12.3–20.0)	7.6	(4.9–11.6)	68.5	(38.5–88.3)	—¶¶¶	—¶¶¶	89.5	(77.4–95.5)
	Foreign-born	41.2	(36.8–45.9)	17.7	(15.4–20.3)	9.5	(7.2–12.5)	37.6	(29.4–46.6)	61.3	(50.0–71.5)	71.6	(62.3–79.4)
Central American or South American	Overall	45.8	(43.8–47.9)	15.6	(14.8–16.6)	11.5	(10.3–12.9)	41.4	(36.1–47.0)				
	Male	50.9	(48.5–53.3)	14.6	(13.5–15.8)	9.8	(8.3–11.6)	41.4	(33.7–49.6)				
	Female	40.5	(38.2–42.7)	16.7	(15.6–17.9)	13.3	(11.4–15.5)	41.4	(34.3–48.9)	69.3	(61.7–76.0)	77.7	(73.9–81.2)
	U.S.-born	25.6	(22.8–28.6)	15.5	(12.6–19.0)	9.1	(6.3–13.0)	84.3	(48.8–96.8)	—¶¶¶	—¶¶¶	76.3	(63.2–85.9)
	Foreign-born	50.3	(48.1–52.5)	15.9	(15.0–17.0)	11.8	(10.4–13.2)	40.1	(34.7–45.7)	69.4	(61.7–76.2)	78.1	(74.0–81.7)

See table footnotes on next page.

a lower prevalence of moderate drinking and a higher prevalence of binge drinking than whites (*16*). In 2011, Hispanics had higher death rates than whites from chronic hepatitis B virus and hepatitis C virus infections; in 2013, their adult vaccination coverage was similar to whites for hepatitis A virus vaccine but lower for hepatitis B virus vaccine (*17*). The long-term effects of obesity and diabetes have been associated with chronic liver disease, particularly nonalcoholic fatty liver disease, and liver cancer (*18*). Liver/intrahepatic bile duct, stomach, and cervical cancers (all associated with infectious etiologies) have been found to be higher among Hispanics compared with whites (*19*).

Given the presence of multiple Hispanic origin groups residing in the United States, public health programs need to be culturally and linguistically appropriate for Hispanics. Bilingual health education materials, innovative means of increasing health insurance coverage, and access to culturally appropriate health care and preventive services (*20*) that consider lower health literacy and education levels of many U.S. Hispanics are all critically important. Increasing Spanish-speaking and bilingual health care providers and representation of Hispanics in the health care and public health workforce are focal strategies for improving culturally appropriate and effective health

TABLE 5. (*Continued*) Annualized prevalence of lack of health insurance, nonutilization of medical care or prescription drugs, and use of preventive screening tests for cancer among adults, by sex, race/ethnicity, Hispanic/Latino subpopulation, and nativity — United States, National Health Interview Survey (NHIS), 2011–2013, 2009–2013, or 2010 and 2013*

Abbreviation: CI = confidence interval.

* All data are from NHIS, pooled for 2011–2013 for uninsured prevalences, 2009–2013 for delay or nonreceipt of medical care or prescription drugs because of cost, and pooled for 2010 and 2013 for colorectal testing, mammography, and Papanicolau (Pap) tests. Calculations based on ages 18–64 years for health insurance and nonutilization because of cost, 50–75 years for colorectal testing, 50–74 years for mammography, and 21–65 years for Pap tests. Estimates are based on household interviews of a sample of the civilian noninstitutionalized adult population. Unknowns for the columns were not included in the denominators when calculating percentages. Percentages might not add to totals because of rounding. "All adults" includes other races not shown separately.

† Uninsured defined as not having any private health insurance, Medicare, Medicaid, Children's Health Insurance Program (CHIP), state-sponsored or other government-sponsored health plan, or military plan, or having only Indian Health Service coverage or only a private plan that paid for one type of service, such as accidents or dental care.

§ Delay or nonreceipt of needed medical care during the past 12 months because of cost was based on response to the questions, "During the past 12 months was there any time when person needed medical care but did not get it because person couldn't afford it?" and "During the past 12 months has medical care been delayed because of worry about the cost?"

¶ Age-adjusted to the 2000 U.S. standard population for ages 18–64 using age groups 18–44, 45–54, and 55–64 years.

** Nonreceipt of needed prescription drugs during the past 12 months because of cost was based on response to the question, "During the past 12 months was there any time when person needed prescription medicine but didn't get it because person couldn't afford it?"

†† Use of colorectal tests or procedures includes reports of home fecal occult blood test (FOBT) in the past year, sigmoidoscopy procedure in the past 5 years with FOBT in the past 3 years, or colonoscopy procedure in the past 10 years. In 2008, the U.S. Preventive Services Task Force recommended screening for colorectal cancer annually using FOBT, every 5 years using sigmoidoscopy with FOBT every 3 years, or every 10 years using colonoscopy, in adults beginning at age 50 years and continuing until age 75 years. Additional information available at http://www.uspreventiveservicestaskforce.org/uspstf08/colocancer/colors.htm.

§§ Use of mammography was based on the following: female respondents aged ≥40 years were asked "Have you ever had a mammogram?" Those who responded "yes" were then asked about the date and time of their most recent mammogram. The U.S. Preventive Services Task Force recommends biennial screening mammography for women aged 50–74 years; however, some persons might start earlier screening because of higher associated risks. The table presents crude estimates for women aged 50–74 years who received a mammogram in the past 2 years.

¶¶ Use of Pap tests based on the following: in NHIS, female respondents aged ≥18 years were asked, "Have you ever had a Pap smear or Pap test?" Those who responded "yes" were then asked about the date and time of their most recent Pap test. Using recommendations of the U.S. Preventive Services Task Force, the table presents crude estimates for women aged 21–65 years without a hysterectomy who received a Pap test in the past 3 years.

*** "U.S.-born" refers to persons born in the 50 states, District of Columbia, or U.S territories and includes children born outside the United States to U.S. citizens.

††† "Foreign-born" refers to persons born outside the United States or its territories (except for children of U.S. citizens), regardless of current citizenship.

§§§ Persons of Hispanic/Latino ethnicity can be of any race or combination of races.

¶¶¶ Estimate has a relative standard error >30%.

services. Hispanics comprise only 5.8% of U.S. physicians and 7.5% of graduates from schools of public health (*21*,*22*).

Hispanics of every age need patient-centered medical homes that provide team-based, comprehensive, coordinated health care with enhanced access. (*23*). Lay health workers or "promotores de salud" can help provide culturally appropriate health outreach education and screening, linkage to care, and patient navigation (*24*–*26*). Examples of CDC-sponsored and other federally-sponsored programs and capacity-building tools for many such programs are available at http://www.cdc.gov/minorityhealth/promotores.html.

This study included data from multiple national data sources. Further, it incorporated data from multiple years to improve stability of estimates for smaller Hispanic subpopulations. This study has several important limitations. Certain variables across all Hispanic origin subgroups could not be assessed because of small sample size. Lower insurance coverage and poorer health care access among Hispanics might have led to underrecognition of disease and consequently, underestimates of self-reported disease prevalence. The quality of Hispanic origin subgroup reporting for mortality data might vary among reporting jurisdictions. Mortality data are subject to racial/ethnic misclassification, but statistical adjustments were made to reduce the potential for bias. Although not a limitation, statistical corrections made for missing ages and racial and ethnic misclassification might limit comparability to reports that do not make these adjustments.

Robust nationwide long-term public health strategies to maximize Hispanic health in the United States need to consider Hispanic origin and nativity. A feasible and systematic data collection strategy is needed to reflect the health diversity in major Hispanic origin subpopulations, including by nativity. Social determinants of health data are important to collect, and oversampling could help ensure representation of relevant Hispanic subpopulations. Studies should be undertaken to better understand what protective factors contribute to Hispanics' overall lower death rates and to develop Hispanic-focused evidence-based interventions to reduce and eliminate existing health disparities in the areas of diabetes, chronic liver disease/cirrhosis, obesity, and homicide among others.

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Morbidity and Mortality Weekly Report

Possible Sexual Transmission of Ebola Virus — Liberia, 2015

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On March 20, 2015, 30 days after the most recent confirmed Ebola Virus Disease (Ebola) patient in Liberia was isolated, Ebola was laboratory confirmed in a woman in Monrovia. The investigation identified only one epidemiologic link to Ebola: unprotected vaginal intercourse with a survivor. Published reports from previous outbreaks have demonstrated Ebola survivors can continue to harbor virus in immunologically privileged sites for a period of time after convalescence. Ebola virus has been isolated from semen as long as 82 days after symptom onset and viral RNA has been detected in semen up to 101 days after symptom onset (*1*). One instance of possible sexual transmission of Ebola has been reported, although the accompanying evidence was inconclusive (*2*). In addition, possible sexual transmission of Marburg virus, a filovirus related to Ebola, was documented in 1968 (*3*). This report describes the investigation by the Government of Liberia and international response partners of the source of Liberia's latest Ebola case and discusses the public health implications of possible sexual transmission of Ebola virus. Based on information gathered in this investigation, CDC now recommends that contact with semen from male Ebola survivors be avoided until more information regarding the duration and infectiousness of viral shedding in body fluids is known. If male survivors have sex (oral, vaginal, or anal), a condom should be used correctly and consistently every time (*4*).

On March 14, 2015, a woman from Monrovia aged 44 years (patient A) developed headache, weakness, joint pain and nausea. She went to a hospital on March 19, and was triaged as a suspected Ebola patient to a nearby transit center (a facility for rapid isolation, diagnosis, and referral of Ebola patients). On March 20, Ebola was confirmed by reverse transcription–polymerase chain reaction (RT-PCR). Genomic sequencing of Ebola virus from her blood specimen identified six mutations not found in 25 other genomes sequenced from Liberia (*5*) or in 107 genomes obtained from Guinea, Mali, and Sierra Leone (*6*–*8*). The investigation found no history of travel by patient A, no interaction with visitors from Sierra Leone or Guinea, no recent funeral attendance, and no contact with a person with symptoms consistent with Ebola.

Patient A did report unprotected vaginal intercourse on March 7, 2015, with an Ebola survivor (survivor A), a man aged 46 years from another community in Monrovia. Survivor A had experienced onset of symptoms consistent with Ebola, including fever, anorexia, and headache on September 9, 2014, and was admitted to an Ebola treatment unit on September 23. His first test by RT-PCR on September 28, 2014, was indeterminate (positive on one assay with a cycle threshold of 40 indicating a low viral load and negative on a second assay). A second specimen was negative by RT-PCR on October 3, 2014. Survivor A was discharged from the Ebola treatment unit on October 7, 2014 and reported no subsequent illness or symptoms.

Survivor A had multiple family members with whom he lived or interacted with confirmed or suspected Ebola during the same period as his symptoms and Ebola treatment unit admission (Table). His older brother was confirmed with Ebola on September 5, 2014, from a postmortem blood specimen. Survivor A's younger brother and daughter were admitted to an Ebola treatment unit on September 23, 2014, with symptoms consistent with Ebola. His younger brother died on September 25 and his daughter died sometime before September 28. No laboratory results were available for survivor A's younger brother or daughter. Survivor A's son entered a holding center on October 8, 2014, was confirmed to have Ebola on October 11 and died soon thereafter.

A new blood specimen was collected from survivor A on March 23, 2015, as part of patient A's case investigation. The specimen was negative for Ebola virus by RT-PCR. Enzyme-linked immunosorbent assays for Ebola virus glycoprotein- and nucleoprotein-specific immunoglobulin G (IgG) antibodies were positive; immunoglobulin M (IgM) was undetectable. A semen specimen, collected from survivor A on March 27, 2015, was positive by RT-PCR with a cycle threshold of 32. Complete genome sequencing of the viral RNA from survivor A's semen has not been possible to date given the low level of detectable viral nucleic acid. However, the partial sequence obtained so far (28% of the genome) closely matches the sequence from patient A. A rapid diagnostic test was conducted to evaluate human immunodeficiency virus (HIV) as a possible reason for long-term viral shedding. The HIV test was negative.

TABLE. Course of Ebola in survivor A and family members — Liberia, 2014

Relationship to survivor A	Age (yrs)	Date of symptom onset	RT-PCR results	Test dates	Date of death
Brother	62	August 22	Positive	September 5	Unknown (before September 5)
Brother	36	September 9	Not done	—	September 25
Survivor A	46	September 9	Indeterminate Negative	September 28 October 3	Living
Daughter	14	September 16	Not done	—	September 23–28
Son	12	October 2	Positive	October 11	Unknown

Abbreviation: RT-PCR = reverse transcription–polymerase chain reaction.

In addition to patient A, survivor A reported recent unprotected vaginal intercourse with a woman aged 45 years (contact A) with no history of illness. Intercourse with contact A occurred on three to five occasions between the last week of February and March 15, 2015. A blood specimen collected from contact A on March 27, 2015 was negative for Ebola virus–specific IgG and IgM.

Since January 21, 2015, all new confirmed cases of Ebola in Liberia have been epidemiologically linked to a single transmission chain (CDC Liberia Ebola Response Team, unpublished data, 2015). Ebola viral RNA from three of the 22 confirmed cases in this transmission chain (with onset dates of January 8, January 27, and February 9, 2015) were sequenced and compared with the genetic material from patient A. None of the sequences from these isolates shared the mutations observed in patient A's isolate.

Discussion

Available epidemiologic and laboratory findings indicate that patient A may have been exposed to Ebola virus through sexual contact with survivor A, whose semen was PCR-positive 199 days (September 9, 2014 to March 27, 2015) after his likely Ebola onset. Although the diagnostic RT-PCR in September was indeterminate, survivor A's positive enzyme-linked immunosorbent assays, specifically against the viral nucleoprotein, indicate previous Ebola virus infection. His clinical course and epidemiologic links suggest that he had Ebola in early September 2014. The diagnostic tests were performed 18 and 24 days after symptom onset, and the results may have reflected convalescence. Although less likely, it is also possible that his Ebola virus infection occurred later and the indeterminate test result reflected the absence of Ebola virus in September 2014.

Ebola virus RNA in survivor A's semen in March 2015 does not prove the presence of infectious virus. However, the absence of patient A's genetic signature in sequenced RNA from three patients in Liberia's last known cluster of epidemiologically-linked cases makes it unlikely that patient A was infected from unrecognized, ongoing community transmission. Culture of survivor A's semen specimen for Ebola virus is planned to determine whether viable virus was present.

It is not possible to definitively ascribe Ebola infection in patient A to transmission from survivor A, and another sexual partner or other source cannot be excluded. However, the timing of intercourse between survivor A and patient A, the subsequent illness in patient A, the presence of viral RNA in survivor A's semen, matching genetic sequences (where coverage has been obtained) in isolates from survivor A and patient A, and the lack of other known exposures suggest possible sexual transmission. Enrichment methods are being applied to survivor A's semen sample to amplify existing Ebola virus RNA and complete genomic sequencing. Other limitations of the investigation include 1) the relatively small number of sequenced genomes from Ebola patients in this epidemic, which limits an assessment of the generalizability of the molecular findings; and 2) incomplete laboratory results and Ebola treatment unit and hospital records for some of survivor A's family members, preventing confirmation of Ebola and exact dates of death.

Previously, CDC and WHO recommended abstinence or condom use for at least 3 months following recovery from Ebola. However, to prevent transmission of Ebola, contact with semen from male survivors should be avoided. If male survivors have sex (oral, vaginal, or anal), a condom should be used correctly and consistently every time until further information is known. Used condoms should be handled and disposed of safely to avoid contact with semen. After handling of condoms, or following any physical contact with semen, skin should be washed thoroughly with soap and water. Based on information from this investigation, CDC, the World Health Organization, and the Government of Liberia issued updated recommendations for survivors (*4,9,10*).

Investigations of several other recent Ebola cases in West Africa have suggested sexual transmission from survivors but have not been confirmed (CDC Emergency Operations Center, unpublished data, 2015). Additional studies are planned to determine clearance, persistence, and shedding of Ebola virus in body fluids of survivors and to evaluate possible sexual transmission of infection. Use of RT-PCR testing of semen (e.g., evidence of two negative tests) might be a useful tool for assessing and counseling male survivors on

What is already known on this topic?

Ebola virus persists in seminal fluid following recovery, but the duration of viral shedding and the likelihood of sexual transmission are not known. Earlier studies have demonstrated that the virus can be isolated from semen as long as 82 days after symptom onset, and that semen can be positive by reverse transcription–polymerase chain reaction, indicating presence of viral RNA, up to 101 days after onset. Possible sexual transmission was reported in 1968 for Marburg virus, a related filovirus, but has not been clearly documented for Ebola.

What is added by this report?

Ebola virus can persist in the seminal fluid of convalescent men for longer than previously recognized and can potentially lead to sexual transmission of Ebola.

What are the implications for public health practice?

Until more information is known, contact with semen from a male survivor should be avoided. If male survivors have sex (oral, vaginal, or anal), a condom should be used correctly and consistently every time. Additional studies are planned to examine Ebola virus persistence in body fluids of male and female convalescent patients and the likelihood of sexual transmission.

measures they should take to prevent transmission of Ebola virus. CDC and other public health partners are reviewing existing data to determine the validity and feasibility of potential recommendations.

Transmission of Ebola in West Africa has diminished over the past few months. However, awareness of possible sexual transmission from survivors to partners and the importance of prevention measures is needed. Sufficient supplies of condoms and counseling to promote their correct and consistent use should be provided as part of the response in Ebola-affected countries. In addition, efforts should be undertaken to prevent the possibility of sexual transmission from stigmatizing survivors.

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Announcement

CDC-Sponsored Continuing Education Courses on Screening for Colorectal Cancer

Colorectal cancer is the second leading cancer killer in the United States. Screening for colorectal cancer saves lives, but problems with its implementation in clinical practice can reduce screening's effectiveness.

A new CDC-sponsored continuing education program is available to provide guidance and tools for clinicians on the best ways to implement screening for colorectal cancer to ensure patients receive maximum benefit.

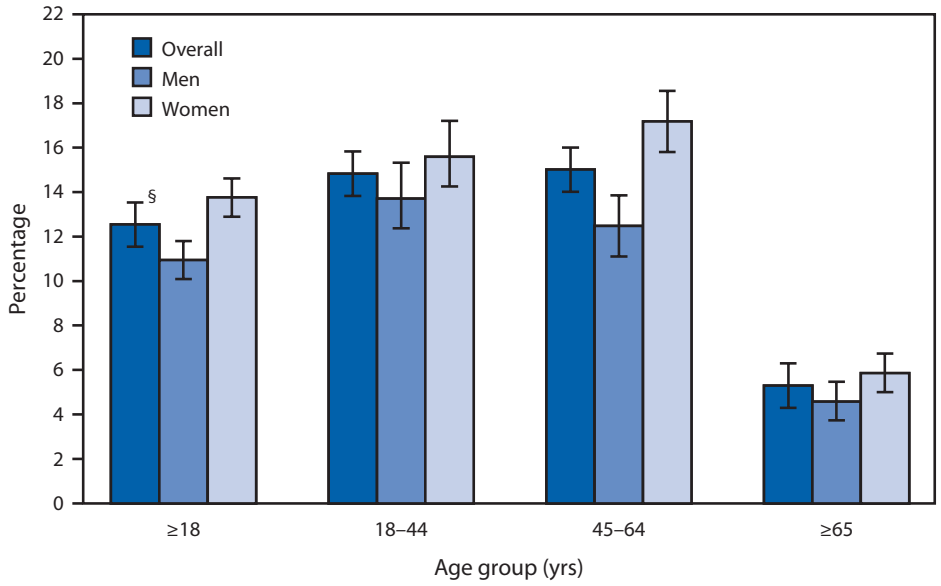
There are two versions of the course: one for primary care providers and one for clinicians who perform colonoscopy procedures. The courses were developed by nationally recognized experts in colorectal cancer screening, including primary care clinicians, gastroenterologists, and leaders in public health programs and research. Continuing education credits are available for physicians, nurses, and other health professionals.

The courses can be accessed free of charge at http://www.cdc.gov/cancer/colorectal/quality.

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Adults Who Did Not Take Medication as Prescribed to Save Money,* Among Those Prescribed Medication During the Preceding 12 Months, by Sex and Age Group — National Health Interview Survey,† United States, 2013



* Based on a positive response to any of the following three survey questions: "You skipped medication doses to save money; you took less medicine to save money; or you delayed filling a prescription to save money." In 2013, these questions were asked to those who reported having been prescribed medication by a doctor or other health professional during the preceding 12 months, and referred to actions to save money during the preceding 12 months.

† 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.

§ 95% confidence interval.

In 2013, 12.5% of adults overall who were prescribed medication by a doctor or other health professional did not take their medication as prescribed to save money. Adults aged ≥65 years were less likely to not take their medication as prescribed (5.3%) than those aged 18–44 years (14.8%) and those aged 45–64 years (15.0%). Women (13.8%) were more likely than men (10.9%) to not take their medication as prescribed, with the largest difference observed between women and men aged 45–64 years (17.2% compared with 12.5%).

Source: National Health Interview Survey, 2013. Available at http://www.cdc.gov/nchs/nhis.htm.

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