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National Gay Men's HIV/AIDS Awareness Day — September 27, 2014

National Gay Men's HIV/AIDS Awareness Day is observed each year on September 27 to direct attention to the continuing and disproportionate impact of human immunodeficiency virus infection (HIV) and acquired immune deficiency syndrome (AIDS) on gay, bisexual, and other men who have sex with men (MSM) in the United States. MSM represent approximately 2% of the U.S. population (*1*); however, in 2010, 63% of all new HIV infections were among MSM (*2*).

By the end of 2010, an estimated 596,600 MSM were living with HIV infection, 52% of the persons living with HIV infection in the United States (*3*). In 2011, a report noted that the percentage of MSM who were HIV-positive but unaware of their status was high, even among those recently tested (*4*).

CDC supports a range of efforts to reduce HIV infection among MSM, including prevention services that increase diagnosis of HIV infection, support the linkage and engagement of MSM in care and treatment, and reduce the risk for acquiring and transmitting HIV. Additional information about these efforts is available at http://www.cdc.gov/hiv/risk/gender/msm. Additional information about National Gay Men's HIV/AIDS Awareness Day is available at http://www.cdc.gov/features/ngmhaad.

References

1. Purcell DW, Johnson CH, Lansky A, et al. Estimating the population size of men who have sex with men in the United States to obtain HIV and syphilis rates. Open AIDS J 2012;6:98–107.
2. CDC. Estimated HIV incidence in the United States, 2007–2010. HIV surveillance supplemental report 2012;17(No. 4). Available at http://www.cdc.gov/hiv/pdf/statistics_hssr_vol_17_no_4.pdf.
3. CDC. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data: United States and 6 U.S. dependent areas—2011. HIV surveillance supplemental report, 2013. Vol. 18(No. 5). Atlanta, GA: US Department of Health and Human Services, CDC; 2013. Available at http://www.cdc.gov/hiv/pdf/2011_monitoring_hiv_indicators_hssr_final.pdf.
4. CDC. HIV testing and risk behaviors among gay, bisexual, and other men who have sex with men—United States. MMWR 2013;62:958–62.

Men Living with Diagnosed HIV Who Have Sex with Men: Progress Along the Continuum of HIV Care — United States, 2010

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Gay, bisexual, and other men who have sex with men (MSM) represent approximately 2% of the United States population, yet are the risk group most affected by human immunodeficiency virus (HIV) (*1*). In 2010, among persons newly infected with HIV, 63% were MSM (*2*); among persons living with HIV, 52% were MSM (*3*). The three goals of the National HIV/AIDS Strategy are to reduce new HIV infections, to increase access to care and improve health outcomes for persons living with HIV, and to reduce HIV-related health disparities (*4*). In July 2013, the HIV Care Continuum Initiative was established by executive order to mobilize and accelerate federal efforts to increase HIV testing, services, and treatment along the continuum (*5*). To meet the 2015 targets of the National HIV/AIDS Strategy, 85% of MSM diagnosed with HIV should be linked to care, 80% should be retained in care, and the proportion with an undetectable viral load (VL) should be increased by 20%. To assess progress toward meeting these

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targets, CDC assessed the level at each step of the continuum of care for MSM by age and race/ethnicity. CDC analyzed data from the National HIV Surveillance System (NHSS)* and the Medical Monitoring Project (MMP)† for MSM with diagnosed HIV infection. The results indicated that 77.5% were linked to care, 50.9% were retained in care, 49.5% were prescribed antiretroviral therapy (ART), and 42.0% had achieved viral suppression. Younger MSM and black/African American MSM had lower levels of care compared with older MSM and those of all other races/ethnicities. Interventions aimed at MSM are needed that increase linkage to care, retention in care, and ART use, particularly among MSM aged <25 years and black/African American MSM.

Data from NHSS in 2010, reported to CDC through December 2012, were used to determine the numbers of MSM aged ≥13 years newly diagnosed and living with HIV and the numbers and percentages linked to care and retained in care. Nineteen jurisdictions met the criteria for the collection and reporting of CD4+ T-lymphocyte (CD4) and VL test results,§ the data used to assess linkage and retention in care. Linkage to care¶ was estimated among MSM with new HIV diagnoses during 2010 who resided in any of the 19 jurisdictions at diagnosis. Retention in care** was assessed among MSM with HIV diagnosed by December 31, 2009, who resided in any of the 19 jurisdictions at diagnosis and were alive on December 31, 2010. Data were statistically adjusted for missing HIV transmission categories (*6*).

* NHSS is the primary source for monitoring HIV trends in the United States. The system collects, analyzes, and disseminates information about new and existing cases of HIV infection.

† MMP is a supplemental HIV surveillance system designed to produce nationally representative estimates of the prevalence of behavioral and clinical characteristics among HIV-infected adults aged ≥18 years receiving medical care in the United States and Puerto Rico.

§ The 19 jurisdictions were California (Los Angeles County and San Francisco only), Delaware, District of Columbia, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New York, North Dakota, South Carolina, West Virginia, and Wyoming. The criteria for complete reporting were as follows: 1) the jurisdiction's laws or regulations required reporting of all CD4 and VL test results to the state or local health department, 2) ≥95% of all laboratory test results were reported by laboratories that conducted HIV-related testing for each jurisdiction, and 3) the jurisdiction reported to CDC all CD4 and VL results received since at least January 2010.

¶ Defined as having one or more CD4 (count or percentage) or VL test performed within 3 months after HIV diagnosis during 2010, including those performed during the same month as diagnosis.

** Defined as having two or more CD4 or VL results at least 3 months apart during 2010, among persons diagnosed through December 31, 2009, and alive on December 31, 2010.

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Data from MMP were used to estimate ART prescription[††] and viral suppression[§§] among MSM aged ≥18 years using methods described previously (*7*). The MMP values are weighted national estimates of the numbers of MSM who received medical care during January–April 2010 and had documentation of ART prescription and viral suppression. Percentages were estimated among MSM whose HIV infection was diagnosed by December 31, 2009, and who were alive on December 31, 2010, in the United States and Puerto Rico (denominators were based on NHSS data). Data analyses were limited to 2010, the most recent year for which data were available for persons living with HIV infection.

Of the 10,093 MSM with HIV infection diagnosed during 2010 in the 19 jurisdictions, 7,826 (77.5%) were linked to care within 3 months after HIV diagnosis (Table 1). The percentage linked to care increased with age. Those aged 13–24 years had the lowest percentage of linkage to care (71.0%), and those aged 45–54 years had the highest percentage (84.1%). By race/ethnicity, black/African American MSM had the lowest percentage of linkage to care (71.6%), followed by Hispanic/Latino (80.3%) and white MSM (82.9%).

Among the 174,071 MSM aged ≥13 years living with diagnosed HIV on December 31, 2010, in 19 jurisdictions, 50.9% were retained in care (Table 2). Retention in care also increased with age. Those aged 13–24 years had the lowest percentage of retention in care (45.7%), and those aged ≥55 years had the highest percentage (53.5%). By race/ethnicity, black/African American MSM had the lowest percentage of retention in care (46.3%), followed by white (52.1%) and Hispanic/Latino MSM (54.1%).

Of 416,730 MSM aged ≥18 years living with diagnosed HIV infection on December 31, 2010, in the United States and Puerto Rico, 206,461 (49.5%) were prescribed ART (Table 3). The prevalence of ART prescription increased with age. Among those aged 18–24 years, 30.5% were prescribed ART, and among those aged ≥55 years, 67.7% were prescribed ART. By race/ethnicity, black/African American MSM had the lowest level of ART prescription (47.1%), followed by Hispanic/Latino (49.2%) and white MSM (49.6%).

[††] ART prescription was based on MMP data for all MSM MMP participants in the 2010 data collection cycle.

[§§] Viral suppression was based on all MSM MMP participants in the 2010 data collection cycle and was defined as having a VL result of ≤200 copies/mL at the most recent HIV VL in the preceding 12 months. The cut-off value of ≤200 copies/mL was based on the U.S. Department of Health and Human Services recommended definition of virologic failure.

TABLE 1. Linkage to HIV medical care within 3 months after HIV diagnosis during 2010,[*†] among men aged ≥13 years who have sex with men, by selected characteristics — National HIV Surveillance System, 19 jurisdictions,[§] United States

Characteristic	No. of HIV diagnoses	Linkage to care[¶]	
		No.	(%)
Age group at diagnosis (yrs)			
13–24	2,764	1,962	(71.0)
25–34	3,128	2,383	(76.2)
35–44	2,227	1,822	(81.8)
45–54	1,491	1,254	(84.1)
≥55	484	405	(83.7)
Race/Ethnicity			
Black/African American	4,348	3,115	(71.6)
Hispanic/Latino[**]	2,060	1,653	(80.3)
White	3,165	2,624	(82.9)
Other[††]	521	434	(83.3)
Total[§§]	**10,093**	**7,826**	**(77.5)**

Abbreviation: HIV = human immunodeficiency virus.

[*] Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis.

[†] Data statistically adjusted to account for missing transmission categories.

[§] The 19 jurisdictions were California (Los Angeles County and San Francisco only), Delaware, District of Columbia, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New York, North Dakota, South Carolina, West Virginia, and Wyoming.

[¶] One or more CD4+ T-lymphocyte or viral load tests within 3 months after HIV diagnosis.

[**] Hispanic/Latino MSM can be of any race.

[††] Includes American Indian/Alaska Native, Asian, Native Hawaiian/Other Pacific Islander, and multiple races.

[§§] Estimates might not sum to total.

TABLE 2. Retention in HIV medical care among men aged ≥13 years who have sex with men and whose HIV infection was diagnosed by December 31, 2009,[*†] and who were alive on December 31, 2010, by selected characteristics — National HIV Surveillance System, 19 jurisdictions,[§] United States

Characteristic	No. living with diagnosed HIV	Retention in care in 2010[¶]	
		No.	(%)
Age group on December 31, 2009 (yrs)			
13–24	7,775	3,552	(45.7)
25–34	26,793	12,788	(47.7)
35–44	52,086	26,331	(50.6)
45–54	59,128	30,765	(52.0)
≥55	28,288	15,132	(53.5)
Race/Ethnicity			
Black/African American	57,942	26,852	(46.3)
Hispanic/Latino[**]	34,254	18,515	(54.1)
White	74,150	38,630	(52.1)
Other[††]	7,663	4,559	(59.5)
Total[§§¶¶]	**174,071**	**88,569**	**(50.9)**

Abbreviation: HIV = human immunodeficiency virus.

[*] Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis.

[†] Data statistically adjusted to account for missing transmission categories.

[§] The 19 jurisdictions were California (Los Angeles County and San Francisco only), Delaware, District of Columbia, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New York, North Dakota, South Carolina, West Virginia, and Wyoming.

[¶] Two or more CD4+ T-lymphocyte or viral load tests performed at least 3 months apart during 2010.

[**] Hispanic/Latino MSM can be of any race.

[††] Includes American Indian/Alaska Native, Asian, Native Hawaiian/Other Pacific Islander, and multiple races.

[§§] Includes persons of unknown race/ethnicity.

[¶¶] Estimates might not sum to total.

TABLE 3. ART prescription and viral suppression among men aged ≥18 years who have sex with men and whose HIV infection was diagnosed by December 31, 2009,*† and who were alive on December 31, 2010, by selected characteristics — National HIV Surveillance System, Medical Monitoring Project, United States and Puerto Rico

Characteristic	No. living with diagnosed HIV§	Antiretroviral therapy (ART) prescription¶		Viral suppression**	
		No.	(%)	No.	(%)
Age group at interview (yrs)					
18–24	18,792	5,740	(30.5)	4,872	(25.9)
25–34	63,931	27,006	(42.2)	20,608	(32.2)
35–44	125,164	51,920	(41.5)	44,881	(35.9)
45–54	143,034	77,258	(54.0)	64,792	(45.3)
≥55	65,808	44,537	(67.7)	40,039	(60.8)
Race/Ethnicity					
Black/African American	123,819	58,276	(47.1)	45,813	(37.0)
Hispanic/Latino††	82,410	40,509	(49.2)	34,233	(41.5)
White	195,086	96,787	(49.6)	85,657	(43.9)
Other§§	15,034	10,889	(72.4)	9,488	(63.1)
Total¶¶* **	**416,730**	**206,461**	**(49.5)**	**175,191**	**(42.0)**

Abbreviations: ART = antiretroviral therapy; HIV=human immunodeficiency virus.

* Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis.

† Data statistically adjusted to account for reporting delays and missing transmission categories.

§ National HIV Surveillance System estimates for United States and Puerto Rico.

¶ Medical Monitoring Project estimates for United States and Puerto Rico for persons who received medical care during January–April 2010 and who had documentation of ART prescription in the medical record.

** Medical Monitoring Project estimates for United States and Puerto Rico for persons who received medical care during January–April 2010 and whose most recent HIV viral load in the preceding 12 months was undetectable or ≤200 copies/mL.

†† Hispanic/Latino MSM can be of any race.

§§ Includes American Indian/Alaska Native, Asian, Native Hawaiian/Other Pacific Islander, and multiple races.

¶¶ Includes persons of unknown race/ethnicity.

*** Estimates might not sum to total.

Among the 416,730 MSM living with diagnosed HIV in the United States and Puerto Rico, 42.0% achieved viral suppression at their most recent test (Table 3). Levels of viral suppression increased with age. Those aged 18–24 years had the lowest level of viral suppression (25.9%), and those aged ≥55 years had the highest level (60.8%). By race/ethnicity, black/African American MSM had the lowest level of viral suppression (37.0%), followed by Hispanic/Latino (41.5%) and white MSM (43.9%).

Discussion

A high percentage of MSM diagnosed with HIV in 2010 were linked to care (77.5%); however, only 50.9% of MSM living with diagnosed HIV infection were retained in care, 49.5% were prescribed ART, and 42.0% had achieved viral suppression. Increasing access to care and sustained treatment is critical for improving health outcomes and to reduce the potential of transmitting HIV among MSM, who are the majority of persons with HIV infection.

What is already known on this topic?

Gay, bisexual, and other men who have sex with men (MSM) represent approximately 2% of the United States population, yet represent 63% of new HIV infections.

What is added by this report?

In 2010, for MSM with diagnosed HIV infection, 77.5% were linked to care, 50.9% were retained in care, 49.5% were prescribed antiretroviral therapy, and 42.0% had achieved viral suppression. At each step of the continuum of care, younger MSM had lower levels of care compared with older MSM. Black/African American MSM had the lowest levels of care compared with MSM of all other races/ethnicities.

What are the implications for public health practice?

Interventions aimed at MSM that increase care, particularly among MSM aged <25 years and black/African American MSM are needed to achieve the goals of the National HIV/AIDS Strategy to reduce new HIV infections, to increase access to care and improve health outcomes for persons living with HIV, and to reduce HIV-related health disparities.

At each step of the continuum of care, younger MSM had lower levels of care compared with older MSM. Black/African American MSM had the lowest levels of care compared with those of all other race/ethnicities. Lack of health insurance, stigma, and discrimination might influence whether MSM access medical care, which has implications for each subsequent step along the continuum of care. Implementing effective interventions for young MSM aged <25 years and black/African American MSM could improve outcomes along the continuum of care.

Early awareness of HIV-positive status permits earlier entry into the continuum of care. In 2011, the National HIV Behavioral Surveillance System in 20 cities found that only 49% of MSM aged 18–24 years who tested positive were aware of their HIV infection (*8*). By race/ethnicity, 54% of black/African American, 63% of Hispanic/Latino, and 86% of white MSM aged ≥18 years who tested positive were aware of their infection. Persons who are aware of their HIV-positive status are less likely to engage in risky behaviors that increase the probability of transmitting HIV to sex partners (*9*) and can enter into care and treatment earlier, further improving health outcomes. CDC recommends routine HIV screening for all persons aged 13–64 years in health care settings. Health care providers should subsequently test all persons likely to be at high risk for HIV at least annually, including MSM (*9*). Among MSM who reported negative or unknown HIV status in 2011 in the National HIV Behavioral Surveillance System, 67% reported testing for HIV during the past year (*10*). Sexually

active, HIV-negative MSM might benefit from more frequent testing, such as every 3–6 months (*10*).

The findings in this report are subject to at least four limitations. First, analyses based on the NHSS data are from 19 jurisdictions with complete CD4 and VL reporting. Data from these 19 areas might not be representative of data on all MSM diagnosed with HIV infection in the United States. Data from these areas represent 42% of MSM diagnosed with HIV infection. Second, overall national data might not be applicable to all states. Third, analyses in this study are based on different populations. Linkage to care and retention in care were based on data for persons aged ≥13 years from 19 jurisdictions, whereas ART prescription and viral suppression were based on weighted estimates of persons receiving care who were aged ≥18 years and resided in the United States and Puerto Rico. In addition, ART use should be interpreted in the context of U.S. Department of Health and Human Services guidelines¶¶ that were in effect at the time of data collection; ART might have been prescribed less frequently for those with CD4 counts >500 cells/mm^3. Finally, documentation of the most recent viral load might not be indicative of consistent viral suppression in this population over time.

CDC has adopted a high-impact prevention approach to reduce the number of new HIV infections by using a combination of scientifically proven, cost-effective, and scalable interventions targeted to relevant populations and geographic areas for increasing the impact of HIV prevention efforts and achieving the goals of the National HIV/AIDS Strategy.*** CDC currently funds prevention, surveillance, research, and evaluation programs for a diverse range of MSM, including young racial/ethnic minority MSM.††† The findings in this report highlight the need for continued expansion of prevention, care, and treatment efforts for achieving improvement in linkage to care, retention in care, and viral suppression for MSM, particularly MSM aged <25 years and black/African American MSM. Given that MSM account for more than half of new infections and comprise approximately half of persons living with HIV infection, to reduce HIV incidence, improve health outcomes, and reduce HIV-related health disparities in the United States, the prevention and care needs of MSM must be addressed.

¶¶ Additional information available at http://aidsinfo.nih.gov/contentfiles/lvguidelines/adultandadolescentgl.pdf.

*** Additional information available at http://www.cdc.gov/nchhstp/newsroom/hivfactsheets/future/high-impact-prevention.htm.

††† Additional information available at http://www.cdc.gov/msmhealth/msm-programs.htm.

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References

1. Purcell DW, Johnson CH, Lansky A, et al. Estimating the population size of men who have sex with men in the United States to obtain HIV and syphilis rates. Open AIDS J 2012;6:98–107.
2. CDC. Estimated HIV incidence in the United States, 2007–2010. HIV surveillance supplemental report 2012; Vol. 17(No. 4). Atlanta, GA: US Department of Health and Human Services, CDC; 2012. Available at http://www.cdc.gov/hiv/library/reports/surveillance.
3. CDC. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data: United States and 6 U.S. dependent areas—2011. HIV surveillance supplemental report, 2013. Vol. 18(No. 5). Atlanta, GA: US Department of Health and Human Services, CDC; 2013. Available at http://www.cdc.gov/hiv/pdf/2011_monitoring_hiv_indicators_hssr_final.pdf.
4. Office of National AIDS Policy. National HIV/AIDS strategy for the United States. Washington, DC: Office of National AIDS Policy; 2010. Available at http://aids.gov/federal-resources/national-hiv-aids-strategy/nhas.pdf.
5. Office of the Press Secretary. Accelerating improvements in HIV prevention and care in the United States through the HIV Care Continuum Initiative. Washington, DC: Office of the Press Secretary, The White House; 2013. Available at http://www.whitehouse.gov/the-press-office/2013/07/15/fact-sheet- accelerating-improvements-hiv-prevention-and-care-united-stat.
6. Harrison KM, Kajese T, Hall HI, Song R. Risk factor redistribution of the national HIV/AIDS surveillance data: an alternative approach. Public Health Rep 2008;123:618–27.
7. Hall HI, Frazier EL, Rhodes P, et al. Differences in human immunodeficiency virus care and treatment among subpopulations in the United States. JAMA Intern Med 2013;173:1337–44.
8. Wejnert C, Le B, Rose CE, et al. HIV infection and awareness among men who have sex with men—20 cities, United States, 2008 and 2011. PLoS ONE 2013;8:e76878.
9. CDC. Revised recommendations for HIV testing of adults, adolescents and pregnant women in health-care settings. MMWR 2006;55(No. RR-14).
10. CDC. HIV testing and risk behaviors among gay, bisexual, and other men who have sex with men—United States. MMWR 2013;62:958–62.

Prevalence of *Chlamydia trachomatis* Genital Infection Among Persons Aged 14–39 Years — United States, 2007–2012

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Infection with the bacterium, *Chlamydia trachomatis* (often termed "chlamydia") is the most frequently reported sexually transmitted infection in the United States. The urethra is the most common site of infection in males, and the urethra and cervix are most commonly infected in females. Ascending infection in females can cause pelvic inflammatory disease, which can lead to infertility and ectopic pregnancy (*1*). Genital chlamydial infections are usually asymptomatic, and screening is necessary to identify most infections. Currently, chlamydia screening for sexually active women aged <25 years is recommended by the U.S. Preventive Services Task Force (grade B recommendation) (*2*). Chlamydia is nationally notifiable (*3*); however, if females do not access care or clinicians do not screen, many infections go undiagnosed, unreported, and untreated. CDC monitors population prevalence of genital chlamydial infection through the National Health and Nutrition Examination Survey (NHANES), which tests a sample of the U.S. population aged 14–39 years for genital *C. trachomatis* and found that the overall chlamydia burden in the United States decreased during 1999–2008 (*7*). Using data from the most recent cycles of NHANES (2007–2012), CDC estimated chlamydia prevalence among persons aged 14–39 years overall and by demographic characteristics and sexual behaviors. The prevalence of chlamydia among persons aged 14–39 years was 1.7% (95% confidence interval [CI] = 1.4%–2.0%). Chlamydia prevalence varied by age and race/ethnicity, with prevalence highest among non-Hispanic blacks (5.2%). Among sexually active females aged 14–24 years, the population targeted for routine screening, chlamydia prevalence was 4.7% overall and 13.5% among non-Hispanic black females. As chlamydia is common and infections are usually asymptomatic, health care providers should routinely screen sexually active young women aged <25 years for chlamydial infection, provide prompt treatment for infected persons, and ensure that infected patients' sex partners receive timely treatment to prevent reinfection.

NHANES is a cross-sectional, complex, multistage survey designed to be nationally representative of the noninstitutionalized U.S. civilian population.* Participants are interviewed in person and are medically examined. During the examination, answers to sensitive questions on sexual and other behaviors are also collected using an audio and computer self-interview. During NHANES 2007–2012, a total of 8,827 persons aged 14–39 years were interviewed, and 8,563 were examined, for an overall response rate of 75%. Of those examined, 8,330 (97%) provided a urine sample that was tested for *C. trachomatis* using the Hologic/Gen-Probe Aptima nucleic acid amplification test. Nucleic acid testing of urine specimens detects urethral infection in males and both urethral and cervical infection in females. Prevalence of chlamydial infection and CIs were estimated by demographic and health care–related characteristics. Participants who responded "yes" to the question, "Have you ever had vaginal, anal, or oral sex" during the audio and computer self-interview were considered to be sexually active; chlamydia prevalence was estimated among this subset of respondents. Prevalence among sexually active females was estimated by age and race/ethnicity and by current use of oral contraceptives or a long-acting injectable contraceptive (i.e., DepoProvera). Prevalence ratios (PRs) and CIs were calculated to assess relative differences in prevalence. Difference in overall prevalence by NHANES cycle was assessed by the Rao-Scott chi-square test. All estimates were weighted to be nationally representative of the U.S. population, accounting for unequal probabilities of selection and nonresponse. Population counts were estimated by multiplying weighted prevalence estimates by the average of the Current Population Survey estimates during the three NHANES cycles (2007–2008, 2009–2010, and 2011–2012).

Among participants aged 14–39 years, overall chlamydia prevalence was 1.7% (CI = 1.4%–2.0%) suggesting that there are approximately 1.8 million prevalent infections nationally (CI = 1.4–2.1 million) (Table). Genital chlamydial infection was associated with age, race/ethnicity, income, marital status, number of sexual partners, and education. Prevalence of chlamydia among non-Hispanic blacks was approximately seven times the prevalence among non-Hispanic whites (PR = 6.7; CI = 4.3–10.6), and prevalence among Mexican-Americans was approximately three times the prevalence among non-Hispanic whites (PR = 2.9; CI = 1.7–5.1). Prevalence among sexually active participants who reported one sex partner in the last year was 1.4% (CI = 1.1%–1.7%), less than the 3.2% (CI = 2.2%–4.2%) prevalence among participants who reported two or more partners (PR = 0.4; CI = 0.3–0.7). Among sexually active female participants, prevalence was

* Additional information available at http://www.cdc.gov/nchs/nhanes.htm.

TABLE. Prevalence of genital *Chlamydia trachomatis infection among persons aged 14–39 years, by selected characteristics — National Health and Nutrition Examination Survey, United States, 2007–2012**

Characteristic	Sample size	Prevalence (%)	(95% CI)	Prevalence ratio	(95% CI)
Total	**8,330**	**1.7**	**(1.4-2.0)**		
Sex					
Male	4,181	1.4	(1.1–1.8)	0.7	(0.5–1.1)
Female	4,149	2.0	(1.5–2.5)	1.0	
Age group (yrs)					
14–19	2,724	2.4	(1.7–3.1)	1.0	
20–24	1,456	2.9	(2.1–3.6)	1.2	(0.8–1.7)
25–39	4,150	1.1	(0.7–1.4)	0.4	(0.3–0.8)
Race/Ethnicity†					
Mexican-American	1,640	2.3	(1.4–3.1)	2.9	(1.7–5.1)
Black, non-Hispanic	1,887	5.2	(4.0–6.4)	6.7	(4.3–10.6)
White, non-Hispanic	3,019	0.8	(0.5–1.1)	1.0	
Poverty-to-income ratio§					
<100%	1,490	2.3	(1.5–3.0)	1.5	(1.1–2.0)
≥100%	3,615	1.6	(1.2–2.0)	1.0	
Current health insurance¶					
Covered	5,753	1.6	(1.3–1.9)	0.8	(0.6–1.1)
Not covered	2,553	2.0	(1.5–2.5)	1.0	
Education**					
≤High school/GED	3,092	2.7	(2.1–3.4)	2.4	(1.6–3.6)
>High school/GED	3,371	1.1	(0.8–1.5)	1.0	
Marital status**					
Never married	2,131	2.3	(1.7–3.0)	2.8	(1.8–4.6)
Divorced/Widowed/Separated	429	3.0	(0.9–5.2)	3.7	(1.6–8.8)
Married/Living with Partner	3,043	0.8	(0.5–1.2)	1.0	
Currently using oral contraceptives/DepoProvera††§§					
Yes	553	1.9	(0.7–3.1)	0.8	(0.4–1.6)
No	2,331	2.3	(1.7–3.0)	1.0	
No. of sex partners in last year§§					
0	402	1.8	(0.6–3.0)	0.6	(0.3–1.1)
1	3,727	1.4	(1.1–1.7)	0.4	(0.3–0.7)
≥2	1,686	3.2	(2.2–4.2)	1.0	
Age at first sex§§					
<14 yrs	779	2.6	(1.5–3.8)	1.4	(0.9–2.4)
≥14 yrs	5,062	1.8	(1.5–2.2)	1.0	
Past STD diagnosis§§¶¶					
Yes	579	1.9	(0.8–3.0)	0.8	(0.4–1.7)
No	1,564	2.3	(1.4–3.3)	1.0	

Abbreviations: CI = confidence interval; GED = General Education Development certification; STD = sexually transmitted disease.

* Prevalence estimates based urine specimen tested using the Hologic/Gen-Probe Aptima assay.

† Data for persons of other racial/ethnic groups, including other race, Hispanic (n = 925) and persons of multiple race/ethnicity (n = 859), are not presented but are included in overall analyses.

§ Ratio of family income to poverty level as defined by the U.S. Census Bureau.

¶ Based on response to the question, "Are you covered by health insurance or some other health care plan?"

** Among persons aged ≥18 years.

†† Among females.

§§ Among persons who answered "yes" to the question, "Have you ever had vaginal, anal, or oral sex?" (n = 5,848).

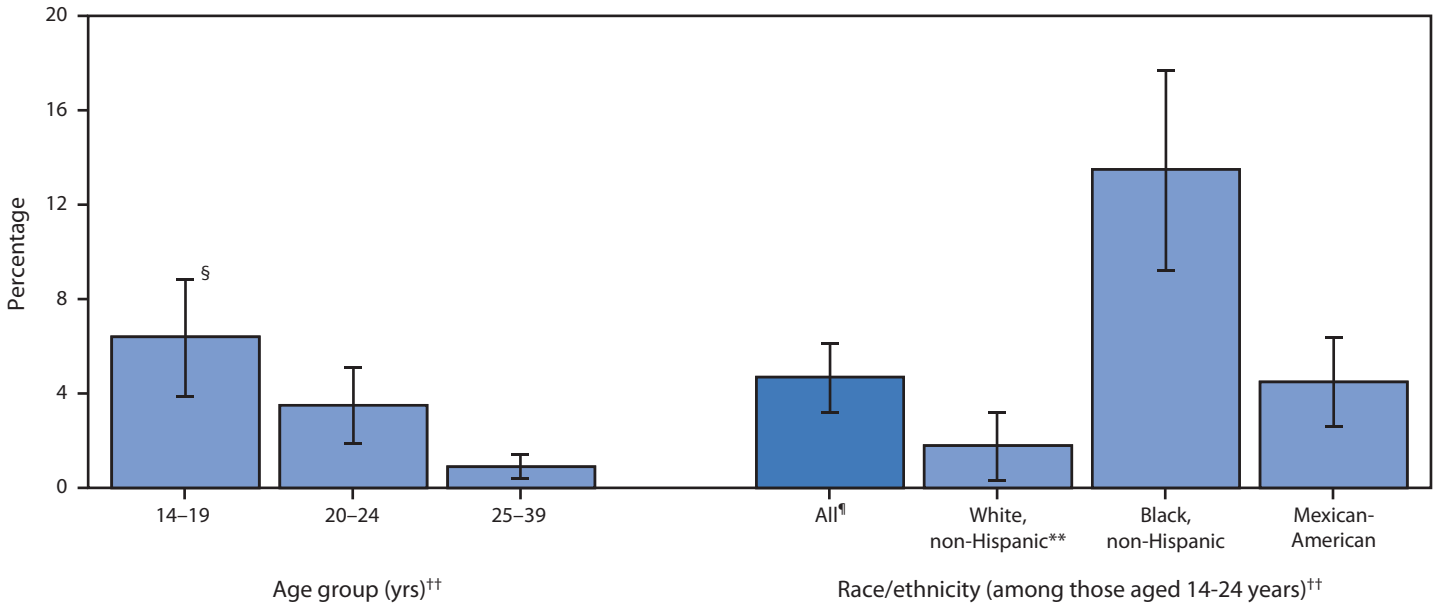
¶¶ Participants who have been told by a doctor or other health care professional in the last 12 months that they had chlamydia or gonorrhea or have ever been told they have herpes or genital warts.

similar among women who were current users of oral contraceptives or DepoProva and women who were not using those birth control methods (PR = 0.8; CI = 0.4–1.6).

Among sexually active females, prevalence of chlamydia decreased with age (p<0.05) (Figure). Prevalence among sexually active females aged 14–24 years (the population targeted for chlamydia screening) was 4.7% overall (CI = 3.2%–6.1%) and varied by race/ethnicity (p<0.05) (Figure). Among sexually active females aged 14–24 years, approximately one in seven non-Hispanic black females was infected with chlamydia (prevalence = 13.5%; CI = 9.2%–17.7%); one in 22 Mexican-American females was infected (prevalence = 4.5%; CI = 2.6%–6.4%), and one in 55 non-Hispanic white females was infected (prevalence = 1.8%; CI = 0.3%–3.2%).

Overall prevalence of chlamydial infection among persons aged 14–39 years was similar over the three NHANES

FIGURE. Prevalence of genital *Chlamydia trachomatis among sexually active† females aged 14–39 years, by age group and race/ethnicity — National Health and Nutrition Examination Survey, United States, 2007–2012**



* Prevalence estimates based urine specimen tested using the Hologic/Gen-Probe Aptima assay.
† Among females who answered "yes" to the question, "Have you ever had vaginal, anal, or oral sex?" (n = 2,887).
§ 95% confidence interval.
¶ Data for persons of other racial/ethnic groups, including other, Hispanic (n = 492) and persons of multiple race/ethnicity (n = 422) are not presented but are included in overall estimate.
** Relative standard error >40% but <50% (n = 7).
†† Differences are statistically significant at p<0.05.

cycles combined for this analysis: 2007–2008: 1.6% (CI = 1.1%–2.2%); 2009–2010: 1.7% (CI = 1.2%–2.1%); and 2011–2012: 1.9% (CI = 1.5%–2.2%).

Discussion

Chlamydia is the most commonly reported nationally notifiable disease, with over 1.4 million infections reported in 2012 (*3*). However, case reports likely underestimate the burden of disease because most infections are asymptomatic and are neither diagnosed nor reported. At the same time, because untreated chlamydia can persist, case report data are strongly influenced by screening activity, increasing with extensive screening and decreasing with limited screening. For these reasons, case report data are not reliable indicators of either population incidence or population prevalence. NHANES provides the best national estimate of chlamydia prevalence. The 2007–2012 NHANES indicate that an estimated 1.8 million persons aged 14–39 years in the United States have a genital chlamydial infection. Prevalence was highest among adolescents and young adults aged <25 years. Young persons might be at increased risk for infection because of biologic risk factors (e.g., cervical ectopy might predispose to infection and is more common in younger women), contextual risk factors (e.g., some young persons might lack power in relationships to insist upon condom use), or behavioral risk factors (e.g., younger persons might be more likely to have sex with new partners or sex with multiple partners) (*1*).

Although infection was more common among participants with multiple sex partners in the last year, prevalence among sexually active participants reporting only one partner in the last year was 1.4%, suggesting that not having had recent multiple partners does not eliminate risk for infection. Among sexually active females, use of oral contraceptives or DepoProvera was not associated with chlamydial infection, although use of these methods might be confounded by condom use because women using hormonal contraceptives might be less likely to use barrier contraceptives. Although previous studies have shown that use of hormonal contraceptives is associated with chlamydial infection (*4*), these studies were not population-based, and the hormonal contraceptives used were older formulations. Longitudinal studies using current formulations of contraceptives might be useful to better determine how contraceptive choice, including hormonal contraceptives and condom use, affects the acquisition of chlamydial infection.

Evidence suggests that chlamydia screening is cost-effective at prevalence >3% (*5*). Prevalence among sexually active

What is already known on this topic:

Chlamydia (*Chlamydia trachomatis* infection) is the most commonly reported notifiable disease in the United States, but case reports likely underestimate burden of disease because infections are usually asymptomatic and go undetected. Data from the 1999–2008 National Health and Nutrition Examination Surveys (NHANES) showed that chlamydia prevalence varies by age, sex, and race/ethnicity. Annual screening of sexually active women aged <25 years is recommended by the U.S. Preventive Services Task Force.

What is added by this report:

During NHANES 2007–2012, chlamydia prevalence was 1.7% among persons aged 14–39 years in the United States. Among sexually active females aged 14–24 years, chlamydia prevalence was 4.7% overall and 13.5% among non-Hispanic blacks.

What are the implications for public health practice:

High chlamydia prevalence among sexually active young females in the United States supports screening of all sexually active young females annually so that infected persons can be diagnosed and they and their sex partners can be treated promptly.

young women aged 14–24 years was 4.7% overall, suggesting that routine screening of young women continues to be a cost-effective preventive intervention. However, in the United States, chlamydia screening rates are suboptimal, with fewer than half of sexually active young women screened annually. (*6*)

Similar to analyses of earlier NHANES data (*7,8*), this analysis found notable racial/ethnic disparities. Prevalence among sexually active, non-Hispanic black females aged 14–24 years was 13.5%, seven times the prevalence among white females (1.8%). Although the reasons for these racial/ethnic disparities are unknown, they might reflect different exposures to chlamydia because of differences in prevalence of chlamydia in sexual networks, as well as decreased access to routine preventive care that includes chlamydia screening and timely partner treatment. Effectively addressing disparities might require targeted interventions. In addition to requiring federally funded programs to focus efforts on populations with high burden of sexually transmitted infections, CDC currently funds the Community-Based Approaches to Reducing Sexually Transmitted Diseases (CARS) initiative to reduce disparities through implementation of interdisciplinary interventions, including facilitating enhanced community-clinical linkages to promote prevention and control of sexually transmitted infections.

The findings in this report are subject to at least four limitations. First, prevalence estimates do not include chlamydial infections at nongenital sites that can be infected through sexual contact, such as the rectum and oropharynx. Thus, prevalence estimates presented in this report are likely to underestimate the actual burden of sexually transmitted infection. Because rectal chlamydial infections might facilitate transmission of human immunodeficiency virus, further understanding of the prevalence of rectal infection is needed. Second, small sample sizes resulted in estimates with wide CIs. Although no temporal trend in prevalence was detected over the three survey cycles, the analysis likely was underpowered to detect epidemiologically significant changes in prevalence over time. Also because of small sample size, CDC was not able to provide estimates stratified by the sex of respondents or that of sex partners, or by both sex and age, except for estimates among sexually active young women, among whom prevalence is high. Third, some participants might have falsely reported being or not being sexually active. Finally, although the diagnostic tests for *C. trachomatis* used in NHANES are >95% sensitive and >99% specific, some results might be falsely positive or negative.

Currently, the U.S. Preventive Services Task Force recommends annual screening of all sexually active females aged <25 years and screening of older women at increased risk (e.g., women who have new or multiple sex partners) (*2*). Additionally, CDC recommends that men who report rectal sex should be screened at least annually and that targeted urogenital screening of sexually active young men in high-prevalence clinics might be considered (*9*). Treatment for chlamydia is simple and effective (*9*). However, reinfection is common, in part because of reinfection from an untreated partner (*10*). Clinicians should routinely screen young women and men who have sex with men for chlamydia and ensure that infected patients and their sex partners receive timely treatment to prevent reinfection (*9*). Strategies to increase screening in clinical facilities might include patient and clinician education and structural interventions at the health care facility, such as adding prompts to the electronic medical record (*6*). Timely treatment of sex partners might be facilitated by use of patient-delivered partner therapy, recommended by CDC for sexually transmitted chlamydial infection since 2006 (*9*).

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References

1. Stamm WE. *Chlamydia trachomatis* infections in the adult. In: Holmes KK, Sparling PF, Stamm WE, et al (eds). Sexually transmitted diseases. 4th edition. New York, NY: McGraw-Hill; 2008:595–606.
2. LeFevre ML. Screening for chlamydia and gonorrhea: U.S. Preventive Services Task Force recommendation statement. Ann Intern Med 2014; September 23 [Epub ahead of print].
3. CDC. Sexually transmitted disease surveillance 2012. Atlanta, GA: US Department of Health and Human Services, CDC; 2013. Available at http://www.cdc.gov/std/stats12/default.htm.

4. Mohllajee AP, Curtis KM, Martins SL, Peterson HB. Hormonal contraceptive use and risk of sexually transmitted infections: a systematic review. Contraception 2006;73:154–65.
5. Marrazzo JM, Celum CL, Hillis SD, Fine D, DeLisle S, Handsfield HH. Performance and cost-effectiveness of selective screening criteria for *Chlamydia trachomatis* infection in women. Implications for a national Chlamydia control strategy. Sex Transm Dis 1997;24:131–41.
6. Hoover KW, Leichliter JS, Torrone EA, Loosier PS, Gift TL, Tao G. Chlamydia screening among females aged 15–21 years—multiple data sources, United States, 1999–2010. MMWR 2014;63:80–8.
7. Datta SD, Sternberg M, Johnson RE, et al. Gonorrhea and chlamydia in the United States among persons 14 to 39 years of age, 1999 to 2002. Ann Intern Med 2007;147:89–96.
8. Datta SD, Torrone E, Kruszon-Moran, et al. *Chlamydia trachomatis* trends in the United States among persons 14 to 39 years of age, 1999–2008. Sex Transm Dis 2012;39:92–6.
9. CDC. Sexually transmitted diseases treatment guidelines, 2010. MMWR 2010;59(No. RR-12).
10. Batteiger BE, Tu W, Ofner S, et al. Repeated *Chlamydia trachomatis* genital infections in adolescent women. J Infect Dis 2010;201:42–51.

Vaccination with Tetanus, Diphtheria, and Acellular Pertussis Vaccine of Pregnant Women Enrolled in Medicaid — Michigan, 2011–2013

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In October 2011, the Advisory Committee on Immunization Practices (ACIP) first recommended the routine administration of a tetanus, diphtheria, and acellular pertussis vaccine (Tdap) during pregnancy as a strategy to protect infants from pertussis (also known as whooping cough) (*1*). This recommendation applied to women previously unvaccinated with Tdap and specified the optimal vaccination time as late second or third trimester (after 20 weeks' gestation) (*1*). By vaccinating pregnant women, infants, who are at highest risk for mortality and morbidity from pertussis, gain passive immunity from maternal antibodies transferred to them in utero (*2–4*). Since this recommendation was made, little has been published on the percentage of women receiving Tdap during pregnancy. In Michigan, Medicaid pays for costs of pregnancy for approximately 40% of births (*5*). Infants enrolled in Medicaid are a particularly vulnerable population; in Michigan, their all-cause mortality is higher than that of privately insured infants.* To assess vaccination coverage among pregnant women enrolled in a publicly funded insurance program in Michigan, Medicaid administrative claims data and statewide immunization information system data for mothers of infants born during November 2011–February 2013 were analyzed. This report describes the results of that analysis, which indicated that only 14.3% of these women received Tdap during pregnancy, with rates highest (17.6%) among non-Hispanic, non-Arab whites and lowest (6.8%) among Arab women.† Vaccination was related to maternal age and gestational age at birth, but not to adequacy of prenatal care. In 2013, recognizing the importance of Tdap for every pregnancy, ACIP revised its guidelines to include a Tdap dose during every pregnancy (*6*). Ensuring that all infants receive the protection against pertussis afforded by maternal vaccination will require enhanced efforts to vaccinate pregnant women.

Birth certificates for infants born during November 2011–February 2013 were linked to maternal Medicaid claims data. Only women who delivered their first infant at age ≥18 years and who received full Medicaid benefits for at least 1 month between 20 weeks gestation and live birth were included. Preterm and full-term infants (defined as those delivered at ≤42 weeks' gestation) were included. Pregnant adolescents were excluded because they should be vaccinated with Tdap based on their age (i.e., 11–18 years), independent of their pregnancy status. Using each infant's birth date and gestational age at birth, an approximate date of conception was calculated. *International Classification of Diseases, Ninth Revision* (ICD-9) procedural codes for vaccination with Tdap (code 99.39) and the *Current Procedural Terminology* codes for vaccination with Tdap (code 90715) were used to identify vaccinations given any time during pregnancy. Statewide immunization information system data from the Michigan Care Improvement Registry supplemented Medicaid data to capture more complete vaccination histories during pregnancy.

The percentage of women who received a Tdap vaccination at any time during pregnancy and disparities in vaccination administration based on maternal race/ethnicity were evaluated. Maternal race/ethnicity was categorized as non-Hispanic and non-Arab white ("white"), non-Hispanic and non-Arab black ("black"), non-Hispanic and non-Arab Asian ("Asian"), non-Hispanic and non-Arab Native American ("Native American"), Hispanic, or Arab based on the birth certificate. Other potential predictors of vaccination were assessed including gestational age at live birth, plurality of the pregnancy, maternal age at live birth, and adequacy of prenatal care use using the Kotelchuck index (*7*). Relative risks assessed differences by maternal race and ethnicity adjusting for two significant predictors of vaccination, maternal age and gestational age at delivery. An alpha level of <0.05 denoted statistical significance.

A total of 15,181 women were included in the study (Table 1). The majority of women were white (59.3%), and the second largest racial/ethnic group was black (29.6%). Approximately 65.5% of infants were born full-term (at ≥39 weeks), and the overwhelming majority of pregnancies were singleton (98.7%). Based on the Kotelchuck index, over half of the study population received either intermediate (37.6%) or inadequate (37.5%) prenatal care. The median maternal age at delivery for the entire study population was 21.0 years (Table 1).

Among the study population, 14.3% of women received Tdap during pregnancy (Table 1). Differences in vaccination

* Michigan ranks second in the United States for largest Arab population. The Division for Vital Records and Health Statistics at the Michigan Department of Community Health collects Arab ethnicity on the birth certificate.

† Information available at https://michigan.gov/documents/mdch/Infant_Mortality_Final_Deliverable_433533_7.pdf.

coverage by maternal race and ethnicity were noted; 17.6% of whites, 8.4% of blacks, 11.9% of Asians, and 21.9% of Native Americans received Tdap during pregnancy. Among Hispanic women, 15.3% received Tdap, whereas 6.8% of Arab women received the vaccine during pregnancy. Based on bivariate analyses, infant's gestational age (full-term versus pre-term) and maternal age at delivery were significant predictors of Tdap vaccination ($p \leq 0.001$). Adequacy of prenatal care was not a predictor of Tdap vaccination. Women whose care was rated "adequate" or "adequate plus" were not more likely to have been vaccinated than women whose care was rated "intermediate" or "inadequate."

Unadjusted and adjusted relative risks (RRs) and 95% confidence intervals (CIs) for Tdap vaccination were calculated based on maternal race and ethnicity (Table 2). Whites were significantly more likely to receive Tdap compared with blacks (RR = 2.1; CI = 1.8–2.3), Asians (RR = 1.5; CI = 1.1–2.0), and Arabs (RR = 2.6; CI = 1.9–3.7). No significant difference in Tdap coverage was observed between white women and Hispanic women (RR = 1.1, CI = 1.0–1.4) or between white women and Native American women (RR = 0.8, CI = 0.5–1.2).

Discussion

Based on Medicaid administrative claims data and the statewide immunization information system records, 14.3% of publicly insured women who delivered their first child during November 2011–February 2013 received Tdap during pregnancy. Because the 2011 ACIP recommendation was

TABLE 1. Demographic characteristics and Tdap vaccination status during pregnancy among women aged ≥18 years enrolled in Michigan Medicaid and delivering their first child during November 2011–February 2013

	Overall		Tdap during pregnancy		No Tdap during pregnancy	
Characteristic	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**
Total study population	**15,181**	**(100)**	**2,168**	**(14.3)**	**13,013**	**(85.7)**
Maternal race and ethnicity*						
Non-Hispanic and non-Arab white	8,975	(59.3)	1,583	(17.6)	7,392	(82.4)
Non-Hispanic and non-Arab black	4,477	(29.6)	375	(8.4)	4,102	(91.6)
Non-Hispanic and non-Arab Asian	311	(2.1)	37	(11.9)	274	(88.1)
Non-Hispanic and non-Arab Native American	73	(0.5)	16	(21.9)	57	(78.1)
Hispanic	806	(5.3)	123	(15.3)	683	(84.7)
Arab	484	(3.2)	33	(6.8)	451	(93.2)
Gestational age at birth						
<39 weeks	5,235	(34.5)	657	(12.6)	4,578	(87.4)
≥39 weeks (full term)	9,946	(65.5)	1511	(15.2)	8,435	(84.8)
Plurality						
Singleton	14,985	(98.7)	2,139	(14.3)	12,846	(85.7)
Multiple	195	(1.3)	29	(14.9)	166	(85.1)
Kotelchuck index						
Adequate plus	2,267	(15.7)	322	(14.2)	1,945	(85.8)
Adequate	1,326	(9.2)	171	(12.9)	1,155	(87.1)
Intermediate	5,427	(37.6)	821	(15.1)	4,606	(84.9)
Inadequate	5,413	(37.5)	785	(14.5)	4,628	(85.5)
Median maternal age at delivery (yrs)	21		22		21	

Abbreviation: Tdap = tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine.
* Missing values for race and ethnicity (n = 55), plurality (n = 1), and Kotelchuck index (n = 748).

TABLE 2. Unadjusted and adjusted relative risks for Tdap vaccination during pregnancy, by maternal race/ethnicity, among women aged ≥18 years enrolled in Michigan Medicaid and delivering their first infant during November 2011–February 2013

	Unadjusted		Adjusted	
Maternal race/ethnicity	**RR**	**(95% CI)**	**RR**	**(95% CI)***
White† versus black†	2.1	(1.9–2.3)§	2.1	(1.8–2.3)§
White† versus Asian†	1.5	(1.1–2.0)§	1.5	(1.1–2.0)§
White† versus Native American†	0.8	(0.5–1.2)	0.8	(0.5–1.2)
White† versus Hispanic	1.2	(1.0–1.4)	1.1	(1.0–1.4)
White† versus Arab	2.6	(1.9–3.6)§	2.6	(1.9–3.7)§

Abbreviations: Tdap = tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine; RR = relative risk; CI = confidence interval.
* Adjusted for maternal age at delivery and gestational age at birth.
† Non-Hispanic and non-Arab.
§ Statistically significant.

only for unvaccinated women and women could have received Tdap before pregnancy, a 100% coverage rate for Tdap during pregnancy would not be expected. However, based on data from the 2012 National Health Interview Survey, only 14.2% of adults reported receiving Tdap in the past 7 years (*8*). With such a low proportion of the general population having received Tdap, a higher proportion of pregnant women in this population would be expected to have received Tdap if ACIP recommendations had been consistently followed.

Black, Asian, and Arab women were significantly less likely to receive Tdap during pregnancy compared with white women, even after controlling for significant predictors of vaccination (infant's gestational age and maternal age at delivery). No significant difference in vaccination was observed between Hispanic women or Native American women and white women. Racial disparities in prenatal vaccination have also been observed with the influenza vaccination; black women (45.4%) were less likely to receive the influenza vaccine compared with white women (52.2%) (*9*).

A previous study examining Tdap coverage among privately insured women of reproductive age (regardless of pregnancy status) found that 45.5% of women received Tdap during their lifetime (*10*). No racial or ethnic differences in receipt of Tdap were observed; almost 80% of the study population were white women (*10*). Results based on the privately insured population of reproductive age differ from these results for the publicly insured Medicaid population, for whom Tdap coverage was assessed during pregnancy.

The findings in this report are subject to at least six limitations. First, only vaccines administered during pregnancy were captured in the dataset. This study did not capture pre- or postpartum vaccinations because Tdap administrations during those periods are unlikely to provide passive immunity to the infant. Second, the Medicaid administrative claims database only captures vaccinations that were correctly billed to and paid by Medicaid. Third, vaccinations administered at locations other than physicians' offices might not be included in this dataset. Fourth, because birth records were linked to maternal Medicaid claims to identify a cohort of women, the study population only included women delivering a live infant and cannot represent all pregnant women. Fifth, although no significant difference in vaccination was observed between white women and Native American women, the result should be interpreted with caution because of small sample sizes. Finally, results from this study are based on a publicly insured population and might not be generalizable to other insured populations.

Vaccinating pregnant women remains the best strategy for protecting newborns against pertussis. Effective February 2013, ACIP revised its previous recommendation to include a Tdap dose during every pregnancy, regardless of previous Tdap vaccination history (*6*). Future studies should reevaluate vaccination coverage to determine whether coverage improved after the 2013 ACIP recommendation. Further exploration into reasons for racial and ethnic disparities in Tdap vaccination also is needed.

Increased education for clinicians, parents, and families might increase adherence to ACIP recommendations. Public health programs should encourage the use of immunization registries and immunization prompts, as well as develop better partnerships with clinicians responsible for prenatal vaccinations.

What is already known on this topic?

In 2011, the Advisory Committee on Immunization Practices first recommended routine vaccination with tetanus, diphtheria, and acellular pertussis vaccine (Tdap) of pregnant women who had never received it. Vaccinating pregnant women is an important strategy for providing passive immunity to infants, who are at highest risk from pertussis.

What is added by this report?

To assess whether pregnant women enrolled in Medicaid in Michigan were being vaccinated with Tdap during pregnancy, Michigan Medicaid administrative claims data and statewide immunization information system data were analyzed. The analysis indicated that only 14.3% of women received Tdap during pregnancy, with rates highest among non-Hispanic, non-Arab whites and lowest among Arab women. Vaccination was related to maternal age and gestational age at birth, but not to adequacy of prenatal care.

What are the implications for public health practice?

Ensuring that all infants receive the protection against pertussis afforded by maternal vaccination will require enhanced efforts, such as increased education of clinicians, parents, and families.

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References

1. CDC. Updated recommendations for use of tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccine (Tdap) in pregnant women and persons who have or anticipate having close contact with an infant aged <12 months—Advisory Committee on Immunization Practices, 2011. MMWR 2011;60:1424–6.
2. Gall SA, Myers J, Pichichero M. Maternal immunization with tetanus-diphtheria-pertussis vaccine: effect on maternal and neonatal serum antibody levels. Am J Obstet Gynecol 2011;204:334.e1–e5.
3. Hardy-Fairbanks AJ, Pan SJ, Decker MD, et al. Immune responses in infants whose mothers received Tdap vaccine during pregnancy. Pediatr Infect Dis J 2013;32:1257–60.

4. Healy CM, Rench MA, Baker CJ. Importance of timing of maternal combined tetanus, diphtheria, and acellular pertussis (Tdap) immunization and protection of young infants. Clin Infect Dis 2013; 56:539–44.
5. Michigan League for Human Services. Right Start in Michigan and its counties, 2011. Lansing, MI: Michigan League for Human Services; 2011. Available at http://www.milhs.org/wp-content/uploads/2011/07/RightStartJuly2011.pdf.
6. CDC. Advisory Committee on Immunization Practices (ACIP) recommended immunization schedules for persons aged 0 through 18 years and adults aged 19 years and older—United States, 2013. MMWR 2013;62(Suppl 1).
7. Kotelchuck M. An evaluation of the Kessner Adequacy of Prenatal Care Index and a proposed Adequacy of Prenatal Care Utilization Index. Am J Public Health 1994;84:1414–20.
8. Williams WW, Lu P-J, O'Halloran A, et al. Noninfluenza vaccination coverage among adults—United States, 2012. MMWR 2014;63:95–102.
9. CDC. Influenza vaccination coverage among pregnant women—United States, 2012–13 influenza season. MMWR 2013;62:787–92.
10. Kharbanda EO, Parker ED, Nordin JD, Hedblom BD, Rolnick SJ. Influenza and pertussis vaccination coverage among privately insured women of reproductive age. Matern Child Health J 2013;17:1631–7.

Announcements

World Heart Day — September 29, 2014

World Heart Day will be observed September 29, 2014. The focus of World Heart Day this year is creating heart-healthy environments in which persons are able to make heart-healthy choices wherever they live, learn, work, and play. Heart disease and stroke are the world's leading causes of death, claiming an estimated 17.3 million lives in 2008, and representing 30% of all deaths worldwide (*1*). A heart-healthy environment can help persons make healthy choices to reduce their risk for heart disease. World Heart Day 2014 encourages persons to reduce their risk for cardiovascular disease by promoting smoke-free environments, environments that encourage physical activity, access to healthy food choices, and a heart-healthy planet for all.

CDC is working to help create heart-healthy environments in multiple ways, including community-based approaches, such as the Sodium Reduction in Communities Program (SRCP), and community-clinical linkages, such as the Million Hearts Initiative. SRCP aims to increase access to and accessibility of lower-sodium food options while building the evidence base on population approaches to reduce sodium consumption at the community level. Million Hearts aims to prevent 1 million heart attacks and strokes by 2017 by bringing together communities, health systems, nonprofit organizations, federal agencies, and private-sector partners from across the country to fight heart disease and stroke and their risk factors.

Additional information about World Heart Day is available at http://www.world-heart-federation.org/?id=123. Additional information about Million Hearts, SRCP, and CDC's Healthy Community Programs is available at http://millionhearts.hhs.gov and http://www.cdc.gov/nccdphp/dch/programs/healthycommunitiesprogram/index.htm.

Reference

1. World Health Organization. Global status report on noncommunicable diseases 2010. Geneva, Switzerland: World Health Organization; 2011. Available at http://www.who.int/nmh/publications/ncd_report2010.

World Rabies Day — September 28, 2014

September 28, 2014, is the 8th annual World Rabies Day. Rabies is a fatal acute encephalitis caused by lyssaviruses (*1*). The number of human rabies deaths worldwide is estimated to exceed 55,000 each year (*2*). In the United States, wild animal reservoirs serve as the most important source of infection. However, over 90% of human deaths globally are caused by bites by rabid dogs (*3*).

Rabies control and prevention efforts focus on elimination of canine rabies through mass vaccination campaigns and treatment of exposed persons with prompt wound care and administration of human rabies immune globulin and vaccine. Although rabies is preventable, a lack of accurate data on the burden of disease, inadequate rabies diagnostic laboratory capacity, and poor access to rabies vaccine for postexposure prophylaxis has delayed progress towards regional goals for human rabies elimination.

Blueprints developed by international rabies experts can be used for the development of country-specific rabies elimination plans (*4*). These blueprints focus on describing the epidemiology of rabies, improving surveillance, raising awareness among clinicians and the public, achieving high canine vaccination coverage, and ensuring reliable diagnostic, cold chain, and vaccine procurement capacity (*5*).

Despite many challenges, considerable progress has been made in the Western Hemisphere; human rabies mortality has been reduced by more than 90% over the past century (*6*). Communicable disease programs proven to be successful in settings similar to those where canine rabies is endemic can be emulated for rabies control and prevention efforts in the future. Also, lessons learned during rabies control efforts can prove valuable for responding to emerging zoonotic diseases (*7*).

References

1. CDC. Rabies. Atlanta, GA: US Department of Health and Human Services, CDC; 2013. Available at http://www.cdc.gov/rabies.
2. World Health Organization. WHO Expert Consultation on Rabies. Second report. World Health Organ Tech Rep Ser 2013;982.
3. Aréchiga Ceballos N, Karunaratna D, Aguilar Setién A. Control of canine rabies in developing countries: key features and animal welfare implications. Rev Sci Tech 2014;33:311–21.
4. Global Alliance for Rabies Control. Blueprint for rabies prevention and control. Manhattan, KS: Global Alliance for Rabies Control; 2010. Available at http://www.rabiesblueprint.com.
5. Franka R, Smith TG, Dyer JL, Wu X, Niezgoda M, Rupprecht CE. Current and future tools for global canine rabies elimination. Antiviral Res 2013;100:220–5.
6. CDC. Human rabies prevention—United States, 2008: recommendations of the Advisory Committee on Immunization Practices. MMWR 2008;57(No. RR-3).
7. Klepac P, Metcalf CJ, McLean AR, Hampson K. Towards the endgame and beyond: complexities and challenges for the elimination of infectious diseases. Philos Trans R Soc Lond B Biol Sci 2013;368:20120137.

Erratum

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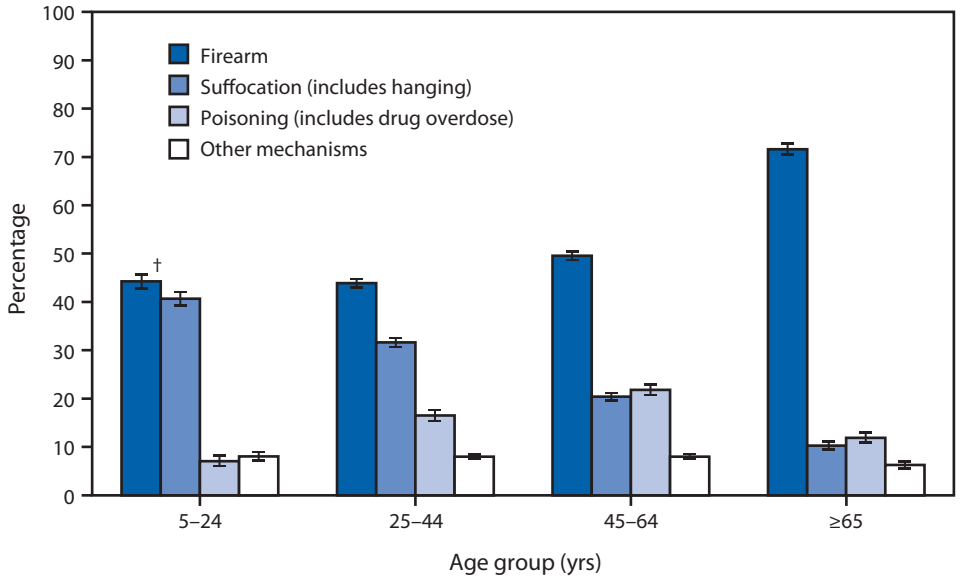
In the report, "Influenza Vaccination Performance Measurement Among Acute Care Hospital-Based Health Care Personnel — United States, 2013–14 Influenza Season," on page 814, in the first full paragraph of the second column, the third sentence should read, "However, a validation study conducted prior to NHSN reporting indicated hospital-reported HCP vaccination data were **categorized** in a manner consistent with measure definitions (*9*)."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Suicide Deaths, by Mechanism* and Age Group — United States, 2011



* Suicide deaths were categorized by mechanism of injury using the following *International Classification of Diseases, Tenth Revision* codes: firearm (X72–X74), suffocation (X70), poisoning (X60–X69) and other mechanisms (U03, X71, X75–X84, and Y87.0).
† 95% confidence interval.

In 2011, firearm was the leading mechanism for suicide deaths for all age groups, ranging from 44% of suicides among persons aged 5–24 years to 72% of suicides among persons aged ≥65 years. Suffocation was the second leading mechanism in the two younger age groups (41% of suicides among persons aged 5–24 years and 32% of suicides among persons aged 25–44 years). In contrast, poisoning was the second leading mechanism (22%) among adults aged 45–64 years and those aged ≥65 years (8%).

Source: National Vital Statistics System mortality data. Available at http://www.cdc.gov/nchs/deaths.htm.

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