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HIV Testing at Visits to Physicians' Offices in the U.S., 2009–2012

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Abstract

Introduction: HIV testing serves as an entry point for HIV care services for those who test HIV positive, and prevention services for those who test HIV negative. The Centers for Disease Control and Prevention recommends routine testing of adults and adolescents in healthcare settings. To identify missed opportunities for HIV testing at U.S. physicians' offices, data from the National Ambulatory Care Surveys from 2009 to 2012 were analyzed.

Methods: The mean annual number and percentage of visits with an HIV test among HIV-uninfected nonpregnant females and males aged 15–65 years was estimated using weighted survey data. Factors associated with HIV testing at visits to physicians' offices were identified.

Results: The mean annual number of U.S. physicians' office visits with an HIV test conducted was 1,396,736 (0.4% of all visits) among nonpregnant females and 986,891 (0.5% of all visits) among males. For both nonpregnant females and males, HIV testing prevalence was highest among those aged 20–29 years (1.3% of all visits by nonpregnant females; 1.7% of all visits by males) and non-Hispanic blacks (1.1% of all visits by nonpregnant females; 1.0% of all visits by males). An HIV test was not conducted at 98.5% of visits at which venipuncture was performed for both nonpregnant females and males.

Conclusions: Important opportunities exist to increase HIV testing coverage at U.S. physicians' offices. Structural interventions, such as routine opt-out testing policies, electronic medical record notifications, and use of non-clinical staff for testing could be implemented to increase HIV testing in these settings.

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SUPPLEMENTAL MATERIAL

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INTRODUCTION

HIV testing has numerous individual and public health benefits. Early HIV diagnosis and treatment improves individual clinical outcomes and reduces HIV transmission.[1,2] For those who test HIV negative and are at substantial risk of HIV acquisition, testing serves as an entry point for prevention services, such as pre-exposure prophylaxis (PrEP), a highly effective biomedical intervention where HIV-negative individuals at substantial risk take HIV antiretroviral medication to prevent infection. HIV testing also leads to a greater awareness of serostatus, which may reduce the risk of transmission through behavioral modification for those with newly diagnosed HIV infection.[3] In 2006, the Centers for Disease Control and Prevention (CDC) published recommendations for routine opt-out testing for persons aged 13–64 years in all healthcare settings except in communities where the prevalence of undiagnosed HIV infection is <0.1%.[4] In 2013, the U.S. Preventive Services Task Force (USPSTF) published recommendations for HIV screening of all persons aged 15–65 years.[1] In 2015, the National HIV/AIDS Strategy listed specific goals consistent with these recommendations including to reduce the number of new diagnoses by 25% and to increase to 90% the percentage of people living with HIV who know their serostatus.[5] Despite both CDC and the USPSTF recommendations encouraging routine testing of adults and adolescents, this has not yet occurred. In 2014, only 38% of adults aged ≥18 years participating in the National Health Interview Survey reported ever having had an HIV test.[6] In addition, 13% of the 1.2 million people living with HIV were unaware of their infection in 2012.[7]

One potential missed opportunity for the diagnosis of HIV is during visits to U.S. physicians' offices. Patients seen in these settings could benefit from having established care with rapid transition into treatment for those who test HIV positive, or prevention services for those at risk who test HIV negative. Recent studies however reported that even among HIV care providers, many continue to conduct risk-based instead of routine opt-out HIV testing.[8] Local campaigns to increase HIV testing by healthcare organizations and health departments have demonstrated an increase in testing, diagnosis, treatment, and linkage to care.[9–11] Other studies from both urban and rural physicians' offices found patient acceptance rates of routine testing between 47% and 62%.[12,13] These results indicate that opportunities exist for increased testing at physicians' offices, many patients accept routine testing, and that campaigns promoting implementation of the CDC guidelines can lead to the diagnosis of new cases with increased linkage to care.

To identify missed opportunities for testing and linkage to HIV care and prevention services, an analysis of HIV testing at visits to U.S. physicians' offices using data collected from the National Ambulatory Medical Care Survey (NAMCS) was conducted.

METHODS

Study Sample

Data from the 2009 to 2012 NAMCS (www.cdc.gov/nchs/ahcd/index.htm) were analyzed to estimate the mean annual number and percentage of visits to U.S. physicians' offices where an HIV test was performed in HIV-uninfected people aged 15–65 years. The methods used for these surveys are described elsewhere.[14] NAMCS, a component of the National Health Care Surveys, is a national probability survey of patient visits to office-based physicians' clinics.[14] Clinical and demographic information from a random sample of visits are obtained through medical chart abstraction by clinic staff or Census Bureau field representatives at selected clinics who agree to participate. HIV testing data are collected as a check box field on the data collection instrument and are not obtained through billing codes. The survey is conducted annually by the National Center for Health Statistics (NCHS) at CDC. NAMCS protocols are reviewed and approved annually by the NCHS Research Ethics Review Board. Waivers of the requirement of informed consent of patients and authorization for release of patient medical record data were granted prior to the initiation of each annual survey.[14] Physicians classified as "office-based, patient care" by the American Medical Association or the American Osteopathic Association and who meet the following criteria are eligible for participation: "principally engaged in patient care activities; non-federally employed, and not in the specialties of anesthesiology, pathology, and radiology." Office types sampled include private solo or group practices, free-standing clinics/urgent care centers, community health centers, mental health centers, non-federal government clinics, family planning clinics, HMOs and other prepaid practices, and faculty practices. Eligible physicians are sampled using a multistage probability design that allows for weighting to generate nationally representative estimates of visits to physicians' offices. The nonresponse rate for invited physicians ranged from 38% to 61% from 2009 to 2012.

Measures

Factors associated with HIV testing at visits to U.S. physicians' offices in HIV-uninfected nonpregnant females and males aged 15–65 years were examined. The mean annual number and percentage of visits where an HIV test was conducted among HIV-uninfected pregnant females was estimated. However, factors associated with HIV testing among pregnant females was not reported because of potential confounding arising from differences in healthcare utilization among pregnant women. Pregnancy and HIV status were defined using ICD-9 codes and Reason for Visit codes consistent with pregnancy and HIV respectively (Appendix Table 1). Results for community health centers were included in this analysis for years 2009–2011, however results had not yet been released for 2012 by NCHS. To increase the statistical power, aggregate statistics combined over years 2009 through 2012 were produced. Results are reported as weighted mean annual estimates.

For nonpregnant females and males the mean annual number and percentage of visits with an HIV test was estimated by age, race/ethnicity, insurance type, venipuncture (defined as having one of the following tests performed at a visit: lipids/cholesterol, complete blood count, hemoglobin A1c, prostate-specific antigen, glucose, or other blood test), provider specialty, visit type (preventive visit versus other), office setting (private practice versus other non-private practice), geographic region, territory type (urban versus rural), and patient sexually transmitted disease (STD) risk. The other category of office setting included free standing clinics/urgicenters (not part of hospital emergency department or outpatient department), community health centers, family planning clinics, HMO or other prepaid practices, Faculty Practice Plan visits, and other ambulatory clinics. STD risk was defined using ICD-9 and Reason for Visit codes for STDs or codes consistent with risk for STD acquisition, such as high-risk sexual behaviors and forced sex (Appendix Table 1, available online).

Statistical Analysis

To properly account for the complex survey design, weighted analyses were employed using unmasked versions of the survey design strata obtained at the CDC research data center. Whenever available, the imputed versions of the NAMCS variables were used. The proportion of visits with an HIV test were compared by subgroups using chi-square tests with a two-sided *p*-value significance level of <0.05. In accordance with NCHS policies, only results based on unweighted cell sizes of five or more visits were reported.

Logistic regression with predictive margins approach was employed to identify factors associated with HIV testing.[15,16] All predictor variables except for venipuncture were included in the initial model, and backward elimination was employed to remove predictor variables that were non-significant at $\alpha \leq 0.2$ level of significance (Appendix Tables 2 and 3, available online). Venipuncture was not included in the initial model because of collinearity with HIV testing. Weighted maximum likelihood estimation and Taylor linearization methods were used to obtain correct SE estimates, and the related 95% CIs and *p*-values.[16] Missing values were assumed to be missing at random. Records with missing values on one or more variables were not included in the analysis; however, imputed values were included. The study proposal, analytic code, and the final analysis tables and figures were reviewed and approved by NCHS research data center staff. Analyses were undertaken from 2015 to 2016 using SAS, version 9.3, and SUDAAN, version 11.

RESULTS

From 2009 to 2012 the mean annual number of visits with an HIV test was 1,396,736 (0.4% of all visits) among nonpregnant females (Table 1), 1,011,984 (3.2% of all visits) among pregnant females (data not shown) and 986,891 (0.5% of all visits) among males (Table 2). No significant differences in HIV testing prevalence were found between survey years (data not shown). Of the total mean annual visits with an HIV test among women, 42% were among pregnant women (data not shown).

HIV testing occurred most frequently at visits by those aged 20–29 years for both nonpregnant females (1.3% of all visits, $p<0.001$ compared with those aged 40–49 years) and males (1.7% of all visits, $p<0.001$ compared with those aged 40–49 years; Tables 1 and 2). For those aged ≥20–29 years, the mean annual percentage of visits with an HIV test decreased with increased age. The lowest HIV testing prevalence was among those aged 50–65 years for nonpregnant females (0.09% of all visits) and males (0.1% of all visits). Among nonpregnant females, non-Hispanic blacks (1.1% of all visits, prevalence ratio [PR]=5.0, $p<0.001$) and Hispanics (0.9% of all visits, PR=3.8, $p<0.001$) had a significantly higher HIV testing prevalence compared with whites. Similarly, compared with white males, non-Hispanic black males (1.0% of all visits, PR=2.9, $p<0.001$) and Hispanic males (0.7% of all visits, PR=2.1, $p<0.05$) had significantly higher HIV testing prevalence.

Among nonpregnant females, HIV testing prevalence was highest among those with Medicaid (0.7% of all visits, PR=1.6, $p<0.05$, compared with those with private insurance; Table 1). Among males, HIV testing prevalence was highest at visits where no insurance was billed (0.9% of all visits; Table 2); however, the difference compared with those with private insurance (PR=1.8, $p=0.1$) was not statistically significant. For both females and males, HIV testing prevalence was lowest among those with other types of insurance (includes Medicare, workers compensation, and other categories). Venipuncture performed at a visit was significantly associated with higher HIV testing prevalence compared with visits where venipuncture was not performed for both nonpregnant females (1.5% of all visits, PR=9.2, $p<0.001$) and males (1.5% of all visits, PR=11.0, $p<0.001$). Despite the association with HIV testing, there were many visits where venipuncture was performed but no HIV test was conducted: 62,089,249 mean annual visits by nonpregnant females (98.5% of visits with venipuncture) and 48,218,630 mean annual visits by males (98.5% of visits with venipuncture).

HIV testing prevalence was highest at visits to Obstetrics and Gynecology providers for females and General and Family Medicine for males. HIV testing was lowest at visits to other provider types for both nonpregnant females and males. However, HIV testing prevalence was lower at visits to private practice offices compared with other office visits for nonpregnant females (0.4% of all visits, PR=0.5, $p<0.01$) and males (0.4% of all visits, PR=0.4, $p<0.001$). Preventive visits had significantly higher HIV testing prevalence compared with non-preventive visits for both nonpregnant females and males (PR=5.6, $p<0.001$, and PR=3.6, $p<0.001$, respectively).

HIV testing prevalence was similar across regions for nonpregnant females ranging from 0.3% of all visits in the Midwest to 0.5% in the South. Among males, HIV testing prevalence was highest in the West (0.6% of all visits, PR=2.0, $p=0.06$) compared with the Midwest. Urban sites had higher HIV testing prevalence than nonurban sites for both nonpregnant women (0.5% of all visits, PR=8.6, $p<0.01$) and males (0.5% of all visits, PR=2.3, $p=0.07$).

Finally, HIV testing prevalence was highest among those at risk for STDs: 9.4% of visits by nonpregnant women with an STD risk (PR=28.9, $p<0.001$) and 14.1% of visits by males with an STD risk (PR=46.9, $p<0.001$) compared with nonpregnant women and males without an STD risk. There was no significant difference in HIV testing prevalence between males with an STD risk compared with nonpregnant women with an STD risk (PR=1.5, $p=0.15$); however, there was significantly higher HIV testing prevalence at visits made by individuals with an STD risk in the South and West compared with visits made by individuals with an STD risk in the Midwest (Table 3).

In the final model, among nonpregnant women, younger age (adjusted prevalence ratio [APR]=0.15, $p<0.001$ for women aged 50–65 years compared with women aged 20–29 years); non-Hispanic black race/ethnicity (APR=3.3, $p<0.001$, compared with non-Hispanic white); Hispanic race/ethnicity (APR=2.2, $p=0.001$, compared with non-Hispanic white); non-private practice clinics (APR=0.6, $p=0.4$ for private practice compared with non-private practice clinics); urban clinics (APR=7.3, $p<0.001$); preventive visits (APR=3.3, $p<0.001$);

and STD risk (APR=12.5, p<0.001) all remained significantly associated with HIV testing at visits to physicians' offices (Table 4). Among males, in the final model, younger age (APR=0.12, p<0.001 for males for aged 50–65 years compared with males aged 20–29 years); provider specialty (APR=0.18, p<0.001 for other compared with Internal Medicine visits); preventive visits (APR=3.0, p<0.001); and STD risk (APR=31.8, p<0.001) all remained significantly associated with HIV testing (Table 4).

DISCUSSION

HIV testing identifies undiagnosed HIV infection and provides an entry point for prevention and care services, such as PrEP and early initiation of antiretroviral therapy. Physicians' offices are important venues for HIV testing in the U.S. Patients tested at physicians' offices can benefit from established care through which rapid initiation of HIV prevention and care services, or rapid referral, can occur. These results are consistent with and expand upon previous studies examining HIV testing among young males,[17] and indicate that the CDC and USPSTF recommendations for routine testing among adults and adolescents have been applied more successfully to certain groups in these settings. For example, whereas pregnant women make up 6% of the reproductive-age female population (aged 15–44 years) they accounted for 42% of all visits with an HIV test among females, a testament to the effectiveness of prenatal screening programs.[18] Among males, the number of new HIV diagnoses is highest for those aged 20–29 years, the same age group found to have the highest HIV testing prevalence at visits to physicians' offices in this analysis.[19] Similarly, the age range with the highest number of new HIV diagnoses among women is 25–39 years.[19] HIV testing prevalence was highest at visits by nonpregnant females aged 20–29 years in this analysis. Black females have a higher rate of new HIV diagnoses and were found to be tested more frequently in these settings.[19] Finally, patients at risk for or with STDs, an important marker of biological and behavioral risk for HIV, also had a higher HIV testing prevalence compared with those without an STD risk. Among patients with an STD risk, there was also significant geographic variation in HIV testing, with testing occurring more frequently at visits made in the South and West compared with the Midwest. Although these findings may represent a higher number of diagnoses in these populations because of higher testing rates, they more likely indicate that providers are aware of the epidemiology of HIV and are conducting targeted, rather than routine, testing, for groups with higher transmission rates.

A systems-level approach to routinize HIV testing, rather than relying on risk-based testing strategies, could be implemented to increase HIV testing coverage in these settings. This strategy might include structural interventions, such as opt-out testing policies; removal of barriers to HIV testing (i.e., informed consent forms rather than opt-out testing models); use of non-clinical staff for testing; electronic medical record notifications; and provider educational campaigns. HIV testing during pregnancy is a good example of how these types of interventions can be successfully integrated into an existing practice to increase coverage. Although these results indicate that having venipuncture performed was associated with HIV testing, the vast majority of visits with venipuncture did not have an HIV test completed. With an opt-out testing model an HIV test could easily be added whenever a patient has a blood draw performed. Finally, the finding that HIV testing is less frequent among nonpregnant females in rural settings is concerning. A recent outbreak of HIV among persons who inject drugs in rural Indiana has highlighted the importance of testing in rural settings, and efforts should be made to increase testing in these jurisdictions.[20]

Limitations

This study had some limitations. The number and percentage of visits at which an HIV test occurred were analyzed, not the percentage of patients tested for HIV. If a patient had multiple visits per year, depending on their risk status, it may not have been appropriate to test them at each individual visit. In addition, the optimal frequency of testing is not well defined, and thus the optimal percentage of visits with an HIV test that would be required to reach testing goals is unknown. Because of a relatively small number of HIV tests performed, the ability to conduct subgroup analysis was limited by small cell size. Differences in HIV testing prevalence between urban and rural territories may have been mediated by the underlying prevalence of HIV infection within communities; however, analyses at the community level were not possible because of small cell sizes. Also, HIV testing data were collected as a checkbox field in the chart abstraction form, not from laboratory records, and as a result underreporting of HIV tests by providers may have impacted the results if the tests were not documented in the patient's chart. Nonresponse bias is a possible concern. Between 38% and 61% of providers contacted to participate in the survey did not respond. Providers at community health centers had the highest nonresponse rates for three of the four survey years. Data for community health centers were available only for survey years 2009–2011. By not including community health center data for 2012, the results likely underestimate the percentage of visits with an HIV test, as providers at these sites often serve higher-risk populations and were found to test patients for HIV more frequently in the 2009–2011 NAMCS than other care providers. Finally, the definition for STD risk includes the ICD-9 code for "high-risk sexual behavior," which may be underreported by patients and inconsistently interpreted by providers.

CONCLUSIONS

Important opportunities exist to increase HIV testing at U.S. physicians' offices. Testing in these settings serves a dual purpose: to identify undiagnosed persons with HIV with rapid linkage to care and to identify HIV-negative individuals at substantial risk of HIV acquisition who might benefit from prevention services, such as PrEP. Structural interventions could be implemented to increase HIV testing coverage in these settings. To achieve routine testing goals among adults and adolescents as recommended by CDC and USPSTF, as well as the goals outlined in the National HIV/AIDS Strategy, testing should be expanded beyond existing programs. With support, U.S. physicians' offices are well positioned to lead this expanded testing effort.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

HIV Testing at Visits to U.S. Physicians' Offices by Nonpregnant Females Aged 15–65 Years

	Total mean annual visits		Mean annual visits with an HIV test		Mean annual visits without an HIV test				
Characteristic	**Weighted *n* (%)**	**Unweighted *n* (%)**	**Weighted *n* (%)**	**Unweighted *n* (%)**	**Weighted *n* (%)**	**Unweighted *n* (%)**	**HIV testing prevalence (95% CI)**	**Prevalence ratio (95% CI)**	***p*-value**
Total	328,897,822	56,956	1,396,736	234	327,501,086	56,722	0.42 (0.33, 0.54)		
Age, years									**<0.001**
15–19	20,304,704 (6.2)	3,416	108,274 (7.8)	25	20,196,430 (6.2)	3,391	0.53 (0.31, 0.91)	0.41 (0.22, 0.75)	**0.004**
20–29	41,294,831 (12.6)	7,191	536,514 (38.4)	88	40,758,317 (12.4)	7,103	1.30 (0.95, 1.77)	ref	
30–39	53,977,515 (16.4)	9,293	417,474 (29.9)	66	53,560,040 (16.4)	9,227	0.77 (0.55, 1.08)	0.60 (0.40, 0.90)	**0.013**
40–49	73,402,205 (22.3)	12,509	210,637 (15.1)	32	73,191,568 (22.3)	12,477	0.29 (0.16, 0.51)	0.22 (0.13, 0.38)	**<0.001**
50–65	139,918,567 (42.5)	24,547	123,837 (8.9)	23	139,794,731 (42.7)	24,524	0.09 (0.04, 0.19)	0.07 (0.03, 0.16)	**<0.001**
Race/ethnicity									**<0.001**
Non-Hispanic white	238,120,720 (72.4)	41,688	544,991 (39.0)	87	237,575,729 (72.5)	41,601	0.23 (0.16, 0.32)	ref	
Non-Hispanic black	41,052,835 (12.5)	6,507	467,529 (33.5)	75	40,585,306 (12.4)	6,432	1.14 (0.77, 1.69)	4.98 (2.96, 8.36)	**<0.001**
Hispanic	34,659,340 (10.5)	5,920	297,901 (21.3)	51	34,361,438 (10.5)	5,869	0.86 (0.60, 1.24)	3.76 (2.31, 6.11)	**<0.001**
Non-Hispanic other	15,064,927 (4.6)	2,841	86,314 (6.2)	21	14,978,614 (4.6)	2,820	0.57 (0.30, 1.08)	2.50 (1.28, 4.91)	**0.008**
Insurance type									**<0.001**
Medicaid	32,242,837 (10.2)	6,379	220,861 (17.3)	59	32,021,977 (10.2)	6,320	0.68 (0.46, 1.02)	1.61 (1.01, 2.59)	**0.047**
Private	221,665,994 (70.0)	35,733	940,312 (73.6)	114	220,725,683 (70.0)	35,619	0.42 (0.32, 0.57)	ref	
Uninsured	24,159,396 (7.6)	4,648	64,178 (5.0)	23	24,095,218 (7.6)	4,625	0.27 (0.13, 0.56)	0.63 (0.29, 1.36)	0.237
Other	38,504,427 (12.2)	7,299	52,053 (4.1)	19	38,452,373 (12.2)	7,280	0.14 (0.08, 0.24)	0.32 (0.17, 0.60)	**<0.001**
Geographic region									0.773
Northeast	63,363,366 (19.3)	9,440	287,126 (20.6)	55	63,076,240 (19.3)	9,385	0.45 (0.28, 0.72)	1.39 (0.63, 3.08)	0.420
Midwest	65,379,525 (19.9)	13,395	213,486 (15.3)	49	65,166,039 (19.9)	13,346	0.33 (0.17, 0.62)	ref	
South	129,605,966 (39.4)	19,488	616,761 (44.2)	79	128,989,204 (39.4)	19,409	0.48 (0.31, 0.72)	1.46 (0.68, 3.14)	0.336
West	70,548,966 (21.5)	14,633	279,364 (20.0)	51	70,269,603 (21.5)	14,582	0.40 (0.27, 0.58)	1.21 (0.57, 2.57)	0.615
Office setting									**0.004**

Characteristic	Total mean annual visits		Mean annual visits with an HIV test		Mean annual visits without an HIV test		HIV testing prevalence (95% CI)	Prevalence ratio (95% CI)	*p*-value
	Weighted *n* (%)	Unweighted *n* (%)	Weighted *n* (%)	Unweighted *n* (%)	Weighted *n* (%)	Unweighted *n* (%)			
Private practice	293,019,962 (89.1)	47,608	1,122,520 (80.4)	129	291,897,442 (89.1)	47,479	0.38 (0.29, 0.51)	0.50 (0.31, 0.80)	**0.004**
Other	35,877,860 (10.9)	9,348	274,216 (19.6)	105	35,603,645 (10.9)	9,243	0.76 (0.53, 1.10)	ref	
Territory type									**0.002**
Urban	272,377,111 (85.8)	46,157	1,356,058 (98.1)	222	271,021,052 (85.8)	45,935	0.50 (0.39, 0.64)	8.58 (2.24, 32.89)	**0.002**
Rural/other	45,000,145 (14.2)	8,428	26,109 (1.9)	6	44,974,035 (14.2)	8,422	0.06 (0.02, 0.22)	ref	
Provider specialty									**<0.001**
General and family practice	81,097,052 (24.7)	13,234	342,409 (24.5)	78	80,754,642 (24.7)	13,156	0.42 (0.30, 0.59)	0.95 (0.40, 2.25)	0.908
Internal medicine	49,484,031 (15.0)	4,734	219,848 (15.7)	35	49,264,183 (15.0)	4,699	0.44 (0.20, 0.98)	ref	
Obstetrics and gynecology	43,795,601 (13.3)	5,946	658,625 (47.2)	93	43,136,976 (13.2)	5,853	1.50 (1.08, 2.09)	3.38 (1.44, 7.97)	**0.005**
Other	154,521,139 (47.0)	33,042	175,854 (12.6)	28	154,345,285 (47.1)	33,014	0.11 (0.05, 0.25)	0.26 (0.08, 0.77)	**0.016**
Visit type									**<0.001**
Preventive	54,530,500 (16.9)	8,381	730,584 (53.0)	123	53,799,917 (16.7)	8,258	1.34 (1.00, 1.79)	5.56 (3.78, 8.18)	**<0.001**
Other	268,608,368 (83.1)	47,720	647,054 (47.0)	105	267,961,314 (83.3)	47,615	0.24 (0.17, 0.34)	ref	
STD risk									**<0.001**
Yes	3,598,836 (1.1)	550	338,547 (24.2)	57	3,260,289 (1.0)	493	9.41 (6.12, 14.18)	28.92 (17.42, 48.01)	**<0.001**
No	325,298,987 (98.9)	56,406	1,058,189 (75.8)	177	324,240,797 (99.0)	56,229	0.33 (0.25, 0.43)	ref	
Venipuncture									**<0.001**
Yes	63,047,149 (19.2)	8,939	957,900 (68.6)	151	62,089,249 (19.0)	8,788	1.52 (1.12, 2.06)	9.20 (6.19, 13.68)	**<0.001**
No	265,850,674 (80.8)	48,017	438,836 (31.4)	83	265,411,838 (81.0)	47,934	0.17 (0.12, 0.22)	ref	

Note: Boldface Indicates statistical significance ($p < 0.05$). Visits are weighted using a four-stage probability sampling design employed by the National Ambulatory Medical Care survey to allow generator of nationally representative estimates of patient visits. Prevalence ratios are unadjusted. Missing values were not included in these results.

STD, sexually transmitted disease.

Table 2.

HIV Testing at Visits to U.S. Physicians' Offices by Males Aged 15–65 Years

Predictor	Total mean annual visits		Mean annual visits with an HIV test		Mean annual visits without an HIV test		HIV testing prevalence (95% CI)	Prevalence ratio (95% CI)	*p*-value
	Weighted *n* (%)	Unweighted *n* (%)	Weighted *n* (%)	Unweighted *n* (%)	Weighted *n* (%)	Unweighted *n* (%)			
Total	219,952,254	39,262	986,891	174	218,965,363	39,088	0.45 (0.36, 0.57)		
Age, years									**<0.001**
15–19	17,516,584 (8.0)	2,909	102,357 (10.4)	12	17,414,227 (8.0)	2,897	0.58 (0.30, 1.13)	0.35 (0.17, 0.74)	**0.006**
20–29	21,741,029 (9.9)	3,952	361,742 (36.7)	56	21,379,287 (9.8)	3,896	1.66 (1.14, 2.42)	ref	
30–39	30,902,680 (14.0)	5,503	219,379 (22.2)	40	30,683,301 (14.0)	5,463	0.71 (0.45, 1.13)	0.43 (0.23, 0.79)	**0.007**
40–49	47,128,284 (21.4)	8,289	200,214 (20.3)	41	46,928,070 (21.4)	8,248	0.42 (0.26, 0.71)	0.26 (0.14, 0.46)	**<0.001**
50–65	102,663,677 (46.7)	18,609	103,199 (10.5)	25	102,560,478 (46.8)	18,584	0.10 (0.05, 0.19)	0.06 (0.03, 0.12)	**<0.001**
Race/ethnicity									**<0.001**
Non-Hispanic white	165,033,679 (75.0)	29,861	573,489 (58.1)	87	164,460,190 (75.1)	29,774	0.35 (0.25, 0.48)	ref	
Non-Hispanic black	21,578,287 (9.8)	3,610	218,033 (22.1)	49	21,360,254 (9.8)	3,561	1.01 (0.64, 1.59)	2.91 (1.65, 5.11)	**<0.001**
Hispanic	23,537,821 (10.7)	3,964	172,512 (17.5)	30	23,365,309 (10.7)	3,934	0.73 (0.42, 1.28)	2.11 (1.14, 3.92)	**0.018**
Non-Hispanic other	9,802,467 (4.5)	1,827	22,857 (2.3)	8	9,779,611 (4.5)	1,819	0.23 (0.07, 0.75)	0.67 (0.20, 2.25)	0.518
Insurance type									**0.008**
Medicaid	16,424,484 (7.8)	3,220	55,924 (6.0)	26	16,368,560 (7.8)	3,194	0.34 (0.18, 0.65)	0.71 (0.36, 1.37)	0.305
Private	146,933,168 (69.8)	24,609	708,849 (75.9)	85	146,224,319 (69.7)	24,524	0.48 (0.36, 0.64)	ref	
Uninsured	14,490,697 (6.9)	3,253	125,801 (13.5)	38	14,364,896 (6.9)	3,215	0.87 (0.47, 1.61)	1.80 (0.90, 3.61)	0.098
Other	32,783,158 (15.6)	6,043	42,984 (4.6)	12	32,740,174 (15.6)	6,031	0.13 (0.05, 0.34)	0.27 (0.10, 0.73)	**0.009**
Geographic region									0.223
Northeast	44,446,930 (20.2)	6,831	166,379 (16.9)	40	44,280,550 (20.2)	6,791	0.37 (0.21, 0.65)	1.20 (0.54, 2.68)	0.649
Midwest	44,059,052 (20.0)	9,285	136,988 (13.9)	30	43,922,064 (20.1)	9,255	0.31 (0.18, 0.55)	ref	
South	81,841,144 (37.2)	12,897	380,932 (38.6)	62	81,460,212 (37.2)	12,835	0.47 (0.31, 0.70)	1.50 (0.74, 3.03)	0.262
West	49,605,128 (22.6)	10,249	302,592 (30.7)	42	49,302,537 (22.5)	10,207	0.61 (0.42, 0.89)	1.96 (0.98, 3.92)	0.056
Office setting									**<0.001**

Predictor	Total mean annual visits		Mean annual visits with an HIV test		Mean annual visits without an HIV test		HIV testing prevalence (95% CI)	Prevalence ratio (95% CI)	*p*-value
	Weighted *n* (%)	**Unweighted *n* (%)**	**Weighted *n* (%)**	**Unweighted *n* (%)**	**Weighted *n* (%)**	**Unweighted *n* (%)**			
Private practice	193,752,003 (88.1)	32,618	719,714 (72.9)	90	193,032,289 (88.2)	32,528	0.37 (0.28, 0.49)	0.36 (0.22, 0.59)	**<0.001**
Other	26,200,251 (11.9)	6,644	267,177 (27.1)	84	25,933,074 (11.8)	6,560	1.02 (0.67, 1.55)	ref	
Territory type									0.073
Urban	182,172,424 (85.7)	31,819	896,944 (93.2)	163	181,275,481 (85.7)	31,656	0.49 (0.38, 0.63)	2.28 (0.93, 5.64)	0.073
Rural/other	30,345,859 (14.3)	5,811	65,397 (6.8)	7	30,280,462 (14.3)	5,804	0.22 (0.09, 0.51)	ref	
Provider specialty									**<0.001**
General and family practice	60,790,568 (27.6)	9,548	568,871 (57.6)	94	60,221,697 (27.5)	9,454	0.94 (0.70, 1.24)	1.34 (0.74, 2.40)	0.331
Internal medicine	38,303,314 (17.4)	3,714	268,073 (27.2)	42	38,035,241 (17.4)	3,672	0.70 (0.42, 1.16)	ref	
Other	120,858,372 (54.9)	26,000	149,947 (15.2)	38	120,708,426 (55.1)	25,962	0.12 (0.07, 0.21)	0.18 (0.09, 0.36)	**<0.001**
Visit type									**<0.001**
Preventive	29,154,026 (13.5)	4,605	350,755 (35.6)	65	28,803,272 (13.4)	4,540	1.20 (0.81, 1.78)	3.56 (2.22, 5.72)	**<0.001**
Other	187,374,822 (86.5)	34,120	633,188 (64.4)	108	186,741,633 (86.6)	34,012	0.34 (0.26, 0.45)	ref	
STD risk									**<0.001**
Yes	2,354,018 (1.1)	417	331,935 (33.6)	52	2,022,083 (0.9)	365	14.10 (9.91, 19.68)	46.85 (30.51, 71.94)	**<0.001**
No	217,598,236 (98.9)	38,845	654,956 (66.4)	122	216,943,280 (99.1)	38,723	0.30 (0.23, 0.40)	ref	
Venipuncture									**<0.001**
Yes	48,968,309 (22.3)	7,244	749,679 (76.0)	129	48,218,630 (22.0)	7,115	1.53 (1.17, 2.00)	11.04 (6.58, 18.51)	**<0.001**
No	170,983,945 (77.7)	32,018	237,212 (24.0)	45	170,746,733 (78.0)	31,973	0.14 (0.09, 0.22)	ref	

Note: Boldface Indicates statistical significance ($p < 0.05$). Visits are weighted using a four-stage probability sampling design employed by the National Ambulatory Medical Care survey to allow generation of nationally representative estimates of patient visits. Prevalence ratios are unadjusted. Missing values were not included in these results.

STD, sexually transmitted disease.

Table 3.

HIV Testing at Visits to U.S. Physicians' Offices Among Those With STD Risk

Characteristic	Total mean annual visits, *n* (%)	Mean annual visits with an HIV test, *n* (%)	Mean annual visits without an HIV test, *n* (%)	HIV testing prevalence (95% CI)	Prevalence ratio (95% CI)	*p*-value
Total	5,952,854	670,482	5,282,372			
Gender						0.150
Nonpregnant female	3,598,836 (60.5)	338,547 (50.5)	3,260,289 (61.7)	9.41 (6.12, 14.18)	ref	
Male	2,354,018 (39.5)	331,935 (49.5)	2,022,083 (38.3)	14.10 (9.91, 19.68)	1.50 (0.86, 2.60)	0.150
Geographic region						**<0.001**
Northeast	833,638 (14.0)	39,482 (5.9)	794,156 (15.0)	4.74 (2.20, 9.89)	1.11 (0.40, 3.13)	0.837
Midwest	1,129,533(19.0)	47,996 (7.2)	1,081,537 (20.5)	4.25 (2.08, 8.47)	ref	
South	2,573,149 (43.2)	408,846 (61.0)	2,164,302 (41.0)	15.89 (11.08, 22.26)	3.74 (1.71, 8.16)	**<0.001**
West	1,416,534 (23.8)	174,158 (26.0)	1,242,376 (23.5)	12.29 (7.89, 18.65)	2.89 (1.27, 6.60)	**0.011**

Note: Boldface indicates statistical significance ($p < 0.05$). Visits are weighted using a four-stage probability sampling design employed by the National Ambulatory Medical Care survey to allow generation of nationally representative estimates of patient visits. Missing values were not included in these results.

STD, sexually transmitted disease.

Table 4.

Multivariable Analysis of HIV Testing at Visits to U.S. Physicians' Offices

	Males		Nonpregnant females	
Characteristic	**APR (95% CI)**	***p*-value**	**APR (95% CI)**	***p*-value**
Age, years		**<0.001**		**<0.001**
15–19	0.53 (0.24, 1.18)	0.119	0.66 (0.34, 1.28)	0.217
20–29	ref		ref	
30–39	0.61 (0.29, 1.27)	0.187	0.88 (0.55, 1.42)	0.608
40–49	0.42 (0.21, 0.83)	**0.013**	0.40 (0.23, 0.69)	**<0.001**
50–65	0.12 (0.05, 0.28)	**<0.001**	0.15 (0.07, 0.34)	**<0.001**
Race/ethnicity		0.132		**<0.001**
Non-Hispanic white	ref		ref	
Non-Hispanic black	1.99 (1.00, 3.96)	0.051	3.26 (1.98, 5.36)	**<0.001**
Hispanic	1.32 (0.71, 2.47)	0.383	2.19 (1.35, 3.55)	**0.001**
Non-Hispanic other	0.51 (0.13, 1.96)	0.328	1.81 (0.89, 3.69)	0.101
Insurance type		0.089		
Medicaid	0.51 (0.24, 1.07)	0.074		
Private	ref			
Uninsured	1.25 (0.59, 2.64)	0.560		
Other	0.43 (0.16, 1.17)	0.098		
Office setting		0.070		**0.040**
Private practice	0.60 (0.35, 1.04)	0.070	0.59 (0.36, 0.98)	**0.040**
Other	ref		ref	
Territory type				**<0.001**
Urban			7.27 (2.28, 23.20)	**<0.001**
Rural/other			ref	
Provider specialty		**<0.001**		**0.020**
General and family practice	1.10 (0.56, 2.14)	0.789	0.85 (0.38, 1.93)	0.698
Internal medicine	ref		ref	
Obstetrics and gynecology	NA		1.41 (0.58, 3.39)	0.446
Other	0.18 (0.08, 0.39)	**<0.001**	0.35 (0.12, 1.02)	0.054

Characteristic	Males APR (95% CI)	Males p-value	Nonpregnant females APR (95% CI)	Nonpregnant females p-value
Visit type		**<0.001**		**<0.001**
Preventive	2.97 (1.76, 5.01)	**<0.001**	3.25 (2.09, 5.04)	**<0.001**
Other	ref		ref	
STD risk		**<0.001**		**<0.001**
Yes	31.84 (19.00, 53.35)	**<0.001**	12.51 (6.90, 22.69)	**<0.001**
No	ref		ref	

Note: Boldface indicates statistical significance ($p < 0.05$). Visits are weighted using a four-stage probability sampling design employed by the National Ambulatory Medical Care surveyto allow generation of nationally representative estimates of patient visits. Missing values were not included in these results.

APR, adjusted prevalence ratio; NA, not applicable; STD, sexually transmitted disease.