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Sexually Transmitted Disease Testing and Uptake of Human Papillomavirus Vaccine in a Large Online Survey of US Men Who Have Sex With Men at Risk for HIV Infection, 2012

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Abstract

National guidelines recommend annual human immunodeficiency virus (HIV)/sexually transmitted disease testing for sexually active men who have sex with men (MSM) and vaccination against human papillomavirus for MSM through age 26. A 2012 online survey of 2,794 MSM found that 51%, 36%, and 14% reported receiving human immunodeficiency virus testing, sexually transmitted disease testing, and human papillomavirus vaccination, respectively.

Men who have sex with men (MSM) in the United States have high rates of sexually transmitted diseases (STDs). Reducing STDs through routine screening and treatment is an important strategy for preventing human immunodeficiency virus (HIV).[1–5] At least annual screening for HIV and STDs is nationally recommended for all sexually active MSM.[6] Previous studies have found that many MSM do not receive all recommended HIV and STD screening.[4–9]

Men who have sex with men are also at high risk for infection and disease associated with human papillomavirus (HPV). Persistent HPV infection is associated with anal and oropharyngeal cancers in men, and HIV is also a major risk factor.[10–13] In December 2011, the Advisory Committee on Immunization Practices recommended routine vaccination against HPV for both girls and boys at age 11–12 years, through age 21 years for men, and through age 26 years for MSM and immunocompromised men.[14] A 2011 study of HPV

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vaccine uptake among MSM found that baseline uptake was 4.9%[15] Little is known about HPV vaccine uptake among MSM since then, although uptake among male adolescents in general has been low.[16]

Ongoing evaluation of how national guidelines are effectively used is essential to understanding barriers to STD screening and HPV vaccination among MSM. For this analysis, we examined STD testing and HPV vaccine uptake among sexually active MSM participating in a national Web-based survey on HIV behavioral risk in 2012.

METHODS

The Web-based HIV Behavioral Survey collected cross-sectional, self-reported data on HIV risk behaviors, HIV and STD testing behaviors, and use of HIV prevention services among a large convenience sample of internet-using MSM in the United States during June to August, 2012. Detailed methods have been described elsewhere.[17] Participants were enrolled through Internet-based sampling methods using banner ads, social media, and peer referral. Men were eligible for participation if they reported being aged 18 years or older, male-identified (not transgender), a resident of a US state or dependent area, able to take the survey in English or Spanish, and ever having oral or anal sex with another man. The survey received Institutional Review Board approval by Emory University and CDC.

Survey questions included demographics, sexual behavior, HIV testing history, drug and alcohol use, and use of HIV prevention services. Respondents were also randomized to complete 1 of 3 additional survey modules, including a module focusing on sexual health care such as STD testing and HPV vaccination. For this analysis, we included only respondents who completed the sexual health care module. To avoid confounding the STD results by HIV care, our analysis focused on MSM at risk for HIV and therefore excluded respondents who self-reported HIV infection or who did not report a male sex partner in the past 12 months. The proportion of respondents reporting either chlamydia and/or gonorrhea testing was similar, thus we defined STD testing as either a self-report of chlamydia or gonorrhea testing in the past 12 months.

Outcomes included HIV or STD testing in the past 12 months, and ever having received any HPV vaccine. These were compared by respondent characteristics. Because HPV vaccine is recommended for MSM through age 26,[14] we assessed age categories 18–20, 21–26, and 27–29 years to compare HPV vaccine uptake and to account for the time because recommendations were made and the completion of data collection.

We calculated adjusted prevalence ratios (aPRs) and 95% confidence intervals (CIs) comparing HIV testing, STD testing, and HPV vaccine uptake by respondent characteristics; significant at a P value of 0.05. We used a condition index (>30) to test for collinearity between independent covariates. Analyses were conducted using SAS v.9.3 (SAS Institute, Cary, NC).

RESULTS

Between June and August 2012, 13,147 nonduplicate respondents were screened and consented for the Web-based HIV Behavioral survey; 11,178 (85%) were eligible for participation; 10,384 (79%) completed the full survey, and 3552 (27%) were randomized to the sexual health care module. After excluding respondents self-reporting HIV infection or no male sex partner in the past 12 months, a total of 2794 respondents were included in this analysis. Median age of respondents was 30 years (interquartile range, 24–42), 79% were white, 60% were college educated, and most (85%) had health insurance (Table 1).

Overall, 51% and 36% reported having been tested for HIV or STDs in the past 12 months, respectively; 30% had tested for both HIV and STDs in the past 12 months. Human immunodeficiency virus testing was significantly associated with younger age (20–39 years compared with age 50+), residing in the south or the west (compared to the Northeast), reporting a health care provider visit in the past 12 months, reporting >1 sex partner, and reporting condomless anal sex with a man. Human immunodeficiency virus testing was significantly lower among men living in rural areas and those who had not participated in HIV prevention programs. The STD testing in the past 12 months was significantly associated with black race or other/multiple races (compared to white), younger age (age, 20–44 years compared with aged 50+ years), health care provider visit in the past 12 months, and >1 male sex partner in the past 12 months. Respondents in rural areas or the Midwest were significantly less likely to have received an STD test.

The HPV vaccine uptake was low among respondents overall (7%) and among participants in the target age range for vaccination (14.0% of men's age, 18–26 years) (Table 2). Among the youngest MSM in our study (age, 18–20 years), 22% reported any HPV vaccination. Respondents from rural areas, the south (compared with the northeast), and those without a health care provider visit in the past 12 months were less likely to report HPV vaccination. Receiving HPV vaccine was significantly associated with other/multiple types of health insurance (compared with no insurance).

DISCUSSION

We report the largest survey of HIV/STD testing and HPV vaccination behaviors among Internet-using MSM in the United States. These findings supplement venue-based research studies by including at-risk MSM who may not be reached at traditional locations.[18–20]

Although national STD treatment guidelines recommend at least annual screening among sexually active MSM, we found that only 36% of MSM had a STD test and 51% had an HIV test in this time frame. This is consistent with findings from comparable studies.[8,21] The high number of respondents with health care visits and low number receiving recommended sexual health screening suggests missed opportunities. We found younger men were more likely to have had an STD test or HIV test. Younger MSM may be more aware of STD and HIV risk and the need for screening through targeted messaging or prevention campaigns[22,23] or they may be seeking STD or HIV screening due to higher infection rates compared with older MSM.[4,24] We also found STD and HIV testing higher among

respondents reporting higher behavior risk (e.g. multiple partners, condomless anal intercourse) that are target populations for STD testing recommendations.[25–27] Respondents residing in rural regions were less likely to have STD or HIV testing. Studies have shown higher rates of STDs among MSM in urban areas.[28] However, MSM in rural settings are also less likely to divulge their sexual identity to providers for multiple reasons, including stigma,[29] thus leading to lower recognition of risk for HIV or STDs.

We found that 14% of MSM aged 18–26 reported receiving HPV vaccine in 2012, which is higher than earlier studies of similarly aged MSM,[1,15] and an encouraging finding given that HPV vaccine recommendations for men were first made in 2011. Human papillomavirus vaccination was associated with younger age. Lower proportions of vaccinated men over age 26 were expected given the age limits in the national recommendations. Among the youngest age MSM in our study (18–20 years), we found that 22% had received HPV vaccination. This finding suggests that vaccine coverage among MSM may continue to climb in future years as national recommendations are implemented.

We acknowledge limitations in our study. First, our online sample is not representative of all MSM. Higher education and access to insurance may lead to increased likelihood to seek information about and receive recommended health care, thus resulting in higher testing and vaccination compared with the general population. Second, we used self-reported data, which might underreport receipt of sexual health services or HIV infections. Third, we did not collect information on symptoms and therefore could not distinguish diagnostic testing versus asymptomatic screening.

In conclusion, we found a low proportion of sexually active MSM in our sample received all services recommended in national guidelines, even among generally well-educated men with access to health care. We found that most MSM routinely accessed health care, suggesting missed opportunities to provide recommended sexual health care.[21] Further research should explore the gaps between recommendations and reported experiences of MSM, particularly regarding actions health care providers can take to ensure that MSM are offered recommended sexual health services. Continued efforts are needed to increase MSM receiving recommended screening for STDs and HPV vaccination, by increasing access to sexual health services and encouraging health care providers to include sexual health as part of routine care.

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TABLE 1

HIV and STD Testing Among Sexually Active MSM Randomized to STD Survey Module, Web-Based HIV Behavioral Survey, United States, 2012

		HIV Test, Past 12 mo						STD Test, Past 12 mo					
	Total	**N (%)**	**(%)**	**PR (95% CI)**		**aPR* (95% CI)**		**N**	**(%)**	**PR (95% CI)**		**aPR* (95% CI)**	
Race/ethnicity													
Black	108	69	(64)	1.28	(1.11–1.49)	1.15	(0.96–1.37)	54	(50)	1.48	(1.22–1.78)	1.27	(1.04–1.56)
Hispanic/Latino†	269	142	(53)	1.06	(0.94–1.20)	0.97	(0.86–1.10)	113	(42)	1.21	(1.05–1.41)	1.07	(0.92–1.25)
White	2200	1094	(50)	Reference		Reference		759	(35)	Reference		Reference	
Other/multiple	175	90	(51)	1.03	(0.89–1.20)	1.07	(0.94–1.22)	75	(43)	1.24	(1.04–1.48)	1.21	(1.02–1.43)
Age, y													
18–19	157	54	(34)	0.81	(0.64–1.04)	0.86	(0.67–1.09)	48	(31)	1.31	(0.98–1.76)	1.24	(0.92–1.67)
20–24	677	342	(51)	1.20	(1.04–1.37)	1.17	(1.03–1.34)	251	(37)	1.59	(1.30–1.95)	1.44	(1.18–1.75)
25–29	556	330	(59)	1.41	(1.23–1.61)	1.33	(1.17–1.50)	255	(46)	1.97	(1.61–2.41)	1.75	(1.44–2.11)
30–34	353	191	(54)	1.28	(1.10–1.49)	1.17	(1.02–1.35)	152	(43)	1.87	(1.51–2.32)	1.63	(1.33–2.00)
35–39	222	116	(52)	1.24	(1.04–1.47)	1.21	(1.04–1.41)	78	(35)	1.49	(1.16–1.92)	1.40	(1.10–1.77)
40–44	238	128	(54)	1.27	(1.08–1.50)	1.16	(0.99–1.35)	89	(37)	1.60	(1.25–2.04)	1.35	(1.07–1.69)
45–49	205	95	(46)	1.10	(0.91–1.32)	1.05	(0.87–1.25)	57	(28)	1.20	(0.90–1.59)	1.11	(0.84–1.46)
50+	386	163	(42)	Reference		Reference		88	(23)	Reference		Reference	
Education													
Less than high school	24	14	(58)	Reference		Reference		8	(33)	Reference		Reference	
High school diploma or equivalency degree	209	77	(37)	0.63	(0.43–0.93)	0.72	(0.52–1.01)	63	(30)	0.86	(0.48–1.53)	0.95	(0.58–1.56)
Some college or technical degree	846	405	(48)	0.82	(0.58–1.16)	0.77	(0.57–1.04)	295	(35)	0.99	(0.57–1.72)	0.89	(0.55–1.43)
College degree or postgraduate	1672	907	(54)	0.93	(0.66–1.31)	0.79	(0.59–1.07)	642	(38)	1.07	(0.62–1.85)	0.89	(0.55–1.42)
Population density‡													
Urban	1560	877	(56)	Reference		Reference		649	(42)	Reference		Reference	
Rural	1234	542	(44)	0.78	(0.72–0.84)	0.88	(0.82–0.94)	369	(30)	0.71	(0.64–0.79)	0.80	(0.72–0.88)
Region													
Northeast	519	252	(49)	Reference		Reference		208	(40)	Reference		Reference	
Midwest	535	226	(42)	0.87	(0.76–0.99)	0.93	(0.82–1.06)	161	(30)	0.75	(0.64–0.88)	0.84	(0.71–0.98)
South	951	511	(54)	1.11	(0.99–1.23)	1.13	(1.01–1.25)	325	(34)	0.84	(0.73–0.96)	0.88	(0.77–1.00)
West	770	422	(55)	1.13	(1.01–1.26)	1.16	(1.05–1.29)	316	(41)	1.02	(0.89–1.16)	1.10	(0.97–1.25)

		HIV Test, Past 12 mo						STD Test, Past 12 mo					
	Total	N (%)	(%)	PR (95% CI)		aPR* (95% CI)		N	(%)	PR (95% CI)		aPR* (95% CI)	
US-dependent areas	19	8	(42)	0.87	(0.51–1.48)	0.86	(0.55–1.36)	8	(42)	1.03	(0.61–1.74)	0.84	(0.49–1.47)
Health insurance													
None	348	154	(44)	Reference		Reference		103	(30)	Reference		Reference	
Private only	2102	1110	(53)	1.19	(1.05–1.35)	1.01	(0.91–1.14)	800	(38)	1.26	(1.07–1.49)	1.08	(0.92–1.27)
Public only	134	71	(53)	1.20	(0.98–1.46)	1.08	(0.90–1.29)	49	(37)	1.30	(0.99–1.70)	1.17	(0.92–1.49)
Other/multiple	126	63	(50)	1.13	(0.92–1.40)	1.01	(0.83–1.23)	43	(34)	1.22	(0.92–1.62)	1.10	(0.84–1.44)
Health care visit, past 12 mo													
No	406	110	(27)	Reference		Reference		61	(15)	Reference		Reference	
Yes	2372	1300	(55)	2.02	(1.72–2.38)	1.79	(1.53–2.10)	949	(40)	2.69	(2.12–3.40)	2.30	(1.83–2.90)
No. male sex partners, past 12 mo													
1	903	264	(29)	Reference		Reference		165	(18)	Reference		Reference	
2–4	810	409	(50)	1.73	(1.53–1.95)	1.58	(1.32–1.88)	281	(35)	1.91	(1.62–2.25)	1.55	(1.22–1.98)
5+	1080	746	(69)	2.36	(2.12–2.64)	2.02	(1.69–2.40)	572	(53)	2.90	(2.51–3.36)	2.22	(1.74–2.83)
Type of male sex partners													
Only main partners	879	284	(32)	Reference		Reference		176	(20)	Reference		Reference	
Only casual partners	769	392	(51)	1.58	(1.40–1.78)	1.01	(0.89–1.15)	272	(35)	1.79	(1.53–2.11)	1.02	(0.84–1.24)
Main and casual partners	1124	731	(65)	2.01	(1.81–2.24)	1.07	(0.93–1.22)	562	(50)	2.51	(2.17–2.89)	1.19	(0.97–1.45)
Anal sex with a man without a condom, past 12 mo													
No	1038	463	(45)	Reference		Reference		322	(31)	Reference		Reference	
Yes	1756	956	(54)	1.22	(1.13–1.32)	1.12	(1.04–1.21)	696	(40)	1.27	(1.15–1.41)	1.10	(0.99–1.22)
One-on-one or group intervention, past 12 mo§													
No	2612	1308	(50)	0.72	(0.64–0.80)	0.76	(0.67–0.86)	933	(36)	0.70	(0.60–0.83)	0.84	(0.69–1.02)
Yes	143	100	(70)	Reference		Reference		74	(52)	Reference		Reference	
Total	2794	1419	(51)					1018	(36)				

Note. Numbers might not add to total because of missing or unknown data.

*Prevalence ratios adjusted for all respondent characteristics presented.

†Hispanics/Latinos can be of any race.

‡Rural locations were defined based on respondent zip code and US Census Bureau data as < 1000 people per square mile and urban locations were defined as ≥ 1000 people per square mile.

[§]One-on-one conversation or small group discussion with an outreach worker, a counselor, or a prevention program worker about ways to protect against HIV or other sexually transmitted diseases; excludes conversations that took place solely as a part of obtaining HIV testing (eg, pretest or posttest counseling).

aPRs, adjusted prevalence ratios; CI, confidence interval.

TABLE 2

Characteristics of Sexually Active MSM Vaccinated for HPV, Web-Based HIV Behavioral Survey, United States, 2012

	Total	N (%)		PR (95% CI)		aPR* (95% CI)	
Race/ethnicity							
Black†	108	4	(4)	0.56	(0.21–1.47)	—	—
Hispanic/Latino‡	269	23	(9)	1.22	(0.80–1.85)	0.88	(0.57–1.36)
White	2200	155	(7)	Reference		Reference	
Other/multiple	175	18	(10)	1.45	(0.91–2.29)	1.1	(0.67–1.79)
Age, y§							
18–20	263	59	(22)	11.92	(7.46–19.03)	13.1	(8.03–21.37)
21–26	835	95	(11)	5.59	(3.55–8.81)	6.32	(3.93–10.16)
27–29	292	17	(6)	2.80	(1.51–5.20)	3.14	(1.67–5.90)
30–34	353	12	(3)	1.65	(0.83–3.30)	1.83	(0.91–3.70)
35+	1051	22	(2)	Reference		Reference	
Population density¶							
Urban	1560	128	(8)	Reference		Reference	
Rural	1234	77	(6)	0.77	(0.59–1.01)	0.68	(0.51–0.90)
Region‖							
Northeast	519	53	(10)	Reference		Reference	
Midwest	535	38	(7)	0.67	(0.45–1.00)	0.76	(0.51–1.13)
South	951	57	(6)	0.57	(0.40–0.82)	0.64	(0.45–0.92)
West	770	57	(7)	0.72	(0.51–1.03)	0.96	(0.67–1.39)
Health insurance							
None	348	13	(4)	Reference		Reference	
Private only	2102	160	(8)	2.03	(1.17–3.53)	1.73	(1.00–2.97)
Public only	134	8	(6)	1.65	(0.70–3.89)	1.44	(0.60–3.46)
Other/multiple	126	15	(12)	3.21	(1.57–6.54)	2.66	(1.32–5.33)
Health care visit, past 12 mo							
No	406	14	(3)	0.44	(0.26–0.75)	0.46	(0.27–0.78)
Yes	2372	189	(8)	Reference		Reference	

	Total	N (%)		PR (95% CI)	aPR* (95% CI)
Total	2794	205	(7)		

Categories collapsed due to small cell size. Percentages may not total to 100% due to small cell sizes.

*Prevalence ratios adjusted for all respondent characteristics presented.

†Suppressed because relative standard error (RSE) >50%.

‡Hispanics/Latinos can be of any race.

§HPV vaccine recommendations are for MSM through age 26 years, therefore age groups were categorized as 18–20, 21–26, and 27–29, 30–34, and 35+ years.

¶Rural locations were defined as < 1000 people per square mile and urban locations were defined as ≥ 1000 people per square mile.

‖US-dependent area excluded due to small cell size.