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HPV vaccine coverage among men who have sex with men – National HIV Behavioral Surveillance System, United States, 2011

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Abstract

Men who have sex with men (MSM) are at high risk for disease associated with human papillomavirus (HPV). In late 2011, HPV vaccine was recommended for males through age 21 and MSM through age 26. Using data from the 2011 National HIV Behavioral Surveillance System, we assessed self-reported HPV vaccine uptake among MSM, using multivariate analysis to calculate adjusted prevalence ratios (aPRs) and 95% confidence intervals (CIs). Among 3221 MSM aged 18–26, 157 (4.9%) reported 1 vaccine dose. Uptake was higher among men who visited a healthcare provider (aPR 2.3, CI: 1.2–4.2), disclosed same-sex sexual attraction/behavior to a provider (aPR 2.1, CI: 1.3–3.3), reported a positive HIV test (aPR 2.2, CI: 1.5–3.2), or received hepatitis vaccine (aPR 3.9, CI: 2.4–6.4). Of 3064 unvaccinated MSM, 2326 (75.9%) had visited a healthcare provider within 1 year. These national data on HPV vaccine uptake among MSM provide a baseline as vaccination recommendations are implemented.

Keywords

Human papillomavirus (HPV); Men who have sex with men (MSM); Vaccine uptake

1. Introduction

Men who have sex with men (MSM) are at high risk for infection and disease associated with human papillomavirus (HPV). A meta-analysis of 53 studies found the pooled

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¹See Appendix A for members of the NHBS Study Group.

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prevalence of any anal HPV was 92.6% among HIV-infected MSM and 63.9% among HIV-uninfected MSM [1]. Among MSM visiting U.S. sexually transmitted disease (STD) clinics, the prevalence of genital warts was 7.5% [2]. In a study involving 34,189 HIV-infected and 114,260 HIV-uninfected individuals, anal cancer incidence per 100,000 person-years was 131 among MSM, 46 among HIV-infected men, and 2 among other HIV-uninfected men [3]. Quadrivalent HPV vaccine clinical trials in MSM demonstrated high efficacy for prevention of anal cancer precursor lesions and genital warts [4].

In the United States, quadrivalent HPV vaccine was first licensed for use in females in 2006 and then for use in males in 2009 [5]. At that time in 2009, the Advisory Committee on Immunization Practices (ACIP) issued national policy stating that males may be vaccinated. In late 2011, ACIP added HPV vaccine to the routine immunization schedule for U.S. males, recommending that it be given to all boys at age 11 or 12 years and through age 21 years if not previously vaccinated [5]. HPV vaccine is also recommended through age 26 years for all MSM and immunocompromised individuals if not previously vaccinated [5,6]. ACIP recommendations are followed by health care providers and also have impact on vaccine availability through federal programs and private health insurance in the United States [6,7].

Data on HPV vaccine uptake among MSM are scarce. Results from the 2008 National HIV Behavioral Surveillance System (NHBS) suggested that there would be many opportunities for young MSM to receive recommended care including HPV vaccine, as 88.9% of participants had accessed health care within the previous 12 months and 61.3% had disclosed same-sex sexual attraction/behavior to a healthcare provider [8]. Using data from the 2011 NHBS – collected after quadrivalent vaccine was licensed, but largely before it was routinely recommended by ACIP for males in the United States – we aimed to assess baseline HPV vaccine uptake among U.S. MSM through age 26 years.

2. Materials and methods

NHBS monitors HIV-associated behaviors and HIV prevalence in the 20 U.S. cities with the largest AIDS burden. Detailed methods have been reported elsewhere [9,10]. Cross-sectional data reported in this analysis are from MSM enrolled in 2011 for interviews and HIV testing. Participant enrollment occurred using venue-based, time-space sampling at locations where MSM congregate, such as bars, clubs, and social organizations. For consenting participants aged 18 years residing in the metropolitan statistical area and who had not participated previously in NHBS during the current survey cycle, trained interviewers used handheld computers to administer, in English or Spanish, a standardized, anonymous questionnaire about demographics, sexual behavior, HPV vaccination history, HIV/STD testing, and other health care use. Interview participants received a cash or gift card incentive typically worth \$25 [9–11]. Activities for NHBS were approved by local institutional review boards (IRB) for each of the 20 participating cities. NHBS activities were determined to be research in which the Centers for Disease Control and Prevention (CDC) were not directly engaged and, therefore, did not require separate review by CDC IRB.

Eligible participants were born male and reported ever having a male sex partner. After describing the percentage of all MSM reporting HPV vaccine by age, we limited further analyses to MSM aged 18–26 years.

Statistical analyses were performed using SAS software, version 9.3 (SAS Institute, Cary, NC). We calculated descriptive frequencies and performed bivariate analyses using Pearson chi-square tests to assess associations between self-reported receipt of HPV vaccine and demographic characteristics, behavioral risk factors, and other sexual health care. In addition, among MSM who reported not receiving HPV vaccine, we assessed recent health care visits. To identify factors associated with HPV vaccine uptake, we estimated prevalence ratios and 95% confidence intervals (CIs) using multivariate analysis and Poisson regression modeling with robust standard errors. To select variables for this model, we first screened out variables that were not significant on bivariate analysis at $\alpha = 0.05$ [8]. To avoid collinearity in measures of health care access, we selected one variable to include in the model (health care visits in the past 12 months) and did not include other related variables that were also significant on bivariate analysis (STD and HIV testing and diagnoses in the past 12 months).

3. Results

Of 9828 MSM aged 18 years who consented to the 2011 NHBS survey, 9819 with valid data were included in the analyses [11]. Of these, 262 (2.7%) reported having received 1 dose of HPV vaccine (Table 1). Most men who reported receipt of HPV vaccine were aged 26 years, within the recommended age range for vaccination. Among men older than 26 years who reported HPV vaccine receipt, HIV infection was common: 25 (71.4%) of 35 vaccinated men aged >40 years were HIV-infected, compared with 15 (38.5%) of 39 vaccinated men aged 31–40 years and 35 (18.6%) of 188 men aged 30 years.

Among 3221 MSM aged 18–26 years, 157 (4.9%) reported having received 1 dose of HPV vaccine. Of these, 44 (28.0%) reported vaccine receipt during 2006–2009, 96 (61.1%) during 2010–2011, and 17 (10.8%) were unsure of the timing.

In bivariate analysis among men aged 18–26 years, HPV vaccine uptake was not significantly associated with any demographic factors (Table 2). Vaccine uptake was significantly higher among men who reported having access to care and receiving other sexual health care, including those who had any health insurance (5.6%), had visited a healthcare provider in the past year (5.9%), had disclosed male–male sexual attraction/behavior to a health-care provider (6.3%), had been vaccinated against hepatitis (7.4%), or had been tested for HIV (5.8%) or another STD (7.8%) in the past year. Vaccine uptake was also significantly higher among men who had received a diagnosis of chlamydia, gonorrhea, or syphilis within the past 12 months (8.1%); who had ever received a diagnosis of genital warts (10.3%), or who reported having had a positive HIV test (13.4%). Finally, vaccine uptake was significantly higher among those reporting greater numbers of sex partners in the past 12 months.

In the multivariate model, four factors predicted HPV vaccine uptake: visiting a health care provider within the past year (aPR 2.3, CI: 1.2–4.2); ever disclosing male–male sexual

attraction/behavior to a health care provider (aPR 2.1, CI: 1.3–3.3); reporting a positive test for HIV infection (aPR 2.2, CI: 1.5–3.2); and reporting any hepatitis vaccination (aPR 2.2, CI: 1.5–3.2) (Table 2).

Of 3064 MSM aged 18–26 years in the target age range for HPV vaccine who reported being unvaccinated, 2326 (75.9%) had visited a health care provider within the past year.

4. Discussion

These are the first national data on HPV vaccine coverage among MSM in the United States. At 4.9%, coverage among MSM aged 18–26 years was low before HPV vaccine was routinely recommended for males in late 2011. Data on HPV vaccine uptake among U.S. MSM in 2011 can be used as a baseline to evaluate progress as vaccine recommendations are implemented.

Several factors predicted HPV vaccine uptake among MSM, including having received a hepatitis vaccine and having visited a health care provider in the past year. An additional predictor was disclosure of same-sex sexual attraction/behavior to a healthcare provider, an important precursor to receiving care recommended specifically for MSM, particularly those aged 22–26 years for whom HPV vaccination is recommended [5,12]. HIV-infected MSM have two indications for receiving HPV vaccine and, therefore, the higher uptake among this group is encouraging; accumulating data show that HPV vaccine has good immunogenicity in this group [13,14].

In the United States, data on HPV vaccine coverage in adolescents are provided by the National Immunization Survey-Teen; in 2011, an estimated 8.3% of boys aged 13–17 years received 1 dose of HPV vaccine [15]. This increased to 20.8% in 2012 [16]. Ideally, over time, more MSM will receive HPV vaccine before onset of sexual activity [17]. In the meantime, the fact that three-quarters of unvaccinated MSM had visited a health care provider within the past 12 months suggests that health care settings offer opportunities for HPV vaccination in this age group.

This analysis is subject to several limitations. Vaccine status is self-reported and may be subject to recall bias. Furthermore, the number of doses of HPV vaccine was not assessed in NHBS and thus vaccine series completion could not be evaluated. In addition, venue-based sampling does not represent all MSM, particularly those who live in rural areas, who do not disclose male–male sexual behavior, or who may not frequent venues where MSM congregate.

Improving HPV vaccine uptake in this population could be facilitated by MSM having access to a healthcare provider who provides vaccine, being willing to disclose same-sex sexual attraction/behavior, and accepting recommended vaccinations. Most MSM in this analysis, including three out of four unvaccinated MSM, had visited a health care provider recently, and two out of three had disclosed. A systematic review revealed that although HPV knowledge was generally poor among MSM, most had positive attitudes about the vaccine and, in two studies, believed it would be “good, safe, smart, easy, important, and

harmless” [18–20]. Vaccinations recommended by ACIP generally are covered by health insurance.

5. Conclusion

All young MSM should have the opportunity to receive HPV vaccine. Although ideally it should be administered before onset of sexual activity, quadrivalent HPV vaccine is recommended for U.S. MSM through age 26 years. Health care settings offer opportunities to increase coverage in this population.

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Appendix A. Members of the NHBS Study Group

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Table 1

Men who have sex with men reporting 1 dose of HPV vaccine, by self-reported HIV status and age – National HIV Behavioral Surveillance System, United States, 2011.

Age (years)	All participants <i>N</i>	Received 1 dose of HPV vaccine, among all participants <i>n</i> (%)	Self-reported positive HIV test, among all participants <i>n</i> (%)	Received 1 dose of HPV vaccine, among participants reporting a positive HIV test <i>n</i> (%)
Total	9819	262 (2.7)	1333 (13.6)	75 (5.6)
18–26	3221	157 (4.9)	224 (6.9)	30 (13.4)
27–30	1334	31 (2.3)	145 (10.9)	5 (3.4)
31–40	2225	39 (1.8)	331 (14.9)	15 (4.5)
>40	3039	35 (1.2)	633 (20.8)	25 (3.9)

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Table 2

Predictors of self-reported receipt of HPV vaccine among young men aged 18–26 years who have sex with men — National HIV Behavioral Surveillance System, United States, 2011.

Characteristic	Participants <i>N</i>	Received <i>n</i> (%) ^a	1 dose of HPV vaccine	Unadjusted <i>P</i> value	Adjusted prevalence ratio (95% CI)
Total	3221	157 (4.9)			
Age (years)				0.40	
18–21	1094	56 (5.1)			
22–26	2127	101 (4.7)			
Race				0.27	
Black or African American	1155	59 (5.1)			
White	816	36 (4.4)			
Multiracial	125	12 (9.6)			
Hispanic or Latino	978	48 (4.9)			
Other ^b	140	2 (1.4)			
Education completed				0.50	
Less than high school	228	8 (3.5)			
High school diploma	1117	48 (4.3)			
Some college or higher	1876	101 (5.4)			
Sexual identity				0.79	
Heterosexual or straight	55	0 (0)			
Homosexual or gay	2537	127 (5.0)			
Bisexual	618	30 (4.8)			
Census region				0.21	
South	1192	52 (4.4)			
Northeast	775	37 (4.8)			
Midwest	436	26 (6.0)			
West	675	39 (5.8)			
Territory (San Juan, PR)	143	3 (2.1)			
Health insurance				0.03	
None	1186	46 (3.9)			Ref
Any	2015	111 (5.5)			1.1 (0.8–1.6)
Usual place of care				0.06	
None	556	20 (3.6)			
One	2367	128 (5.4)			
More than one	274	8 (2.9)			
Usual place of care type ^c				0.07	
Clinic or health center	810	50 (6.2)			
Doctor's office or HMO	1257	72 (5.7)			
Hospital emergency room	488	12 (2.5)			
Some other place	76	2 (2.6)			
Visited a health care provider within 12 months				<0.01	

Characteristic	Participants <i>N</i>	Received <i>n</i> (%) ^a	1 dose of HPV vaccine	Unadjusted <i>P</i> value	Adjusted prevalence ratio (95% CI)
No	749	12 (1.6)			Ref
Yes	2471	145 (5.9)			2.3 (1.2–4.2)
Disclosed same-sex sexual attraction/behavior to a health care provider				<0.01	
No	1075	22 (2.0)			Ref
Yes	2143	135 (6.3)			2.1 (1.3–3.3)
Tested for HIV within 12 months				0.01	
No	991	27 (2.7)			
Yes	2226	130 (5.8)			
Tested for an STD within 12 months ^d				<0.01	
No	1680	38 (2.3)			
Yes	1536	119 (7.7)			
HIV test result (self-reported)				<0.01	
Negative	2537	116 (4.6)			Ref
Positive	224	30 (13.4)			2.2 (1.5–3.2)
Unknown	460	11 (2.4)			0.9 (0.5–1.7)
Diagnosed with herpes ever				0.50	
No	3137	149 (4.7)			
Yes	81	8 (9.9)			
Diagnosed with genital warts ever				0.05	
No	3109	145 (4.7)			
Yes	107	11 (10.3)			
Diagnosed with an STD within 12 months ^d				0.04	
No	2837	126 (4.4)			
Yes	383	31 (8.1)			
Vaccinated against hepatitis ever				<0.01	
No	1208	18 (1.5)			Ref
Yes	1822	132 (7.2)			3.9 (2.4–6.4)
Number of sex partners within 12 months				<0.01	
0–1	577	23 (4.0)			Ref
2–3	1031	42 (4.1)			1.0 (0.6–1.7)
4–5	597	28 (4.7)			1.1 (0.7–1.9)
>5	1016	64 (6.3)			1.5 (0.9–2.3)

^aNumbers may not add to total due to missing data.

^bIncludes Asian, Pacific Islander, American Indian, multiple races, and other race.

^cAmong participants reporting 1 usual place of care.

^dChlamydia, gonorrhea, or syphilis.