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Gay and Bisexual Men's Willingness to Receive Anal Papanicolaou Testing

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Abstract

Objectives—We assessed the willingness of gay and bisexual men, who have high rates of anal cancer that might be prevented through regular screening, to receive anal Papanicolaou tests.

Methods—We surveyed a national sample of men aged 18 to 59 years who self-identified as gay (n=236) or bisexual (n=70).

Results—Most respondents were willing to accept free screening (83%), but fewer would pay for the test (31%; McNemar's $\chi^2=158.02$; $P<.001$). Willingness to pay for screening was higher among men who reported greater worry about getting anal cancer (OR [odds ratio]=1.70; 95% confidence interval [CI]=1.06, 2.72), higher perceived likelihood of anal cancer (OR=1.88; 95% CI=1.18, 2.99), and higher income (OR=2.17; 95% CI=1.18, 3.98), in adjusted analyses. Only 33% (17 of 51) of HIV-positive respondents, who have the highest risk for anal cancer, had received anal Papanicolaou tests.

Conclusions—Anal cancer screening was highly acceptable to gay and bisexual men, although cost was a major barrier. Efforts to reduce anal cancer disparities should target beliefs about anal cancer and barriers to anal Papanicolaou testing in this population.

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Rates of anal cancer among men have nearly doubled over the past 3 decades in the United States, making it an increasingly important public health concern.¹ The observed increase in anal cancer is a particular concern for gay and bisexual men, who are at substantially greater risk for the disease than are heterosexual men.² Furthermore, the risk of anal cancer is much higher among HIV-positive men who have sex with men than it is among HIV-negative men who have sex with men.³ The incidence of anal cancer among HIV-positive gay and bisexual men may be up to 10 times greater than are current rates of cervical cancer among women in the United States.⁴

In addition to HIV infection, risk factors for anal cancer include receptive anal intercourse, a high number of lifetime sexual partners, rectal drug use, smoking, and certain sexually transmitted infections, including human papillomavirus (HPV).^{2,5-8} These factors may help explain the high rates of anal cancer observed among gay and bisexual men, because this population has been shown to have high rates of risky sexual behavior (including receptive anal intercourse with multiple partners), smoking and other drug use, and sexually transmitted infections (including HPV infection).^{6,9-13}

Research indicates that HPV may cause most anal cancers.^{4,5,8} A systematic review found that HPV DNA was present in more than 70% of anal cancer cases, with HPV type 16 being the most common.¹⁴ HPV DNA is found in 97.7% of anal tumors in men who are not exclusively heterosexual.⁵ If approved for use in males, HPV vaccination may offer substantial protection against anal cancer for males.⁴ However, HPV vaccination against oncogenic HPV types 16 and 18 is unlikely to prevent all anal cancers.¹⁴ Furthermore, many gay and bisexual men who have initiated sexual activity may already be infected with HPV by the time they present for vaccination. Thus, anal cancer screening could play a role in anal cancer prevention for gay and bisexual men, regardless of whether they receive HPV vaccination.

Statistical models suggest that regularly screening gay and bisexual men for anal cancer through anal Papanicolaou (Pap) testing (also called anal cytology) would increase life expectancy similarly to other accepted prevention measures, such as cervical cancer screening, and would be cost effective.¹⁵ Cost-effectiveness analyses suggest screening HIV-positive gay and bisexual men annually¹⁶ and HIV-negative gay and bisexual men every 2 to 3 years.¹⁵ Although no national organizations yet offer guidelines for screening with anal Pap tests, the Gay and Lesbian Medical Association encourages gay and bisexual men to talk with their health care providers about anal cancer.¹⁷ The absence of national screening guidelines may be a reason that health insurance reimbursements for anal cancer screening tests are limited.¹⁸

Studies of anal cancer screening behavior have focused on low rates of uptake and intentions,^{19, 20} but they have not examined many constructs known to motivate other screening behaviors, such as worry and perceived risk, that could help inform future intervention programs. We examined beliefs of gay and bisexual men about anal cancer and anal cancer screening, as well as correlates of willingness to receive anal Pap tests. In exploratory analyses, we also examined whether HIV-positive gay and bisexual men, who are at especially high risk for anal cancer, differed from HIV-negative gay and bisexual men in these beliefs and attitudes.

Methods

In January 2009, we interviewed men aged 18 to 59 years who were members of an existing national panel of US households maintained by Knowledge Networks (Menlo Park, CA), oversampling for our study men who self-identified as gay or bisexual. Knowledge Networks identified panel members through list-assisted, random-digit dialing. Panel members received free Internet access or small cash payments for completing multiple Internet-based surveys each month.

Of 874 men invited to participate in our study, 609 (70%) completed the online survey.²¹ We did not ask heterosexual participants about anal cancer screening, because their risk of anal cancer is much lower than that of gay and bisexual men and the cost-effectiveness of anal cancer screening has not yet been examined for heterosexual men.^{2,5,22} We report data from 306 men who self-identified as either gay or bisexual. We excluded 12 men whose sexual orientation we could not definitively categorize as either gay or bisexual. Most men in the final sample self-identified as gay (77%) and were HIV negative (83%; Table 1). Their mean age was 46.4 years (SD=9.0). Most were non-Hispanic White (81%), had college degrees (56%), reported annual household incomes of \$60000 or higher (60%), had health insurance (86%), and lived in urban areas (93%). Approximately one half were living with a partner or were married (48%); similar percentages of gay (47%) and bisexual (50%) men reported this type of relationship.

Measures

The survey is available online at <http://www.unc.edu/~ntbrewer/hpv.htm>. We drew on our previous work on HPV-related diseases^{23–25} and others' work on anal Pap tests^{19, 20} in developing our survey items. We cognitively tested the survey with 28 gay and bisexual men and further refined it with 8 additional men prior to beginning the study.

Anal cancer—The survey first presented basic information about anal cancer, because pilot testing showed that men had low familiarity with the disease: “Anal cancer forms in the tissues of the anus. The anus is the opening of the rectum (last part of the large intestine) to the outside of the body. Anal cancer is different from colon cancer and rectal cancer.” The survey then assessed perceived knowledge about anal cancer, perceived severity of anal cancer, concern about anal cancer, perceived likelihood of getting anal cancer, and how men thought HIV affects the chances of getting anal cancer.

Anal Pap tests—We measured awareness of anal Pap tests and then presented basic information about this test, because pilot testing showed that most men were unfamiliar with the procedure. The survey then assessed history of anal Pap testing by asking men when their most recent test occurred, whether they had ever tried unsuccessfully to get an anal Pap test (including the main reason they were unsuccessful), where they would go to get an anal Pap test if they decided to get one, barriers that they believed would prevent them from getting an anal Pap test, perceived effectiveness of anal Pap testing, whether anal Pap testing is only needed for people who have anal intercourse, how often men who have sex with men should get an anal Pap test, and whether they thought doctors recommend anal Pap tests for men who have sex with men.

Willingness—We assessed how willing men would be to get an anal Pap test (1) if it were free, and (2) if it cost \$150 out of pocket. Response options for willingness items were “definitely not willing,” “probably not willing,” “not sure,” “probably willing,” and “definitely willing.” We recoded responses into 2 categories, willing (definitely or probably willing) and not willing (all other responses).

Demographic characteristics—Men indicated their sexual orientation as “gay or homosexual [attracted to men]” or “bisexual [attracted to men and women],” as well as their age, race/ethnicity, education, income, health insurance status, urbanicity (according to Metropolitan Statistical Area criteria²⁶), and relationship status. The survey also assessed men's sexual and medical history, including history of sexually transmitted infections, anal or penile lesions, and oral, anal, and penile cancer (cancer at these anatomic sites shows consistent associations with high-risk HPV types²⁷).

Analyses

We used McNemar's test to compare willingness to receive an anal Pap test if it were free or cost \$150. We used logistic regression to examine bivariate correlates of willingness to receive an anal Pap test if it cost \$150. We chose this willingness measure as the primary study outcome, instead of willingness if testing were free, because in current clinical practice, reimbursement for anal screening tests is often limited.¹⁸ We entered statistically significant bivariate correlates ($P < .05$) into a multivariate model.

Post hoc exploratory analyses compared HIV-positive gay and bisexual men to HIV-negative gay men and HIV-negative bisexual men on variables that analyses identified as bivariate correlates of willingness. These post hoc analyses used 1-way analysis of variance for continuous variables and logistic regression for categorical variables. We analyzed data with SPSS version 16.0 (SPSS Inc, Chicago, IL) and Intercooled Stata version 10.1 (StataCorp LP, College Station, TX). All statistical tests were 2-tailed, with a critical α of 0.05.

Results

Only 23% (71 of 306) of gay and bisexual men had heard of anal Pap tests prior to the survey. Even fewer men reported ever having received an anal Pap test (14%; 44 of 306). Five men indicated that they had tried to get an anal Pap test but were unsuccessful because their doctor or health care provider did not usually give the test ($n=2$), their doctor or health care provider told them they did not need an anal Pap test ($n=2$), or their doctor or health care provider told them the cost of doing the test was too high to justify doing it ($n=1$).

Willingness to Receive an Anal Pap Test

Fewer than one third (31%; 95 of 306) of men were willing to get an anal Pap test if it cost \$150. A much larger percentage (83%; 255 (McNemar's $\chi^2=158.02$; $P < .001$). To receive anal Pap testing in the future, most men indicated they would go to their primary care provider (83%; 252 of 305), a gay health center (7%; 20 of 305), or a sexual health clinic (5%; 14 of 305). The most common reasons men reported for unwillingness to get an anal Pap test, even if a local doctor or clinic performed them, were cost (39%; 120 of 306), not knowing enough about the test (28%; 87 of 306), embarrassment about requesting or getting the test (13%; 41 of 306), concern about the test being inaccurate (7%; 20 of 306), and concern that testing information would be recorded in medical records (5%; 16 of 306).

Bivariate analyses found that men were more willing to get anal Pap tests if they reported greater perceived knowledge about anal cancer, greater worry about getting anal cancer, or higher perceived likelihood of developing anal cancer (all, $P < .05$; Table 2). Other correlates of willingness included being aware of anal Pap testing prior to our study, having had an anal Pap test, knowing the best frequency for anal Pap testing (1 to 3 years, according to cost-effectiveness modeling), not believing anal Pap tests are only necessary for people who have anal intercourse, and having had a digital rectal exam. Men were also more willing to undergo anal Pap testing if they were gay, were HIV positive, or had an annual household income of \$60000 or higher. Men were less willing to undergo anal Pap testing if they had not disclosed their sexual behavior with men to their primary health care provider.

Multivariate analyses (Table 3) found that men were more willing to get an anal Pap test if they reported greater worry about getting anal cancer (odds ratio [OR]=1.70; 95% confidence interval [CI]=1.06, 2.72). We dichotomized worry to characterize this association, although our regression analyses examined both worry and perceived likelihood as continuous. Men who worried a moderate amount or quite a lot about anal cancer were more likely to report a willingness to get an anal Pap test (70%; 21 of 30) than were respondents who were not at all

or a little worried (27%; 74 of 276). Participants who perceived a greater likelihood of developing anal cancer (OR=1.88; 95% CI=1.18, 2.99) were more willing to get an anal Pap test. More men who perceived their chances of getting anal cancer as moderate, high, or certain (48%; 38 of 79) than men who perceived their chance as low or none (25%; 57 of 227) were willing to get an anal Pap test. Men who reported household incomes of \$60000 or more were more willing than were those who reported earning less to get an anal Pap test (OR=2.17; 95% CI = 1.18, 3.98).

Sexual Orientation and HIV Status

Exploratory analyses examined differences between HIV-positive gay and bisexual men, HIV-negative gay men, and HIV-negative bisexual men (Table 4). Few HIV-negative gay and bisexual men reported ever having received an anal Pap test (11%; 27 of 255). Of HIV-negative gay and bisexual men who had received an anal Pap test, 89% (24 of 27) reported that their most recent test was within the past 3 years, the cost-effective testing interval for this population.¹⁵ Only 33 % (17 of 51) of HIV-positive gay and bisexual men had received an anal Pap test. Of these men, only 53% (9 of 17) reported that their most recent test was within the previous year, the cost-effective interval for this population.¹⁶

HIV-positive gay and bisexual men were more likely than were HIV-negative gay and bisexual men to have disclosed their sexual behavior with men to their primary health care provider, to have been aware of anal Pap testing before completing the survey, to have had an anal Pap test, and to report higher levels of worry about getting anal cancer. HIV-positive gay and bisexual men also reported greater perceived knowledge of anal cancer and perceived greater likelihood of developing anal cancer than did HIV-negative bisexual men. HIV-negative gay men were more likely than were HIV-negative bisexual men to have disclosed their sexual behavior with men to their primary health care provider and to have been aware of anal Pap testing before completing our survey.

Discussion

Although gay and bisexual men have notably high rates of anal cancer, it is promising that potential benefits of anal cancer screening for these men are comparable to observed benefits of cervical cancer screening for women.¹⁵ However, only 1 in 7 gay and bisexual men in our national sample had received an anal Pap test, a rate comparable to those measured in previous studies conducted primarily among convenience samples of gay and bisexual men (11% –14 %).^{19, 20} Furthermore, only one third of HIV-positive gay and bisexual men in our study reported having had an anal Pap test, with even fewer indicating their most recent test was within the past year, the cost-effective screening interval for this population.¹⁶ It is encouraging that more than half of HIV-positive gay and bisexual men were willing to pay for anal Pap tests in the future.

We identified important modifiable beliefs associated with willingness to get anal cancer screening tests that have not been extensively studied among gay and bisexual men. Multivariate analysis revealed that men who reported greater worry about getting anal cancer and higher perceived likelihood of getting anal cancer were more willing to undergo future anal Pap testing. Many health behavior theories posit that risk perception prompts protective health behaviors, a proposition that is well supported for many different behaviors, including cancer screening.^{28–30} Some health behavior theorists also suggest that affect, such as worry, is important to motivating health behavior, including cancer screening.^{31, 32} Our findings support these relationships.

HIV status may affect gay and bisexual men's attitudes and beliefs about anal Pap testing. HIV-positive participants were more likely than were HIV-negative participants to be aware of anal

Pap testing, to report having had an anal Pap test, and to report more worry about getting anal cancer. Previous research also has found greater concern about anal cancer among HIV-positive men who have sex with men.¹⁹ Because HIV-positive gay and bisexual men are at higher risk of anal cancer, these differences are unsurprising.

Gay and bisexual men differed in their knowledge, beliefs, and behaviors related to anal Pap testing. For example, gay men were more likely than were bisexual men to have heard of anal Pap testing and to have disclosed their sexual orientation to their primary health care provider. Gay men were also more willing to undergo anal Pap testing regardless of cost than were bisexual men (in bivariate analyses). Interventions to increase anal cancer screening may need to be tailored to differing beliefs of gay and bisexual men.

Implications for Practice

Awareness and cost are substantial barriers to gay and bisexual men initiating anal cancer screening. Few men had heard of anal Pap tests, making awareness a straightforward target for campaigns to boost screening. Less easily addressed is the large impact that cost had on willingness to get anal Pap tests. Half of our sample was willing to get anal Pap tests only if they did not have to pay out of pocket. Men with lower incomes were also less willing to pay for anal Pap tests. Our results for income were similar to those previously reported: uninsured men who have sex with men were less likely to seek anal Pap testing.¹⁹ Furthermore, abnormal anal Pap tests may entail substantial additional costs for follow-up and treatment that may not be covered by health insurance. Education campaigns may be beneficial, but they must be accompanied, or preceded, by policy changes that ensure that anal Pap testing and follow-up are more affordable and widely available.

Most men indicated that they would go to their primary care providers if they wanted to get anal Pap tests. This finding suggests that primary care physicians should be educated about the importance of anal cancer screening for HIV-negative and HIV-positive gay and bisexual men. No published data we are aware of address whether doctors discuss anal cancer screening with gay and bisexual men patients or perform such tests.³³ In our study, 5 men reported being unsuccessful in obtaining an anal Pap test. If primary care physicians are to be the medical home for gay and bisexual men, they may require additional training about anal cancer and anal Pap tests to meet this need. For men who do not have access to clinicians who can provide anal Pap tests, home screening by mailed tests may be a viable alternative.³⁴

Another important issue is the availability of clinicians knowledgeable and skilled in the follow-up of abnormal anal cytology results, including high-resolution anoscopy and biopsy.²² Future research is needed to address these issues, as well as the acceptability of follow-up tests, among gay and bisexual men.

More than 25% of our respondents indicated that they had not disclosed that they have sex with men to their health care providers. This finding indicates a greater need for health care providers to create environments that facilitate patient disclosure of their sexual behaviors to allow providers to identify men most likely to benefit from anal cancer prevention services. The Gay and Lesbian Medical Association recommends providing this type of medical environment.³⁵ For example, it encourages providers to post nondiscrimination statements in their clinics and to use gender-neutral language about sexual or relationship partners.³⁵ When taking a sexual history, practitioners should ask patients if they have ever been sexually active with men, women, or both.³⁶ By discussing sexual history with all adult male patients, primary health care providers will be able to identify gay and bisexual men who are at high risk of anal cancer and to discuss anal cancer screening with them.

Strengths and Limitations

Our national sample yielded a high participation rate, enough bisexual men to enable exploration of differences from other participants, and enough respondents to enable examination of many novel correlates of willingness to receive an anal Pap test. We focused on populations at higher risk for anal cancer than the general population.

Limitations included a cross-sectional design and reliance on self-report for screening history. We also did not assess condom use or the frequency of receptive anal intercourse. The main outcome, willingness to obtain an anal Pap test, may have overstated behavior that we would observe if the test were more easily obtained; hypothetical statements can fail to anticipate barriers to action. Additional costs of follow-up and potential treatment required by abnormal screening tests could also affect willingness and are a topic for future research. Although our sample was drawn from a study panel known to closely resemble the US population,³⁷ most participants were non-Hispanic Whites, had high socioeconomic status, and resided in urban areas. The generalizability of the findings to other gay and bisexual men is not yet known. The financial and informational barriers to anal Pap screening that we observed may be even more prevalent among a more diverse sample of gay and bisexual men.

Conclusions

Few gay and bisexual men in our sample had undergone anal Pap testing or even heard of it. This is a concern for this high-risk group and especially for those who are HIV positive. Correlates of willingness to undergo anal cancer screening offer potentially modifiable targets for future interventions designed to increase anal Pap testing among this high-risk population. Cost strongly affected men's willingness to undergo anal Pap tests, suggesting the need for policy changes that make anal cancer screening more affordable.

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Note. The opinions expressed in this paper are those of the authors and do not necessarily represent those of & Co, Inc.

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Table 1
Demographic Characteristics of Participants in Survey of Gay and Bisexual Men's
Knowledge and Attitudes Toward Anal Cancer Screening: United States, January 2009

| Participant characteristics (n = 306) | No. (%) |
|---|----------------|
| Age, y | |
| 20–39 | 59 (19) |
| 40–49 | 124 (41) |
| 50–59 | 123 (40) |
| Race/ethnicity | |
| Non-Hispanic White | 247 (81) |
| Non-Hispanic Black | 14 (5) |
| Hispanic | 29 (9) |
| Other | 16 (5) |
| Education | |
| No college degree | 136 (44) |
| College degree | 170 (56) |
| Annual household income, \$ | |
| <60 000 | 122 (40) |
| ≥60 000 | 184 (60) |
| Health insurance | |
| Yes | 262 (86) |
| No | 44 (14) |
| Urbanicity | |
| Rural | 20 (7) |
| Urban | 286 (93) |
| Sexual orientation | |
| Bisexual | 70 (23) |
| Gay | 236 (77) |
| Relationship status | |
| Not living with partner and not married | 160 (52) |
| Living with partner or married | 146 (48) |
| HIV status | |
| Negative | 255 (83) |
| Positive | 51 (17) |
| Ever diagnosed with cancer (oral, anal, penile) or lesions (anal, penile) | |
| No | 301 (98) |
| Yes | 5 (2) |

Table 2
Bivariate Correlates of Willingness to Get an Anal Papanicolaou Test Among Gay and Bisexual Men: United States, January 2009

| | Not Willing (n=211), Mean (SD) or No. (%) | Willing (n=95), Mean (SD) or No. (%) | OR (95% CI) |
|--|--|---|---------------------|
| Anal cancer and screening | | | |
| Perceived knowledge of anal cancer ^a | 1.36 (0.61) | 1.84 (0.90) | 2.32** (1.65, 3.25) |
| Worry about anal cancer ^b | 1.29 (0.59) | 1.83 (0.96) | 2.47** (1.76, 3.46) |
| Perceived severity of anal cancer ^b | 3.58 (0.76) | 3.64 (0.68) | 1.12 (0.80, 1.58) |
| Belief that HIV status affects likelihood of anal cancer ^c | 2.84 (0.30) | 2.77 (0.41) | 0.61 (0.31, 1.20) |
| Perceived likelihood of anal cancer ^d | 2.09 (0.62) | 2.43 (0.68) | 2.23** (1.51, 3.30) |
| Perceived effectiveness of anal Pap test ^e | 2.18 (0.84) | 2.06 (0.81) | 0.83 (0.62, 1.13) |
| Belief that only people who have anal intercourse need anal Pap tests ^e | 3.53 (1.11) | 3.81 (1.15) | 1.26* (1.01, 1.58) |
| Awareness of anal Pap test | | | |
| No (Ref) | 175 (74) | 60 (26) | 1.00 |
| Yes | 36 (51) | 35 (49) | 2.84** (1.64, 4.92) |
| Had anal Pap test | | | |
| No (Ref) | 192 (73) | 70 (27) | 1.00 |
| Yes | 19 (43) | 25 (57) | 3.61** (1.87, 6.96) |
| Unsuccessfully attempted to get anal | | | |
| Pap test | | | |
| No (Ref) | 209 (69) | 92 (31) | 1.00 |
| Yes | 2 (40) | 3 (60) | 3.41 (0.56, 20.74) |
| Belief that doctors recommend anal Pap tests for men who have sex with men | | | |
| No (Ref) | 40 (67) | 20 (33) | 1.00 |
| Yes | 72 (64) | 40 (36) | 1.11 (0.57, 2.15) |
| Did not know | 99 (74) | 35 (26) | 0.71 (0.37, 1.37) |
| Knew cost-effective frequency for anal Pap testing (1–3 y) | | | |
| No (Ref) | 123 (75) | 40 (25) | 1.00 |
| Yes | 88 (62) | 55 (38) | 1.92* (1.18, 3.14) |
| Had digital rectal exam | | | |
| No (Ref) | 64 (81) | 15 (19) | 1.00 |
| Yes | 147 (65) | 80 (35) | 2.32* (1.24, 4.34) |
| Sexual identity and behavior | | | |
| Sexual orientation | | | |
| Bisexual (Ref) | 58 (83) | 12 (17) | 1.00 |
| Gay | 153 (65) | 83 (35) | 2.62* (1.33, 5.16) |
| Disclosed sexual behavior with men to primary care provider | | | |
| Yes (Ref) | 116 (62) | 70 (38) | 1.00 |

| | Not Willing (n=211), Mean (SD) or No. (%) | Willing (n=95), Mean (SD) or No. (%) | OR (95% CI) |
|--|--|---|--------------------|
| Not applicable/missing | 33 (85) | 6 (15) | 0.30* (0.12, 0.76) |
| No | 62 (77) | 19 (23) | 0.51* (0.28, 0.91) |
| Age at first sexual intercourse (oral, anal, or vaginal), y | | | |
| <16 (Ref) | 72 (67) | 36 (33) | 1.00 |
| ≥ 16 | 139 (70) | 59 (30) | 0.85 (0.52, 1.40) |
| No. of lifetime sexual partners ^f | | | |
| ≤4 (Ref) | 28 (80) | 7 (20) | 1.00 |
| ≥5 | 183 (68) | 88 (33) | 1.92 (0.81, 4.58) |
| No. of male partners (anal or oral intercourse) in past year | | | |
| ≤4 (Ref) | 160 (71) | 67 (29) | 1.00 |
| ≥5 | 51 (65) | 28 (35) | 1.31 (0.76, 2.26) |
| Diagnosis of cancer (oral, anal, penile) or lesions (anal, penile) | | | |
| No (Ref) | 209 (69) | 92 (31) | 1.00 |
| Yes | 2 (40) | 3 (60) | 3.41 (0.56, 20.73) |
| HIV status | | | |
| Negative (Ref) | 186 (73) | 69 (27) | 1.00 |
| Positive | 25 (49) | 26 (51) | 2.80* (1.52, 5.18) |
| Other STI diagnosis | | | |
| No (Ref) | 150 (72) | 59 (28) | 1.00 |
| Yes | 61 (63) | 36 (37) | 1.50 (0.90, 2.50) |
| Demographic characteristics | | | |
| Health insurance | | | |
| No (Ref) | 35 (80) | 9 (20) | 1.00 |
| Yes | 176 (67) | 86 (33) | 1.90 (0.87, 4.13) |
| Current smoker | | | |
| No (Ref) | 158 (72) | 61 (28) | 1.00 |
| Yes | 53 (61) | 34 (39) | 1.66 (0.99, 2.80) |
| Race/ethnicity | | | |
| Non-Hispanic White (Ref) | 172 (70) | 75 (30) | 1.00 |
| Other | 39 (66) | 20 (34) | 1.18 (0.64, 2.15) |
| Age, y | | | |
| 50–59 (Ref) | 83 (67) | 40 (33) | 1.00 |
| 40–49 | 85 (69) | 39 (31) | 0.95 (0.56, 1.63) |
| 20–39 | 43 (73) | 16 (27) | 0.77 (0.39, 1.53) |
| Annual household income, \$ | | | |
| <60 000 (Ref) | 94 (77) | 28 (23) | 1.00 |
| ≥60 000 | 117 (64) | 67 (36) | 1.92* (1.15, 3.23) |
| Education | | | |
| No college degree (Ref) | 96 (71) | 40 (29) | 1.00 |
| College degree | 115 (68) | 55 (32) | 1.15 (0.70, 1.87) |
| Urbanicity | | | |

| | Not Willing (n=211), Mean (SD) or No. (%) | Willing (n=95), Mean (SD) or No. (%) | OR (95% CI) |
|---|--|---|-------------------|
| Rural (Ref) | 14 (70) | 6 (30) | 1.00 |
| Urban | 197 (69) | 89 (31) | 1.05 (0.39, 2.83) |
| Relationship status | | | |
| Not living with partner and not married (Ref) | 116 (73) | 44 (27) | 1.00 |
| Living with partner or married | 95 (65) | 51 (35) | 1.42 (0.87, 2.30) |

Note: CI = confidence interval; OR = odds ratio; Pap = Papanicolaou; STI = sexually transmitted infection.

^a On a 4-point scale: 1 (nothing at all), 2 (a little), 3 (a moderate amount), 4 (quite a lot).

^b On a 4-point scale: 1 (not at all), 2 (a little), 3 (a moderate amount), 4 (quite a lot).

^c On a 3-point scale: 1 (decreases chances), 2 (has no effect), 3 (increases chances).

^d On a 5-point scale: 1 (no chance), 2 (low chance), 3 (moderate chance), 4 (high chance), 5 (certain I will get anal cancer).

^e On a 5-point scale: 1 (strongly agree), 2 (somewhat agree), 3 (neither agree nor disagree), 4 (somewhat disagree), 5 (strongly disagree).

^f This was a categorical variable.

* $P < .05$;

** $P < .001$.

Table 3
Multivariate Correlates of Willingness to Get an Anal Papanicolaou Test Among Gay and Bisexual Men: United States, January 2009

| | <u>OR (95% CI)</u> |
|---|--------------------|
| Perceived knowledge of anal cancer | 1.38 (0.86, 2.21) |
| Worry about anal cancer | 1.70* (1.06, 2.72) |
| Perceived likelihood of anal cancer | 1.88* (1.18, 2.99) |
| Awareness of anal Pap test | |
| No (Ref) | 1.00 |
| Yes | 0.84 (0.37, 1.91) |
| Had anal Pap test | |
| No (Ref) | 1.00 |
| Yes | 2.15 (0.91, 5.09) |
| Knew cost-effective frequency for anal Pap testing (1–3 y) | |
| No (Ref) | 1.00 |
| Yes | 1.61 (0.91, 2.83) |
| Belief that only people who have anal intercourse need anal Pap tests | 1.15 (0.89, 1.48) |
| Sexual orientation | |
| Bisexual (Ref) | 1.00 |
| Gay | 1.72 (0.74, 4.02) |
| Had digital rectal exam | |
| No (Ref) | 1.00 |
| Yes | 1.71 (0.83, 3.52) |
| Disclosed sexual behavior with men to primary care provider | |
| Yes (Ref) | 1.00 |
| Not applicable/missing | 0.67 (0.23, 1.96) |
| No | 0.76 (0.36, 1.61) |
| HIV status | |
| Negative (Ref) | 1.00 |
| Positive | 1.44 (0.67, 3.09) |
| Annual household income, \$ | |
| <60000 (Ref) | 1.00 |
| ≥60000 | 2.17* (1.18, 3.98) |

Note. CI=confidence interval; OR=odds ratio; Pap=Papanicolaou. Multivariate model contained only the variables displayed in this table.

* $P < .05$.

Table 4
Effects of HIV Status and Sexual Orientation on Bivariate Correlates of Willingness to Get an Anal Papanicolaou Test Among Gay and Bisexual Men: United States, January 2009

| | HIV-Positive Participants ^a (n = 51), Mean (SD) or No. (%) | HIV-Negative Gay Participants (n = 186), Mean (SD) or No. (%) | HIV-Negative Bisexual Participants (n = 69), Mean (SD) or No. (%) |
|--|---|---|---|
| Perceived knowledge of anal cancer ^b | 1.76 (0.97) | 1.51 (0.74) | 1.33 ^c (0.50) |
| Worry about anal cancer ^d | 1.80 (1.06) | 1.38 ^e (0.67) | 1.40 ^c (0.69) |
| Perceived likelihood of anal cancer ^f | 2.39 (0.80) | 2.19 (0.57) | 2.08 ^c (0.73) |
| Belief that only people who have anal intercourse need anal Pap tests ^g | 3.76 (1.19) | 3.68 (1.07) | 3.33 (1.20) |
| Awareness of anal Pap test | | | |
| No | 23 (45) | 149 ^{e,h} (80) | 63 ^c (91) |
| Yes | 28 (55) | 37 (20) | 6 (9) |
| Had anal Pap test | | | |
| No | 34 (67) | 164 ^e (88) | 64 ^c (93) |
| Yes | 17 (33) | 22 (12) | 5 (7) |
| Knew cost-effective frequency for anal Pap testing (1-3 y) | | | |
| No | 22 (43) | 103 (55) | 38 (55) |
| Yes | 29 (57) | 83 (45) | 31 (45) |
| Had digital rectal exam | | | |
| No | 11 (22) | 46 (25) | 22 (32) |
| Yes | 40 (78) | 140 (75) | 47 (68) |
| Disclosed sexual behavior with men to primary care provider | | | |
| No ⁱ | 4 (8) | 62 ^{e,h} (33) | 54 ^c (78) |
| Yes | 47 (92) | 124 (67) | 15 (22) |
| Annual household income, \$ | | | |
| <60 000 | 21 (41) | 68 (37) | 33 (48) |
| ≥ 60 000 | 30 (59) | 118 (63) | 36 (52) |

Note: Pap = Papanicolaou. Table contains variables bivariately associated with willingness to receive an anal Pap test. Sexual orientation and HIV status were not examined because they were used to create the 3 comparison groups.

^aHIV-positive cohort comprised 50 gay men and 1 bisexual man.

^bOn a 4-point scale: 1 (nothing at all), 2 (a little), 3 (a moderate amount), 4 (quite a lot).

^cDifference between HIV-positive participants and HIV-negative bisexual men, $P < .05$.

^dOn a 4-point scale: 1 (not at all), 2 (a little), 3 (a moderate amount), 4 (quite a lot).

^eDifference between HIV-positive participants and HIV-negative gay men, $P < .05$.

^fOn a 5-point scale: 1 (no chance), 2 (low chance), 3 (moderate chance), 4 (high chance), 5 (certain I will get anal cancer).

^gOn a 5-point scale: 1 (strongly agree), 2 (somewhat agree), 3 (neither agree nor disagree), 4 (somewhat disagree), 5 (strongly disagree).

^hDifference between HIV-negative gay and bisexual men, $P < .05$.

ⁱIncluded not applicable/missing (n = 39).