The Duality of Oral Sex for Men Who Have Sex with Men: An Examination Into the Increase of Sexually Transmitted Infections Amid the Age of HIV Prevention

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Abstract

Several studies suggest that the increase in sexually transmitted infections (STIs) among men who have sex with men (MSM) could be due, in part, to human immunodeficiency virus (HIV) risk reduction strategies, which include engaging in oral sex over anal sex. The aims of this study were to evaluate oral sex behaviors and STI diagnoses and to investigate the potential dual role of oral sex as being protective for HIV, yet perpetuating STI transmission among MSM. We analyzed records from 871 MSM presenting to the Rhode Island STI Clinic between 2012 and 2015. We compared outcomes in men engaging in two HIV protective oral sex behaviors: (1) HIV/STI outcomes by men engaging only in oral sex versus those that did not, and (2) HIV/STI outcomes by men engaging in condomless oral sex with 100% condom use for all other sex acts versus those that did not. Men engaging in HIV protective oral sex behaviors were more likely to be HIV negative compared to men not engaging in them (99% vs. 93%, $p < 0.01$). In contrast, there was no significant difference in STI diagnoses between those that engaged in HIV protective oral sex behaviors and those that did not. The findings provide evidence to support the unique duality of oral sex: decreased risk for HIV and perpetuation of STI risk. Promotion of routine STI testing, including extragenital sites, is critical to address STI prevention among MSM. In the age of HIV prevention, addressing the ambiguous risks of discrete sex acts would be beneficial for both HIV and STI prevention education for MSM.

Keywords: HIV, men who have sex with men, MSM, oral sex, sexually transmitted infections, STIs

Introduction

HUMAN IMMUNODEFICIENCY VIRUS (HIV) continues to disproportionately impact gay, bisexual, and other men who have sex with men (MSM) in the United States. In 2014, MSM accounted for 83% of the HIV diagnoses among all males aged 13 years and older and 67% of the diagnoses among all persons receiving an HIV diagnosis that year.¹ Given the epidemic among this group, preventing HIV transmission has been a primary focus among MSM. The Centers for Disease Control and Prevention (CDC) has instituted numerous primary and secondary HIV prevention programs specifically for MSM.² In 2012, \$339 million were dedicated over 5 years to organizations for MSM-specific HIV testing programs¹ to address the high incidence rates. However, other sexually transmitted infection (STI) pre-

vention efforts among MSM have received comparably less attention. Across the United States, MSM are at increasing risk for STIs such as gonorrhea, chlamydia, and syphilis.³ Rates of chlamydia (+4.7%), gonorrhea (+4.5%), and syphilis (+56.1%) increased from 2011 to 2015 among MSM. Among all cases reported in 2015, MSM accounted for 82% of primary and secondary syphilis cases and in the United States.⁴

Several studies suggest that the increase of bacterial STIs among MSM could be due, in part, to the promotion of HIV-exclusive risk reduction strategies. One example of this is substituting oral sex for anal sex,^{5–8} which has lower risk for HIV acquisition.^{9,10} Previous studies demonstrate high rates of MSM engaging in oral sex^{11–14} and initiation of oral sex at a younger age than other sex acts.¹⁵ In contrast to HIV, other STIs, including syphilis, gonorrhea, and chlamydia, are frequently transmitted through oral-genital or

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oral-rectal pathways.¹⁶ Studies have brought attention to STI acquisition among MSM reporting oral sex as their only condomless sex behavior (i.e., not engaging in other types of sex other than oral or engaging in all other types of sex with condoms).^{5,17,18} In mathematical transmission models, Hui et al.¹⁹ found that gonorrhea transmission among MSM persisted despite prompt treatment of urethral infections, and gonorrhea elimination was not achieved by increasing condom use for all instances of anal sex. In addition, they found that an increase in condom use for oral sex, while maintaining condom use during anal sex, could lead to a large reduction in prevalence of gonorrhea. These models indicate a dual role of oral sex for MSM: as a harm reduction strategy for HIV, yet also as a risk amplification factor for bacterial STIs. This duality indicates a need to examine the differential role of oral sex in STIs among MSM.

Outside the United States, the rising prevalence of STIs among MSM has prompted increased scrutiny, including the role of oral sex in transmission. High rates of condomless oral sex, high rates of pharyngeal infections, and associations between oral sex and STI acquisition were common findings among MSM across multiple international settings.^{12,18,20–26} Oral sex was more frequently reported than other sex acts, and condom use during oral sex was rare.^{24,25} Beyond high rates of oral sex behaviors, research has also shown high and increasing rates of pharyngeal infections with gonorrhea and chlamydia.^{20,21,27} Evidence supports a robust association between oral sex and pharyngeal infections, with some findings showing pharyngeal infections occurring in men who engage only in oral sex but not anal sex.^{12,18,22,23,25,26} Overall, these findings indicate that oral sex is a common route of STI transmission among MSM. However, there has been far less research on this topic in the United States, and studies have shown both significant associations^{5,28} and lack of association between oral sex and acquisition of STIs.²⁹ There are also little data on frequency of disparate patterns in oral sex behaviors (i.e., condom use for oral sex, only engaging in oral but not anal sex, and engaging in oral sex with 100% condom use for all other sex acts) and potential association with STIs. Understanding oral sex and STI transmission can help guide counseling efforts and prevention interventions.

The goal of this study was to evaluate oral sex behaviors and STI diagnoses among a sample of MSM and to investigate the potential dual role oral sex may have as a harm reduction strategy for HIV and also as a risk factor for bacterial STIs. To explore this, the primary aims of the study were threefold: (1) describe various patterns in oral sex behaviors among a sample of MSM attending a public STI clinic in the United States; (2) investigate if HIV and STI outcomes differ between men characterized by two different types of oral sex behaviors known as being protective against HIV: those who engage only in oral sex with or without condoms versus those who engage in condomless oral sex with 100% condom use for all other sex acts; and (3) determine if there is a significant association between number of oral sex partners and STIs in the past year. Findings will help public health and other organizations better address the increasing rates of STIs, especially syphilis, among MSM and will also be able to provide insight into behavior trends for public health interventions.

Methods

Patients

Demographic, behavioral, and laboratory data were reviewed from medical records of men attending a publicly funded STI Clinic in Providence, RI between January 2012 and December 2015. Mirroring national trends, the rate of newly identified cases of HIV among MSM in Rhode Island was 90 times higher than heterosexual men in 2014. Further reflective of these national trends, the Rhode Island Department of Health (RI DOH) recently released data indicating that reported cases of syphilis, gonorrhea, and chlamydia have continued to rise. Notably, the RI DOH's most recent data show that infectious syphilis among MSM increased by 50% from 2010 to 2014. Moreover, the data showed that in 2014 the syphilis rate was 127 times higher among Rhode Island MSM compared with their heterosexual male counterparts.³⁰ For the current study, men that reported having sex with other men, or with men and women, were included and men reporting no sexual activity in the past 12 months were excluded. Although all men presenting at the clinic had genital STI testing performed, men who did not additionally have at least one oral or rectal STI test performed were excluded from the analysis.

Data collection

Demographic, behavioral, and laboratory data were reviewed from clinical records and intake forms. Review of patient data was approved by the Institutional Review Board at The Miriam Hospital. The following data variables were reviewed.

Demographics. Demographic data included age, gender, race, ethnicity, and education status.

STI outcomes. STI data included the results of HIV, syphilis, gonorrhea, and chlamydia testing. For the purposes of this study, the term STI was used to refer to bacterial STIs only (and not HIV). In accordance with the CDC's testing guidelines for MSM, the clinic offers routine testing for gonorrhea and chlamydia at genital, rectal, and oral sites using nucleic acid amplification testing (NAAT). Extra-genital testing was routinely performed starting in August of 2014 for all MSM presenting for testing. Syphilis testing was performed using the rapid plasma regain (RPR) test. HIV testing was performed using a third-generation antibody test. Men were also asked to self-report if they had ever been diagnosed with an STI in the past 12 months ("In the past 12 months have you ever been diagnosed with an STD"?). Men were considered HIV positive if they had self-reported a past HIV positive test or if they tested positive at their clinic visit.

Oral sex behaviors. Oral sex behaviors included the number of oral sex partners (both male and/or female) in the past 12 months ("In the past 12 months, how many people have you had oral sex with?"). Participants were asked to answer separately for male partners and female partners. This was followed up with the number of partners they did not use a condom with ("How many have you not used a condom with?"). Two HIV protective oral sex behavior groups were

evaluated: (1) men engaging only in oral sex and (2) men engaging in oral sex with 100% condom use for anal or vaginal sex.

Female partners. Sex behaviors with females included the number of female anal/vaginal sex partners they had in the past 12 months ("In the past 12 months, how many FEMALES have you had vaginal/anal sex with?"). This was also followed up with collecting the number of partners with whom they did not use a condom ("How many have you not used a condom with?").

Anal sex (with men) behaviors. Anal sex behaviors included the total number of male anal sex partners they had in the past 12 months ("In the past 12 months, how many MALES have you had anal sex with?"). This also included number of times the person was: (1) the insertive partner (i.e., top), (2) the receptive partner (i.e., bottom), and (3) both the insertive and receptive partner (i.e., versatile). Patients were also asked the number of partners they did not use a condom with for anal sex partners ("How many have you not used a condom with?").

Data analysis

All analyses were executed in SPSS version 22.³¹ Descriptive statistics was obtained for all variables included in the analyses. Additional frequencies were obtained for various oral, anal, and vaginal sex behaviors. To investigate if STI rates were significantly different between men engaging in the two HIV protective oral sex behaviors and those who did not, bivariate associations between each of the two oral sex behaviors and STI outcomes (Chi-Square tests) were conducted (only engaging in oral sex or not by STI outcomes; oral sex and 100% condom use for all other sex or not by STI outcomes). A bivariate binary logistic regression model was fit to determine if there was a significant association between number of oral sex partners and STIs (combination of self-report and clinic data: men either self-reporting past year STI diagnosis or testing positive for at least one STI test). The model included if an individual had any condomless anal sex, age, race, ethnicity, and sexual behavior (MSM vs. men who have sex with men and women) as covariates. The alpha level for significance was set to 0.05 (two tailed) for each analysis.

Results

Sample description

Table 1 presents the study sample characteristics. There were a total of 871 men who presented for HIV/STD testing during the study time period with the majority being white (68.2%) and men who had sex with men only (86.9%). Table 2 presents descriptive data on the sexual behaviors in the past 12 months of the men in the sample. Out of the 871 men, 97.2% engaged in any oral sex, and these men reported an average of 9.1 partners over the past 12 months; 93.1% had any anal sex and these men reported an average of 8.1 partners; and 11.9% men had any sex (anal or vaginal) with a female and these men reported an average of between 2.6 female partners. Table 3 presents the STI outcomes for the full sample in the first column. One-fourth of the men self-reported having been diagnosed with an STI in the past 12

TABLE 1. SAMPLE CHARACTERISTICS (N=871)

	<i>M (SD) or n (%)</i>
Age at time of clinic visit (years)	32.6 (12)
Race	
White	594 (68.2%)
Black or African American	80 (9.2%)
Asian	27 (3.1%)
Cape Verdean	6 (0.7%)
American Indian/Alaskan native	1 (0.1%)
Native Hawaiian/other Pacific Islander	0 (0%)
More than one race	30 (3.4%)
Other	124 (14.2%)
Missing/unknown	9 (1%)
Hispanic/Latino	147 (16.9%)
Sexual behaviors	
Men who have sex with men only	757 (86.9%)
Men who have sex with men and women	114 (13.1%)

M, mean; SD, standard deviation.

months and 229 (26.3%) tested positive for at least one STI at their clinic visit.

HIV protective oral sex behaviors and HIV/STI outcomes

There was a total of 106 men who engaged in only oral sex with or without condoms (12.2%) and a total of 156 men who engaged in condomless oral sex with 100% condom use for

TABLE 2. SEX BEHAVIORS PAST 12 MONTHS (N=871)

	<i>n (%) or M (SD)</i>
Oral sex	
Any oral sex	847 (97.2%)
Oral sex with men only	756 (86.8%)
Oral sex with women only	5 (0.6%)
Oral sex with both men and women	86 (9.9%)
Total no. of oral sex partners ^a	9.1 (15.1)
100% Condom use for oral sex	75 (8.6%)
Oral sex only with or without condoms (no other types of sex)	106 (12.2%)
Condomless oral sex with 100% condom use for all other sex	156 (17.9%)
Anal sex with men	
Any anal sex with men	811 (93.1%)
Insertive only anal sex with men (top)	143 (16.4%)
Receptive only anal sex with men (bottom)	150 (17.2%)
Both insertive and receptive anal sex with men (versatile)	518 (59.5%)
100% Condom use for anal sex with men	167 (19.2%)
Total no. of anal sex male partners ^a	8.1 (13.4)
Female sex	
Vaginal or anal sex with a female	104 (11.9%)
100% Condom use for female sex	35 (4%)
Total no. of female sex partners ^b	2.6 (2.7)

^aRange=0–201; average taken from only men engaging in sex behavior.

^bRange=0–12; average taken from only men engaging in female sex.

M, mean; SD, standard deviation.

TABLE 3. SEXUALLY TRANSMITTED INFECTION (STI) OUTCOMES AND BIVARIATE ASSOCIATIONS WITH ORAL SEX BEHAVIORS

		<i>Oral sex only</i> (n = 106)			<i>Condomless oral sex with</i> <i>100% condom use for all</i> <i>other sex (n = 156)</i>		
	<i>Full sample</i> (N = 871)	n (%)			n (%)		
	n (%)	Yes	No	χ^2 (p)	Yes	No	χ^2 (p)
HIV outcome ^a				3.31 (0.07)			6.98 (0.01)
Positive	50 (5.7)	2 (1.9)	48 (6.3)		2 (1.3)	48 (6.7)	
Negative	821 (94.3)	104 (98.1)	717 (87.3)		154 (98.7)	667 (93.3)	
Self-report							
Past year STI diagnosis				1.16 (0.28)			3.05 (0.08)
Reported	209 (24)	21 (19.8)	188 (24.6)		29 (18.6)	180 (25.2)	
Not reported	662 (76)	85 (80.2)	577 (75.4)		127 (81.4)	535 (74.8)	
Clinic test outcome							
Urine gonorrhea				2.07 (0.15)			2.31 (0.13)
Positive	28 (3.2)	1 (0.9)	27 (3.6)		2 (1.3)	26 (3.7)	
Negative	828 (95.1)	105 (99.1)	723 (96.4)		152 (98.7)	676 (96.3)	
Not performed	15 (1.7)						
Urine chlamydia				0.12 (0.75)			0.88 (0.35)
Positive	20 (2.3)	2 (1.9)	18 (2.4)		2 (1.3)	18 (2.6)	
Negative	837 (96.1)	104 (98.1)	733 (97.6)		152 (98.7)	685 (97.4)	
Not performed	14 (1.6)						
Syphilis				1.97 (0.16)			1.23 (0.27)
Positive	68 (7.8)	5 (4.8)	63 (8.9)		9 (6.1)	59 (8.9)	
Negative	745 (85.5)	99 (95.2)	646 (91.1)		139 (93.9)	606 (91.1)	
Not performed	57 (6.5)						
Oral gonorrhea				0.98 (0.32)			0.15 (0.70)
Positive	79 (9.1)	7 (6.6)	72 (9.6)		13 (8.4)	66 (9.4)	
Negative	779 (89.4)	99 (93.4)	680 (90.4)		142 (91.6)	637 (90.6)	
Not performed	13 (1.5)						
Oral chlamydia				0.61 (0.44)			1.90 (0.17)
Positive	16 (1.8)	3 (2.8)	13 (1.7)		5 (3.2)	11 (1.6)	
Negative	840 (96.4)	103 (97.2)	737 (98.3)		150 (96.8)	690 (98.4)	
Not performed	13 (1.5)						
Rectal gonorrhea				1.39 (0.24)			5.66 (0.02)
Positive	71 (8.2)	4 (5.9)	67 (10.4)		4 (3.7)	67 (11.1)	
Negative	643 (73.8)	64 (94.1)	579 (89.6)		105 (96.3)	538 (88.9)	
Not performed	156 (17.9)						
Rectal chlamydia				0.02 (0.90)			5.34 (0.02)
Positive	60 (6.9)	6 (8.8)	54 (8.4)		3 (2.8)	57 (9.4)	
Negative	654 (75.1)	62 (91.2)	592 (91.6)		106 (97.2)	548 (90.6)	
Not performed	156 (17.9)						

Bold values indicate significance at the <0.05 level.

χ^2 =Chi-squared test; recoded "not performed" as missing for Chi-squared tests; "Yes" indicates engaging in oral sex behavior; "No" indicates engaging in other sex behaviors.

^aMen were included as HIV+ if they had self-reported a past HIV positive test or tested positive for HIV at their clinic visit.

HIV, human immunodeficiency virus; STI, sexually transmitted infection.

all other sex types (17.9%). Table 3 presents the STI outcomes for each of these oral sex behavior groups and also the bivariate associations between the two HIV protective oral sex behaviors and HIV and STI outcomes. Men engaging in both HIV protective oral sex behaviors had higher percentages of being HIV negative compared to the men not engaging in the HIV protective oral sex behaviors (98% of men engaged in oral sex only were HIV negative versus 87% for those that did not; 99% of men who had oral sex with 100% condom use for other sex were HIV negative versus 93% for those that did not). There was a significant overall difference in HIV status for men engaging in condomless oral sex with

100% condom use for all other sex ($\chi^2=6.98$, $p<0.01$), and near significance for men engaging only in oral sex with or without condom use ($\chi^2=3.31$, $p=0.07$). Contrary, the majority of the STI outcomes were nonsignificant for the men engaging in HIV protective oral sex behaviors. In other words, on both self-reported STI and clinic-based testing STI outcomes, there was no difference in testing positive for STIs between those that engaged in the HIV protective oral sex behaviors and those that did not. However, there were significant group differences in men engaging in oral sex with 100% condom use and those who did not on rectal gonorrhea ($\chi^2=5.66$, $p<0.05$) and rectal chlamydia ($\chi^2=5.34$,

$p < 0.05$). Men that engaged in this particular HIV protective oral sex behavior had lower percentages of being positive for gonorrhea (3.7% positive) and chlamydia (2.8% positive) compared to the men not engaging in this sex behavior (11.1% positive for gonorrhea and 9.4% positive for chlamydia).

Number of oral sex partners and STIs

Table 4 presents the bivariate binary logistic regression model predicting having an STI in the past 12 months. The total number of oral sex partners was significantly predictive of having had an STI diagnosis in the past year [adjusted odds ratio (aOR) = 1.03, 95% confidence interval (CI) = 1.02–1.04, $p < 0.001$] over and above condomless anal sex. In other words, for each one partner increase in oral sex partners, MSM had a 3% increased odds of having an STI despite controlling for condomless anal sex.

Discussion

To our knowledge, this is the first study to demonstrate the dual role of oral sex on both reducing HIV risk and increasing risk for other STIs and to provide insight into various oral sex behaviors among a sample of MSM in the United States. Oral sex has been contextualized as a lower-HIV risk sex behavior compared to anal sex, yet there is still a significant risk for other STIs. This study uniquely contributes an examination of this duality using STI clinic data. In addition, there have been inconsistent findings in the United States regarding the association between oral sex and STIs due to the paucity of literature.^{5,28,29} Current findings support a significant relationship between oral sex and STIs; the likelihood of having an STI increased as number of oral sex partners increased.

This study demonstrates that condomless oral sex among MSM is not protective against STIs, yet significant differences emerged in HIV diagnosis, thus showing the unique duality of oral sex as an HIV risk reduction strategy. A substantial number of men engaged in oral sex only with or without condoms ($n = 106$, 12%) and other men engaging in condomless oral sex with 100% condom use for all other sex ($n = 156$, 18%); two sex behaviors promoted as reducing HIV risk. Men engaging in the HIV protective oral sex behaviors had higher rates of being HIV negative compared to the men

engaging in other sex behaviors, yet overall no significant difference in STI outcomes (aside from rectal STIs). Public health professionals need to be aware of the possible impact of HIV prevention efforts to be able to educate MSM that choosing oral sex only does not protect against bacterial STIs. Government and community agencies need to be aware of this effect when designing HIV prevention communications and consider promoting conjoint STI prevention along with HIV risk reduction. In addition, addressing the ambiguous risks of discrete sex acts (e.g., oral sex) would be beneficial for HIV/STI prevention education for MSM.³²

Unlike HIV, bacterial STIs such as gonorrhea, chlamydia, and syphilis are curable when diagnosed appropriately and treated. Routine STI testing among MSM facilitates treatment as prevention, in that early diagnosis and treatment prevent transmission to others. This is especially important given that other STIs increase the risk of HIV acquisition.³³ Bacterial STIs are not as chronic as HIV and have set limited treatment regimens creating a risk for recurrent infection. Thus, in order for treatment as prevention for STIs to be the most effective, routine testing is crucial. However, barriers to STI testing for MSM have been examined and need to be addressed when planning promotion of treatment as prevention. Mimiaga et al.³⁴ found that among a sample of MSM, reasons for not getting tested for STIs included the following: not experiencing symptoms, not considering themselves at risk, lack of access to free and anonymous testing, and not knowing how to go about getting a test. Considering that pharyngeal infections are commonly asymptomatic and not experiencing symptoms is a barrier to testing, these infections may be significantly contributing to the increasing rates of STIs among MSM and should be addressed in sexual health clinics. However, as early as adolescence, individuals do not consider oral sex in their definition of “sex.”^{35,36} This nonsex attitude about oral sex could be an important target for change in public health interventions. If there is an understanding that oral sex is a risk factor for STIs, individuals primarily engaging in this behavior may be more apt to get tested or use condoms. The indication that lack of access to free testing is a barrier to STI testing is something government and community agencies should be addressing if the goal is to decrease the rates of STIs among MSM. Further, public communications about how and where to get tested are critical; there should be information provided about how to go about this call to action and not just promotion of testing. Increases in regular STI testing among MSM engaging in other sex, not just condomless anal sex, are imperative in a treatment as prevention model. Notably, it is critical to promote and enforce extragenital STI testing (urethral, pharyngeal, and rectal) among MSM. In a retrospective analysis of asymptomatic MSM in an urban STI clinic, Marcus et al.³⁷ found that about 84% of chlamydia and gonorrhea infections would have been missed if urethral testing was the only site tested, compared with only 10% when pharyngeal and rectal tests were also done. Being able to detect extragenital STIs is critical to decreasing STI rates among MSM.

Although this is the first known study to focus on the duality of oral sex for MSM, limitations should be noted. These data, aside from the STI testing outcomes, are self-reported and retrospective, thus subject to recall bias of the clinic patients. A limitation of this secondary analysis of clinic data

TABLE 4. BINARY LOGISTIC REGRESSION PREDICTING HAVING HAD A SEXUALLY TRANSMITTED INFECTION (STI) DIAGNOSIS

	<i>Having had any STI in past year^a</i>	
	<i>aOR</i>	<i>95% CI</i>
Total no. of oral sex partners	1.03**	1.01–1.04
Model $\chi^2 = 60.53^{**}$ $p < 0.001$		

Model controls for condomless anal sex, age, race, ethnicity, and sexual behaviors (MSM vs. men who have sex with men and women).

^aModel predicts for men testing positive for at least one clinic STI test and/or self-reporting an STI diagnosis in the past year.

** $p < 0.001$.

aOR, adjusted odds ratio; CI, confidence interval; MSM, men who have sex with men; STI, sexually transmitted infection.

records was that sex behaviors were not parsed out by insertive versus receptive oral sex behaviors. In addition, it did not allow to differentiate between oral-genital or oral-rectal pathways. Further research should gather more specific behavior patterns to thoroughly examine if specific types of oral sex have different roles in STI transmission. Since STI outcomes were of main interest for the current study, and it has been shown that urine tests may not detect infections,³⁷ men were excluded if they did not have at least one oral or rectal STI test done and this was not established in the clinic until August 2014, which may have introduced a sampling bias. There is a likelihood that men who did not receive either rectal or oral testing had an infection in the site that was not tested, thus emphasizing the importance of comprehensive extragenital testing. Given that we did not have data regarding motivations of engagement/nonengagement of protective oral sex behaviors, interpretation should be taken with caution. It could be that HIV positive people are more likely to do other, nonoral sex behaviors since they are already HIV positive, but it is also likely that HIV positive men engage in protective oral sex behaviors as to not transmit the virus. In addition, the current study was not able to examine other seroadaptive behaviors such as serosorting or seropositioning. These alternative HIV protective behaviors also have risk for transmission of STIs and should be considered in further research. There should be caution in generalizing to the more broad MSM population, as these data were collected in a specific geographic location in the United States. Moreover, like all groups of people, MSM are a heterogeneous group and a one-size-fits-all approach to STI promotion may not be effective. Despite these limitations, the current findings are important to document such that government and community agencies have direction in addressing the increase of bacterial STIs among MSM.

Overall, the current findings emphasize the importance of addressing the role of oral sex in STIs among MSM. The primary focus on HIV and condomless anal sex in sexual health promotion efforts may contribute to increases in STIs among MSM. Given the risk for STIs through oral sex, attention to oral sex behaviors needs to be a focus for STI prevention efforts. Future research regarding specific sexual behaviors of MSM, and within subgroups of MSM, and how they differ for HIV and STIs is warranted to reduce the impact of other STIs. Given the recent data on the link among HIV-positive status, nondisclosure of such status, and condomless sex with uninfected partners,^{38,39} future research should also examine the relationship between disclosure of having an STI and sexual behaviors. HIV prevention efforts have evolved since the AIDS epidemic and continue to improve with robust support from multiple agencies; it is time to bring STIs into focus alongside HIV for promoting sexual health among MSM.

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