



Published in final edited form as:

*Arch Sex Behav.* 2014 May ; 43(4): 755–769. doi:10.1007/s10508-013-0203-0.

## Enema Use among Men who have Sex with Men: A behavioral epidemiologic study with implications for HIV/STI prevention

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### Abstract

Enema use or douching is a risk factor for HIV/STI in men who have sex with men (MSM). However, few studies have explored enema use practices. We examined the frequency of enema use, type of products used, and reasons to use and not to use before and after receptive anal sex in a large sample of MSM (N=4992) recruited from sixteen US cities. Through online surveys, we examined personal, behavioral, and environmental factors associated with enema use. Most (52%) participants reported having douched at least once and 35% reported douching within the last three months. While most (88%) reported enema use before receptive anal sex, 28% douched after receptive anal sex. Most participants (65%) used water to douche, 24% added salt, soap, and/or antibacterial products to water, and 30% reported using commercially-available products. Being a man of color ( $p<0.05$ ); HIV-positive ( $p<0.001$ ); diagnosed with an STI ( $p<0.01$ ); identifying as “versatile” in sex ( $p<0.001$ ); and having more than two unprotected sex partners ( $p<0.001$ ) were significantly associated with recent enema use. Douching behavior appears closely associated with HIV/STI risk. Douching with water may be a concern since it may increase HIV/STI infection by damaging the epithelium. Development and promotion of a non-damaging, non-water based enema specifically for use in anal sex is recommended. In addition, the seemingly contradictory recommendations that water-based lubricant is recommended for anal sex but water-based enemas are dangerous need to be reconciled into a single consistent message.

### Keywords

Men who have sex with men; enema use; rectal douching; SILAS; HIV

### INTRODUCTION

Enema use or douching is an under-researched practice affecting the sexual health of men who have sex with men (MSM). Enema use has been associated with several sexually transmitted infections (STIs) in MSM, including *lymphogranulomavenereum* (LGV) (de Vries et al., 2008), non-LGV *chlamydia trachomatis* (Tinmouth et al., 2008), *neisseriagonorrhoeae* (Heiligenberg et al., 2012), and hepatitis C (Ndimbie, Kingsley, Nedjar, & Rinaldo, 1996). In addition, studies report it as a risk factor for HIV infection (Winkelstein et al., 1987), in all major racial/ethnic groups: blacks, Hispanics as well as in whites (Easterbrook et al., 1993).

Products that result in loss or damage to the anal epithelium may facilitate HIV/STI transmission. In 2000, a trial of nonoxynol-9 as a potential rectal microbicide failed when it was shown that it increased epithelia soothing and consequently increased HIV risk (Phillips, Taylor, Zacharopoulos, & Maguire, 2000). A double-blind, repeated-measures study of 24 healthy volunteers compared three types of enema solutions (soap suds, tap water and polyethylene glycol-electrolyte solution – PEG-ES) (Schmelzer, Schiller, Meyer, Rugari, & Case, 2004). Rectal biopsies from the valves of Houston showed surface epithelium loss after soapsuds and tap water enemas, but not for PEG-ES enemas. Similarly, in a study comparing an iso-osmolar and a hyperomolar commercial lubricant, epithelial denudation in the distal colon was significantly greater with the hyperosmolar gel than with the iso-osmolar formulation, measured 60–90 minutes after application (Fuchs et al., 2007). Together, these studies suggest that the use of water-based douches increase HIV/STI risk by producing epithelial disruption “present not long after, if not during, anal intercourse and potential exposure to infectious seminal fluid” (Fuchs et al., 2007).

Despite these studies, water-based lubricant has been heavily promoted to MSM for HIV prevention. While water-based enemas have not been promoted, neither has the avoidance of enema use. While the biological risk of douching has been established through laboratory studies, very little has been published describing the rectal douching practices in sex between men. Early in the epidemic, the San Francisco AIDS Cohort study examined ancillary sexual behaviors including the use of douches or enemas before sexual contact between men (Winkelstein et al., 1987). Among the 514 MSM who reported receptive anal intercourse, 52.7% reported douching before sexual contact. Douching significantly predicted HIV infection ( $RR=1.6$ , 95% CI: 1.2–2.3;  $p<.01$ ) (Winkelstein et al., 1987). In 1993, the Multicenter AIDS Cohort study included douching in their investigation of potential factors contributing to increased HIV seroprevalence in black ( $n=194$ ) and Hispanic ( $n=234$ ) MSM compared to white MSM ( $n=4,447$ ) (Easterbrook et al., 1993). Recent incidence of rectal douching differed significantly across race/ethnicity -- with 26% Hispanic, 32% white, and 41% black MSM reporting rectal douching before anal sex with two or more partners in the prior 6 months. Multivariate analysis identified rectal douching as a significant risk factor for HIV-1 seropositivity across all racial/ethnic groups. While both studies found similar results, suggesting that the association between enema use and HIV risk is reliable, the studies are old and were limited to a single question on enema use.

Recently, research into rectal microbicides has renewed interest in enema use in anal sex. Carballo-Diequez et al. (2008 and 2010) conducted two studies investigating enema use by MSM in greater depth. In the first study, participants were 105 MSM living in New York city who meet other men for intentional condom less receptive anal intercourse (also known as “barebackers”) (Carballo-Diequez et al., 2008). Most (83%) of their sample reported having douched in the prior six months, 64% doing so in preparation for anal sex, and 53% reported frequently or always douching whenever anal intercourse was anticipated. On all these measures, HIV-positive participants were significantly more likely to report engaging in douching than HIV-negative participants. Douching after sex was less common (reported by 31%) than douching before sex, with douching frequently or always after sex cited by 15%. The most commonly-cited reasons for douching before sex included cleanliness

(60%), because a sex partner requested it (24%), and on advice of friends (16%). Reasons for douching after sex were cited as cleanliness (64%), to prevent STIs (24%), and as requested by the sex partner (9%). Average age of onset for pre-coital douching was 25 years (SD=8.2 years), and post-coital douching 27 years (SD=9.7). The study found no differences in douching by race, age, education, or income.

The second study involved a qualitative study of 20 HIV-negative MSM and a survey study of 105 HIV-negative MSM with a history of recent unprotected anal intercourse living in Boston (Carballo-Diequez, Bauermeister, Ventuneac, Dolezal, & Mayer, 2010). In the qualitative interviews, the primary reasons for douching were identified as hygiene (cleanliness) and also increased pleasure. Two men also linked douching to having unprotected anal intercourse. Fleet enemas, water, or soapy solutions were used, applied with enema bottles or plastic or rubber bulbs. In the qualitative study, most (51%) reported rectal douching in the past 6 months. Of these, most reported doing it in preparation for sex (91%), frequently or always (78%), and usually about 2 hours before sex (SD=2.9). About half of the men who reported any douching also reported douching following sex ( $n=26$ , 48%), typically within 30 minutes. Reasons cited were similar to those in the first study.

While these studies provide some of the first data on the douching practices of MSM, the relatively small sample sizes, geographic restrictions, study requirements for participants to have recent histories of unprotected anal intercourse, and for the first study, to engage in intentional barebacking all severely limit generalizability of the findings. Clearly, we lack published studies addressing current enema practices among MSM in the USA. To address this gap, as part of a larger trial, we conducted a behavioral epidemiologic investigation into the douching practices of MSM. Using data from the Structural Interventions to Lower Alcohol-Related STI/HIV-Risk (SILAS) study, we aimed to collect the first prevalence and incidence data on enema use, types of produced used, and reasons to use and not use before and after receptive anal sex. Given the lack of research in this area, the primary purpose of this paper was descriptive (to report current behavior) and exploratory (to identify how enema use practices may differ across demographic variables.) We used Bandura's social cognitive behavior model to examine personal, behavioral, and environmental factors potentially associated with enema use.

## METHOD

### Study Participants and Data Collection Procedure

In 2011, we recruited 5,047 MSM into Wave 4 of the SILAS study (Horvath, Weinmeyer, & Rosser, 2010; Jones-Webb, Smolenski, Brady, Wilkerson, & Rosser, 2013), a structural study of alcohol-related HIV risk behavior in 16 U.S. states. Banner advertisements from two of the nation's largest gay websites directed interested persons to a webpage hosted on a dedicated university server with appropriate encryption to ensure data security. The webpage included information about the study procedures and a link to the eligibility screener. The eligibility criteria were being a biological male, having prior sexual experience with a man, being 18 years or older, and reporting a residential zip code in a Metropolitan Statistical Area (MSA) under study. Eligible respondents were invited to complete our consent protocol (Rosser et al., 2009). Of the 6,876 eligible enrollees, 5,047

(73.4%) consented and completed the survey. We followed a standard (developed by our team) de-duplication, cross-validation and data cleaning process to exclude participants with impossible or nonsensical data patterns (Pequegnat et al., 2007). This analysis was restricted to participants ( $N=4,992$ , 98.9%) with complete data on recent enema use in the past three months prior to the survey. Participants were asked a variable number of items depending on responses and skip patterns (maximum of 123 questions). The mean survey completion time was 71 minutes. Participants were compensated \$30 for their time. A Certificate of Confidentiality was obtained from the National Institutes of Health. The institutional review board of the researchers' home institution approved study procedures.

## Measures

The survey consisted of sections about demographics; typical Internet use; sexual behaviors with partners from online, from bars/clubs and from other locations; rectal enema/douche use; current alcohol and drug use; sexuality and role in sex; long-term relationships (LTRs); openness as gay and bisexual men; mental health; internalized homonegativity; HIV and STI status; perception of the gay scene in the MSA; awareness of public policy in the MSA; and social climate toward gays at the neighborhood, MSA, and state levels. A refuse to answer response option allowed participants to opt out of answering any item. We grouped interpersonal variables such as age, race/ethnicity, income as personal variables; behavior related variables such as number of sexual partners, unprotected anal intercourse as behavioral variables and residence in urban or rural MSA or in pro or anti-gay MSA as environmental variables. Measures relevant to this analysis are described below.

**Enema use**—In this analysis, our primary outcome of interest was lifetime and recent enema use. We calculated this variable from two questions: have you ever used rectal enema/douche; and how many times have you used a rectal enema/douche in the past three months. Participants who reported ever using enemas and at least once in past three months were identified as recent enema users and the rest of the participants were identified as non-users.

**Alcohol and substance use**—Participants were asked to provide information about their alcohol consumption. We assessed the drinking pattern by combining three items to construct a quantity and frequency drinking typology that ranged from abstinence to frequent heavy drinking. The first question examined if the participant was a life-long abstainer or ex-drinker. The second question examined frequency: “In the past 3 months, on average, how often did you drink any kind of alcoholic beverage?” (less than once a month, about once a month, 2–3 times a month, 1–2 times a week, 2–3 times a week, nearly every day, at least once a day), and the third question examined quantity: “In the past 3 months, on a day when you drank some alcohol, how many drinks did you usually have?” At analysis, “infrequent” consumption was defined as drinking less than once a week, “frequent” consumption was drinking at least once a week, “light/moderate” consumption was 1–4 drinks, while “heavy” drinking was 5 or more drinks.

Participants also provided information on drug use in past three months. Based on the frequency of use (not at all to daily use) of marijuana, cocaine, uppers (methamphetamines,

crystal, crank), LSD, PCP, downers, ecstasy, MDMA, opioids, erectile enhancement and poppers in last 90 days, we calculated the drug use variable (no/yes).

**Sexual risk behavior**—A sexual behavior battery investigated sexual risk behavior in the past three months with partners met online, at a gay bar/club, and at any other location(s). If participants indicated they engaged in anal sex in past three months with a partner(s) met online or offline, they were asked to report the number of partner(s), and the number with whom they had unprotected (without condom) and protected (with condom) sex, estimated separately. Using these estimates, we created three summary variables; total number of partners (0 partner/1–2 partner/2+ partners) unprotected anal intercourse male partners (UAIMP: 0–2 partners/2+ partners) and protected anal intercourse male partners (PAIMP: 0 partner/1+ partners). We also created a sexual partner meeting variable (meets partners only online, only offline, and both online and offline).

**Sexual orientation**—Participants' sexual identity was investigated by asking, “do you identify as...” with response options being gay/homosexual, bisexual, heterosexual, or other (with a space to write in their response). They were also asked to report role-in-sex by answering one question where they identified themselves as top, top/versatile, versatile, bottom/ versatile, bottom, oral only, oral and jerking off, and jerking off only. At analysis, we categorized participants as top only, versatile (either top/versatile, or versatile, or bottom/ versatile), bottom only and no anal (either oral only, or oral and jerking off, or jerking off only)

**Other measures**—Demographic variables included age, education, income, race/ ethnicity, marital status to a man, long-term relationship status (90+ days), political party affiliation, history of any sexually transmitted infections (STI) and HIV serostatus. “Outness,” defined in the survey as “the degree to which you are out of the closet or open about being sexually attracted to or having sex with men,” was measured as a 5-point Likert-type item (1 = *not at all open (out)*, 5 = *open (out) to all or most people I know*). We used the shortened CES-D 10 item scale (Zhang et al., 2012) to assess depression among participants. Cronbach's alpha for CES-D scale in this sample was 0.85. We used the revised Reaction to Homosexuality 7-item scale (Smolenski, Diamond, Ross, & Rosser, 2010) to measure internalized homonegativity, which was treated as continuous. Alpha reliability for this scale with our sample was 0.76.

## Data Analysis

Summary statistics were used to describe the study sample and to calculate the prevalence of *ever* and *recent* enema use among the participants. We used Pearson's chi-square test (for categorical) and t-tests (for continuous variables) to examine if enema users and non-users differ by selected personal characteristics. We also examined if the two groups differed by behavioral and environmental factors.

Our goal was to assess the association between recent enema use and personal, behavioral, and environmental factors. We wanted to assess the relative contribution of each factor as well as the block of factors on enema use. Therefore, we used a block regression strategy.

Three separate multiple logistic regression models were run to identify factors associated with recent enema use (0=did not use, 1=yes, recently used). Personal characteristics that were significant ( $p<0.05$ ) at the bivariate level were entered into the first multiple logistic regression model. In the second multiple logistic regression model, we included behavioral variables that were significant ( $p<0.05$ ) at the bivariate level. Finally, in the third model we included all the variables that were significant ( $p<0.05$ ) in the first two regression models. We build three level (individual, rural/urban MSA, and pro/anti MSA) random-intercept random-coefficient nested logistic regression model using *gllamm* (S. Rabe-Hesketh, Skrondal, & Pickles, 2004; S. Rabe-Hesketh, Skrondal, & Pickles, 2005) in STATA. All statistical tests were two-tailed, and all analyses were conducted in Stata 11 software (StataCorp., 2010).

## RESULTS

### Demographic, Sexual, and Behavioral Characteristics

Characteristics of the sample are summarized in Table 1. Most participants were young (under 35 years), white (non-Hispanic), well-educated (with a college degree or higher), earned less than forty-thousand dollars, lived in an urban area and identified politically as either democrats or independents. While about half (52.8%) reported being in a long-term relationship, only 10.6% reported being legally married, partnered, or in a civil union to a man. Almost 10.9% of the sample were HIV-positive MSM (by self-report); and 9.6% reported having an STI diagnosis in the past twelve months. Most (90.9%) identified as gay/homosexual, and 78.6% were “out” about their sexual orientation to all or almost all others. On the two mental health scales, most reported low internalized homonegativity and low-to-moderate levels of depression.

In the last ninety days, 32.7% men reported no sexual partners, 25.8% reported one-to-two sexual partners, and 41.5% reported more than two sexual partners. Most men reported meeting their sexual partners both online and offline. Most MSM (69.4%) reported less than two unprotected anal sex male partners in the last 90 days, while 73.1% reported protected anal sex with one or more men. Most of the sample (71.8%) identified their role-in-sex as either versatile (58.3%) or as an exclusive bottom (13.5%), 8.3% reported being exclusively a top, while 19.9% reported not engaging in anal sex. In terms of drugs and alcohol, 11.4% scored in the range for frequent heavy alcohol use and 16% for problematic illicit drug use.

### Ever Enema Use

Of the total sample, 52% reported *ever* having used a rectal enema/douching; among enema users, 87.6% reported using it before receptive anal sex and 27.4% reported using it after receptive anal sex (see Table 2). Median time of using enema before receptive anal sex was 60 minutes whereas after receptive anal sex median time to use was 30 minutes. Among participants who reported enema use before anal sex, 43.3% reported frequent use, defined as almost always or always using enemas before sex. Water was the most common product used by 65.7%, with 24.4% adding salt, soap, or antibacterial product to water, and 30.4% using commercially-prepared saline enema products (e.g., Fleet enemas). Hygiene or cleanliness issues were the most commonly cited reasons for enema use, both before sex



(63.6%) and after sex (54.6%); with 16.3% also reporting douching before sex “to avoid embarrassment for having feces during anal sex,” 27.7% as “to transition from sex,” and 12.7% douching after sex as “HIV/STI prevention.”

### Ever Enema Use by Race/Ethnicity

We also examined frequency of enema use, products used, and reasons to use across four racial/ethnic categories: whites, blacks, Hispanics, and others (see Table 2). Most black participants (91.1%) reported using enema before receptive anal sex whereas more Hispanic participants (56.2%) reported using enema after receptive anal sex. Both the time elapsed between enema use and sex, and the type of enema used, differed across race/ethnicity. Among white participants, median time to douche before receptive anal sex was an hour, however, this was significantly longer than estimated by the other racial groups (around 30 minutes,  $p < 0.001$ ). Using only water was the most prevalent type of enema reported by white participants before (73.8%) and after (64.5%) anal sex whereas, adding salt, soap, or antibacterial product to the water was most commonly reported by Hispanic participants both before and after anal sex. Commercially-prepared a saline enema product was most used by black participants.

### Ever Enema Use by HIV and STI status

Over ninety-five percent of the HIV-positive MSM in our sample reported using enema before anal sex and 45.8% reported of using after anal sex (see Table 3). HIV-positive MSM who used enema before anal sex were also more likely (42.4%) to report frequent use (almost always or always) compared to those using enema after sex (15.1%). Adding salt, soap, or antibacterial product to water was more prevalent among HIV-positive MSM compared to HIV negative MSM (46.2% vs. 19.5%) before anal sex as well as after anal sex. HIV-positive participants were also more likely than HIV-negative participants to report using enema before (81.5% vs. 67.6%) and after (76.5% vs. 38.1%) any (either protected or unprotected) receptive anal sex.

Participants who reported a STI diagnosis in past year (94.3% vs. 5.7%) or over their lifetime (87.2% vs. 12.8%) were more likely to use enemas than those without an STI history (see Table 3). Participants with a recent STI diagnosis were more likely (60.7% vs. 21.9%) to add salt, soap, or antibacterial product to water compared to those reporting no STI diagnosis. Furthermore, participants who reported a recent or lifetime STI diagnosis were more likely to report using enema before (78.4% or 72.2% vs. 67.0%) and after (76.7% or 46.8% vs. 38.8%) any (either protected or unprotected) receptive anal sex compared to MSM who reported no STI diagnosis.

### Recent Enema Users and Non-users

Over one-third of the sample ( $n=1748$ , 35.1%) reported using rectal enemas within the last three months (see Table 1). Compared to non-recent enema users, recent enema users were more likely to be older, more educated, with a higher income, men of color, in a long-term relationship, married or in a domestic civil union with a man, HIV-positive MSM, and report a recent STI diagnosis. Recent enema users were also more open (out) as gay, scored less on internalized homonegativity, but reported more depressive symptoms (902/1748, 52%

scored 10 on CES-D). In addition, recent enema users were also more likely to identify their role-in-sex as versatile (versus “bottom”); score more problematic for alcohol use; report more than two unprotected anal intercourse partners, and be less likely to report no protected anal intercourse partners in last three months.

### Reasons for Not Using Enemas

We also investigated reasons for non-use of enemas before anal sex among those who stated they did not use them (see Table 4). The three most commonly cited reasons for not using enemas were preferring sex to be spontaneous, not knowing about douching, and not engaging in receptive anal sex.

### Correlates of Recent Enema Use

To investigate the relative contribution of the variables associated with recent enema use, we calculated the odds ratios and associated 95% confidence intervals in three separate multiple logistic regression models (see Table 5). For each model, variables that were statistically significant ( $p < .05$ ) at the bivariate level were entered into the model. Model 1 analyzed personal variables ( $n=12$  variables), and Model 2 behavioral variables ( $n=4$  variables). Then, ten variables (six from model 1; and four from model 2) were entered into the third and final model (see Table 4).

Among personal variables, having an annual income higher than twenty thousand ( $p < 0.05$ ); being a man of color ( $p < 0.05$ ); being HIV-positive ( $p < 0.001$ ); being diagnosed with an STI within the past twelve months ( $p < 0.001$ ) or ever ( $p < 0.01$ ) remained significantly associated with recent enema use controlling for the other variables. For behavioral variables, meeting partners online and offline both ( $p < 0.001$ ); being versatile ( $p < 0.001$ ); being bottom only ( $p < 0.001$ ); having 2+UAIMP ( $p < 0.001$ ) and having 1+ PAIMP ( $p < 0.01$ ) were significantly associated with recent enema use controlling for the other variables.

## DISCUSSION

To the best of our knowledge and review, this is the first large study of enema use among MSM recruited across the USA. As reflected in the sample characteristics, the sample is fairly typical for an online study of MSM and large enough to detect demographic, behavioral, and environmental differences in enema use.

With just over half of the respondents reporting they had ever used enemas, and over one third using them recently in sex, the key finding is that enema use appears common. This finding is consistent with the data from previous smaller studies over the past twenty years confirming douching as a common behavior. Despite its frequent practice, almost a quarter of this sample reported not knowing about douching which suggests enema use remains a common yet somewhat taboo topic within the MSM community. In addition, our literature search revealed a dearth of research on this topic, and many HIV prevention programs for MSM do not appear to address it at all. Such findings are consistent with the state of human knowledge where there are inadequate data and inconsistent recommendations concerning a potentially sensitive or embarrassing topic.



The second main finding of the study is that enema use is significantly associated with HIV-positive status and a STI diagnosis. Our results are consistent with previous studies reporting similar associations (de Vries et al., 2008; Easterbrook et al., 1993; Heiligenberg et al., 2012; Ndimbie et al., 1996; Tinmouth et al., 2008; Winkelstein et al., 1987). In addition, HIV-positive MSM and MSM with an STI diagnosis were more likely to report adding salt, soap, or antibacterial product to water before douching. The products most commonly used for douching – water, soap, and saline -- are those, which laboratory and clinical studies have identified as damaging the epithelium. Thus, douching appears a candidate behavior that may plausibly influence both HIV and other STI transmission among MSM.

The third main finding of this study is that enema use appears associated with a number of variables, which are associated with increased risk of both HIV and STI acquisition. Using Bandura's typology, personal characteristics associated with enema use include being MSM of Color (vs. white MSM), being HIV-positive (vs. negative), and being diagnosed with an STI either within the prior twelve months or ever (vs. never). These populations are all identified as at disproportionately high risk for HIV and other STIs. To the degree the association between enema use and transmission risk is causal, enema use may contribute to and/or explain in part these long-standing health disparities. Our results are similar to Easterbrook et al. (Easterbrook et al., 1993) who twenty years ago observed a relationship between race/ethnicity and enema use. We encourage researchers investigating racial/ethnic differences in HIV acquisition between African American, Latino and white MSM to consider collecting data on enema use. Cultural variations within/between race/ethnicity categories may also help to examine MSM's willingness to learn about and use enemas prior to sex. Similarly, researchers proposing comprehensive studies of STI acquisition, including in HIV-positive MSM, may wish to include questions on enema use and the product being used.

That low income MSMs are less likely to use enemas is consistent with them not having the financial resources to buy enemas (commercially produced disposable enemas costing around \$2 in the USA per use). That versatile- and bottom-identified men are more likely than tops to use enemas is also not surprising since it is the receptive partner whose anus is the site of concern. Having more anal sexual partners, more unprotected anal sex partners, and more protected anal sex partners reinforces the importance of considering enema use in any comprehensive HIV/STI sexual risk assessment. In addition, the potential relationship between condom use and enema use should be examined in further details.

The principal reason participants report using enemas before and/or after anal sex is cleanliness or hygiene, meaning MSM douche to avoid the sight and/or smell of fecal matter escaping from the rectum, getting on a partner's penis, and/or sheets or furniture. Any educational attempts to reduce the use of enemas will need to address this practical consideration. Three other findings are interesting to consider together. The use of commercial products by 30.4% of participants (which are marketed "for relief of occasional constipation" and therefore may be assumed by MSM to be safe), combined with 12.7% MSM reporting that they use enemas post-coitally for HIV/STI prevention, and 26.5% of non-users stating that they do not use them because they do not know about them, all suggest there is a need for better education about enema use among MSM.

HIV prevention researchers may consider at least three approaches to addressing enema risk. Education to decrease enema use is the most obvious approach, however we doubt a “just say” “no” approach will be successful. Since early in the AIDS epidemic, the CDC has warned MSM against the use of enemas, yet enema use remains common. We doubt more of the same advice will change douching behavior. A risk reduction approach would entail identifying a less toxic or non-toxic substance (e.g., iso-osmolar based enemas) and promoting them. This approach holds promise and should be considered. A third approach is to recognize that the data on water-based enemas raises a broader question of the effects of all water-based products on the anal epithelium. Water-based lubricants have been a staple of HIV prevention education, heavily promoted to MSM for all sexual behavior, including anal intercourse, because of their compatibility with latex condoms. However, we could find no studies examining the effects of water-based lubricants on the anal epithelium, a gap in research that needs to be filled. The data on the negative effects of water-based enemas suggests that HIV prevention, as a field, may need to step back to consider not just the effects of such products on the condom, but also on the anal epithelium. Prior to community-based agencies developing educational materials about enemas, there needs to be national leadership in establishing evidence-based recommendations, and then issuing new recommendations based on the current evidence.

There are three principal limitations to consider when evaluating these data. First, this is a cross-sectional study and, as such, causality cannot be assumed. Second, all the data are by self-report. Because of the socially-sensitive nature of the topic, we caution that rates are likely under-estimates of the true incidence of use. Third, while a strength of this study is that it reports the first large sample to investigate enema use in a general sample of MSM, the sample was neither a national sample nor a representatively-chosen one. Hence, the generalizability of findings is not known.

We highlight four potential directions for future research. First, clinical research should study the effects of douching as undertaken by MSM on the anal (squamous) and rectal (columnar) mucosa. Second, depending on the results from these clinical studies, the frequent use of enemas prior to sex by many MSM suggests the development and promotion of a non-damaging enema for use in anal sex is needed and should be prioritized. Such a product may also have a major role to play as a rectal microbicide. Third, studies investigating disparities in HIV/STI sexual risk outcomes, and particularly longitudinal studies of HIV/STI disparities, which can inform causality, should consider collecting data on recent enema use. Two single items to examine enema use before and after anal sex should be sufficient to monitor douching behavior. Fourth, in terms of prevention education, the seemingly contradictory recommendations that water-based lubricant is good for anal sex but water-based enemas are dangerous because they damage the anal lining need to be reconciled into a single consistent message. Once this apparent contradiction is resolved, then new recommendations for enema use can be developed and testing the effects of enema education can be proposed.

## Acknowledgments

This research was funded by the National Institute on Alcohol Abuse and Alcoholism (grant # R01AA016270-01A1) and conducted under the oversight of the University of Minnesota Institutional Review Board (#0610S93786).

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**Table 1**

Demographic, sexual, and behavioral characteristics of SILAS participants and recent enema use in the past 90 days

	Total N (%) 4992	Didn't use Enema N (%) 3244 (64.9%)	Used Enema N (%) 1748 (35.1%)	<i>p</i>
<b>Personal:</b>				
Age in years,				<0.001
Mean ± SD (min-max)	33.9±12.8 (18–89)	33.1±12.9 (18–89)	35.4±12.5 (18–81)	
Education				0.03
Less than HS or HS degree	543 (10.9)	381 (11.8)	162(9.3)	
Technical degree or some college	1893 (37.9)	1225 (37.8)	668 (38.2)	
College degree	1663 (33.3)	1079 (33.3)	584 (33.4)	
Graduate degree	889 (17.8)	556 (17.1)	333 (19.1)	
Income				<0.001
\$0 to \$19,999	1689 (34.9)	1240 (39.8)	449 (26.2)	
\$20,000 to \$39,999	1138 (23.5)	732 (23.5)	406 (23.7)	
\$40,000 to \$59,999	838 (17.3)	459 (14.7)	379 (22.1)	
\$60,000 to \$79,999	446 (9.2)	255 (8.2)	191 (11.1)	
\$80,000 or more	718 (14.9)	427 (13.7)	291 (16.9)	
Race/ Ethnicity				<0.001
White, Non-Hispanic	3752 (75.2)	2548 (78.5)	1204 (68.9)	
Men of Color <sup>a</sup>	1240 (24.8)	696 (21.5)	544 (31.1)	
Marital Status to a man				<0.001
Married, domestic, civil union	452 (10.6)	250 (8.7)	202 (14.5)	
Separated, divorced, widowed	195 (4.5)	104 (3.6)	91 (6.5)	
Never legally married	3634 (84.9)	2534 (87.7)	1100 (78.9)	
In a long-term relationship				<0.001
No	2638 (52.8)	1797 (55.4)	841 (48.1)	
Yes	2354 (47.2)	1447 (44.6)	907 (51.9)	
Self-reported HIV status				<0.001
HIV-Negative	4438 (89.1)	3036 (93.9)	1402 (80.4)	
HIV-Positive	540 (10.9)	198 (6.1)	342 (19.6)	
Self-reported Any non-HIV STI				<0.001
Never	3320 (66.7)	2355 (72.9)	965 (55.3)	
In past 12 months	477 (9.6)	192 (5.9)	285 (16.3)	
Yes, not in past 12 months	1180 (23.7)	685 (21.2)	495 (28.4)	
Political party affiliation				0.02
Democrat	2616 (52.5)	1677 (51.9)	939 (53.8)	
Republican	387 (7.8)	259 (8.1)	128 (7.3)	
Independent	815 (16.4)	506 (15.6)	309 (17.7)	
No Party affiliation	886 (17.8)	597 (18.5)	289 (16.6)	
Other	275 (5.5)	195 (6.1)	80 (4.6)	

	Total N (%) 4992	Didn't use Enema N (%) 3244 (64.9%)	Used Enema N (%) 1748 (35.1%)	<i>p</i>
Self-reported identity				0.004
Other (Bisexual/Heterosexual/Other)	452 (9.1)	322 (9.9)	130 (7.4)	
Gay/Homosexual	4535 (90.9)	2917 (90.1)	1618 (92.6)	
Openness				<0.001
Not Open	119 (2.4)	81 (2.5)	38 (2.2)	
Open to few people	438 (8.8)	233 (7.2)	205 (11.7)	
Open to half the people	511 (10.2)	306 (9.4)	205 (11.7)	
Open to most people	1025 (20.6)	738 (22.8)	287 (16.4)	
Open to all or most people	2891 (58.0)	1880 (58.1)	1011 (57.9)	
Internal Homonegativity (as continuous scale) <sup>b</sup>				0.03
Mean ± SD	2.17±1.03	2.19±1.04	2.12±1.01	
Depressive symptoms (CES-D 10)				<0.001
Absent (score < 10)	2633 (52.7)	1787 (55.1)	846 (48.4)	
Present (score ≥ 10)	2359 (47.3)	1457 (44.9)	902 (51.6)	
<b>Behavioral:</b>				
Meeting venue				<0.001
Offline only (Gay bar/Club or some Other Place)	937 (18.8)	775 (23.9)	162 (9.2)	
Online only	507 (10.2)	394 (12.2)	113 (6.5)	
Online and offline both	3542 (71.0)	2071 (63.9)	1471 (84.3)	
Self-reported role-in-sex				<0.001
Top only	413 (8.3)	356 (11.1)	57 (3.3)	
Versatile	2890 (58.3)	1739 (54.1)	1151 (65.9)	
Bottom only	668 (13.5)	362 (11.2)	306 (17.6)	
No Anal	989 (19.9)	758 (23.6)	231 (13.2)	
Total sex partners, last 90 days				<0.001
0 partner	1598 (32.7)	1250 (39.6)	348 (20.1)	
1–2 partners	1263 (25.8)	884 (28.0)	379 (21.9)	
2+ partners	2026 (41.5)	1023 (32.4)	1003 (57.9)	
UAIMP <sup>c</sup> , last 90 days				<0.001
0–2 partners	1923 (69.4)	1193 (79.4)	730 (57.5)	
2+ partners	848 (30.6)	309 (20.6)	539 (42.5)	
PAIMP <sup>d</sup> , last 90 days				<0.001
0 PAI partner	744 (26.9)	461 (30.8)	283 (22.3)	
1+ PAI partner	2019 (73.1)	1034 (69.2)	985 (77.7)	
Alcohol consumption in the last 90 days				0.053
Former or Abstainer	1299 (26.2)	875 (27.2)	424 (24.3)	
Infrequent, light/Moderate	1135 (22.9)	714 (22.2)	421 (24.2)	
Infrequent, Heavy	296 (5.9)	191 (5.9)	105 (6.0)	
Frequent, light/Moderate	1665 (33.6)	1054 (32.8)	611 (35.1)	
Frequent, Heavy	565 (11.4)	383 (11.9)	182 (10.4)	
Any substance use in last 90 days				0.235



	Total N (%) 4992	Didn't use Enema N (%) 3244 (64.9%)	Used Enema N (%) 1748 (35.1%)	<i>p</i>
No	4208 (84.3)	2720 (83.9)	1488 (85.1)	
Yes	784 (15.7)	524 (16.1)	260 (14.9)	
<b>Environmental:</b>				
MSA Strata				0.11
Pro	2669 (53.9)	1705 (53.1)	964 (55.4)	
Anti	2284 (46.1)	1509 (46.9)	775 (44.6)	
Residence in				0.003
Rural	1131 (22.8)	776 (24.1)	355 (20.4)	
Urban MSA	3822 (77.2)	2438 (75.9)	1384 (79.6)	

<sup>a</sup>Men of Color includes African American (3.1%), Hispanics (11.1%) and American Indian, Asian, Pacific Islanders and multi-racial (10.7%)

<sup>b</sup>Higher score indicates internal homonegativity

<sup>c</sup>Unprotected anal intercourse male partners

<sup>d</sup>Protected anal intercourse male partners

**Table 2**  
 Frequency of ever enema use, reasons to use before and after receptive anal sex by race/ethnicity (N=2597)

	Race/Ethnicity n (%)				P	
	Total n (%)	White	Black	Other <sup>a</sup>		Hispanics
Before receptive anal sex:		1891 (72.8)	78 (3.0)	289 (11.1)	338 (13.0)	
Enema use						0.142
Ever	2275 (87.6)	1640 (86.7)	71 (91.1)	261 (90.3)	303 (89.6)	
Never	321 (12.4)	251 (13.3)	7 (8.9)	28(9.7)	35 (10.4)	
How long before sex do you typically douche						
Median (IQR) <sup>b</sup> in minutes	60 (30–120)	60 (30–120)	30 (20–120)	30 (20–90)	31 (25–60)	<0.001 <sup>‡</sup>
Frequency of enema use						<0.001
Not applicable	315 (13.8)	246 (15.0)	8 (11.3)	41 (15.8)	20 (6.6)	
Never (0%)	414 (18.2)	328 (20.1)	18 (25.4)	49 (18.9)	19(6.3)	
Rarely (1–24%)	361 (15.9)	185 (11.3)	11 (15.5)	39 (15.1)	126 (41.6)	
Sometimes (25–49%)	201 (8.8)	127 (7.8)	8 (11.3)	26 (10.0)	40 (13.2)	
Frequently (50–74%)	213 (9.5)	153 (9.3)	10 (14.1)	29 (11.2)	21 (6.9)	
Almost to always (75–100%)	767 (33.8)	599 (36.6)	16 (22.5)	75 (28.9)	77 (25.4)	
Products used						
Water only	1496 (65.7)	1208 (73.8)	33 (46.5)	134 (51.3)	121 (40.1)	<0.001
Water and added salt	217 (9.6)	56 (3.4)	6 (8.5)	26 (10.0)	129 (42.7)	<0.001
Water and added soap	253 (11.1)	142 (8.7)	9 (12.7)	45 (17.2)	57 (18.9)	<0.001
Water and added antibacterial product	86 (3.7)	30 (1.8)	6 (8.5)	26 (10.0)	24 (7.9)	<0.001
Commercially prepared a saline enema product	692 (30.4)	524 (32.0)	29 (40.9)	66 (25.3)	73 (24.2)	<0.001
When do you use enema						<0.001
Unprotected receptive anal sex	290 (13.1)	191 (12.0)	16(22.5)	54 (21.2)	29 (9.7)	
Any receptive anal sex	1560 (70.2)	1132 (70.9)	39 (54.9)	157 (61.6)	232 (77.6)	
Protected receptive anal sex	371 (16.7)	273 (17.1)	16 (22.5)	44 (17.3)	38 (12.7)	
Reasons to use enema						<0.001 <sup>‡</sup>
Sex preparation	193 (8.5)	125 (7.7)	7 (9.9)	21 (8.1)	40 (13.3)	
Hygiene/cleanliness	1443 (63.6)	1088(66.5)	36 (50.7)	131 (50.2)	188 (62.7)	

	Total n (%)	White	Black	Other <sup>a</sup>	Hispanics	P
Partner considerations	85 (3.7)	47 (2.9)	6 (8.5)	19 (7.3)	13 (4.3)	
It is safer to douche before anal sex to clean out anything that is transmissible	53 (2.3)	22 (1.4)	5 (7.1)	16 (6.3)	10 (3.3)	
To avoid embarrassment	370 (16.3)	279 (17.1)	9 (12.7)	42 (16.1)	40 (13.3)	
To get excited for anal sex	24 (1.1)	8 (0.5)	3 (4.2)	9 (3.5)	4 (1.3)	
To flush out any leftover ejaculate/ejaculate/cum from last time	19 (0.8)	7 (0.4)	4 (5.6)	8 (3.1)	0	
To increase pleasure	57 (2.5)	40 (2.5)	1 (1.4)	12 (4.6)	4 (1.3)	
Other	23 (1.1)	19 (1.2)	0	3 (1.2)	1 (0.3)	
After receptive anal sex	1886 (72.9)	78 (3.0)	287 (11.1)	338 (13.1)		
Enema use						<0.001
Ever	711 (27.4)	358 (19.0)	37 (47.4)	126 (43.9)	190 (56.2)	
Never	1878 (72.4)	1528 (81.0)	41 (52.6)	161 (56.1)	148 (43.8)	
How long after sex do you typically douche						<0.001 <sup>#</sup>
Median (IQR) <sup>b</sup> in minutes	30 (15–60)	30 (10–60)	60 (60–60)	30 (30–60)	30 (19–36)	
Frequency of enema use						<0.001 <sup>†</sup>
Not applicable	85 (11.9)	64 (17.9)	3 (8.1)	14 (11.1)	4 (2.1)	
Never (0%)	78 (10.9)	55 (15.4)	3 (8.1)	15 (11.9)	5 (2.6)	
Rarely (1–24%)	131 (18.4)	55 (15.4)	12 (32.4)	24 (19.1)	40 (21.2)	
Sometimes (25–49%)	194 (27.2)	64 (17.9)	6 (16.2)	21 (16.7)	103 (54.5)	
Frequently (50–74%)	100 (14.3)	49 (13.7)	11 (29.7)	21 (16.7)	19 (10.1)	
Almost to always (75–100%)	122 (17.1)	71 (19.8)	2 (5.4)	31 (24.6)	18 (9.5)	
Product used						
Water only	304 (42.7)	231 (64.5)	10 (27.0)	30 (23.8)	33 (17.5)	<0.001
Water and added salt	171 (24.1)	14 (3.9)	6 (16.2)	25 (19.8)	126 (66.7)	<0.001
Water and added soap	197 (27.7)	60 (16.7)	6 (16.2)	29 (23.1)	102 (53.9)	<0.001
Water and added antibacterial product	75 (10.6)	23 (6.4)	5 (13.5)	23 (18.3)	24 (12.7)	<0.01
Commercially prepared a saline enema product	151 (21.2)	96 (26.8)	11 (29.7)	24 (19.1)	20 (10.6)	<0.001
When do you use enema						<0.001 <sup>†</sup>
Mainly after unprotected receptive anal sex	283 (40.2)	137 (38.7)	27 (72.9)	94 (75.2)	25 (13.3)	

	Total <i>n</i> (%)	Race/Ethnicity <i>n</i> (%)				<i>p</i>
		White	Black	Other <sup><i>a</i></sup>	Hispanics	
Any receptive anal sex	346 (49.1)	169 (47.7)	8 (21.6)	27 (21.6)	142 (75.5)	
Mainly after protected receptive anal sex	75 (10.6)	48 (13.6)	2 (5.4)	4 (3.2)	21 (11.2)	
Reasons to use enema						<0.001 <sup><i>I</i></sup>
Hygiene/cleanliness	386 (54.6)	245 (69.0)	17 (45.9)	64 (51.2)	60 (31.8)	
Transition from sex	197 (27.7)	34 (9.6)	12 (32.4)	41 (32.8)	110 (58.2)	
HIV/STI prevention	90 (12.7)	49 (13.8)	7 (18.9)	17 (13.6)	17 (8.9)	
Other	33 (4.6)	27 (7.6)	1(2.7)	3 (2.4)	2 (1.1)	

<sup>*a*</sup> Other: Asian, Pacific Islanders, Native American and multi-racial

<sup>*b*</sup> IQR: Inter-quartile range (25%–75%)

<sup>*#*</sup> *p*-value for Kruskal-Wallis test

<sup>*I*</sup> *p*-value for Fisher's exact test

**Table 3**  
 Frequency of ever enema use before, and after receptive anal sex by HIV and STI status (N=2597)

	Total n (%)		HIV Status n (%)		P	STI Status n (%)		P
	HIV-	HIV+	In Past year	Before past year				
Before receptive anal sex:	2140 (82.7)	448 (17.3)	1422 (54.9)	353 (13.6)	813 (31.4)			
Enema use								<0.001
Ever	2275 (87.6)	1839 (85.9)	430 (95.9)	333 (94.3)	709 (87.2)			
Never	321 (12.4)	301 (14.1)	18 (4.1)	20 (5.7)	104 (12.8)			
How long before sex do you typically douche								
Median (IQR) <sup>a</sup> in minutes	60 (30–120)	60 (30–90)	60 (30–120)	51 (30–60)	60 (30–120)			<0.001 <sup>#</sup>
Frequency of enema use								<0.001
Not applicable	315 (13.8)	271 (14.8)	43 (10.0)	19 (5.7)	116 (16.4)			
Never (0%)	414 (18.2)	354 (19.3)	59 (13.7)	36 (10.8)	171 (24.1)			
Rarely (1–24%)	361 (15.9)	242 (13.2)	117 (27.2)	117 (35.1)	70 (9.9)			
Sometimes (25–49%)	201 (8.8)	171 (9.3)	29 (6.7)	43 (12.9)	39 (5.5)			
Frequently (50–74%)	213 (9.5)	180 (9.8)	33 (7.7)	31 (9.3)	54 (7.6)			
Almost to always (75–100%)	767 (33.8)	617 (33.6)	149 (34.7)	87 (26.1)	259 (36.5)			
Product used								
Water only	1496 (65.7)	1221 (66.5)	273 (63.5)	182 (54.8)	536 (75.6)			<0.001
Water and added salt	217 (9.6)	100 (5.5)	117 (27.2)	123 (37.1)	18 (2.5)			<0.001
Water and added soap	253 (11.1)	190 (10.4)	62 (14.4)	54 (16.3)	56 (7.9)			<0.001
Water and added antibacterial product	86 (3.7)	66 (3.6)	20 (4.6)	24 (7.3)	11 (1.6)			<0.001
Commercially prepared a saline enema product	692 (30.4)	600 (32.7)	89 (20.7)	54 (16.3)	248 (34.9)			<0.001
When do you use enema								<0.001
Unprotected receptive anal sex	290 (13.1)	231 (12.9)	58 (13.6)	44 (13.4)	68 (9.9)			
Any receptive anal sex	1560 (70.2)	1209 (67.6)	348 (81.5)	258 (78.4)	496 (72.2)			
Protected receptive anal sex	371 (16.7)	349 (19.5)	21 (4.9)	27 (8.2)	123 (17.9)			
Reasons to use enema								<0.001
Sex preparation	193 (8.5)	143 (7.8)	50 (11.7)	35 (10.5)	51 (7.2)			
Hygiene/cleanliness	1443 (63.6)	1153 (62.9)	288 (66.9)	206 (62.1)	500 (70.7)			
Partner considerations	85 (3.7)	68 (3.7)	17 (3.9)	21 (6.3)	14 (1.9)			

	Total n (%)	HIV Status n (%)	HIV+	HIV-	No	In Past year	Before past year	P
It is safer to douche before anal sex to clean out anything that is transmissible	53 (2.3)	46 (2.5)	7 (1.6)		38 (3.1)	9 (2.7)	6 (0.9)	
To avoid embarrassment	370 (16.3)	311 (17.0)	56 (13.1)		202 (16.5)	51 (15.4)	116 (16.4)	
To get excited for anal sex	24 (1.1)	23 (1.3)	1 (0.2)		23 (1.9)	0	1 (0.2)	
To flush out any leftover ejaculate/ejaculate/cum from last time	19 (0.8)	16 (0.9)	3 (0.7)		17 (1.4)	2 (0.6)	0	
Increase pleasure	57 (2.5)	49 (2.7)	8 (1.9)		35 (2.9)	6 (1.8)	16 (2.3)	
Other	23 (1.1)	23 (1.3)	0		18 (1.5)	2 (0.6)	3 (0.4)	
After receptive anal sex:	2133 (82.6)	448 (17.3)			1418 (54.9)	352 (13.6)	812 (31.5)	
Enema use								<0.001
Ever	711 (27.4)	505 (23.7)	205 (45.8)		399 (28.1)	166 (47.2)	141 (17.4)	
Never	1878 (72.4)	1628 (76.3)	243 (54.2)		1019 (71.9)	186 (52.8)	671 (82.6)	
How long after sex do you typically douche								
Median (IQR) <sup>a</sup> in minutes	30 (15–60)	30 (10–60)	30 (20–38)		45 (15–60)	30 (20–38)	30 (10–60)	<0.01 <sup>‡</sup>
Frequency of enema use								<0.001
Not applicable	85 (11.9)	70 (13.9)	15 (7.3)		55 (13.8)	4 (2.4)	26 (18.4)	
Never (0%)	78 (10.9)	58 (11.5)	20 (9.8)		34 (8.5)	9 (5.5)	35 (24.8)	
Rarely (1–24%)	131 (18.4)	85 (16.9)	46 (22.4)		72 (18.1)	36 (21.8)	22 (15.6)	
Sometimes (25–49%)	194 (27.2)	100 (19.8)	93 (45.3)		82 (20.6)	88 (53.3)	23 (16.3)	
Frequently (50–74%)	100 (14.3)	82 (16.3)	18 (8.8)		67 (16.8)	21 (12.7)	9 (6.4)	
Almost to always (75–100%)	122 (17.1)	109 (21.6)	13 (6.3)		89 (22.3)	7 (4.2)	26 (18.4)	
Product used								
Water only	304 (42.7)	232 (46.0)	72 (35.1)		163 (40.9)	35 (21.2)	105 (74.5)	<0.001
Water and added salt	171 (24.1)	63 (12.5)	108 (52.7)		52 (13.0)	115 (69.7)	4 (2.8)	<0.001 <sup>†</sup>
Water and added soap	197 (27.7)	96 (19.1)	101 (49.3)		79 (19.8)	100 (60.6)	17 (12.1)	<0.001
Water and added antibacterial product	75 (10.6)	59 (11.7)	16 (7.8)		54 (13.5)	13 (7.9)	8 (5.7)	<0.05
Commercially prepared a saline enema product	151 (21.2)	124 (24.6)	26 (12.7)		98 (24.6)	15 (9.1)	36 (25.5)	<0.001
When do you use enema								<0.001 <sup>†</sup>
Unprotected receptive anal sex	283 (40.2)	242 (48.5)	41 (20.1)		194 (48.9)	35 (21.5)	53 (38.1)	
Any receptive anal sex	346 (49.1)	190 (38.1)	156 (76.5)		154 (38.8)	125 (76.7)	65 (46.8)	
Protected receptive anal sex	75 (10.6)	67 (13.4)	7 (3.4)		49 (12.3)	3 (1.8)	21 (15.1)	



	Total <i>n</i> (%)		HIV Status <i>n</i> (%)		<i>p</i>	STI Status <i>n</i> (%)		<i>p</i>
	HIV-	HIV+	In Past year	Before past year		In Past year	Before past year	
Reasons to use enema					<0.001			<0.001
Sex preparation								
Hygiene/cleanliness	386 (54.6)	75 (36.8)	233 (58.8)	99 (71.2)				
Transition from sex	197 (27.7)	110 (53.9)	84 (21.2)	9 (6.5)				
HIV/STI prevention	90 (12.7)	13 (6.4)	64 (16.2)	17 (12.2)				
Other	33 (4.6)	6 (2.9)	15 (3.8)	14 (10.1)				

<sup>a</sup> IQR: Inter-quartile range (25%–75%)

<sup>#</sup> *p*-value for Kruskal-Wallis test

<sup>I</sup> *p*-value for Fisher's exact test

**Table 4**

Reasons not to use enema before anal sex (N=4301)

<b>Reasons not to douche before anal sex</b>	<b><i>n</i></b>	<b>%</b>
I do not have receptive anal sex	866	20.1
I do not like douche, find it painful or uncomfortable	256	5.9
No need, I prefer it to be spontaneous/not planned	1975	45.9
I do not mind/prefer anal sex being "dirty"/"natural"	424	9.8
HIV/STI prevention	156	3.6
I don't know about douching or haven't thought about it	1141	26.5
Other	264	6.1

**Table 5**  
Multiple (simple) logistics regression models of recent enema use in past 90 days (N=4992)

	Univariate Odds Ratio (95% Confidence Interval)	Model 1 <sup>a</sup> Adjusted Odds Ratio (95% Confidence Interval)	Model 2 <sup>b</sup> Adjusted Odds Ratio (95% Confidence Interval)	Final Model <sup>c</sup> Adjusted Odds Ratio (95% Confidence Interval)
<b>Personal Demographics:</b>				
Age in years,	1.01*** (1.01-1.02)	0.99 (0.99-1.01)		
Education				
Less than HS or HS degree	1.0	1.0		
Technical degree or some college	1.29* (1.05-1.59)	0.96 (0.75-1.21)		
College degree	1.26* (1.02-1.55)	0.93 (0.72-1.19)		
Graduate degree	1.39** (1.10-1.75)	0.92 (0.69-1.23)		
Income				
\$0 to \$19,999	1.0	1.0		1.0
\$20,000 to \$39,999	1.53*** (1.30-1.80)	1.30*** (1.07-1.57)		1.31* (1.04-1.65)
\$40,000 to \$59,999	2.27*** (1.91-2.70)	1.73*** (1.38-2.16)		2.00*** (1.55-2.59)
\$60,000 to \$79,999	2.08*** (1.67-2.58)	1.81*** (1.36-2.39)		2.18*** (1.56-3.04)
\$80,000 or more	1.86*** (1.55-2.24)	1.86*** (1.44-2.41)		1.59** (1.22-2.10)
Race/ Ethnicity				
White, Non-Hispanic	1.0	1.0		1.0
Men of color	1.65*** (1.45-1.89)	1.32*** (1.11-1.57)		1.28* (1.05-1.57)
Marital Status to a man				
Married, domestic, civil union	1.0	1.0		
Separated, divorced, widowed	1.15 (0.82-1.62)	1.10 (0.70-1.72)		
Never legally married	0.55*** (0.45-0.67)	0.84 (0.67-1.07)		
In a long-term relationship				
No	1.0	1.0		1.0
Yes	1.33*** (1.18-1.49)	1.31*** (1.13-1.53)		1.16 (0.97-1.39)
Self-reported HIV status				
HIV-Negative	1.0	1.0		1.0

	Univariate Odds Ratio (95% Confidence Interval)	Model 1 <sup>a</sup> Adjusted Odds Ratio (95% Confidence Interval)	Model 2 <sup>b</sup> Adjusted Odds Ratio (95% Confidence Interval)	Final Model <sup>c</sup> Adjusted Odds Ratio (95% Confidence Interval)
HIV-Positive	3.76*** (3.11–4.53)	2.12*** (1.68–2.69)		2.77*** (2.02–3.81)
Self-reported Any non-HIV STI				
Never	1.0	1.0		1.0
In past 12 months	3.59*** (2.94–4.38)	1.99*** (1.55–2.56)		1.69*** (1.27–2.24)
Yes, not in past 12 months	1.74*** (1.52–2.00)	1.51*** (1.27–1.79)		1.50** (1.20–1.87)
Political party affiliation				
Democrat	1.0	1.0		
Republican	0.93 (0.74–1.16)	0.79 (0.58–1.08)		
Independent	1.10 (0.93–1.29)	1.18 (0.97–1.43)		
No Party affiliation	0.88 (0.75–1.04)	1.11 (0.91–1.35)		
Other	0.74* (0.56–0.97)	0.95 (0.71–1.30)		
Self-reported identity				
Other (Bisexual/Heterosexual/Other)	1.0	1.0		
Gay/Homosexual	1.37** (1.10–1.69)	1.08 (0.82–1.44)		0.92 (0.84–1.01)
Internal Homonegativity (as continuous scale),	0.95 (0.89–1.01)			
Not Open	1.0	1.0		
Open to few people	1.83** (1.19–2.81)	0.93 (0.50–1.70)		
Open to half the people	1.41 (0.92–2.16)	0.77 (0.42–1.42)		
Open to most people	0.79 (0.52–1.19)	0.76 (0.43–1.34)		
Open to all or most people	1.08 (0.73–1.61)	0.90 (0.51–1.55)		
Depressive symptoms				
Absent (CESD score <10)	1.0	1.0		1.0
Present (CESD score ≥10)	1.32*** (1.18–1.49)	1.15* (1.00–1.32)		1.13 (0.95–1.35)
<b>Behavioral:</b>				
Meeting venue				
Online and offline both	1.0		1.0	1.0
Offline only (Gay bar/Club or some Other Place)	0.41*** (0.33–0.51)		0.40*** (0.30–0.54)	0.51*** (0.37–0.70)
Online only	0.30*** (0.25–0.36)		0.44*** (0.33–0.58)	0.56*** (0.41–0.75)

	Univariate Odds Ratio (95% Confidence Interval)	Model 1 <sup>a</sup> Adjusted Odds Ratio (95% Confidence Interval)	Model 2 <sup>b</sup> Adjusted Odds Ratio (95% Confidence Interval)	Final Model <sup>c</sup> Adjusted Odds Ratio (95% Confidence Interval)
Self-reported sex role				
Top only	1.0		1.0	1.0
Versatile	4.14 <sup>****</sup> (3.10–5.53)		5.43 <sup>****</sup> (3.78–7.80)	5.29 <sup>****</sup> (3.64–7.68)
Bottom only	5.31 <sup>****</sup> (3.86–7.30)		7.15 <sup>****</sup> (4.79–10.68)	7.60 <sup>****</sup> (5.02–11.50)
No Anal	1.89 <sup>****</sup> (1.38–2.60)		2.97 <sup>****</sup> (1.99–4.46)	3.14 <sup>****</sup> (2.07–4.77)
UAIMP, last 90 days				
0–2 partners	1.0		1.0	1.0
2+ partners	2.83 <sup>****</sup> (2.40–3.36)		2.79 <sup>****</sup> (2.33–3.35)	1.95 <sup>****</sup> (1.59–2.41)
PAIMP, last 90 days				
0 PAI partner	1.0		1.0	1.0
1+ PAI partner	1.55 <sup>****</sup> (1.30–1.84)		1.48 <sup>****</sup> (1.23–1.79)	1.41 <sup>**</sup> (1.15–1.73)

\*  $p < 0.05$ ;

\*\*  $p < 0.01$ ;

\*\*\*  $p < 0.001$

<sup>a</sup> adjusted for personal variables

<sup>b</sup> adjusted for behavioral variables

<sup>c</sup> adjusted for personal and behavioral variables