

## Preference and practices relating to lubricant use during anal intercourse: implications for rectal microbicides

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**Abstract.** *Background:* The importance of the acceptability of rectal microbicides for HIV and sexually transmissible infections (STIs) prevention is widely recognised. Given relatively consistent use of lubricants for anal intercourse (AI) and the potential for lubricant-like rectal microbicides, understanding barriers to lubricant use may help inform hurdles likely to be encountered once a rectal microbicide becomes available. *Methods:* We conducted an internet-based survey using a 25-item questionnaire to assess AI and lubricant use, including lubricant preferences and barriers to use. *Results:* The majority of the 6124 respondents who reported AI were male (93%), 25 years or older (80%) and from North America (70%). Consistent condom use during AI was reported by a minority (35%) and consistent lubricant use was reported by over half of respondents. Reasons for non-use differed by age and region. Among men, those <25 years were more likely to report barriers around cost compared with those 45 and older (odds ratio (OR)=6.64; 95% confidence interval (CI) 3.14–14.03). European men (OR=1.92; 95% CI 1.50–2.45), Latin American women (OR=3.69; 95% CI 1.27–10.75) and Asian women (OR=4.04; 95% CI 1.39–11.78) were more likely to report sexual preference as a reason for non-use. *Conclusions:* Rectal lubricants are widely used, but barriers to use vary by age and region for dry sex. A lubricant-like rectal microbicide would potentially be acceptable and such a product may be useful as a method of HIV prevention. However, targeted marketing and educational approaches may be needed to enhance use and acceptability of such a product.

**Additional keywords:** condoms, HIV, safer sex, STIs, survey.

### Introduction

Unprotected anal intercourse (AI) is well recognised as one of the most efficient modes of HIV sexual transmission, with per-act transmission probabilities estimated to be at least 10 times higher for receptive penile–anal sex as compared with penile–vaginal sex.<sup>1–3</sup> The prevalence of AI among both men and women is relatively high. Lifetime occurrence of heterosexual AI has been reported by 30–33% of respondents in a national survey conducted in the USA and by 14–32% of college students.<sup>4–8</sup> The prevalence of recent experience with AI is also relatively high and varies by study population. For instance, 18–22% of clients attending sexually transmissible infection (STI) clinics and 42% of substance-using women participating in a HIV prevention study reported having AI in the past 3 months.<sup>9–11</sup> A survey of more than 3000 men who have sex with men (MSM) found that 92% of respondents had practiced AI in the past 12 months, with 58% reporting unprotected AI.<sup>12</sup> The prevalence of condom use for AI is even lower among heterosexuals, with 63–80% reporting unprotected AI.<sup>6,7,11,13,14</sup> Given that the prevalence of AI among both men and women is relatively high and that consistent condom use during AI remains low, other protective methods such as rectal

microbicides may serve as an alternative to condom use and have important implications in terms of preventing transmission of STIs, including HIV.

Product acceptability will serve as an important factor in the adoption of rectal microbicides as an HIV prevention strategy once a safe and effective microbicide is available. Microbicide acceptability has been studied in a wide range of populations and most studies have been conducted among women examining acceptability surrounding vaginal microbicides.<sup>15–19</sup> However, data on the acceptability of rectal microbicides is limited. In studies conducted among MSM, overall participants responded positively to hypothetical microbicides and believed that microbicides would be easier to use if formulated as lubricants.<sup>20–24</sup> In the only study to examine the acceptability of an actual product, both men and women reported that the use of UC781 gel, a vaginal microbicide applied rectally, was highly acceptable and had high intentions of using a gel similar in the future.<sup>25</sup>

Currently, several rectal microbicides are under development, with the majority being formulated as gels or creams, which will act as lubricants when used during sex. Although condom use with AI remains inconsistent, lubricant

use is relatively common, indicating that the acceptability of a lubricant-like rectal microbicide holds promise as a potential formulation for such microbicides.<sup>21,22</sup> Current lubricant preferences can thus be used to inform the development of rectal microbicides.<sup>26</sup> This information is critical in the initial stages of microbicide development, as altering formulations to increase acceptability after testing would be expensive and delay use of the product.<sup>27</sup> Furthermore, understanding barriers to lubricant use will not only help inform potential hurdles likely to be encountered when a rectal microbicide is available, examining these barriers in different groups and settings is necessary if rectal microbicides are to be widely utilised. The main goal of this study was to describe lubricant preferences among men and women who report AI, and to examine barriers to lubricant use by age and geography.

## Methods

### *Study population and design*

We conducted a cross-sectional study of respondents who participated in an international survey on lubricants used for AI. An internet-based survey was conducted by the International Rectal Microbicide Advocates (IRMA; [www.rectalmicrobicides.org](http://www.rectalmicrobicides.org); verified March 2010), a network of advocates, policymakers and scientists from over 60 countries working to advance rectal microbicide research. Men and women who reported anal sex in the past 6 months were eligible and included in this analysis. The study was approved by the Human Subjects Review Committee at the University of California, Los Angeles. Survey respondents were recruited through various means. Brief email messages with three different target audiences (general, gay men and MSM, and women) were sent through various topical, regional and community listservs (i.e. electronic mailing lists). The listservs primarily included (but were not limited to) those focussed on HIV, microbicides, gay men's health, women's health, and sexual and reproductive health. In addition, several websites posted information and links to the survey, including sites targeted to gay men and rectal microbicides. Finally, several organisations included notices in their agency newsletter and websites, and several media outlets wrote articles about the survey.

### *Data collection*

The questionnaire design and data collection was conducted by IRMA over a 29-week period from February 14 to August 31, 2007. The survey was offered in six languages including English, French, German, Portuguese, Spanish and Turkish, and the same questionnaire was administered to both men and women. Respondents were asked to report their age, gender and country of residence, although no specific information on the gender of sex partners was asked. In addition to the basic demographic information, the 25-item online survey also included questions about sexual behaviours surrounding AI in the past 6 months including condom use, lubricant preferences and barriers to lubricant use. Specifically, respondents were asked to report if they have had any AI (receptive or insertive) in the past 6 months. However, only condom use was assessed in terms of receptive or

insertive practices, and lubricant preferences and barriers were reported for overall AI experience. If participants had insertive AI in the past 6 months, they were asked how often they used a condom. Likewise, condom use for receptive AI was assessed and response categories included 'Never', 'Rarely', 'Often' and 'Always'. Lubricant preferences for flavour, colour and smell were assessed based on mutually exclusive categories such as 'No flavour', 'Flavour' and 'It doesn't matter'. We assessed barriers to lubricant use by asking participants 'In the past 6 months, if there were any times you had anal sex but did not use lube, why was that the case?'

### *Statistical analysis*

Because sexual behaviours and experiences vary by gender, we analysed data for men and women separately. In addition, among men, we further stratified the data by receptive and insertive AI. Descriptive statistics were conducted for the total sample and by demographic characteristics. Differences between groups were evaluated using  $\chi^2$ -test methods. Associations between reported barriers to lubricant use and other factors including age and region were evaluated using logistic regression analysis. All analyses were conducted using SAS version 9.1 (SAS Institute Inc., Cary, NC, USA).

## Results

### *Sample characteristics*

There were a total of 8675 respondents from 107 countries. This analysis focuses on the 6124 (71%) who reported anal sex in the past 6 months. The majority of respondents were male (93%) and from North America (70%) (Table 1). Male respondents were older than female respondents, with 55% of men being aged 35 years and older compared with 31% of women. Furthermore, among men who reported AI in the past 6 months, 20% reported insertive AI only and 18% reported receptive AI only, with the remaining 62% reporting both receptive and insertive AI.

### *Condom use during anal intercourse*

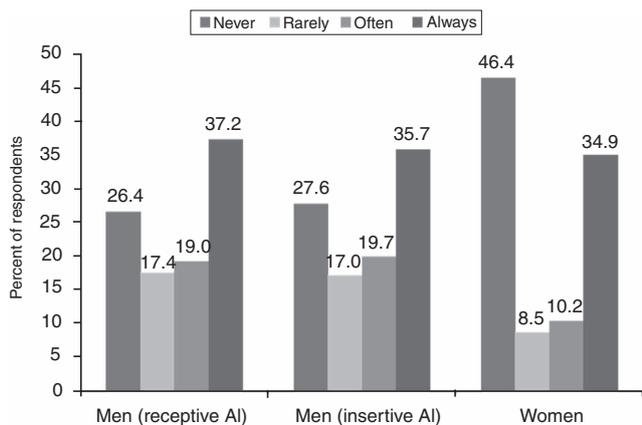
The patterns of condom use for anal sex varied by gender. Among men, 28% and 26% of the sample reported never using condoms for insertive and receptive AI, respectively (Fig. 1). The prevalence of unprotected AI was much higher among women, with nearly half of the women reporting never using a condom. Consistent condom use, defined as always using a condom, also varied by age. For instance, among men who reported receptive AI, 34% of those less than 25 years of age reported always using a condom as compared with 41% of those 45 years and older ( $P$ -value  $<0.01$ ; data not shown).

### *Lubricant use during AI*

A total of 2523 respondents (41%) reported not using lubricant for AI on at least one occasion over the past 6 months. Among men, the most commonly reported reason for not using lubricant during AI was the use of saliva (71%), followed by lack of availability of lubricants (32%) and preference for dry sex (19%) (Table 2). Reasons for not using lubricants were similar among men who reported insertive AI as compared with those who

**Table 1. Demographic characteristics of participants, by gender and type of anal intercourse**

	Women (n=408)		Men (n=5716)					
	n	%	Total		Insertive anal intercourse		Receptive anal intercourse	
			n	%	n	%	n	%
Age (years)								
<25	93	23.0	1115	19.5	895	19.2	908	19.9
25–34	185	45.7	1448	25.4	1200	25.8	1144	25.1
35–44	93	23.0	1658	29.1	1376	29.5	1327	29.1
45+	34	8.4	1487	26.1	1187	25.5	1175	25.8
Region								
North America	267	67.9	3877	70.0	3101	68.7	3186	71.7
Europe	81	20.6	1188	21.4	1021	22.6	889	20.0
Latin America/Caribbean	21	5.3	178	3.2	147	3.3	130	2.9
Asia	2	0.5	163	2.9	134	3.0	124	2.8
Oceania	17	4.3	95	1.7	78	1.7	79	1.8
Other	5	1.4	41	0.8	34	0.8	33	0.8



**Fig. 1.** Prevalence of condom use during anal intercourse (AI) by gender and type of intercourse.

reported receptive AI (Table 2). Among women, the most common reported reason for not using lubricant during AI was the use of vaginal fluid (65%). Other reasons included the use of saliva (51%), lack of availability of lubricants (26%) and preference for dry sex (17%).

Barriers to lubricant use during AI varied significantly by age. For instance, among men who reported receptive AI, those <25 years of age were nearly seven times more likely to report not being able to afford lubricants as a barrier to use (odds ratio (OR)=6.64; 95% confidence interval (CI) 3.14–14.03 L; *P*-value <0.01) when compared with those 45 years and older (Table 3). Likewise, those less than 25 years of age were more likely to report that lubricants were not available (OR=2.87; 95% CI 2.18–3.76; *P*-value <0.01), being in a rush (OR=2.35; 95% CI 1.50–3.69; *P*-value <0.01) and having a preference for dry sex (OR=1.67; 95% CI 1.16–2.39; *P*-value <0.01) (Table 3).

Barriers to lubricant use for AI also varied by region. European male respondents who reported receptive AI were more likely to report partner refusal (OR=5.94; 95% CI 3.76–9.37; *P*-value <0.01) and preference for dry sex (OR=1.92; 95% CI 1.50–2.45; *P*-value <0.01) as barriers to using lubricants during AI. Among women, respondents from Latin America and Asia were more likely to report a preference for dry sex as the reason for not using lubricant (OR=3.69; 95% CI 1.27–10.75; *P*-value=0.02 and OR=4.04; 95% CI 1.39–11.78; *P*-value=0.01, respectively). Furthermore, those from Europe and Oceania were more likely to report the use of saliva (OR=4.57; 95% CI 1.00–20.87; *P*-value=0.05 and

**Table 2. Barriers to lubricant use during anal intercourse, by gender and type of intercourse**

	Women (n=168)		Men (n=2355)					
	n	%	Total		Insertive anal intercourse		Receptive anal intercourse	
			n	%	n	%	n	%
Reasons for no lubricant use								
Prefer dry sex	29	17.3	443	18.8	365	18.7	361	19.1
Used saliva	85	50.6	1662	70.6	1377	70.4	1364	72.2
Lube not available	43	25.6	777	32.3	633	32.4	637	33.7
In a rush	19	11.3	308	13.1	261	13.3	251	13.3
Could not afford	5	3.0	124	5.3	101	5.2	103	65.5
Partner refused	4	2.4	126	5.4	104	5.3	97	5.1
Used vaginal fluid	109	64.9	142	6.0	139	7.1	60	3.2

**Table 3. Age and regional associations with reported barriers to lubricant use during anal intercourse (AI) by gender and type of intercourse<sup>A</sup>**  
 CI, confidence interval; OR, odds ratio

	Preferred dry sex		Used saliva		Lubricant not available		In a rush		Could not afford to buy lubricant		Partner refused							
	OR	95% CI	P-value	OR	95% CI	P-value	OR	95% CI	P-value	OR	95% CI	P-value						
<i>Men – insertive AI</i>																		
Age (years)																		
<25	1.75	(1.2–2.57)	<0.01	1.23	(0.99–1.54)	0.06	2.40	(1.82–3.15)	<0.01	2.73	(1.72–4.31)	<0.01	13.33	(5.14–34.55)	<0.01	1.46	(0.67–3.17)	0.34
25–34	1.39	(0.98–1.96)	0.06	1.24	(1.03–1.49)	0.02	1.40	(1.08–1.82)	0.01	2.01	(1.31–3.08)	<0.01	5.02	(1.89–13.36)	<0.01	0.58	(0.25–1.37)	0.22
35–44	1.20	(0.86–1.68)	0.28	1.16	(0.97–1.38)	0.10	1.36	(1.06–1.73)	0.01	1.81	(1.20–2.74)	<0.01	2.49	(0.90–6.94)	0.08	0.88	(0.44–1.78)	0.73
45+	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–
Region																		
North America	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–
Europe	2.12	(1.68–2.69)	<0.01	1.12	(0.96–1.31)	0.15	1.08	(0.88–1.32)	0.49	1.76	(1.33–2.33)	<0.01	2.18	(1.37–3.46)	<0.01	6.50	(4.14–10.19)	<0.01
Latin America/Caribbean	0.85	(0.41–1.76)	0.67	1.14	(0.80–1.63)	0.46	1.78	(1.18–2.68)	<0.01	1.65	(0.87–3.12)	0.12	3.47	(1.53–7.85)	<0.01	2.96	(1.03–8.54)	0.04
Asia	0.34	(0.11–1.08)	0.07	0.93	(0.63–1.36)	0.71	1.76	(1.15–2.70)	0.01	1.29	(0.62–2.70)	0.49	3.26	(1.36–7.78)	<0.01	3.26	(1.13–9.41)	0.03
Oceania	2.70	(1.43–5.07)	<0.01	1.08	(0.66–1.76)	0.76	0.66	(0.30–1.44)	0.29	1.40	(0.56–3.51)	0.48	1.83	(0.44–7.68)	0.41	1.38	(0.19–10.23)	0.76
<i>Men – receptive AI</i>																		
Age (years)																		
<25	1.67	(1.16–2.39)	<0.01	1.28	(1.03–1.59)	0.02	2.87	(2.18–3.76)	<0.01	2.35	(1.50–3.69)	<0.01	6.64	(3.14–14.03)	<0.01	1.53	(0.75–3.13)	0.24
25–34	1.30	(0.93–1.82)	0.13	1.42	(1.18–1.71)	<0.01	1.79	(1.38–2.33)	<0.01	2.09	(1.38–3.18)	<0.01	2.47	(1.11–5.49)	0.03	0.54	(0.23–1.26)	0.15
35–44	1.17	(0.85–1.63)	0.33	1.24	(1.04–1.48)	0.02	1.50	(1.16–1.93)	<0.01	1.60	(1.06–2.43)	0.03	1.60	(0.71–3.65)	0.26	0.68	(0.33–1.41)	0.30
45+	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–
Region																		
North America	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–
Europe	1.92	(1.50–2.45)	<0.01	1.19	(1.01–1.85)	0.03	1.21	(0.98–1.49)	0.08	1.98	(1.48–2.65)	<0.01	2.03	(1.28–3.22)	<0.01	5.94	(3.76–9.37)	<0.01
Latin America/Caribbean	1.03	(0.52–2.06)	0.93	1.28	(0.89–1.85)	0.19	2.27	(1.51–3.42)	<0.01	2.41	(1.33–4.39)	<0.01	2.41	(0.95–6.14)	0.06	4.07	(1.56–10.65)	<0.01
Asia	0.34	(0.11–1.09)	0.07	0.84	(0.56–1.27)	0.41	1.86	(1.20–2.88)	<0.01	1.91	(0.98–3.72)	0.06	2.53	(0.99–6.46)	0.05	3.39	(1.18–9.76)	0.02
Oceania	2.45	(1.33–4.67)	<0.01	1.06	(0.65–1.71)	0.83	0.65	(0.30–1.42)	0.28	1.47	(0.59–1.47)	0.41	2.38	(0.73–7.79)	0.15	1.31	(0.18–9.68)	0.79
<i>Women</i>																		
Age (years)																		
<25	1.50	(0.28–7.86)	0.62	1.49	(0.58–3.81)	0.41	0.96	(0.27–3.47)	0.95	0.98	(0.16–5.92)	0.97	–	–	–	0.47	(0.03–7.31)	0.60
25–34	0.68	(0.13–4.21)	0.89	1.19	(0.50–2.81)	0.70	1.04	(0.33–3.26)	0.94	1.35	(0.26–6.86)	0.72	–	–	–	–	–	–
35–44	0.74	(0.13–4.21)	0.89	1.04	(0.41–2.62)	0.94	0.53	(0.14–2.01)	0.35	2.00	(0.37–10.7)	0.42	–	–	–	0.43	(0.03–8.01)	0.56
45+	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	–	–	–	1.00	Reference	–
Region																		
North America	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–	1.00	Reference	–
Europe	0.54	(0.19–1.57)	0.26	4.57	(1.00–20.87)	0.05	1.24	(0.50–3.05)	0.65	1.39	(0.61–3.16)	0.43	2.54	(1.08–5.97)	0.03	6.73	(0.60–75.25)	0.12
Latin America/Caribbean	3.69	(1.27–10.75)	0.02	4.40	(0.44–44.26)	0.21	0.65	(0.08–5.13)	0.68	3.48	(1.16–10.40)	0.03	0.90	(0.11–7.23)	0.92	13.30	(0.80–220.65)	0.07
Asia	4.04	(1.39–11.78)	0.01	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Oceania	1.71	(0.23–12.76)	0.60	11.73	(1.82–75.62)	<0.01	1.74	(0.37–8.18)	0.48	1.49	(0.32–6.92)	0.61	2.41	(0.50–11.59)	0.27	–	–	–

<sup>A</sup>Based on unadjusted logistic regression analysis.

OR = 11.73; 95% CI 1.82–75.62; *P*-value <0.01, respectively; Table 3).

### Lubricant preferences

Almost all respondents (96%, *n* = 4338) reported that lubricant flavour did not matter or preferred a lubricant with no flavour. In addition, most also felt that lubricant colour (98%, *n* = 4893) or smell (93%, *n* = 4673) did not matter or else preferred a lubricant that had no colour or smell. When asked about lubricant dispensers for AI, 50% (*n* = 3062) reported a preference for dispensers with a 'pop-up' lid or a pump, followed by tubes (28%, *n* = 1715), single-use packets (21%, *n* = 1286) and containers with screw-top or snap-off lids (13%, *n* = 796). Nearly 60% of respondents indicated that they added another substance to the lubricant they used for AI. Among this group, the prevalence of added substances, varied by gender. Nearly all men reported adding spit/saliva (94%, *n* = 2528) followed by water (14%, *n* = 387). Among women, 74% (*n* = 147) reported adding spit/saliva, 73% (*n* = 144) reported adding vaginal fluids and 11% (*n* = 22) reported adding water.

### Discussion

Based on this internet survey we find that consistent condom use for AI was reported by a minority of respondents (~35%). However, consistent lubricant use was reported by more than half of respondents (59%), suggesting the potential acceptability of a rectal microbicide formulated as a lubricant and the potential of such a product as a method of HIV prevention. These findings are consistent with other studies.<sup>21,22</sup> However, our findings suggest that reasons for non-use of lubricants differed by age, with young men reporting barriers related to cost and access. Consequently, age-specific marketing and educational approaches may be needed to enhance use and acceptability of rectal microbicides. In addition, reasons for non-use of lubricants varied by region. Among European respondents, sexual preferences (e.g. preference for dry sex) was more likely to play a role in lubricant non-use compared with North American men. Although the number of respondents from other regions besides North America and Europe was relatively small, the data further highlight the finding that regional differences may serve as an important factor in the uptake of a rectal microbicide formulated as a lubricant. Finally, our findings also suggest that when testing candidate rectal microbicides for safety and efficacy, it is important to consider the implications of other substances being added to the product, including saliva, water and vaginal fluids.

Findings from this survey should be interpreted in light of the limitations. The survey respondents represent a convenience sample drawn from a larger population of users of the targeted email lists, chat rooms and websites. It is impossible to know what proportion of subscribers completed the survey. This limitation of online sampling has been noted before;<sup>28,29</sup> however, the strength of this method is the ability to access hard-to-reach groups and eliminate some of the validity issues associated with interview-based data on sensitive sexual behaviours. Other factors that limit our generalisability include the small proportion of women and the fact that those participating in internet-based surveys are also likely to differ

from other populations. While we are unable to quantify these differences, comparisons of our study population with other surveys of populations examining AI reveal that the prevalence of unprotected AI is similar in this sample to that in other studies.<sup>6,11,12,30</sup> Among men, we were unable to determine if insertive AI was practiced with female or male partners because respondents reported on behaviours overall and not in the context of specific sexual partners/encounters. This limits our interpretations regarding insertive AI; however, the data are still informative, particularly as they pertain to women and receptive AI among men.

Despite the absence of a proven rectal microbicide, this study suggests the potential acceptability of a rectal microbicide formulated as a lubricant as one potential HIV prevention strategy. Understanding impediments to lubricant use, which can serve as a surrogate product, can help to significantly improve the uptake of a rectal microbicide once it becomes available.

### Conflicts of interest

None declared.

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