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## Assessment of Fully and Partially Condom-Protected Sex among U.S. Women: The Potential for Overestimating Protected Sex Acts

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### Abstract

Limited information is available on potential over-reporting of protected sex acts among U.S. women. Of 19,003 sex acts reported by 705 participants over a three-month period, 26.9% and 9.2% were fully and partially protected by a condom, respectively. The potential for misclassifying partially condom-protected sex acts as fully condom-protected sex acts is discussed.

### Keywords

Condom use measures; partial condom use; protected sex acts; women

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Condom use is among the key factors determining risk for acquiring and transmitting HIV and other sexually transmitted infections (STIs) during penetrative sex.<sup>1</sup> However, accurate assessment of condom use has been problematic in HIV/STI surveillance and risk reduction behavioral intervention studies because these studies mostly rely on self-reports.<sup>1–3</sup> Over the years, various strategies have been employed to improve precision in condom use measures, including using shorter recall periods to minimize recall bias, assessing social desirability to examine the validity of condom use measures, using multiple-item measures to enhance the reliability of the measures, asking questions specific to sexual partners and sex acts to differentiate variability in HIV/STI risk, and specifying incorrect condom use and condom failure to obtain more accurate counts of protected and unprotected sex acts.<sup>1, 4–8</sup>

Partial condom use (using a condom during part, but not all of a penetrative sexual act) is one form of incorrect condom use. Research indicates that this form of incorrect use occurs quite frequently.<sup>9–15</sup> However, little attention has been paid to a problem of overestimating protected sex acts when partial use is not specifically assessed in condom use surveys; many sex risk survey instruments do not distinguish between fully and partially condom-protected episodes, leading to the possibility that partially condom-protected episodes are classified as fully condom-protected. The present study assessed this potential estimation bias by measuring numbers of fully and partially condom-protected sexual episodes among U.S. women attending family planning clinics.

Data are from baseline surveys of 705 sexually active heterosexual women who enrolled in the Female Condom Intervention Trial (FEMIT), which evaluated the efficacy of female condom skills training in increasing female condom use.<sup>16</sup> Recruitment took place at family

planning clinics in four San Francisco Bay Area cities (Concord, Mountain View, Santa Cruz, San Francisco) from June 2003 to November 2004. Women qualified to complete the baseline assessment if they self-identified as African American, Asian, Latina, or White; were 18–39 years of age; had more than one male sex partner in the previous year; had no known allergies to polyurethane, latex, or lubricants; were HIV negative; had no plan to get pregnant within the subsequent 6 months; and were English speakers. Eligible participants provided written informed consent. The participants completed a standardized baseline questionnaire using an audio computer-assisted self-administered interview (ACASI) system and received \$10 in cash immediately following the survey. The Committee for Human Research of the University of California, San Francisco approved the study procedures.

The questionnaire included items on demographics, as well as frequency of male and female condom use during vaginal and anal intercourse with each sexual partner (up to ten partners) during a three-month period. For each type of penetrative sex, participants were asked the following six questions: (1) “How many times did your partner wear a male condom during the entire sexual act from start to finish?” (2) “How many times did the partner wear a male condom some of the time, but at other times he did not wear a male condom whenever his penis was in your vagina [anus] during part of the sexual act?” (3) “How many times did you wear a female condom during the entire sexual act from start to finish?” (4) “How many times did you wear a female condom some of the time, but at other times you did not wear a female condom whenever his penis was in your vagina [anus] during part of the sexual act?” (5) “How many times did you use both male and female condoms during the same sexual act and at least one type of condom was worn whenever your partner’s penis was in your vagina [anus]?” (6) “How many times did you use both male and female condoms during the same sexual act and a condom was not always worn whenever your partner’s penis was in your vagina [anus]?” Based on responses to these questions, we examined condom use at the respondent- and sex-act levels. At the respondent-level, we identified four types of condom users: (1) “non-users” if a male or female condom was never used during vaginal or anal intercourse; (2) “inconsistent users” if a male or female condom was used during vaginal or anal intercourse some of the time, but not always; (3) “consistent, partial users” if a male or female condom was used whenever respondents had vaginal or anal intercourse, but a condom was not worn from start to finish of each sex act; and (4) “consistent, full users” if a male or female condom was used whenever respondents had vaginal or anal intercourse and a condom was worn from start to finish of each sex act. For the sex-act level condom use, we calculated percentages of fully and partially condom-protected sex acts by dividing counts of fully and partially condom-protected sex acts by counts of all sex acts, respectively.

Our sample of 705 women was ethnically diverse with 62.0% White, 16.4% Latina, 11.4% African American, and 10.2% Asian. The mean age of the sample was 22 years (range, 18–39). A majority were never married (90.4%) and attended college (51.5%).

As Table 1 shows, 28.8% of 705 respondents were non-users, 53.9% were inconsistent users, 3.5% were consistent, partial users, and 13.8% were consistent, full users. Of the total number of 19,003 vaginal or anal sex acts reported by these 705 participants, 26.9% and 9.2% were fully and partially protected by a condom, respectively.

Our study of U.S. women attending family planning clinics found that 3.5% of respondents were consistent condom users, but did not use condoms correctly; these women used a condom during each sex act, but reported at least one partially condom-protected sexual episode. If “consistent, partial users” and “consistent, full users” were not differentiated, these two groups of condom users would have been combined, inflating the estimated percentage of consistent condom users who engaged in fully condom-protected sex acts

from 13.8% to 17.3% (i.e., 13.8% + 3.5%). In addition, at the sex-act-level of analysis, we found that 9.2% of sex acts reported by our sample of women were not fully protected by a condom. If these partial condom-protected sex acts were not identified, they would have incorrectly been considered as protected, raising the estimated percentage of protected sex acts from 26.9% to 36.1% (i.e., 26.9% + 9.2%). These findings suggest that counts of consistent condom users and fully-protected sex acts would be overestimated if measures of condom use simply ask whether a condom was used, failing to inquire about partial use. This points to the need for specificity in asking about condom use to assess unprotected sex. The findings also imply that women should be educated about correct condom use and increased risk for HIV/STIs associated with partial condom use during a sex act.

Other studies have reported higher respondent-level prevalences of partial condom use, based upon samples diverging from that of the current study (i.e., male college students, male STD clinic patients, men who have sex with men, female college students, female sex workers, and women in managed care).<sup>9–15</sup> For example, in a study of male college students that examined delayed condom use (“started intercourse without a condom, then stopped to put it on”) and early condom removal (“started intercourse with a condom, then removed it and continued intercourse”) during vaginal intercourse in the prior month, 17% reported delayed use and 8.5% early removal.<sup>15</sup> A study of young women in managed care that asked about delayed condom use (“started having intercourse without a condom, then a partner putting one on during sex) in the prior three months found 44% reported such a problem.<sup>9</sup> Study sample differences may explain some reported partial condom use differences, but question wording is also likely to be critical. In-depth exploration with the target audience may clarify understandings of phrases such as “wearing a condom during the entire sex act from start to finish” or asking about “starting intercourse” without a condom (the type of activity with the highest apparent prevalence).

Our study has three limitations. First, generalizability of study findings is limited to women attending family planning clinics because of the non-random nature of our sample. Second, the sample might have been overrepresented by women who were interested in female-initiated barrier methods as we used baseline data from a clinical trial that was advertised as a study to promote women’s general health including sexual health and the female condom. Third, our ability to accurately estimate condom use might have been reduced due to reliance on self-reports.

For the last two decades, significant efforts have been made to refine condom use measures to obtain more accurate accounts of self-reported condom use.<sup>1, 4–8</sup> Our study was an attempt to advance these efforts. This study demonstrated that there is the potential for overestimating protected sex acts if partial condom use is not assessed. This finding suggests that future HIV/STI epidemiological and prevention intervention studies should include measures of full condom use (i.e., whether a condom was used from the beginning to the end of a sex act) to minimize a bias in their estimates for HIV/STI risk and intervention outcomes.

#### SUMMARY

A study of women attending family planning clinics in Northern California found that almost one out of 10 sex acts would have been misclassified as protected had partially condom-protected sex acts not been counted.

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## References

1. Fishbein M, Pequegnat W. Evaluating AIDS prevention interventions using behavioral and biological outcome measures. *Sex Transm Dis.* 2000; 27(2):101–10. [PubMed: 10676977]
2. Catania JA, Gibson DR, Chitwood DD, Coates TJ. Methodological problems in AIDS behavioral research: Influences on measurement error and participation bias in studies of sexual behavior. *Psychological Bulletin.* 1990; 108:339–62. [PubMed: 2270232]
3. Fenton KA, Johnson AM, McManus S, Erens B. Measuring sexual behaviour: methodological challenges in survey research. *Sex Transm Infect.* 2001; 77(2):84–92. [PubMed: 11287683]
4. Sheeran P, Abraham C. Measurement of condom use in 72 studies of HIV-preventive behaviour: a critical review. *Patient Educ Couns.* 1994; 24(3):199–216. [PubMed: 7753715]
5. Schroder KE, Carey MP, Venable PA. Methodological challenges in research on sexual risk behavior: I. Item content, scaling, and data analytical options. *Ann Behav Med.* 2003; 26(2):76–103. [PubMed: 14534027]
6. Schroder KE, Carey MP, Venable PA. Methodological challenges in research on sexual risk behavior: II. Accuracy of self-reports. *Ann Behav Med.* 2003; 26(2):104–23. [PubMed: 14534028]
7. Graham CA, Crosby RA, Sanders SA, Yarber WL. Assessment of condom use in men and women. *Annu Rev Sex Res.* 2005; 16:20–52. [PubMed: 16913286]
8. Noar SM, Cole C, Carlyle K. Condom use measurement in 56 studies of sexual risk behavior: review and recommendations. *Arch Sex Behav.* 2006; 35(3):327–45. [PubMed: 16799837]
9. Civic D, Scholes D, Ichikawa L, et al. Ineffective use of condoms among young women in managed care. *AIDS Care.* 2002; 14(6):779–88. [PubMed: 12511211]
10. Sanders SA, Graham CA, Yarber WL, Crosby RA. Condom use errors and problems among young women who put condoms on their male partners. *J Am Med Womens Assoc.* 2003; 58(2):95–8. [PubMed: 12744422]
11. Crosby R, Sanders S, Yarber WL, Graham CA. Condom-use errors and problems: A neglected aspect of studies assessing condom effectiveness. *American Journal of Preventive Medicine.* 2003; 24(4):367–70. [PubMed: 12726876]
12. Crosby RA, Sanders SA, Yarber WL, Graham CA, Dodge B. Condom use errors and problems among college men. *Sex Transm Dis.* 2002; 29(9):552–7. [PubMed: 12218848]
13. Yarber WL, Crosby RA, Graham CA, et al. Correlates of putting condoms on after sex has begun and of removing them before sex ends: a study of men attending an urban public STD clinic. *Am J Mens Health.* 2007; 1(3):190–6. [PubMed: 19482797]
14. Lipovsek V, Longfield K, Buszin J. Can follow-up study questions about correct and consistent condom use reduce respondent over-reporting among groups at high risk? An analysis of datasets from six countries. *Reprod Health.* 7:9. [PubMed: 20540738]
15. Warner L, Clay-Warner J, Boles J, Williamson J. Assessing condom use practices: implications for evaluating method and user effectiveness. *Sexually Transmitted Diseases.* 1998; 25:273–7. [PubMed: 9662759]
16. Choi KH, Hoff C, Gregorich SE, Grinstead O, Gomez C, Hussey W. The efficacy of female condom skills training in HIV risk reduction among women: a randomized controlled trial. *Am J Public Health.* 2008; 98(10):1841–8. [PubMed: 18703460]

**TABLE 1**

Condom use during vaginal or anal intercourse in the past three months among sexually active women attending family planning clinics in the San Francisco Bay Area

	%	(N)
<u>Respondent-level condom use:</u>		
Non-users	28.8	(203/705)
Inconsistent users	53.9	(107/705)
Consistent, partial users	3.5	(25/705)
Consistent, full users	13.8	(97/705)
<u>Sex-act-level condom use</u>		
Partially-protected sex acts	9.2	(1750/19003)
Fully-protected sex acts	26.9	(5105/19003)