Young Men's Experience with Condom Breakage

By Laura Duberstein Lindberg, Freya L. Sonenstein, Leighton Ku and Greg Levine

In a nationally representative sample of men aged 17–22, 23% of those using condoms reported experiencing at least one condom break during the previous 12 months. Of all condoms used, 2.5% had broken. In multivariate analyses, increased experience with condoms reduced the likelihood of experiencing condom breakage. Recent sex education was associated with an almost 80% decrease in the risk of breakage among young men who used condoms infrequently. Young males who had ever had a sexually transmitted disease (STD), or whose sexual partner had had an STD, were almost three times as likely as other respondents to have experienced condom breakage. In addition, young men with a household income of less than $60,000 were 2–3 times as likely to have broken a condom as were those with a higher household income.

(Family Planning Perspectives, **29:**128–131 & 140, 1997)

Continuing concerns with adolescents' sexual and reproductive health have resulted in an increasing emphasis on condom use, which has been identified as an important means of reducing the risk of pregnancy and sexually transmitted diseases (STDs), including AIDS. To date, research seeking ways of improving young men's condom use has focused on means of increasing the incidence and consistency of use,[1] while the effectiveness of young men's use of condoms has received little attention. Studies on breakage, an important indicator of effectiveness, typically have not included the experiences of young men.[2] Yet, young men may differ from older men in ways potentially related to their risk of condom breakage, such as their sexual experience, access to information or level of psychological comfort in using a condom.

This study examines young men's experiences with condom breakage as one aspect of effective condom use, using retrospective reports from a nationally representative sample of men aged 17–22. It focuses on young men's annual risk of experiencing any breakage and identifies characteristics associated with an elevated risk of breakage.

Data and Methods

The study uses data from the 1991 follow-up of the National Survey of Adolescent Males (NSAM), a nationally representative survey of never-married, noninstitutionalized males aged 15–19. The original wave of face-to-face interviews conducted in 1988 had a response rate of 74%. In the 1991 wave, face-to-face interviews were conducted with 1,676 respondents aged 17–22, for an 89% follow-up rate. Blacks and Hispanics were oversampled in 1988; therefore, we developed longitudinal sample weights based on the original weights and adjusted for loss to follow-up. The results presented in this article were calculated using weighted data.

The NSAM was designed, in part, to collect detailed information related to young men's condom use, such as the number of times an individual had had sexual intercourse in the previous 12 months and the number of condoms he had used during that period. To improve recall, we collected these data through a series of relationship-specific questions: Respondents were asked how often they had had intercourse and how often they had used condoms with each of up to six recent female partners. We then converted the relationship-specific data to an annual estimate. We excluded data for 12 young men who reported sexual contact with other males since the 1988 interview.

Young men who had used at least one condom in the last year were asked: "Of all the times you have used a condom in the last 12 months, how many times has it broken?" We used the response to this question to estimate several measures of condom breakage. We calculated the percentage that had broken by dividing the total number of condoms that had broken by the total number used by all young men in the sample. This measure (often called the per-condom breakage rate) is the best measure of the reliability of the condoms themselves. We also calculated, for each user, the percentage of condoms that had broken. By averaging the percentages for all respondents, we obtained the per-person breakage rate.

The reliability and validity of these two breakage rates depend on accurate reporting of the numbers of condoms used and broken. This is more difficult for individuals in retrospective studies than in clinical trials, where participants are assigned a set number of condoms to report on in a short time interval. In the NSAM, the reported number of broken condoms heaps on intervals of five (i.e., 1, 5, 10, 20, etc.), suggesting some degree of misreporting.

A more reliable measure is whether or not a young man has experienced any condom breakage during the previous 12 months, because it does not require respondents to remember the precise number of times they experienced a condom break.* We used this measure of individual experience with breakage not only because of its greater reliability, but also because it identifies the population of condom users potentially exposed to the risk of pregnancy or disease transmission. We also sought to determine which, if any, individual characteristics are associated with experiencing any condom breakage. Unfortunately, information on condom breakage is missing for 101 eligible respondents. After we exclude cases with missing data on other key variables, our analysis includes 933 sexually active young men who had used a condom dur-

Laura Duberstein Lindberg is a research associate, Freya L. Sonenstein is director of the Population Studies Center and Leighton Ku is a senior research associate at The Urban Institute, Washington, D.C. Greg Levine is a programmer analyst at the Kidney Cost and Epidemiology Center, University of Michigan, Ann Arbor. This article is adapted from a paper presented at the annual meeting of the American Public Health Association, New York, Oct. 21–25, 1996. The authors are grateful for the research assistance of Marta Pernas and Sean Williams. This project was supported by a grant from the Office of Population Affairs (OPA), Department of Health and Human Services. The National Survey of Adolescent Males was conducted with support from a grant from the National Institute for Child Health and Human Development (NICHD). All opinions are those of the authors and do not necessarily reflect the views of The Urban Institute, OPA or NICHD.

*All of these measures required men to identify experiences that occurred within the last 12 months. If men included earlier experiences, these measures will produce overestimates.

ing the 12 months preceding the survey.

Variables

We test three types of individual characteristics theoretically related to condom breakage. First, we examine direct and indirect measures of young men's knowledge about condom use. Because previous studies have shown that breakage rates are higher among inexperienced condom users,[3] we test whether the risk of condom breakage declines as individuals become more experienced in the use of the device. However, breakage may also occur because of a flaw in the condom itself. Because this cause of condom breakage is an independent random process that is unrelated to any characteristic of the user, the likelihood that an individual will experience condom breakage at least once rises with the number of condoms he uses. Thus, the model includes a linear term to capture the effect of random breakage, and a squared term to capture the learning process.

As another, indirect measure of knowledge, we identify young men who reported that they had received education on sexuality or AIDS between 1988 and 1991. We also examine educational achievement, age, race and household income, as these social and demographic variables indirectly measure general access to information. These characteristics also provide a measure of socioeconomic status, which past research indicates is strongly associated with effective contraceptive use.[4]

Second, we test whether certain types of sexual behavior are associated with condom breakage. We identify factors that may increase the risk of condom breakage: whether the young man reported that he or his partner had ever had a sexually transmitted disease, whether he had had more than one sexual partner during the previous 12 months or whether he had engaged in heterosexual anal intercourse during that period.

The direction of association between these sexual risk characteristics and condom breakage is not clear. On one hand, the increased risk of disease transmission associated with these factors could motivate individuals to be more careful condom users, lowering the rate of breakage. On the other hand, as Jessor has suggested, young men who engage in identified risk behavior may be generally less averse to risk than other young men and thus less careful condom users.[5] In addition, the literature suggests that condoms are more likely to break during anal intercourse than during vaginal intercourse because of greater friction.[6]

Third, we test whether condom breakage is related to psychological and interpersonal dimensions of use. We hypothesize that young men who express discomfort about or embarrassment about condoms are more likely to use them incorrectly. To measure psychological discomfort with condoms, we employ a four-item index that had a high level of internal consistency in previous studies using NSAM data.[7] Respondents first assessed the chances that they would be embarrassed in four situations: when buying, discussing, having and using a condom. Second, they rated how much this embarrassment would matter to them in each situation. The product of these ratings is the psychosocial "disutility" of condom use in each situation, and the sum for the four situations results in an index of condom embarrassment.

Finally, we use the importance young men placed on condom strength when buying their last condom to test whether a preference for extra-strong condoms is related to the risk of condom breakage. Young men who had used, but had not purchased, a condom during the previous year (N=106) were assigned the mean value of this measure.

In the NSAM, most information was collected for the entire 12-month period preceding the interview rather than for any specific act of intercourse. We therefore cannot link a specific condom breakage incident to a specific sexual episode. Moreover, we cannot tell if the condom broke during sexual intercourse—which would increase the risk of disease and pregnancy—or while being put on or removed. Factors identified as associated with condom breakage in these analyses should thus be interpreted cautiously.

Results

Descriptive Analyses

According to our estimates, the 933 17–22-year-old men in this sample who reported any condom use during the 12 months preceding the survey used 23,256 condoms during that period, or an average of 25 condoms per user. Of these condoms, 582 broke (2.5%). In contrast, the average percentage of condoms broken by each user was 4.8%. Each user contributed equally to this rate, regardless of the number of condoms he had used. Both these breakage rates are well within ranges reported in other studies.[8]

Twenty-three percent of condom users reported having experienced condom breakage during the previous 12 months. While condom users as a group had broken an average of 0.6 condoms, those who had experienced breakage had broken an average of 2.7 condoms. However, fully half reported only one condom breaking. Table 1 shows the percentage of young men who had experienced at least one condom break during the year before the survey, according to various social and demographic characteristics. Significant variation in the proportion experiencing condom breakage is evident for the majority of the characteristics examined. Young men with past exposure to STDs were the group most likely to have experienced condom breakage, while young men who

Table 1. Weighted number of male condom users aged 17–22, and percentage who had experienced any breakage in the year preceding the survey, by selected characteristics, National Survey of Adolescent Males, 1991

Characteristic	N	%
All	**933**	**23.0**
No. of condoms used in previous 12 mos.		***
≤3	242	11.1
4–30	469	20.4
>30	222	41.3
Recent sex/AIDS education		
Yes	502	22.0
No	431	24.1
Behind in school		
Yes	112	27.7
No	821	22.3
Age		**
17–19	496	20.0
20–22	437	26.3
Race		
Black	158	26.5
Hispanic	75	22.6
White/other	700	22.2
Household income		***
<$30,000	321	29.6
$30,000–$59,999	374	23.5
≥$60,000	238	13.1
STD history†		***
Yes	53	41.8
No	880	21.8
No. of partners in previous 12 mos.		
1	415	21.8
>1	518	23.9
Anal intercourse in previous 12 mos.‡		**
Yes	86	33.3
No	817	21.7
Condom embarrassment index		**
0	155	31.0
1–3	421	22.8
4–16	357	19.7
Extra-strength condom		***
Not important	118	21.5
Somewhat important	214	10.8
Important	601	27.6

**Differences within categories are statistically significant at p< .05. ***Differences within categories are statistically significant at p<.01. †Self or partner. ‡Based on 903 responses.

Table 2. Among men aged 17–22 who had used condoms in the previous year, coefficients and adjusted odds ratios (ORs) showing effects of selected variables on the likelihood of experiencing breakage

Characteristic	Coefficient	Adjusted OR
No. of condoms used	0.01***	1.01
No. of condoms squared	–0.00004*	1.00
Recent sex/AIDS education	0.12	1.13
Interaction between recent sex/AIDS education and use of 1–3 condoms	–1.63***	0.20
Behind in school	0.29	1.34
Age		
17–19	–0.16	0.85
20–22	†	†
Race		
Black	–0.25	0.78
Hispanic	0.07	1.08
White/other	†	†
Household income		
<$30,000	1.03***	2.80
$30,000–$59,000	0.66***	1.93
≥$60,000	†	†
STD history	1.00***	2.73
Multiple partners	–0.22	0.8
Condom embarrassment index‡	–0.30***	0.74
Extra-strong condoms important	0.55***	1.73
Intercept	*–2.94****	
χ^2	*120.069*	
Degrees of freedom	*14*	

*p<.10. **p<.05. ***p<.01. †Reference category. ‡Four-item index, scale ranging from 0 (low embarrassment) to 16 (high embarrassment).

had used three or fewer condoms were among those least likely to have experienced breakage.

Multivariate Analyses

Table 2 presents the results of a logistic regression model estimating the likelihood that an individual had experienced any condom breakage in the 12 months preceding the survey. As the table shows, there was a significant positive relationship between the number of condoms used and condom breakage. While the risk of having experienced a condom break increased with the number of condoms used, the incremental increase in this risk diminished slightly with the addition of each condom, as evidenced by the negative coefficient on the number of condoms squared (p<.10).

The linear aspect of this relationship is presumably due to an underlying random risk of any condom breaking, while the leveling off of risk suggests that users develop experiential knowledge of correct condom use that reduces the risk of breakage. Alternatively, this relationship may indicate that as young men experience condom breakage they discontinue condom use, so that men using more condoms may be those who have experienced less breakage.*

Young men's access to information about condom use was measured most directly by their exposure to education about sex and AIDS. In addition to this main effect, an interaction term between recent sex education and the level of condom use was included in the model to test if the impact of sex education on young men's risk of condom breakage depended on their personal experience with condoms. This interaction between sex education and number of condoms did have a significant effect. Among the young men who reported having used only 1–3 condoms during the last year (26% of the sample), recent sex education was associated with an almost 80% reduction in the risk of condom breakage. However, recent sex education did not significantly affect the risk of condom breakage among young men who had used more than three condoms.

To illustrate this interaction between recent sex education and levels of condom use, we calculated predicted probabilities based on the coefficients of the regression model. The two levels of condom use examined, two condoms and 32 condoms, represent the mean number of condoms used by young men in the lower (1–3 condoms) and higher (four or more condoms) levels of condom use in the regression model.

Among young men reporting use of just two condoms during the last year, only 5% of those with recent sex education had had a condom break, compared with 19% of those without recent sex education (Figure 1). This large differential in the risk of condom breakage associated with sex education was not evident for young men reporting higher levels of condom use—28% and 27%, respectively, had experienced breakage. It appears that classroom exposure to sex education replaces personal experience for young men with low levels of condom use.

As Table 2 shows, household income was the only indirect measure of young men's access to information about correct condom use that had a significant association with condom breakage. Young men who had lived in households with an income of less than $60,000 during the year before their interview had odds of condom breakage 2–3 times those of young men who had lived in households with an income of $60,000 or more.

The sexual risk behaviors measured did not have a consistent relationship to the risk of condom breakage. Men who had ever had an STD, or whose sexual partner had had an STD, were 2.7 times as likely as other men to have experienced a condom break. However, having had multiple sexual partners during the previous year was not significantly associated with the risk of breakage. Although men who reported engaging in anal intercourse during the prior 12 months had a greater risk of condom breakage in the bivariate measures, this behavior was not associated with condom breakage in the multivariate model. The measure of anal intercourse was excluded from the final model because data were missing for 29 of the 933 respondents.

We had expected the condom embarrassment index to have a significant relationship to the risk of condom breakage. Surprisingly, the more embarrassment a young man expressed about using, buying and discussing condoms, the less likely he was to have experienced a condom break. This unexpected finding contrasts with the hypothesis that psychological discomfort would be related to less careful condom use, and thus more breakage. An alternate hypothesis is that young men who are embarrassed about condoms are more self-conscious about the use of condoms, and therefore are at lower risk of breakage.

A preference for extra-strong condoms was positively associated with the risk of condom breakage. The causal direction of this association is not clear, however, and it seems likely that this association derives from a selection process. Young men may value extra-strong condoms because they have past experience with condom breakage and want the extra protection they believe these types of condoms offer.†

To determine if certain characteristics were associated with experiencing multiple condom breaks, we estimated a logistic regression model of the likelihood that a respondent had experienced more than one condom break during the previous year. This model included only the 234 men who reported having experienced at least one condom break. Because of heaping in the reports of exact numbers of condoms that broke, we did not treat the dependent variable as linear. The same explanatory variables were included in this model as in the previous models. Because of the small number of cases, we did not include the interaction between recent

*This selectivity would not be observable in clinical studies, since participants are required to continue with condom use, regardless of breakage, as part of the research protocol. Thus, clinical trials may overestimate the rate of condom breakage in the general population.

†The additional protection against pregnancy or disease offered by condoms marketed as extra-strength is not known. A recent evaluation of condom quality by *Consumer Reports* found that the risk of breakage for condoms advertising extra strength was no lower than that for other condoms. (See: Consumers Union, "How Reliable Are Condoms?" *Consumer Reports*, May 1995, pp. 320–325.)

sex education and number of condoms.

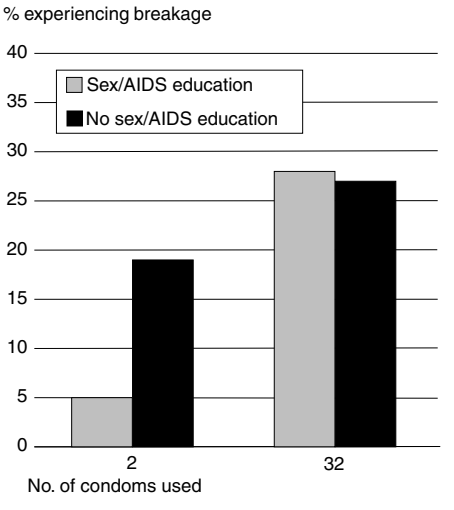
Overall, this model had limited power to predict whether a young man reported one condom break or more than one. The more condoms a man had used, the greater his likelihood of having experienced multiple breaks (Table 3). This relationship had a significant curvilinear effect with a declining risk at greater numbers, providing some evidence that personal experience reduces the risk of breakage. Educational underachievement was the only other variable that maintained a significant association with multiple breaks. Young men who were two or more years behind in school or had dropped out were almost three times as likely to report multiple breaks as were those who had not. This relationship may represent a behavioral association related to access to information or to risk-taking, or it may be a reporting bias.

Discussion

Our analysis provides the first population-based estimates of condom breakage among males aged 17–22, a group at particular risk for STDs and unintended pregnancy. The risk of a condom breaking in this study was relatively low; only 2.5% of condoms used in the previous year had broken. However, these broken condoms were not isolated among a few users: About one in four young men using condoms had experienced at least one condom break in the year before their interview.

The patterns of differences in young males' reports of condom breakage suggest interventions for reducing men's risk. Both experience with condoms and knowledge about condoms appear to reduce the risk of a condom break. The likelihood of experiencing a condom break diminished with increasing numbers of condoms used, suggesting that users may develop relevant skills with greater condom experience. Among young men who had used no more than three condoms during the previous year, formal sex education was associated with a decreased risk of condom breakage. Education and training therefore appear to have potential as interventions for reducing the risk of condom breakage. However, only about half of the young men in our sample who had used condoms reported having recently had sex education, indicating that increasing young men's access to such education could reduce condom breakage rates.

Figure 1. Estimated percentage of males experiencing condom breakage, by recent receipt of sex/AIDS education and number of condoms used



Our analyses find that young men at the greatest risk of disease transmission, those who report that they or their partner have ever had an STD, are more than twice as likely as other young men to have experienced a condom break. Since these measures are self-reported, they probably underreport men's actual experiences with STDs. Moreover, there may be a reporting bias if men associate their STD with a condom breaking and thus place greater importance on the event. However, the magnitude of the estimated relationship suggests that males presenting with an STD, or a history of STD exposure, should be identified as in need of additional training in correct condom use.

Users need to know not only how to reduce their risk of condom breakage, but also how to reduce their risk of pregnancy or STD transmission if a condom does break—by immediately inserting a spermicide into the vagina or washing the penis and vagina with soap and water, and by seeking postcoital contraception.[9]

Condom breakage not only increases the risk of pregnancy and disease transmission, but may discourage use. In additional analyses, we found that men who had experienced any condom breakage in the previous year were significantly less likely to think that condoms were very effective in preventing pregnancy, AIDS or other STDs. It appears that condom failure reduces confidence in the method, and thus may pose a psychological barrier to use. Providing users with the skills to reduce the risk of breakage and to respond appropriately to this breakage can therefore serve to encourage condom use.

Table 3. Among men aged 17–22 who had at least one condom break, coefficients and adjusted odds ratios (ORs) showing effects of selected variables on the likelihood of experiencing multiple breaks (N=234)

Characteristic	Coefficient	Adjusted OR
No. of condoms used	0.04***	1.04
No. of condoms squared	–0.00008***	1.00
Recent sex/AIDS education	0.53	1.70
Behind in school	1.08**	2.96
Age		
17–19	–0.33	0.72
20–22	†	†
Race		
Black	0.80*	2.22
Hispanic	–0.45	0.64
White/other	†	†
Household income		
<$30,000	–0.21	0.81
$30,000–$59,000	–0.15	0.86
≥$60,000	†	†
STD history	–0.67	0.51
Multiple partners	0.14	1.15
Condom embarrassment index	–0.05	0.95
Extra-strong condoms important	–0.27	0.76
Intercept	*–0.58*	
χ^2	*50.275*	
Degrees of freedom	*13*	

*p<.10. **p<.05. ***p<.01. †Reference category.

References

1. M. Solomon and W. DeJong, "Preventing AIDS and Other STDs Through Condom Promotion: A Patient Education Intervention," *American Journal of Public Health*, **79:**453–458, 1989; D. Cohen, C. Dent and D. MacKinnon, "Condom Skills Education and Sexually Transmitted Disease Reinfection," *Journal of Sex Research*, **28:**139–144, 1991; and F. L. Sonenstein, J. H. Pleck and L. Ku, "Why Some Men Don't Use Condoms: Factors Related to Consistency of Utilization," in D. Besharov et al., eds., *Why Some Men Don't Use Condoms: Male Attitudes About Condoms and Other Contraceptives*, Henry Kaiser Foundation, Menlo Park, Calif. (in press).

2. W. R. Grady and K. Tanfer, "Condom Breakage and Slippage Among Men in the United States," *Family Planning Perspectives*, **26:**107–112, 1994; M. Steiner et al., "Condom Breakage and Slippage Rates Among Study Participants in Eight Countries," *International Family Planning Perspectives*, **20:**55–58, 1994; A. Albert et al., "Condom Use Among Female Commercial Sex Workers in Nevada's Legal Brothels," *American Journal of Public Health*, **85:**1514–1520, 1995; P. Russell, "Comparison of Condom Breakage During Human Use with Performance in Laboratory Tests," *Contraception*, **45:**429–437, 1992; and M. Steiner et al., "Can Condom Users Likely to Experience Condom Failure Be Identified?" *Family Planning Perspectives*, **25:**220–223, 1993.

3. J. Trussell, D. L. Warner and R. Hatcher, "Condom Performance During Vaginal Intercourse: Comparison of Trojan-Enz© and Tactylon™ Condoms," *Contraception*, **45:**11–19, 1992; J. Thompson, T. Yager and J. Martin, "Estimated Condom Failure and Frequency of Condom Use Among Gay Men," *American Journal of Public Health*, **83:**1409–1413, 1993; and M. Steiner et al., 1993, op. cit. (see reference 2).

4. M. Hayward, W. R. Grady and J. O. G. Billy, "The Influence of Socioeconomic Status on Adolescent Pregnancy," *Social Science Quarterly*, **73:**750–772, 1992; and E. F. Jones and J. D. Forrest, "Contraceptive Failure Rates Based on the 1988 NSFG," *Family Planning Perspectives*, **24:**12–18, 1992.

(continued on page 140)

Young Men's Experience with…

(continued from page 131)

5. R. Jessor, "Risk Behavior in Adolescence: A Psychosocial Framework for Understanding and Action," *Journal of Adolescent Health,* **12:**597–605, 1991.

6. J. Richters, C. Donovan and J. Gerofi, "How Often Do Condoms Break or Slip Off in Use?" *International Journal of Sexually Transmitted Diseases and AIDS*, **4:**90–94, 1993; S. Golombok, J. Sketchley and J. Rust, "Condom Failure Among Homosexual Men," *Journal of Acquired Immune Deficiency Syndrome*, **2:**404–409, 1989; and M. Steiner et al., "Standardized Protocols for Condom Breakage and Slippage Trials: A Proposal," *American Journal of Public Health*, **84:**1897–1900, 1994.

7. J. H. Pleck, F. L. Sonenstein and L. C. Ku, "Adolescent Males' Condom Use: Relationships Between Perceived Cost-Benefit and Consistency," *Journal of Marriage and the Family*, **53:**733–745, 1991; and ——, "Changes in Adolescent Males' Use of and Attitudes Toward Condoms, 1988–1991," *Family Planning Perspectives,* **25:**106–110, 1993.

8. W. R. Grady and K. Tanfer, 1994, op. cit. (see reference 2); M. Steiner et al., 1994, op. cit. (see reference 2); and A. Albert et al., 1995, op. cit. (see reference 2).

9. R.A. Hatcher et al., *Contraceptive Technology*, 16th ed., Irvington Publishers, New York, 1994, p. 174.