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Introduction

Promoting condom use is a major part of HIV and STD prevention programs. Because condom use cannot be directly observed, measuring it relies on self-reported data obtained through survey interview questions. The methods of survey research are, therefore, central to evaluating the success of anti-HIV programs, and to targeting prevention efforts. While questions about condom use have been included on many national and local surveys, and on numerous evaluation studies of high risk populations, there has been no standard method of asking about condom use. Condom use measures reported on 6 national surveys indicate considerable variation in asking about and reporting condom use (1-6). The lack of standard methods of measurement makes it difficult to compare data from different surveys and populations.

Two basic approaches have been used in measuring condom use. The first approach, asking about the frequency of use in some interval of time, requires respondents to answer in terms of a scale – for example, a 5-part scale ranging from always to never. The second approach is to ask whether a condom was used the last time the respondent had sex, with a dichotomous yes or no response. We refer to these two methods of asking about condoms as the "frequency of use" and "use at last sex" approaches. The objectives of this paper are to compare the two approaches using data from a national survey of U.S. adults who were asked about condom use in both ways, the 1996 National Household Survey on Drug Abuse (NHSDA).

The NHSDA, which is conducted annually by the Substance Abuse and Mental Health Services Administration, consists of a household-based probability sample of the non-institutionalized population age 12 and older. Survey interviews take place in respondent's homes using a questionnaire with both interviewer-administered and self-administered sections (7). In 1996 a personal behaviors section was added to the questionnaire, containing 25 questions covering the areas of sexual activity (including vaginal, oral and anal sex) in the past year (numbers, types and gender of partners), frequency of condom use in the past year, circumstance

of the last sexual encounter (condom use, type of partner, reason for using or not using condom), and HIV testing. This section of the questionnaire was one of several sections of the NHSDA that was self-administered, that is, given to the respondent during the interview process to read and fill out without assistance from the interviewer. (Interviewers would read the questions if requested by respondents who had difficulty). The personal behaviors section was given to all respondents who were age 18-59, and was completed by 12,381 of 12,974. In all statistical estimation, SUDAAN software has been used to adjust for the effects of the complex survey design (8).

On both condom use sequences, additional questions were asked in order to distinguish between use during sex within and outside of an ongoing sexual relationships, a factor that is important for disease prevention, and is strongly related to condom use.

There are a number of criteria which might be used in evaluating the two methods of asking about condom use:

1. The number of questions required.
2. Particular data needs, such as tracking progress toward goals set by government agencies
3. Cognitive demands on respondents
4. Whether there are differences in the results for different questions
5. Statistical power.

Two question sequences on condom use.

The frequency of use method required more questions than the use at last sex method, 8 versus 3. However, the frequency of use sequence obtained additional information, asking about condom use separately for vaginal and anal intercourse. The use at last sex sequence asked one question about condom use during vaginal, oral or anal sex. Both sequences distinguish between use within ongoing relationships and outside ongoing relationships.

The frequency of use questions asked respondents to characterize their condom use in the past year by selecting one of 5 categories (every single time, almost every single time, at least half the time, at least once, but less than half the time, never). This was done separately for sex occurring within and outside of ongoing relationships. Note that in this self-administered, paper-

Table 1
Comparison of frequency of condom use with use at last sex questions
1996 National Household Survey on Drug Abuse

A. Used condom <u>every time/almost every time</u> , vaginal sex, past year			B. Used condom <u>the last time you had sex</u> (vaginal, anal or oral sex)		
In ongoing relationship			Outside ongoing relationship		
		Unwtd			Unwtd
<u>Percent</u>	<u>95% C.I.</u>	<u>N</u>	<u>Percent</u>	<u>95% C.I.</u>	<u>N</u>
17.0	15.8-18.2	9358	60.0	55.4-64.6	1475
18.7	17.5-20.0	9270	62.1	57.6-66.7	755

and-pencil questionnaire, respondents who had not engaged in the activity within the relationship type were intended to select the last category listed (e.g., "I have not had vaginal sex in an on- going relationship in the past 12 months").

In the use at last sex sequence, after respondents stated whether they had used a condom at last sex, they were asked about the relationship type during last sex.

Missing Data

Because this was a paper-and-pencil, self-administered questionnaire, respondents were free to skip questions or provide inconsistent answers. When asked about frequency of sex in the past year, among those who should have answered the questions (or potentially should have), 3.5 percent had missing data (that is, refusal, inconsistent or blank responses) regarding vaginal sex within relationships, while 8.7 percent had missing data for condom use for vaginal sex with outside of ongoing relationships. For anal sex the level of missing data was quite high, 22.4 percent and 33.9 percent; this is apparently due to respondents who skipped the question rather than reading through the list of responses to select the last one indicating that they did not have this type of sex in the past year.

Missing data rates for condom use at last sex (vaginal, oral or anal) were lower. 1.9 percent refused or had inconsistent or missing responses; 0.9 percent had missing data on type of relationship. The last sex sequence, then, had substantially lower non-response for these items.

Reported levels of condom use for two methods

The responses to the frequency of use questions indicate that condom use (for vaginal sex) is much higher outside of ongoing relationships, a pattern that has often been observed; 12 percent used a condom every time within relationships, 47 percent outside of relationships. Responses are distributed bimodally, with the over 75 percent of responses accounted for by the "never" and

"every single time" categories.

The 5-point Likert scale can be collapsed to form a dichotomy to make it easier to compare differences between sample subgroups. We have calculated the percentage who reported using the condom every time or almost every time. This percentage (for vaginal sex) mirrors very closely the percentage who used a condom at last sex based on the other sequence of condom use questions (Table 1).

Table 1 also illustrates that the numbers of observations obtained from this nationally-representative sample of adults is substantially lower for sex outside of ongoing relationships. Both methods yielded over 9000 observations for sex within relationships. The frequency of use method yielded 1475 observations outside of relationships; this includes anyone who had vaginal sex outside of an ongoing relationship in the past year. The use at last sex method yielded roughly half this number, 755 observations; this includes only persons who had sex in the past year, for whom the last sex occurred outside of, rather than within, an ongoing relationship.

Differences in condom use by background variables.

For purposes of comparison we have restricted ourselves to condom use outside of ongoing relationships. The differences for major covariates shown in Table 2 indicate roughly the same pattern of differences for the two methods. Both methods find statistically significant differences between males and females, and by education. For age and race the patterns of differences are similar, but only for the frequency of use measure is there statistical significance, probably related to the greater number of observations for this method. Despite the smaller number of observations, statistically significant findings were found for 2 covariates for use last time but not for frequency of use: region and metropolitan residence.

Condom use by HIV risk factors.

With few exceptions, condom use does not have

Table 2
 Comparison of Condom Use Measures by Covariates
 Condom Use Outside of Ongoing Relationships
 1996 National Household Survey on Drug Abuse

Covariate	Used every time/almost every time in past year, vaginal sex			Used during last sex		
	<u>Percent</u>	<u>95% C.I.</u>	<u>N</u>	<u>Percent</u>	<u>95% C.I.</u>	<u>N</u>
Total	60.0	55.4-64.6	1475	62.1	57.6-66.7	755
Male	65.1*	60.0-70.1	854	65.3*	59.6-71.1	499
Female	51.1	44.2-58.0	621	54.4	46.1-62.8	256
Age						
18-25	69.8*	65.9-73.7	743	66.3	60.1-72.5	379
26-34	62.8	57.6-67.9	523	64.4	58.2-70.7	271
35+	44.7	4.1-55.4	209	52.8	39.9-65.7	105
Race/ ethnic group						
White	58.5*	52.1-64.9	583	62.0	55.6-68.3	315
Black	69.6	62.6-76.5	501	65.0	56.7-73.2	267
Hispanic	49.6	42.1-57.1	359	57.5	47.7-67.3	156
Other	73.5	47.9-99.1	32	---	-- --	17
Education						
< HSG	48.5*	41.0-56.0	391	51.9*	42.4-61.3	190
HSG	61.2	55.0-67.4	500	59.5	50.7-68.4	256
Some col.	59.1	49.6-68.7	357	71.6	63.3-79.9	190
Col. Grad+	72.5	62.2-82.8	227	66.2	57.5-75.0	119
Region						
Northeast	67.4	59.0-75.7	245	73.9*	64.7-83.2	127
Midwest	62.1	50.9-73.2	267	50.9	42.6-59.2	153
South	62.8	56.3-69.2	603	61.4	54.1-68.6	314
West	49.6	39.6-59.6	360	67.5	56.2-78.8	161
Residence						
Large metro	63.8	57.7-70.0	757	68.9*	62.4-75.5	372
Small metro	54.3	47.3-61.4	477	58.5	50.6-66.4	254
Nonmetro	60.5	47.9-73.1	241	51.4	41.6-61.2	129
Sex partners in past year						
6+ partners	65.6	56.9-74.2	153	51.5	39.4-63.7	106
<6 partners	59.4	54.5-64.3	322	63.6	58.9-68.3	649
2+ partners	66.5*	61.6-71.4	998	65.5*	59.7-71.2	538
1 partner	46.4	39.0-53.8	477	53.5	44.6-62.5	217
1+ sex risks	68.4*	60.1-76.6	243	61.1	52.7-69.5	180
No sex risks	58.4	53.6-63.1	1232	62.5	57.3-67.6	575

* p<.05, chi-square test.

Table 2, continued

Covariate	Used every time/almost every time in past year, vaginal sex			Used during last sex		
	Percent	95% C.I.	N	Percent	95% C.I.	N
1+ drug risks	47.0	32.9-61.1	78	44.5	25.3-63.8	45
No drug risks	60.7	56.0-65.5	1397	63.1	58.2-68.1	710
1+ HIV risks	65.1	57.0-73.1	269	59.5	51.4-67.6	191
No HIV risk	58.9	54.0-63.8	1206	62.9	57.7-68.2	564

* $p < .05$, chi-square test.

Sex risks: in past year: 6+ sex partners, sex with HIV infected person, sex in exchange for money or drugs, male same sex partner.
 Drug risks: sex in exchange for drugs, crack cocaine use in past year, injected drugs in past 3 years
 HIV risk: Either sex or drug risk

Table 3
 Comparison of Condom Use Measures for Population Subgroups
 AIDS Community Demonstration Projects, Brief Street Intercept Interviews
 Condom use during vaginal sex, with non-main partner

Population Subgroup	Used every time/ Almost every time	Used last time	N
Total	54.0	52.5	9773
Male	39.4	37.2	4515
Female	66.5	65.7	5258
Injecting drug users	29.4	25.9	2012
Sex traders	70.1	70.3	4058
Youth	73.6	65.4	1096
White	60.2	58.6	2563
Black	49.7	48.2	5664
Hispanic	52.9	52.2	961

statistically significant relationships with various measures of increased risk for HIV. Both methods found higher rates of use for those with 2 or more sex partners, but not for those with 6 or more partners in the past year. Drug use and a composite measure of risk based on both sex and drug behaviors does not yield any statistically significant associations.

Discussion

The two methods of asking about condom use appear to be tapping the same information from respondents and therefore produce very similar results in terms of levels of condom use, and differences between major population groups. Results from a series of surveys of high risk populations (collected as part of the AIDS Community

Demonstration Projects) show the same correspondence between using every time or almost every time in the past year and use during last sex (Table 3) (9).

Based on these comparisons the use at last sex method appears to have a number of advantages:

1. It requires fewer questions. This is particularly relevant if questions are being added to questionnaires that cover a wide range of subjects, or have a focus not closely related to condom use, such as drug use.
2. It places less of a cognitive burden on the respondent. The frequency of use method requires the respondent to calculate an average frequency under a number of conditions (type of

sex, type of relationship), over a one-year period. It has been recognized that asking specific questions about as short a period as possible leads to more accurate information (10,11).

3. The properties of the 5-point Likert scale obtained from the frequency of use method are often not used; most respondents are in the never or always category. For analytic purposes it is often convenient to collapse the scale into a dichotomy.
4. The use at last sex measure can be used to measure progress toward goals which are stated in terms of condom use at last sex, such as the healthy people 2000 objective, set by the Federal government, that by 2000 50 percent of unmarried adults will have used condoms during last sex (12).
5. Other questions about the context of the last sexual encounter can be added easily, such as whether alcohol or drugs were used (13).

Asking about condom use during last sex has much to recommend it as a standard approach for questionnaires. Adopting a standard approach would increase the value of surveys making it possible to compare the results of local surveys and evaluation studies to national survey data. The main disadvantage of this method is lower statistical power because of fewer observations of last sex occurring outside of ongoing relationships. It may be possible to design question sequences to increase the number of observations, for example by asking persons whose last sex was within a relationship whether they had sex outside of a relationship in the past year, and whether condoms were used the last time. These approaches should be developed and fully tested.

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