

# TECHNICAL PAPERS ON HEALTH AND BEHAVIOR MEASUREMENT

## TECHNICAL PAPER 17

### **Impact of ACASI on Reporting of Male-Male Sexual Contacts: Preliminary Results from the 1995 National Survey of Adolescent Males**

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#### **Reference Citation**

Turner, C.F., L. Ku, F.L. Sonenstein, and J.H. Pleck. (1996) Impact of ACASI on reporting of male-male sexual contacts: Preliminary results from the 1995 National Survey of Adolescent Males. In R.B. Warnecke (ed.), *Health Survey Research Methods: Conference Proceedings*. DHHS Pub. No. (PHS) 96-1013. Hyattsville, Md.: National Center for Health Statistics.

## Impact of ACASI on Reporting of Male-Male Sexual Contacts: Preliminary Results From the 1995 National Survey of Adolescent Males

Charles F. Turner, Leighton Ku, Freya L. Sonenstein, and Joseph H. Pleck

### Overview

Since 1988, the National Survey of Adolescent Males-1 (NSAM-1) has tracked the sexual, contraceptive, and AIDS risk behaviors of a national probability sample of young men who were aged 15 to 19 in 1988. This longitudinal research effort gathered follow-up data from this cohort in 1990-91, and it is conducting a new wave of data collection in 1995. Data from the prior rounds of this survey have provided a unique resource for studying changes in behaviors that are central to our understanding of the transmission of sexually transmitted diseases, HIV risk, and unintended pregnancy among adolescents and young adults in the United States.

Data from prior rounds of the NSAM-1 have also presented perplexing methodological puzzles. Reporting of male-male sexual contacts, for example, has occurred at rates that are considerably lower than would be predicted based upon the retrospective reports of national samples of adult men. Similarly, analyses of the stability of reporting of male-male contacts between 1988 and 1991 yielded evidence of considerable rescission (e.g., respondents reporting some male-male contact in 1988 but reporting no lifetime contact in 1991).

These considerations and our desire to increase the actual and perceived privacy of the interview context have motivated us to adopt and evaluate the impact of audio computer-assisted self-interviewing (ACASI) in the 1995 round of the NSAM. ACASI technology permits respondents to listen on headphones to spoken questions (recorded digitally) and/or to read questions on the computer screen of a laptop personal computer. They respond directly on a com-

puter keyboard. This permits respondents to answer confidential questionnaires even if they have limited reading abilities.

The results presented in this paper are properly termed preliminary. They report the results for approximately the first 45% of the NSAM-2 cases ( $N = 928$ ). The major focus of our attention is an experiment embedded within the survey. NSAM-2 respondents were randomly assigned to receive the most sensitive sections of the NSAM either in a paper self-administered questionnaire (SAQ) or an ACASI interview.<sup>1</sup> While data from these initial interviews do not provide national estimates of male-male sexual contact, it is possible to use these data to assess whether different response distributions were obtained from those respondents who received ACASI rather than paper SAQs.

In the following pages, we briefly review the history of the NSAM and past problems with NSAM estimates of the prevalence of male-male contact that motivated our decision to use ACASI. We will then provide an overview of the design of the 1995 rounds of NSAM-1 and NSAM-2 and our methodological experiment. We will conclude by presenting some of the preliminary results from this experiment.

### 1988 and 1991 NSAMs

The 1988 and 1991 rounds of the NSAM were the first surveys of the sexual and HIV-risk-related behaviors of probability samples of young men in the U.S. conducted since 1979. The NSAM surveys were originally designed to complement the National Center for Health Statistics's National Survey of Family Growth (Cycle IV-1988) for women of childbearing ages, although NSAM provides richer data about sexual activity and risk behaviors. Both waves of NSAM covered similar topics, with varying degrees of emphasis and reference time periods. Core topics included demographic characteristics; family background; educational history and aspirations; and a detailed history of sexual, contraceptive, and HIV-related behaviors, including

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Preparation of this paper and the research reported herein were supported by grant R01-HD30861 from the National Institutes of Health National Institute of Child Health and Human Development. In preparing this draft, the authors have benefitted from contributions by Harvey Zelon, NSAM Survey Director; Frank Mierzwa, NSAM Regional Supervisor; and James Chromy, Chief Scientist in the Research Triangle Institute's Statistical Research Division. Mr. Mierzwa prepared a report on NSAM training and field operations that we have summarized in this presentation.

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<sup>1</sup>Since in-house processing and keying of paper SAQs are slower than for ACASI computer files, we have attempted to ensure that the data reported in this paper reflect equivalent interview periods. ACASI data include all ACASI interviews received at the Research Triangle Institute through Wednesday, May 10, 1995. Paper SAQ data reflect all paper SAQs on hand at the Research Triangle Institute on Thursday, May 11, 1995.

detailed histories of first and last intercourse and information about recent partners: use of alcohol and drugs; attitudes about condom use; gender role attitudes; and knowledge about sex, AIDS, and contraception (Sonenstein, Pleck, & Ku, 1991).

Interviews for the 1988 NSAM were carried out between April and November 1988 with a nationally representative sample of 1,880 never married, noninstitutionalized men 15 to 19 years old, living in households. Between December 1990 and May 1991, 1,676 follow-up personal interviews were conducted. Thanks to a strong tracking and field effort, we reinterviewed 89% of the original respondents (not including 11 respondents who died between 1988 and 1990). In 1991, we found that 1988 respondents who were lost to follow-up tended to be slightly older, but more importantly, there was no attrition bias by race or by behavioral outcomes, such as sexual activity or condom use (Ku & Kershaw, 1991).

The 1988 and 1991 NSAM waves have provided a rich body of data for studying behaviors that involve risk of HIV transmission as well as unintended pregnancy, drug dependency, and other phenomena. (See, for example, work by the present authors included in the references.) There are, however, some perplexing puzzles in these data. As discussed below, the most troubling of these involve prior NSAM measurements of male-male sexual contact—the most common mode of HIV transmission.

### *Measurements of Male-Male Sexual Behaviors*

The 1988 NSAM estimated that only 2.1% of males aged 15 to 19 reported any male-male contact during their lifetime, with 1.4% reporting male-male oral or anal sex. Only 0.3% of the 1988 NSAM sample reported male-male oral or anal sex during the 12 months prior to the survey. Furthermore, longitudinal analyses comparing reports in the 1988 and 1991 NSAMs have revealed considerable inconsistency in the reporting of lifetime contacts between 1988 and 1991 (Ku, Sonenstein, & Pleck, 1992a). Only 11 of the 30 men who indicated any lifetime male-male oral or anal intercourse in the 1988 NSAM acknowledged these contacts in the 1991 follow-up.

Besides these troubling discrepancies over time, the prevalence estimates obtained in the 1988 and 1991 NSAMs are extremely low when viewed in the context of the retrospective reports given by adult men about their adolescent behaviors (see Turner, Danella, & Rogers, 1995). Previous analyses of the 1970 Kinsey data estimated that 20.3% of adult men in 1970 had some reported contact with another male in their lifetime; 8.4% of men only reported having contacts before age 14, while 11.9% reported some contacts after age 14 and 6.7% of men reported some male-male sexual contacts during adulthood (Fay, Turner, Klassen, & Gagnon, 1989; Turner, Miller, & Moses, 1989).

If there were no major changes in the patterns of same gender sexual behaviors between 1970 and 1988, these results would imply that the prevalence observed in the

1988 NSAM should be much higher than 2%. Additional analyses of the 1970 Kinsey Institute data set have provided a more precise indication of the extent of this discrepancy. Turner, Danella, and Rogers (1995) report that in addition to the 8% of men who reported experiences prior to age 14, 81% of males reporting same gender sexual contacts also reported that their first contact occurred before age 19; 52% of males reported that their first contact occurred before age 15. These estimates would suggest that the 20% estimate for male-male contact in the 1970 Kinsey Institute Survey should translate into an estimate of between 10% and 16% for a study that interviewed a sample of 15 to 19 year olds.

The 1992 National Health and Social Life Survey obtained results that are roughly consistent although slightly lower than those reported for the 1970 Kinsey survey. The National Health and Social Life Survey, however, did not ask about male-male sexual contacts before puberty. For contacts after puberty, the investigators found that 9.1% of American men in 1992 reported having male-male contacts after puberty and 4.9% reported such contacts after age 18 (Laumann, Gagnon, Michael, & Michaels, 1994). These results would imply that (a) 4.2% of men had male-male contacts that were restricted to adolescence, (b) some portion of the 4.9% reporting adult contacts began such contacts in adolescence, and (c) an unknown percentage had only prepubertal contacts.

Turner, Danella, and Rogers (1995) speculated that the most plausible hypothesis for the divergent results in the NSAM is that the reporting of same gender experiences is considerably more sensitive for adolescents than for adults, and hence the reporting biases inherent to these measurements will differ. This is plausible for two reasons. First, adolescents will be reporting on relatively recent behaviors, while adults may be providing retrospective reports of behaviors that have become less sensitive with the passage of time. Qualitative research on reporting of sexual behaviors suggests that reporting of very recent sexual events is particularly sensitive (Spencer, Faulkner, & Keegan, 1988). Similarly, a large experimental study of the effects of offering a private interviewing mode on the reporting of illicit drug use found that the advantage of the more private mode of administration is most pronounced for reporting of recent behaviors (Turner, Lessler, & Devore, 1992). A second reason to expect divergences in survey estimates is that adolescents are reporting at a time when their own sexual identities may not be well defined, and hence, they may be more fearful of reporting stigmatized behaviors.

These concerns about anomalies in the 1988 and 1991 NSAM measurements motivated our decision to use ACASI in the 1995 wave of NSAM. Our hope was that this technology would attenuate the apparent underreporting bias in prior waves of NSAM and that we would find greater logical consistency over time in our measurements of male-male sexual behaviors. Below, we briefly describe the ACASI technology used in the NSAM and provide a summary of our research design and preliminary findings.

## ACASI Technology

In 1991, scientists at the Research Triangle Institute (RTI) developed and field tested a computer-driven technology that administers survey questionnaires in an audio format and records respondents' answers without the intervention of a survey interviewer (O'Reilly & Turner, 1992; Turner, Lessler, & Gfroerer, 1992, pp. 304-305). This process is entirely private—respondents listen to questions through headphones, and they enter answers by pressing labelled keys on a keypad. Development of this technology was spurred by an initial discussion of the feasibility of ACASI interviewing between the first author (Turner) and David Celentano at a meeting of the steering committee for a multisite evaluation of HIV prevention programs (Project Light, 1991, Feb.; Project Light, 1991, May; Turner, 1991).<sup>2</sup> James O'Reilly and Darren DeLoach developed and programmed RTI's initial systems, and this technology was successfully piloted at RTI during the spring of 1992 (O'Reilly, Hubbard, Lessler, Biemer, & Turner, 1994).

ACASI technology offers several important advantages over the paper SAQ methods that were available for the 1988 and 1990 NSAMs and those currently in use by other investigators (see Turner, Danella, & Rogers, 1995). Most importantly, ACASI

1. can be used with any respondent who can hear and speak—it does not require literacy in any language;
2. permits efficient multilingual administration of surveys without requiring multilingual survey interviewers;
3. offers the traditional advantages of computer-assisted survey technologies (i.e., computer-controlled branching through complex questionnaires, automated consistency and range checking, automatic production of data files, etc.); and
4. provides a completely standardized measurement system in which every respondent (in a given language) hears the same question asked in *exactly the same way*.

### Research Design for 1995 NSAM-1 and NSAM-2

The two previous waves of NSAM-1 were conducted as a longitudinal panel survey of males 15 to 19 years old who were first interviewed in 1988. To obtain the best measures of period, age, and cohort effects on sexual and contracep-

<sup>2</sup>In this discussion at the February 28, 1991, meeting of the Steering Committee for Project Light, it was Dr. Celentano (not the first author [Turner]) who suggested investigating the possibility of developing an "audio-CAPI" (audio computer-assisted personal interviewing) system using voice synthesis. Use of digitized (rather than synthesized) voice was subsequently implemented by O'Reilly at RTI in April and May of 1991. During this same period, G. Johnston implemented a Macintosh-based "audio-CAPI" system using a digitized voice at the University of Michigan. Johnston's development of his system probably antedates Celentano's suggestion by some months.

tive behaviors, we have expanded the NSAM into a "staggered prospective multiple cohort study," using the terminology of Fienberg and Mason (1985). Cohorts (or panels) are followed longitudinally, with new cohorts periodically introduced. This design offers many advantages for cohort analysis. Most importantly, it permits longitudinal analysis of age effects and the use of multiple cohorts to help distinguish period and cohort effects (Glenn, 1977).

In 1995, we are conducting the third round of interviews with the original cohort (NSAM-1), and we have added a new cohort (NSAM-2) of young men who are 15 to 19 years old in 1995.

The 1995 NSAM research program will include

1. *the third wave of NSAM-1 data collection.* This includes the original cohort of young men, who will be about 22 to 27 years old in 1995. Data will be collected using methods from the first two waves: a personal interview with a written instrument and an SAQ.
2. *a new primary panel of 15 to 19 year olds (NSAM-2).* The general structure of the data collection is similar to that used before with the following methodological improvements:
  - a. The coverage for the sample has been extended to include college dormitories and prisons, and the Hispanic oversample has been expanded.
  - b. The most sensitive questions are being asked using RTI's ACASI technology.
3. *a methodological experimental panel of 15 to 19 year olds.* A randomly selected comparison group will be interviewed with the most sensitive questions asked in a traditional, written SAQ (as was done in the 1988 NSAM-1).

The original 1988 NSAM-1 panel oversampled black youth (and effectively oversampled Hispanics). The new NSAM-2 panel of 15 to 19 year olds will oversample black and Hispanic youth because HIV, STDs, and adolescent pregnancy disproportionately burden these communities. In our original design for the 1995 NSAM research program, we proposed the following sample sizes:

Panel	White and			Total
	Black	Hispanic	Other	
Primary	600	593	800	1,993
Experimental	126	124	168	418
Total	726	717	968	2,411

Funding constraints, the considerable expense of screening over 60,000 households to identify a sample of 2,411 households with a 15- to 19-year-old male, and other problems have caused us to reduce the total sample size. We presently anticipate completing approximately 2,000 total interviews in NSAM-2.

## Preliminary Results

### *Status of Fieldwork*

As of May 6, 1995, 42,282 sample lines had been released for screening in NSAM-2, and screening had been completed on 33,126 of these assignments. Of screening assignments, 3.3% (1,386) were found to contain an eligible adolescent male. As of May 6, interviews had been completed with 927 of these eligible respondents.

### *Field Experience With ACASI*

A total of 123 field interviewers were trained in late January and the first week of February on the use of the ACASI software. The field problems using the ACASI hardware have been minimal, given the number of field interviewers working on the NSAM. There have been a few instances (approximately 6) in which a computer problem that occurred in the field could not be solved over the phone. In these cases, a replacement machine was shipped to the field interviewer via Federal Express. We have also replaced approximately 10 Antex Audio Interfaces and a few fraying cables used to connect the Antex box to the computer (Mierzwa, 1995).

Other than these problems, our 138 computers have held up well in the field. Many of the field interviewers hired for the NSAM were inexperienced in using computers, but supervisors report that they have become quite comfortable with the technology. Reports from the field interviewers indicate that most respondents seem to enjoy using the computer, and they find it to be an interesting aspect of the survey. Our survey staff do not know of any respondent who has refused to use the computer. The major recommendation made by our survey team is that future surveys eliminate the external audio interface and associated cables (Mierzwa, 1995).

RTI's new generation of ACASI software does just that. It will run on laptop computers that have integrated sound chips, such as the TI 4000M and IBM Thinkpad 755 series of laptops. With this new system, the field interviewer plugs headphones directly into a port on the laptop. There are no external boxes or cables other than the power cable (see Cooley, Turner, O'Reilly, Allen, & Paddock, in press).

### *Expectations for ACASI in NSAM*

While we embarked upon the experiment of incorporating ACASI into the NSAM in the hope of reducing the apparent underreporting of male-male sexual contacts, our expectations were tempered by two considerations. First, it is entirely plausible (as noted above) that the underreporting in prior rounds of the NSAM could be due to differences in the sensitivity of the reporting of male-male contact by teenage males who may not be fully confident in their sexual identity. Compared to an adult reporting on his

teenage sexual behaviors, a teenage boy is both reporting a much more recent behavior and is more likely to be insecure in his interpretation of how that report fits into his sexual identity.

Secondly, the increment in privacy afforded by switching from a paper-and-pencil SAQ to ACASI is not as substantial as that which has induced 2- to 4-fold increases in reporting of sensitive behaviors in other experiments. Our own recent work comparing telephone ACASI (T-ACASI) reports of sensitive behaviors with those obtained in a standard telephone interview (Turner, Miller et al., 1995) and other experimental comparisons of paper SAQs to interviewer-administered survey measurements (e.g., Aquilino, 1994; Jones & Forrest, 1992; Turner, Lessler, & Devore, 1992) involved a much stronger manipulation of privacy than is involved in the NSAM's comparison of measurements obtained using a paper-and-pencil SAQ *versus* an ACASI interview. We thus embarked upon these preliminary analyses prepared to find relatively modest differences between the measurements obtained in the two experimental conditions in the 1995 NSAM.

### *Preliminary Estimates of Male-Male Contact*

Table 1 presents the results obtained from the first 928 respondents in NSAM-2. The table shows the percentage of respondents who report engaging in each of six types of male-male sexual contact: masturbating another male, being masturbated by another male, insertive oral sex, receptive oral sex, insertive anal sex, and receptive anal sex. The final line of the table shows the results for a composite measure comparable to that previously discussed for the 1988 NSAM-1. This measure indicates whether the respondent reported at least one type of male-male contact.

It will be seen from Table 1 that there are substantial and statistically reliable differences between the reports given in the ACASI interview and in the paper-and-pencil SAQ. Respondents were more than four times more likely to report some male-male contact in the ACASI interview. Although the odds ratios for the individual behaviors vary somewhat (from 2.1 to 5.4) and several are statistically unreliable with our current incomplete sample size of 928, there seems little reason to doubt that ACASI will reduce the underreporting of male-male sex in the 1995 NSAM-2.

Based upon this preliminary analysis, two other observations merit note. First, even with this apparent fourfold increase in reporting of male-male sex, the 4.7% estimate is still considerably below what would be reasonable based upon the retrospective reports of adolescent sexual behaviors made by recent generations of adult men. Secondly, although the sample size is too small for the result to be statistically reliable (and the preliminary 1995 sample is not appropriate for making population estimates), the paper-and-pencil SAQ in the 1995 NSAM-2 presently yields an (unweighted) estimate of any male-male contact (1.1%) that is half the size of the weighted estimate derived from the 1988 NSAM-1 (2.1%).

Table 1. Estimates of prevalence of different types of male-male sexual contact in a national sample of males aged 15 to 19 in 1995 by mode of data collection: Preliminary results from the 1995 NSAM-2

Measurement	Paper SAQ		ACASI		OR	p
	Estimated %	Base N	Estimated %	Base N		
Ever masturbated another male	1.1	176	2.3	731	2.07	0.29
Ever been masturbated by another male	0.6	176	3.0	730	5.44	0.03
Ever had insertive oral sex with another male (your penis in his mouth)	0.6	176	2.5	730	4.42	0.07
Ever had receptive oral sex with another male (his penis in your mouth)	0.6	176	2.1	730	3.67	0.13
Ever had receptive anal sex with another male (his penis in your rectum or butt)	0.0	176	1.2	730	— <sup>a</sup>	0.05
Ever had insertive anal sex with another male (your penis in his rectum or butt)	0.6	176	1.6	729	2.93	0.23
Any male-male sex <sup>b</sup>	1.1	176	4.7	728	4.26	0.01

NOTE: Preliminary data from the first 928 cases of 1995 NSAM-2. *p*-values are those for likelihood ratio chi-square for fit of independence model to the two-way table of mode by reporting of behavior.

<sup>a</sup>Odds ratio cannot be calculated due to zero denominator.

<sup>b</sup>Composite measure of any male-male sex is derived from the six individual measurements. Cases with missing data for any of the six behaviors were excluded from the analysis of the composite measure.

### Patterns of Response

While the results presented in Table 1 suggest that ACASI has effects that are larger than we anticipated, there remain several other concerns worthy of analysis. Most important, perhaps, is an assessment of the impact of ACASI on the internal consistency of responses. One fear in moving to computer-based self-interviewing is that any apparent increase in a low-prevalence behavior may reflect nothing more than an increase in the error rates (e.g., respondents accidentally pressing 1 ["yes"] when they meant to respond "no").

To provide some initial evidence, we examined the patterns of response to the six male-male sex questions. If one ignores item nonresponse, there are 64 (2<sup>6</sup>) possible combinations of answers respondents could have given to the six male-male sexual behavior questions. Actual sexual behaviors, however, are much more structured; some patterns should be rare or nonexistent. For example, we would not expect to find *large numbers* of males reporting no sexual activity other than insertive anal intercourse. To the extent that such structure is lacking in the ACASI response patterns, one may legitimately wonder whether the ACASI responses are meaningful. Similarly, a proliferation of response patterns with very small frequency counts might encourage suspicion that random errors in keying were inflating the prevalence estimates.

The reports obtained under ACASI do evidence substantial structure. Only 20 of the 64 possible response patterns are observed in the ACASI data, and the patterns observed

most frequently conform well to our expectations as to the patterning of male-male contacts among adolescents. The most frequent pattern observed was, of course, the reporting of no experience with each of the six male-male sexual behaviors (694 respondents). The next most frequent patterns were (a) only masturbation (13 respondents), (b) masturbation plus oral sex (5 respondents), and (c) masturbation plus oral and anal sex (9 respondents). An additional 3 respondents reported only oral sex, and 2 respondents reported oral and anal sex but not male-male masturbation. These response patterns account for all of the ACASI reports but 2.

### Conclusion

While we are anxiously awaiting completion of the second half of the survey, our preliminary data strongly suggest that ACASI is diminishing (but not eliminating) the underreporting of male-male sexual contacts. The evidence we can adduce at this time also suggests that this result is unlikely to be due to random measurement errors.

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