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Sexual Behavior in the United States, 1930-1990: Trends and Methodological Problems

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Sexual Behavior in the United States, 1930–1990: Trends and Methodological Problems

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Background and Objectives: **Arguments for population-based research on patterns of sexual behavior are reviewed, and survey data are used to illustrate the insights that can be gained from such research.**

Study Design: **Reports of sexual behavior obtained in surveys of large probability samples of the U.S. population are analyzed and compared to make inferences about changes in the age of onset of sexual intercourse and the patterns of heterosexual and same-gender sexual behaviors of American men and women who entered adulthood during the period from 1930 to 1990.**

Results: **Strong trends are documented for both a decline in the reported age at first heterosexual intercourse and an increase in the numbers of heterosexual partners reported during adulthood. Similar evidence on patterns of same-gender contact indicate a relatively stable prevalence of reported male–male contact for cohorts of men born from the 1930s through the 1960s. Preliminary analyses suggest, however, that there has been a substantial increase in the proportion of women reporting female–female sexual contact during adulthood. Although the analyses require refinement, it appears that the prevalence of reported female–female contact may have increased by a factor of 3 to 4 for cohorts of women born between the 1930s and the 1960s.**

***Conclusions*: Although the trends in reported behaviors are robust, inferences about behavior, per se, rest on the assumption that reporting biases were equivalent across cohorts. Methodological challenges in the interpretation of such findings and new technologies for conducting such research are described.**

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THE DEARTH OF POPULATION-BASED surveys of sexual behavior was well recognized during the past decade.[1–4] This lack of reliable data hobbled early efforts to understand the likely scope and spread of the human immunodeficiency virus (HIV) epidemic in the United States. The authors note, for example, that the earliest estimates of the size of the population infected with HIV[5] relied on research conducted during the 1930s and 1940s by Kinsey and his colleagues[6,7] to estimate the prevalence and patterns of male–male sexual contact in the contemporary U.S. population. However, the Kinsey data were long recognized to be inappropriate for such uses. A primary reason for their inappropriateness arose because the selection of individuals was not representative of the U.S. population of the period in question (1938 to 1948), not to mention the leap of faith that would be required to apply any such estimates to the population living in the United States 40 years later.

In recent years, some progress has been made in obtaining a more complete picture of patterns of sexual behaviors in the U.S. population. Elements of this progress include analyses of the patterns of male–male sexual contact using a "lost" data set from a 1970 survey of sexual behavior,[8,9]* a longitudinal study of sexual behavior of adolescent males[10] that complements longstanding research on adolescent females,[11–13] a large-scale telephone survey,[14] and smaller in-person surveys[15] of adult sexual behavior.

Although all of these research efforts doubtlessly will be viewed as primitive "first steps" in decades to come,

The authors are grateful to the Kinsey Institute and Albert Klassen (Principal Investigator) for providing a dataset for secondary analysis from the 1970 Kinsey Institute Survey, to the Roper Center for providing data tapes from the 1988 to 1991 National Opinion Research Center (NORC) General Social Surveys (GSS), and to the Data Archive on Adolescent Pregnancy and Pregnancy Prevention for providing a copy of the 1988 National Survey of Family Growth (NSFG) dataset. The authors are grateful to the National Center for Health Statistics for performing tabulations from the 1989 National Household Seroprevalence Survey Pretest. The authors acknowledge the helpful comments of Sevgi Aral, Albert Klassen, Leighton Ku, Heather Miller, June Reinisch, Stephanie Sanders, Tom Smith, and Mary Ziemba-Davis on an earlier draft of this article.

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*These 1970 data were not truly lost. Rather their publication was delayed until 1989 because of a dispute among the investigators. Estimates of the prevalence of male-male contact in the United States were finally derived and published by investigators at the National Research Council-National Academy of Sciences in collaboration with the principal investigator for the 1970 survey.

they are nonetheless important steps in a field of research that has seen only sporadic efforts to survey representative populations—and then on quite restricted aspects of sexual behavior.[16] Nonetheless, this research has raised some important questions, many of which will have direct application to understanding the distribution in the population of the behaviors that transmit HIV and other sexually transmitted diseases (STDs). It also has provided valuable information on the context in which sexual behaviors are motivated and shaped. Finally, the slow accretion of these research efforts is allowing us to test by replication the adequacy of our measurement methods, and it is stimulating important improvements in the technology we use to make our measurements.

Because of limitations in the presently available data, the topics we can address are restricted, although much less so than 5 years ago. The available evidence does, however, allow us to discern important changes in sexual behaviors that have occurred for cohorts born during the period from 1910 to 1970. Taking 20 years of age as a convenient marker of adulthood, the available data allow us to chart the evolution of sexual behaviors in cohorts that came of age in the United States between 1930 and 1990.

Although we do not have longitudinal measurements on the various birth cohorts, it is nonetheless possible to discern large and important changes in many sexual behaviors. This fortunate situation arises because many key measurements deal with characteristics that can only increase with age (e.g., the proportion of the cohort that has ever had same-gender sexual contact) and, in many of our analyses, we find that the oldest cohorts have substantially lower prevalences than the younger cohorts. So, for example, the authors will report preliminary findings that the proportion of women who report having had a female sexual partner in adulthood is highest among the cohort of women born during the 1960s and that this prevalence declines markedly for cohorts born in earlier decades. Parallel findings will be reported for the accumulation of heterosexual partners by recent birth cohorts and the age of their initiation of heterosexual intercourse.

In this article, the authors briefly summarize the rationale for undertaking surveys of sexual behavior. They then provide examples of trends in reported sexual behavior that now can be documented by aggregating results from multiple surveys. In each of these examples, the inference that the actual patterns of sexual behavior in the population changed over time rests on the assumption that the reporting biases were equivalent across the survey measurements. In the final section of this paper, the authors consider what is presently known about the biases that afflict self-reports of sexual behaviors, and describe a new technique for reducing their magnitude.

Reasons For Studying Sexual Behavior

Not infrequently, one encounters biomedical scientists who ask: "Does behavioral research really have a useful role to play in understanding and retarding the spread of HIV and other STDs?" The answer to that question is, the authors believe, an emphatic "Yes."

The biology of pathogens is only one element of STD transmission. The spread of those pathogens in a population reflects the confluence of their biology, including their infectivity, host susceptibility, etc., and, equally important, the patterns of human behavior that transmit the pathogen and sustain the chains of epidemic or endemic infection[2].

The spread of STDs is thus a biosocial phenomenon. Presently, for HIV, the most deadly of the sexually transmitted pathogens, all of our means of controlling its spread rely on our ability to influence human behaviors. Even if fully effective therapies were to become available, the history of other STDs[17] suggests the need for protective behavior change will persist, as will the need for a reliable technology for monitoring the persistence of these changes.

These arguments for behavioral research, in general, and sexual behavior research, in particular, have been echoed by groups reviewing AIDS research needs. These include numerous committees of the National Academy of Sciences and the Institute of Medicine, as well as President Reagan's Commission on the HIV Epidemic, the National Commission on AIDS, the General Accounting Office, and others.[2,3,18,19] Among the major reasons cited to conduct such research are the following:

> To understand the spread of the HIV epidemic (and its potential for spread) you must know some simple "facts" about sex, such as the size of key population groups, including men who have sex with men and heterosexuals with multiple partners; rates of new partner acquisition, and so forth.
>
> To induce behavior change, you need an understanding of what motivates and constrains those sexual behaviors that risk STD transmission and how behavior change can be made more attractive.
>
> To measure the effectiveness of prevention efforts, you need baseline data and data at regular intervals to assess whether protective change is occurring in the patterns of sexual behavior in the population.

Population-based surveys of sexual behaviors can provide estimates of the prevalence and patterns of behaviors that affect the velocity and breadth of spread of an STD. These same surveys provide information about the factors that shape risk-taking behaviors and thus provide hypotheses that can later be tested experimen-

tally as to the sorts of behavioral interventions that may be effective in motivating individuals to change their behaviors. Furthermore, repetition of such surveys provides a way of monitoring over time whether the population is adopting protective changes and whether those changes are persisting through time.

With regard to HIV prevention, some readers may wonder why we cannot rely on HIV incidence and prevalence data to tell us what is happening. There are several reasons why such an approach is insufficient. First, the only trustworthy estimates of HIV incidence in the population are derived from back-calculation procedures applied to the reports of diagnosed AIDS cases.[20] These estimates provide indicators of trends in HIV incidence 2 to 3 years ago owing to the nature of the function relating HIV incidence to AIDS case counts. (If prophylactic use of zidovudine or other drugs increases this latency period for sizable segments of the population, this evidence will become even more out of date.) Secondly, HIV incidence and prevalence statistics can tell you only what has been "lost," that is, where prevention efforts have failed to protect individuals from HIV transmission. Such statistics cannot tell you where the vulnerable segments of the population are; nor can they tell you how to evaluate the effectiveness of programs in populations where HIV is not heavily seeded. In such populations, the persistence of a low prevalence rate does not prove that the population has adopted protective changes in their sexual and other risk-related behaviors; it may only reflect that the population has not yet been massively challenged.

Overview

If one accepts that basic research on sexual behavior in the population is relevant, then other questions arise about the scientific basis for this research. Some of the key questions are:

Will people really answer these surveys?

Will they tell the truth?

Is this scientific measurement?

Each of these questions is, at least in part, an empirical question. The authors will present a variety of evidence charting several key aspects of sexual behavior in the United States during the past 60 years. This evidence provides a qualified affirmative answer to these three fundamental questions.

The authors will describe the sources of their data, and then present some important trends that can be discerned by combining data from several large surveys. Some of these trends are directly relevant to STD transmission, e.g., changes in numbers of sexual partners and the age at which intercourse is begun. Other data suggest that over the past 6 decades some surprising shifts have occurred in sexual behavior among some segments of the U.S. population (or in their willingness to report these behaviors), and that these shifts have largely gone unnoticed both by researchers and by the population itself.

Methods

Data Sources

The data discussed in the following pages are derived from several sources, including the following:

The 1988, 1989, 1990, and 1991 rounds of the National Opinion Research Center's General Social Survey, which annually surveyed probability samples of the U.S. population aged 18 and older. The data report in this paper are based on the authors' analyses of the public use data set distributed by the Roper Center data archive at the University of Connecticut.

The 1970 Kinsey Institute Survey, which surveyed a probability sample of American men and women aged 21 and older in 1970. This survey used area probability sampling to the census block or segment level with quota sampling to select individual respondents. The data reported in this paper are based on the authors' analyses of a survey data set provided by the Kinsey Institute, and it builds on other previously reported work by Klassen et al, Turner et al, and Fay et al.[8,21,22]

The 1989 National Household Seroprevalence Survey Pretest (NHSS), which surveyed a probability sample of men and women aged 18 to 54 years in 1989 in Dallas County, Texas. The data reported in the present paper build on tabulations previously reported by Rogers and Turner[9] and special tabulations performed for the authors by staff of the National Center for Health Statistics. (Because the data from this survey include the results of HIV testing, no public use data tape is available.)

The 1982 and 1988 National Surveys of Family Growth (NSFG), which surveyed full probability samples of American women aged 15 to 44 years. The data reported here from the 1988 survey are based on tabulations the authors have made from the public use data file released by the National Center for Health Statistics. The data reported here from the 1982 survey are based on the authors' re-

working of tabulations published by Hofferth et al.[13]

Published results from two other surveys, the 1991 National Survey of Men (NSM)[23] and Sonenstein et al's[24,25] National Survey of Adolescent Males (NSAM), will be briefly treated in the discussion. Detailed descriptions of the procedures used in each of these surveys may be found in the published literature[8,13,24,25] and in technical manuals available from the survey organizations.[26–30]

Statistical Procedures

Table 1 presents details for each survey of the population sampled, the sample size, mode of collecting information on sexual behavior, and the name of the organization conducting the survey. Response rates for the surveys that used full probability samples are also shown in Table 1. It is not possible to calculate a response rate for the 1970 Kinsey Institute Survey, because quota sampling was used at the census block or segment level. Examination of the demographic composition of the sample used in this survey shows a reasonable (although not perfect) match to the age, education, and marital status composition of the U.S. population as reported by the 1970 Census.[8] This survey does, however, contain substantially more black respondents than would have been expected based on the 1970 Census (16% in the sample versus 9% in the Census).

Because the purpose of this paper is descriptive, the authors do not, in general, report statistical analyses. For the most part, both the trends that will be reported and the survey sample sizes are sufficiently large that the machinery of statistical inference is not required. Where conclusions are questionable, the authors will perform appropriate tests of their inferences. Because variables of major interest are polytomous or binary (e.g., gender of sexual partners: all male, all female, or both), hierarchical log-linear and logistic regression modeling are the tools of choice for these analyses.[31–34] Because the sample designs for these surveys typically use stratification and clustering, the authors use computer algorithms designed to fit such models to data from such complex sample designs.[35]

TABLE 1. Details of Surveys Providing Sexual Behavior Data Analyzed in This Article

Survey and Year	Organization	Population*	Sample Size	Measurement Mode†	Response Rate
Full probability samples					
National Survey of Family Growth, 1982, 1988	NORC (1982) Westat (1988)	Females, ages 15–44 yr, US	7,969 8,450	IAQ	79% (1982) 79% (1988)‡
National Household Seroprevalence Survey Pretest, 1989	RTI	Adults, ages 18–54, Dallas County, Texas	1,449	SAQ	88%§
General Social Survey, 1988, 1989, 1990, 1991	NORC	Adults, ages 18+ yr, US	1,481 1,537 1,372 1,517	SAQ	77% (1988) 78% (1989) 74% (1990) 78% (1991)
Probability samples with quotas					
Kinsey Institute Survey, 1970	NORC	Adults, ages 21+ yr, continental US	3,018	SAQ	¶

*Survey populations often are defined with other minor restrictions—e.g., exclusion of persons in the military or those residing in prisons, hospitals, or other institutions, persons not speaking English, etc.

†Mode indicates method by which sexual behavior data were collected. IAQ (interview-administered questionnaire) indicates that questions were asked by the survey interviewer who recorded the respondents answers. SAQ (self-administered questionnaire) indicates that the survey interviewer handed the respondents a written questionnaire to complete. Several surveys used both procedures. The designation shown in this table refers to the mode of collection for the sexual behavior data discussed in this article.

‡The 79% response rate for 1988 takes account of both an intensive follow-up effort performed on a subsample of 1988 National Survey of Family Growth (NSFG) nonrespondents as well as the nonresponse rate (4%) to the National Health Interview Survey that was used to identify the NSFG sample members in 1988.

§Response rate of 88% applies to collection of sexual behavior data. Blood samples also were requested; a response rate of 82% was achieved for the collection of blood samples.

¶The 1970 Kinsey Institute Survey was a multistage area probability sample to the block or segment level. At the block or segment level, interviewers were given a prescribed travel pattern beginning at a random dwelling unit, and they were instructed to proceed in a specified direction until they had completed interviews with a quota of persons in each of several categories. (Interviewers were restricted to one interview per household.) Interview characteristics were established for: 1) men ages 21 to 29 yr, 2) men ages 30+ yr, 3) women employed outside the household, and 4) women not employed outside the household. (From reference 8.)

¶Because the survey design used quotas at the block level, a response rate could not be computed. Field work reports on the survey's execution indicated that the field staff believed the refusal rate for this survey did not seem higher than that for other NORC surveys of the period. (From reference 8.)

Results

Trends in Age at Initiation of Heterosexual Contact

One of the best recognized trends in sexual behavior in the United States in the 20th century has been the declining age at the initiation of sexual intercourse and the uncoupling of sexual activity from marriage. This is reflected in the dramatic increase in the numbers of pregnancies and births to unmarried adolescent mothers and the findings of population surveys of adolescents dating back at least to the work of Kantner and Zelnik in the 1970s.[11,12] Retrospective reports from the 1982 NSFG previously have permitted researchers to chart trends in the age at initiation of sexual activity among those American females born since 1938. By combining the NSFG data with the reports of sexual activity obtained from all adults in the 1970 Kinsey Institute survey, it is now possible to track these trends with reasonable precision back to the cohort of women who were born during the 1910s and who reached age 20 during the 1930s. Data from the 1988 NSFG provide an independent replication of part of this time series; this replication is helpful in assessing the reliability of these measurements.

In making these comparisons, some uncertainty is introduced into the estimates by differences in the wording of the questions used in the two surveys. In the 1982 and 1988 NSFG, women were asked, "When did you have intercourse for the first time—what month and year was that?" (If the respondent could not give a month and year, she was asked a sequence of questions inquiring whether she was younger or older than 18 years, and then whether she was younger or older than either 15 or 20 years.)

In the 1970 Kinsey survey, however, respondents were asked, "How old were you the first time you had sexual activity with someone of the opposite sex, when either you or your partner came to a sexual climax? If the first time was when you got married, please give your age at marriage."

Because the latter question allows for the reporting of noncoital sexual activity leading to orgasm, one would expect the 1970 Kinsey survey to yield somewhat higher estimates than the NSFG surveys. For the cohorts that overlapped in the 1970 Kinsey and 1982 NSFG surveys, this was indeed the case. Table 2 shows the rates obtained for women born from 1944 to 1949 in the two surveys. For sexual activity between ages 14 and 20 years, the 1970 Kinsey survey produced estimates 1.3 to 2.0 times higher than those obtained from the 1982 NSFG. Moreover, Table 2 indicates that there is an almost monotonic decline in this ratio for reporting of sexual activity at ages intermediate between 14 and 20 years. This suggests that persons reporting their first sexual activity in late adolescence were more likely to engage in intercourse than in other activities leading to orgasm.

The data presented in Table 2 make it possible to estimate the results that would have been obtained if the NSFG questions had been asked of the 1970 Kinsey sample. This can be done by using the observed ratios of reporting frequencies in the overlapping cohort to deflate the 1970 Kinsey estimates for the other cohorts. This involves a crucial assumption that cannot be empirically verified. We must assume that the ratios observed for the cohort born from 1944 to 1949 are reasonable estimates of those that would apply to women born in earlier years. That is to say, it assumes a stable ratio (over the time periods) of women reporting noncoital orgasmic experiences versus those reporting sexual intercourse at a given age.

Figures 1 and 2 plot the proportion of women reporting premarital sexual contacts[36]* before age 15 (Figure 1) and before age 18 (Figure 2) in the two NSFG surveys together with the adjusted estimates derived from the 1970 Kinsey Institute Survey.† Figure 1 confirms a substantial rise in the proportion of women reporting premarital intercourse before age 15. The authors' synthetic estimates from the 1970 Kinsey Institute Survey suggest that this proportion has risen from approximately 1% for the cohort of women born at the beginning of the century to 12% for the NSFG cohort born between 1968 and 1973. Similarly, the estimates for premarital intercourse before age 18 (Figure 2) rise from less than 10% for women born at the beginning of the century to well over 50% for the cohort born between 1968 and 1973.

*The 1982 estimates are aggregated from tabulations published by Hofferth et al.[13] The 1988 estimates are derived from our tabulations using the 1988 NSFG public use dataset (see below). Age in years at first intercourse after menarche in the 1988 NSFG (Variable: Sex1Age) was used to define the universe of females who had sexual intercourse before ages 15 and 18. (It should be noted that NCHS imputed values for this variable in 76 cases in which respondents did not supply answers to the relevant survey questions; in 8,374 cases, values for this variable were based upon the respondents' answers alone.) Respondents were excluded from these calculations if they had not completed their 15th (or 18th) year of age at the time of the survey. For those respondents reporting their age at first intercourse as prior to age 15 (or 18), we compared the reported month of their first intercourse to their month of first marriage (if any). If the month of first intercourse was equal to or greater than their month of first marriage, the intercourse was considered post-marital. In a small number of cases (unweighted n = 22), age at first marriage was missing. Two of these cases reported having sexual intercourse before age 15, and an additional 13 reported intercourse between ages 15 and 17. These cases were treated as premarital since the overwhelming majority of contacts before ages 15 (775 of 787) and 18 (3,580 of 3,747) were premarital by the above definition.

†These tabulations from the 1970 Kinsey Institute Survey differ slightly from those previously published by Klassen et al[22] and Turner et al.[2] The present tabulations aggregate data from ever-married and never married individuals.

TABLE 2. Cumulative Percentage of Female Respondents Born Between 1944 and 1949 Reporting Premarital Sexual Contact to the Point of Orgasm in 1970 Kinsey Institute Survey, and Cumulative Percentage Reporting Sexual Intercourse in 1982 National Survey of Family Growth (NSFG)

	Survey and Cohort		
Age at First Sex	Kinsey 1944–1949	NSFG 1944–1949	Ratio
Before 14	3.9	2.1	1.86
Before 15	7.1	3.6	1.97
Before 16	15.0	8.8	1.70
Before 17	26.0	16.6	1.57
Before 18	38.2	26.5	1.44
Before 19	50.4	36.6	1.38
Before 20	57.1	45.5	1.25

Estimates from the 1970 Kinsey Institute Survey are based upon our re-analysis of the raw data. Respondent's year of birth was approximated by subtracting the respondent's age in 1970 from the year the survey was conducted (1970). Note that the 1970 Kinsey estimates reported here deviate slightly from previously published estimates because we retained never-married women in the analysis to make the estimates more comparable with those from the 1982 NSFG. Estimates from 1982 NSFG are weighted means of estimates for two birth cohorts (1944–1946 and 1947–1949) reported in reference 13. The sample numbers (479 and 664) for the cohorts were used as weights in estimating the percentages for the combined group (1944–1949; see reference 2).

A second important feature of the data presented in Figures 1 and 2 is the remarkable consistency of the estimates from the 1982 and 1988 NSFG. Although the consistency is not perfect, the observed discrepancies do not exceed two percentage points for reporting intercourse before age 15 nor five percentage points for reporting intercourse before age 18. Given that the sample sizes for each cohort range from 383 to 897, these fluctuations appear to be within the range that might be expected owing to sampling error. (For a percentage with an expected value of 50%, a single estimate derived from a sample size of 600 would have a sampling error of 2.5 percentage points assuming a sample design effect of 1.5.[37] The 95% confidence interval for the difference between two such survey estimates would thus be ± 6.9 percentage points.)

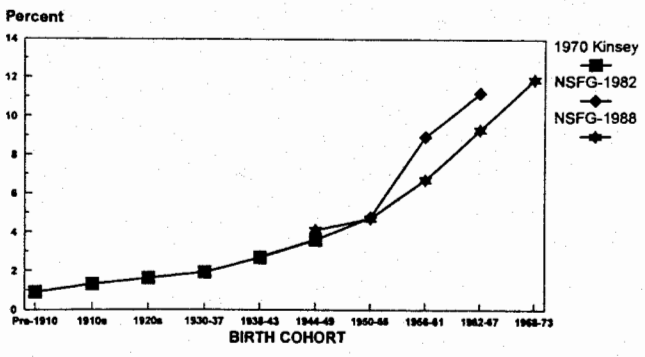

Fig. 1. Estimates of percentage of U.S. women who reported having sex before age 15 years. (See Appendix for details of calculations.)

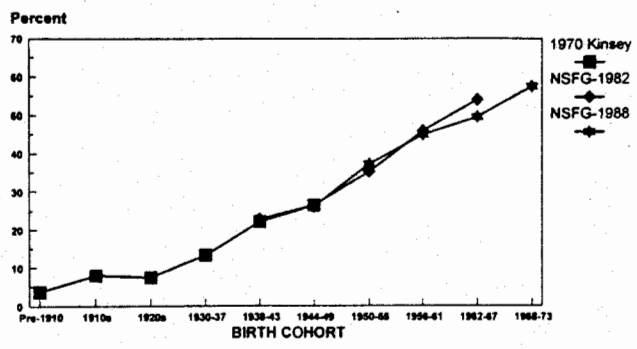

Fig. 2. Estimates of the percentage of U.S. women who reported having sex before age 18 years. (See Appendix for details of calculations.)

The authors' synthetic estimates for the 1938 to 1943 cohort from the 1970 Kinsey Institute Survey are highly consistent with the measurements made for this birth cohort in the 1982 NSFG. Because this cohort was not used to derive the authors' adjustment factors, the consistency of these estimates is heartening, although it does not ensure that the adjustment is necessarily accurate for this or earlier cohorts.

Trends in Numbers of Heterosexual Partners

Along with the increasing incidence of sexual activity at younger ages and the decoupling of marriage and sex, there also have been substantial shifts in the numbers of sexual partners that are accumulated. This is an important finding because those with high partner change rates are more likely to acquire and transmit sexually acquired infections.[38] Unfortunately, we do not have the multiple, long-term, longitudinal studies that would allow one to disentangle the effects of aging from those induced by secular shifts in patterns of sexual behavior in the population. This can be important because older

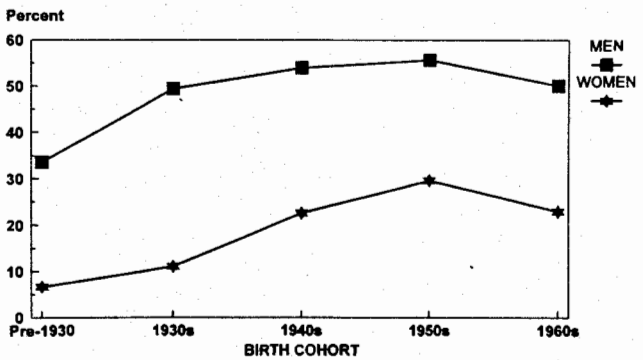

Fig. 3. Estimates of percent of American adults in 1989–1991 who reported having had five or more heterosexual partners since age 18 years. (See Appendix for details of calculations.)

TABLE 3. Percent of Adult Men and Women Reporting Specified Heterosexual Partners Since Age 18 Years, by Gender of Respondent and Birth Cohort

Respondent Gender and Number of Partners	Birth Cohort					
	Pre-1930	1930s	1940s	1950s	1960s	All*
Women						
0 or 1 partner	70.5	62.0	46.0	37.6	40.7	49.9
5 or more partners	6.7	11.1	22.6	29.6	22.9	19.2
10 or more partners	3.1	2.8	9.1	13.0	8.6	7.6
20 or more partners	0.7	1.9	3.0	4.0	3.4	2.6
Men						
0 or 1 partner	39.2	27.5	23.2	20.6	19.2	25.4
5 or more partners	33.7	49.5	54.0	55.7	50.1	48.0
10 or more partners	15.9	34.5	35.5	37.4	30.3	30.2
20 or more partners	9.8	24.9	22.1	17.9	16.8	17.0
Sample						
Women, nonresponse†	30.6	23.4	15.3	16.2	12.2	19.3
Women, base N‡	473	214	335	494	420	2,007
Men, nonresponse†	33.6	30.4	21.0	15.6	15.2	21.3
Men, base N‡	267	145	271	399	345	1,480

*Since surveys were done between 1989 and 1991 and included persons ages 18 years and older, the 1970s birth cohort was small (n = 71 women and 53 men) and truncated. It included nobody born after 1973. For this reason, separate estimates are not shown for the 1970s cohort. Data from this cohort are, however, included in the table totals.
†Weighted estimate of item nonresponse rate (i.e., percent of respondents who did not complete self-administered questionnaire or this particular survey question or who gave a nonnumeric response). Item nonresponse rate is weighted to adjust for unequal probabilities of selection for persons residing in households with different numbers of eligible adults.
‡Unweighted number of respondents providing a valid response to question.
Tabulated from 1989–1991 General Social Survey using weights to adjust for unequal probabilities of selection for persons residing in households with different numbers of eligible adults. Sample includes persons ages 18 years and older at time of interview.

populations have had more time to accumulate larger numbers of sexual partners than younger populations.

The trends, however, are so strong that they largely overwhelm this data limitation. In Figure 3, the authors plot the proportion of adult men and women who reported having had five or more heterosexual partners since age 18. (These measures were made in the 1989–1991 National Opinion Research Center's General Social Surveys.[26]) This plot shows a steady rise in this proportion for cohorts born early in the century to those born in the 1950s. Thus, the lowest proportions are found among men and women born before the 1930s, the cohort that had the most years to accumulate sexual partners. The proportion of the population reporting five or more sexual partners rises throughout the 1930s to 1950s cohorts. This trend runs in reverse of the years of "opportunity" the cohorts have had to accumulate partners. It is only with the 1960s birth cohort that a slight downturn is seen. This cohort would have had only between 2 and 13 years to accumulate (adult) sexual partners by the time of the survey measurement.* Even so, the proportions of men and women reporting five or more sexual partners in this cohort are not markedly dissimilar from those observed for the 1950s cohort.

In addition to a greater accumulation of partners by later cohorts, the authors also observed substantial variation by gender. All of the estimates for females are markedly lower than those for males from the same birth cohort.[39]* The female estimates, however, show a steeper rise for cohorts born in the 1940s and afterward. Thus, the 1950s birth cohort of women is three to four times more likely than the pre-1930s and 1930s cohorts to report having had five or more sexual partners. This increase is only weakly paralleled in the male data. Males show substantial increases between the pre-1930s and 1930s birth cohorts. The proportion of men reporting five or more sexual partners increases from 34% to 50% for these cohorts. The proportion then stabilizes in the range of 50% to 56% for the 1940s and later cohorts of men.

This is an interesting finding. It suggests that beginning with the cohort of women who turned age 20 dur-

*The most opportunity would have been afforded to a respondent born in 1960 and interviewed at age 31 years in 1991. This respondent would have had between ages 18 to 31 years in which to accumulate "adult" partners. The least opportunity would have been had by a respondent born in 1969 and interviewed at age 20 years in 1989. This respondent would have had between ages 18 and 20 years to accumulate partners.

*In these analyses, attention should be focused on the trends over time in reporting by men and women. There is reason to suspect that the differences between males and females in reported numbers of partners may be partly due to a difference in reporting bias. For an analysis of the reporting biases and other artifacts that might account for the anomalous finding of a lower average number of heterosexual partners reported by females than by males, see reference 39.

ing the 1960s (i.e., the 1940s birth cohort) there was a substantial increase in the number of sexual partners accumulated by women (or at least in their willingness to report these partners). As Table 3 shows, this increase in the proportion of women reporting five or more partners is paralleled by similar increases in the proportion of women in these cohorts reporting ten or more partners and declines in the proportions reporting zero or one partner. Although these trends in the accumulation of heterosexual partners by women are of interest, one should not forget that the 1950s birth cohort of women had not caught up to the pre-1930s cohort of men in the proportion reporting five or more sexual partners during adulthood (30% versus 34%).

These results from the General Social Surveys conducted during the period 1989 to 1991 are reinforced by similar trends in the reports made by these cohorts in the 1970 Kinsey survey. As noted previously, these data ask about sexual contact to orgasm, and furthermore, the questions on numbers of partners were restricted to premarital partners. Thus, it is impossible to derive estimates that can be mapped unambiguously onto the 1989 to 1991 GSS estimates. Premarital contacts cannot be identified in the GSS (except for persons who never married). Thus, the 1970 Kinsey findings must be considered independently.

In Figure 4 the authors plot the proportions of men and women reporting more than 5 premarital partners with whom they have had sexual contact to orgasm (by either partner). In considering these data, the authors suspect that the huge differences observed between men and women reflect, in part, both differences in the accumulation of sexual partners and differences in the ease with which young male and female partners can achieve orgasm themselves or recognize that their partners have done so. The authors suspect that for many young couples engaging in noncoital contacts, men were more likely to have an orgasm themselves and more likely to recognize this fact than their female partners.

Figure 4 shows that the increase in the proportion of adults reporting premarital contacts to orgasm in the 1970 Kinsey survey parallel those observed for the reporting of sexual intercourse in Figure 3. The proportion of men who reported having five or more premarital partners rises from 30% for the pre-1910 birth cohort to 49% for the 1920s birth cohort, and it remains at roughly this level for the 1930s and 1940s cohorts. The number of women reporting five or more premarital partners is minuscule, but it appears to rise in two small spurts. The first occurs at the beginning of the century (among women who would have turned age 20 during the 1930s). The proportion of women reporting five or more premarital sexual partners rises from 0 to 3% from the pre-1910 to the 1910s birth cohorts. It

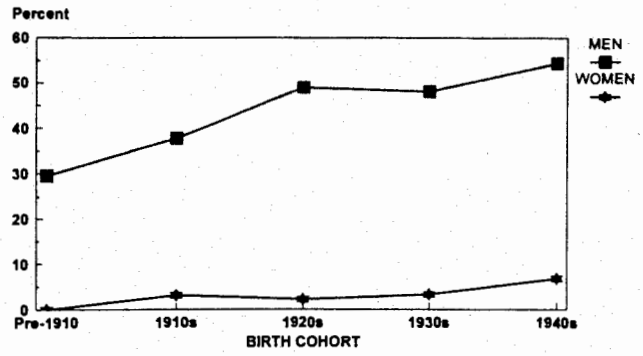

Fig. 4. Estimates of percent of American adults who in 1970 reported having had five or more premarital heterosexual partners (criterion behavior is contact to orgasm by either partner). (See Appendix for details of calculations.)

remains stable at roughly 3% for the 1920s and 1930s cohorts, and then doubles to 6.8% for the 1940s cohort. This latter cohort would have turned age 20 during the 1960s. Despite these increases, the proportion of women reporting five or more premarital sexual partners in the 1940s birth cohort was only one-fifth the number of men who reported an equivalent number of partners in the cohort of men born during the 1910s.

Trends in Same-Gender Contact

The changes observed in heterosexual contact lead naturally to similar questions regarding patterns of same-gender sexual contact. This pursuit produced the most surprising findings. The authors had previously undertaken a variety of analyses of the reporting of male–male contacts using data on men ages 21 and older from both the 1970 Kinsey survey[8] and the 1988–1990 General Social Surveys.[9] These analyses revealed little variation across cohorts in the patterns of (reported) male–male sexual contacts. (The only statistically noteworthy exception was a lower rate of reporting of contacts that ended during adolescence among men who were aged 65 years or older in 1970.[8]) Figure 5A shows estimates by birth cohort of the proportion of American men reporting at least one male sexual partner in adulthood in the 1989 to 1991 General Social Surveys. It will be seen from Figure 5A that the proportion of men reporting male–male contact during adulthood varies inconsistently in the range 3.4% (SE = 1.0) to 7.7% (SE = 2.3). Although the fluctuations in the reported prevalence of male–male contacts across birth cohorts are not insubstantial, they are not statistically significant. When sample sizes and the surveys' complex sample designs are taken into account, there is no reliable association between birth cohort and the prevalence of reported

male–male contact (Jackknifed Likelihood-Ratio chi-square: $J^2 = 0.21$, d.f. = 4, $P = 0.32$).

The situation for women is dramatically different (Figure 5B). Women in recent birth cohorts are more likely to report having had one or more female sexual partners during adulthood. This trend is dramatic, and it far exceeds fluctuations that could be attributed to sampling error. (The null hypothesis that the prevalence of reported female–female contact is equivalent across cohorts is rejected with Jackknifed Likelihood-Ratio chi-squared: $J^2 = 7.06$, d.f. = 4, $P = .002$). The trend is such that women in the cohort born during the 1960s are more than four times more likely to report some female–female sexual contact than women born before or during the 1930s (7.1% versus 1.5% and 1.6%; standard errors of these estimates are, respectively, 1.5, 0.9, and 0.6.). As before, it is important to recognize that this trend runs counter to what would be expected based on the number of years each cohort has had the opportunity to acquire a female partner.

This finding for women was unexpected, and led the authors to seek corroboration from other independent sources. Although the data admit to some frailty of interpretation, the NHSS pretest of a probability sample of women in Dallas County, Texas, offers such corroboration. This survey asked about sexual contacts after 1978—a reasonable starting point for a study interested in tracking infection with and exposure to HIV virus. This choice does, however, induce some unfortunate confounding for the authors' purposes, because the youngest cohort of women would be reporting for a period notable for greater sexual experimentation. (Data for men from this study suggest that this may be so, although the results are not as dramatic as those for women.) The proportion of women in the NHSS pretest who reported having one or more female partners during the reporting period (1978–1989) rose monotonically from 0.4% for women aged 50 to 64 in 1989 to 2.2% for those 40 to 49 years old, 3.0% for those 30 to 39 years old, and 4.0% for women aged 21 to 29 years. Although these analyses are preliminary, they do suggest that substantially higher proportions of women in recent cohorts had female–female sexual contacts during the time period 1978 to 1989. This trend, however, is somewhat attenuated from that observed in the GSS data.

In considering these results, it is important to recognize that none of these data relate in any direct way to issues of sexual orientation. The majority of both men and women who reported adult same-gender contacts also report male–female sexual partnerings. Similar analyses have not yet been performed for the Dallas pretest of the NHSS. (This is based upon our analysis of national survey data from the 1988-1991 GSS.)

Contacts in the Past 12 Months

The data presented in Figure 5 can be supplemented further. It is possible, for example, to ask parallel questions about the reporting of sexual contacts during the past 12 months. Here, however, the problems of confounding are severe. Such measurements for young cohorts provide a snapshot of sexual partnerings during a period that may be characterized by high rates of sexual activity, partner turnover, and experimentation, whereas the oldest cohorts may be reporting on 12-month periods that may be characterized by relatively low levels of sexual activity and relative stability in partnerings. With these caveats in mind, there is some value in assessing trends for the reporting of contacts during the past 12 months, because it provides a better indicator of current sexual behaviors.

Table 4 presents estimates by birth cohort of the proportions of men and women reporting one or more same-gender sexual partners during the past 12 months. These estimates were derived from the 1988 to 1991 General Social Surveys. It will be seen that the proportion of men reporting some male–male sexual contact during the preceding 12 months is low but relatively stable, fluctuating between 1.5% (SE = 0.6) and 2.5% (SE = 0.7). Statistical analysis indicates no significant association between birth cohort and prevalence of reported male–male contact during the past 12 months ($J^2 = -1.1$, d.f. = 4, $P > .5$). For women, however, no woman born before 1940 reported having had a female sexual partner during the 12 months preceding the survey. The reported prevalence of female–female contacts rises to 0.5% for the 1940s birth cohort and to 1.0% for the 1950s and 1960s cohorts. Although the prevalence

TABLE 4. Percent of Adult Men and Women in the United States Who Reported Having had One or More Same-Gender Sexual Partners During the Past 12 Months

	Birth Cohort				
	Pre-1930	1930s	1940s	1950s	1960s
Men					
Percent	1.5	2.1	1.6	2.5	2.0
Standard error	0.6	1.1	0.6	0.7	0.6
Base N	445	221	401	545	490
Women					
Percent	0.0	0.0	0.5	1.0	1.0
Standard error	0.0	0.0	0.3	0.5	0.4
Base N	764	328	466	683	587

Calculated from aggregate file of 1988 to 1991 National Opinion Research Center General Social Surveys using weights to adjust for different probabilities of selection for persons residing in households with differing numbers of eligible adults. Standard errors have been calculated using algorithms[35] that take account of complex sample design. Numbers shown are the unweighted sample sizes for the tabulation, excluding cases in which data were missing. Fifteen percent of men (unweighted) and 13% of women were excluded from these tabulations because of incomplete data.

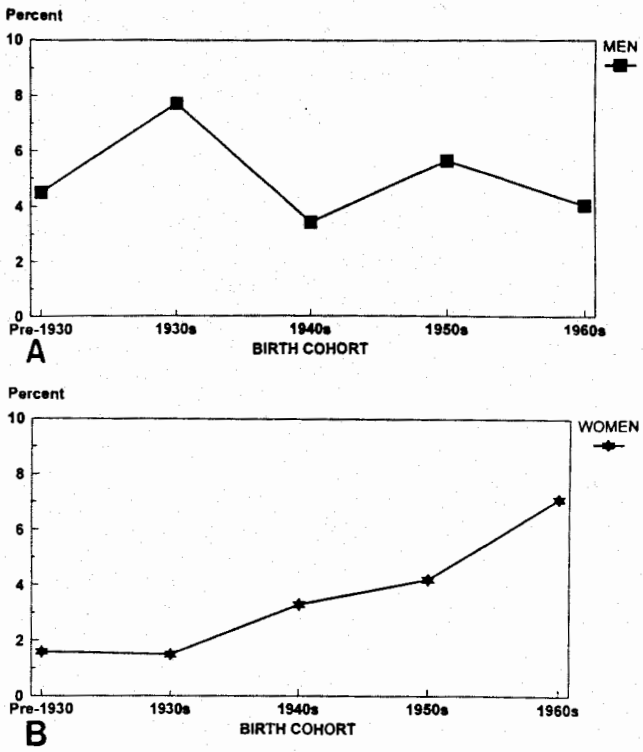

Fig. 5. Estimates of percent of males and females in the United States in 1989–1991 who reported (**A**) male–male and (**B**) female–female sexual contacts as adults. (See Appendix for details of calculations.)

estimates are quite low, the variation across birth cohort in reporting of female–female sexual contact is statistically reliable ($J^2 = 5.72$, d.f. = 4, $P < .001$).

Conclusions: Trends and Problems

Trends in Heterosexual Behaviors

The forgoing analyses provide dramatic evidence of several important historical trends in the sexual behaviors of the U.S. population. First, there is evidence that can now be extended back to the beginning of the century showing a substantial increase in the proportions of women who report initiating heterosexual contact during adolescence—including early adolescence. By combining data for cohorts from the early part of the century collected in the 1970 Kinsey Institute Survey with estimates for later cohorts from the 1982 and 1988 National Surveys of Family Growth, the authors have been able to track changes in the age of initiation of intercourse from women born early in the 20th century to the cohorts of women who entered adulthood during the 1980s. These analyses show sharp increases over the course of the century in the proportions of women reporting intercourse during early and mid-adolescence. Evidence on historical changes in the behaviors of men is more limited. Although Sonenstein et al[40] have made analogous comparisons for samples of U.S. males surveyed in their teens in 1979[41] and in 1987, and Klassen et al[22] have reported some analyses for birth cohorts of men from the 1970 Kinsey Institute Survey, we do not presently have data for males that are as rich as that for females on trends across the 20th century in the age at initiation of sexual intercourse.

Trends in the acquisition of sexual partners indicate both a marked increase in the numbers acquired by recent birth cohorts and a long-standing—but slowly narrowing—gap in the numbers reported by male and female survey respondents. The authors' analysis (Figure 4) indicates that very few women born before 1950 reported amassing five or more partners before their first marriage. Although the percentage shows a mild increase for the cohort born during the 1940s, the percentage of these women who reported five or more premarital sexual partners in 1970 was well below 10%. In contrast, the percentage of men reporting five or more premarital partners approached 30% for birth cohorts born before 1910 and rose to more than 50% for cohorts of men born during the 1940s.

When one considers the total number of sexual partners acquired before and after the first marriage (Figure 3), one finds a greater diversity in female experience. For cohorts born from the 1930s to the 1960s, the proportion of men reporting five or more sexual partners hovers in the vicinity of 50%. For women, however, this percentage rises from 11% for the cohort born during the 1930s to 30% for the cohort born during the 1950s. This percentage falls slightly for women born during the 1960s (23%), but this decline reflects, the authors believe, the lesser number of years during which these women have had the opportunity to acquire partners.

Both of these patterns—earlier onset of intercourse and increasing numbers of heterosexual partners—have important implications for the changing patterns of STD prevalence and incidence.

Trends in Same-Gender Sexual Behaviors

These same data sources provide surprising evidence on the prevalence of reported same-gender sexual contacts. For males, reporting of adult same-gender contacts and contacts within the past year shows no strong variation across birth cohorts. For females, however, there is a remarkable increase in the reporting of female–female contacts over the birth cohorts available for this analyses (pre-1930s to 1960s). This increase has not, to the authors' knowledge, been the subject of commentary in the scientific or popular literature. The increase, however, involves a remarkable quadrupling of the proportion of U.S. women who report having had one or

more female sexual partners during their adulthood (age 18 years or older). This finding from the authors' analyses of the 1989 to 1991 General Social Surveys is supported by estimates derived from a probability sample of women ages 18 to 54 years residing in Dallas County, Texas.

Because the forgoing analyses have not accounted for the patterns of missing responses in these data, the authors' conclusions may be properly termed preliminary. As noted, the rates of nonresponse to these items are not trivial and they do show substantial variation across the birth cohorts. Efforts to impute the missing data for these analyses and to explore the patterns of female–female and female–male behaviors discernible in these data sets are presently underway.

Prior analyses of male–male contacts[9] indicated that the prevalence of some history of adult same-gender contact was, in large part, indicative of the diversity of sexual behaviors found in the population. Thus a notable proportion of men who reported some male–male contacts during adulthood appeared to be reporting episodic incidents with a single male partner. These men also reported having female partners during adulthood. Indeed, the authors have previously estimated that approximately 5% of currently married men ages 21 and older in the United States have had one or more (reported) male sexual partners during adulthood. As the preliminary findings shown in Figure 5 are refined, the authors shall be interested in learning whether similar diversity in sexual behavior characterizes the increasing levels of same-gender contact observed among recent cohorts of American females.

Problems of Definition

In addition to yielding insights into changing patterns of sexual contact that have occurred across birth cohorts, the results of this analysis show the importance of using care when discussing what is meant by vague questions—of the sort often asked by the media—such as, "How many gay men and lesbians are there in the United States?" A comparison of the estimates shown in Figure 5 for adult same-gender contacts to those shown in Table 4 for same-gender contacts during the past 12 months makes clear that one would give quite different answers depending on the behavioral criterion that was used. For men, there is roughly a three-fold difference in the reported prevalence of male–male contact during the past year versus contact during adulthood. Even larger variations are observed for recent cohorts of females.

The authors believe that imprecision in the definitions used to identify the behaviors and population segments of interest is responsible for much of the confusion found in discussions of the "size of the gay population" in the United States. In Table 5 the authors present an array of estimates of the prevalence of same-gender contact among males in the United States. These estimates are derived from the authors' preceding tabulations using the 1988 to 1991 General Social Surveys, their prior work with the 1970 Kinsey data set,[2,8] the 1989 NHSS pretest,[9] work reported by other investigators with the National Survey of Adolescent Males, which sampled males ages 15 to 19 years in 1988,[25] and the National Survey of Men, which sampled men ages 20 to 39 years in 1991.[23] This table shows that there are both some substantial consistencies and some noteworthy discrepancies in estimates of the prevalence of male–male contact (see Appendix).

First, it should be noted that there is a tremendous range in the estimates, which depends in very large part on one's definition of the criterion behavior. Estimates range from 20.3% for male–male contact at any age (using the 1970 Kinsey Institute Survey criterion of orgasm by either partner) to estimates that converge on a value of between 1.4% to 2.3% for the reporting of male–male sexual contact during the past year in national surveys of adult males.

Second, there is considerable consistency in the estimates derived from different surveys when the criterion behaviors are the same. Thus, the four national surveys providing estimates of the proportion of men reporting male–male contact during the past year all produce estimates within the narrow range of 1.4% to 2.3%. Estimates from the Dallas County probability sample are somewhat higher (4.6%), but the authors believe this reflects, at least in part, the higher reported prevalence of male–male contact in populations residing in urban areas. (Rogers and Turner[9] previously reported that rates of male–male contact during adulthood were 1.6 times higher for persons residing in places with populations of 25,000 or more versus persons residing in smaller towns and rural areas.)

Similarly, the four national surveys that provide estimates of the proportion of the adult male population reporting male–male sexual contacts during adulthood all produce estimates that lie in the range 4.1% to 6.7%. Given the higher prevalence of reported male–male contact in larger towns and cities, the estimate of 8.1% for male–male contacts since 1978 derived from the Dallas County probability sample might be seen as consistent with the four national estimates.

Finally, Table 5 presents two conspicuous discrepancies in estimates that demand interpretation. These involve the reporting of male–male contact at any age by adolescents in the National Survey of Adolescent Males and the apparently discrepant reports of male–male contact in the past 10 years obtained in the 1991

TABLE 5. Survey Estimates of Percentages of American Men Reporting Male-Male Sexual Contacts

Male-Male Sexual Contact	1970 Kinsey	1988 GSS	1989 GSS	1990 GSS	1991 GSS	1988 NSAM	1991 NSM	1989 NHSS
At any age	20.3	—	—	—	—	1.4–2.1†	—	—
After age 14 yr	11.9	—	—	—	—	—	—	—
As adult*	6.7	—	5.5	4.9	4.1	—	—	—
Since 1978	—	—	—	—	—	—	—	8.1
In last 5 yr	—	—	—	—	3.8	—	—	—
In last 10 Yr	—	—	—	—	—	—	2.3	—
In last year	1.6–2.0‡	2.2	1.4	1.8	2.3	0.3§	—	4.6
Population	US, 21+ yr	US, 18+ yr	US, 18+ yr	US, 18+ yr	US, 18+ yr	US, 15–19 yr, never married	US, 20–39 yr	Dallas, 18–54 yr
Sample size (unweighted no. of males)‖	1,450	569	583	493	509	1,880	3,321¶	660
Interview mode#	SAQ	SAQ	SAQ	SAQ	SAQ	SAQ	IAQ	SAQ

*Defined as report of a male sexual partner after age 18 yr in the 1988–91 GSS or report of last sexual contact to orgasm with another male as occurring at age 20 yr or later in the 1970 Kinsey Institute Survey.
†2.1% for any male-male sexual contact, including mutual masturbation; 1.4% for male-male oral or anal sex.
‡Estimates for contact in last year from 1970 Kinsey Institute survey were inferred from difference between current age and reported age at last same-gender contact. Range reflects results for instances in which two ages were the same and two ages were within 1 year of each other.
§Estimate for male-male oral or anal sex in last year.
‖Sample sizes for particular estimates may vary slightly because of item nonresponse.
¶Survey included oversample of blacks.
#Mode of data collection for ascertainment of male-male sexual contacts.
SAQ = self-administered questionnaire. IAQ = interview-administered questionnaire. NSM = National Survey of Males. NSAM = National Survey of Adolescent Males.
See text and appendix for question wordings and interview procedures. 1988–1991 General Social Survey estimates were tabulated by authors from public use dataset using weights to correct for unequal probabilities of selection for persons residing in households with different numbers of eligible adults.[26] 1988 NSAM estimates are from analyses by Ku et al.[57] 1991 NSM estimates are from analyses by Billy et al.[23] 1989 NHSS estimates are from analyses reported by Rogers and Turner.[9] 1970 Kinsey Institute Survey estimates are from analyses reported by Turner et al.[2] The latter estimates include imputations for missing data.

National Survey of Men ages 20 to 39 years. These are considered below.

Problems with Adolescent Measurements

The first apparently discrepant measurement from Table 5 involves the 1988 National Survey of Adolescent Males. That survey estimated that 2.1% of males ages 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 before the survey, and longitudinal data from a 1991 follow-up has revealed considerable inconsistency in the reporting of lifetime contacts between 1988 and 1991.[25] 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.

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, and that 11.9% had such contact after age 14. This implies that roughly 8% of men had reported experiences that occurred at age 14 or before and that did not continue into adulthood. If there were no major changes in the patterns of same-gender sexual behaviors between 1970 and 1988, this result 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 provide a more precise indication of the extent of this discrepancy. Table 6 presents the cumulative percentage distributions for age at time of first same-gender contact to orgasm for men and women who reported any such contacts in the 1970 Kinsey Institute Survey. (Note that this tabulation uses a different

TABLE 6. Age at First Reported Same-Gender Sexual Contact to Orgasm for Respondents in the 1970 Kinsey Institute Survey Reporting Such Contact

Age	Males (%)	Females (%)
Before 13	33	17
Before 15	52	22
Before 17	70	34
Before 19	81	55
Before 21	88	74
Before 23	93	87
Before 30	99	99
Base N	206	115

Cumulative percentage distributions tabulated from responses to the 1970 Kinsey Institute Survey.

item and does not include imputations for missing data employed in previously published analyses.) Table 6 indicates that males report initiating same-gender sexual contacts at an earlier age than females. Thus 81% of the men versus 55% of the women reporting some same-gender contact reported that their first contact occurred at age 18 or before; 52% of men and only 22% of women reported that their first contact occurred before age 15. These estimates for men 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. Clearly, the 1970 Kinsey Institute Survey estimates are inconsistent with the 1988 NSAM estimates.

This might encourage speculation that there has been secular change such that male–male sex was less common among adolescent males in the 1980s or that it began at a later age. But these speculations are undermined by the fact that contemporary surveys and the 1970 Kinsey Institute Survey provide roughly comparable estimates of the proportion of men who reported engaging in adult male–male contact in 1970 and 1988 to 1990. Furthermore, delay in the onset of male–male sexual contacts for recent birth cohorts would run strongly counter to the trend previously documented of much earlier onset of heterosexual contacts (Figures 1 and 2).

The authors now think 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. The authors believe this is plausible for two reasons. First, adolescents will be reporting on relatively recent behaviors whereas 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.[42] Similarly, a large experimental study (see below) 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. This result suggests that more recent behaviors are more sensitive for respondents than those occurring in the more distant past, and thus they are more influenced by the provision of privacy in the survey. A second reason to expect divergences in survey estimates is that adolescents are reporting on their sexual behaviors at a time when their own sexual identities may not be well defined, and hence they may be more fearful of reporting stigmatized behaviors.

Although these two explanations are plausible, they are not entirely satisfying. At a minimum, they imply that the reporting biases in such measurements would vary with the respondent's age. This would pose serious inferential problems for studies seeking to assess the role of aging on patterns of sexual behaviors. Such confounding of reporting bias with age would make it difficult to disentangle age-related changes in sexual behaviors from changes due to variation in the reporting biases. The authors have noted elsewhere[8] that analogous problems afflict attempts to infer changes across time in stigmatized sexual behaviors. As societal attitudes toward such behaviors change, one can expect parallel changes both in the prevalence of the behavior itself, and also in the willingness of survey respondents to report engaging in the behavior. Disentangling patterns of behavior change over time from changes in such reporting biases is a difficult but unavoidable challenge. Indeed, the authors' preliminary results on changes across birth cohorts in the prevalence of reported female–female sexual contacts pose just such an interpretive challenge.

Problems with Interviewer Administration of Sensitive Questions

The second noteworthy discrepancy in Table 5 involves the 1991 National Survey of Men, which drew a national sample of men ages 20 to 39 years and produced an estimate that only 2.3% of this population had male–male contact during the previous 10 years. This is roughly half the size of the estimates from five national surveys of the prevalence of adult male–male contact. (See Figure 5 for aggregate GSS estimates for the 1950s and 1960s birth cohorts represented in the NSM sample.)

In considering this apparent discrepancy,[43,44] two aspects of the 1991 NSM measurements are noteworthy. First, the NSM estimate does lie well within the range of national estimates for male–male contacts during the prior 12 months. Secondly, the NSM measurements of male–male sexual contact are methodologically distinctive in that they are the only estimates derived from interviewer-administered (rather than self-administered) questioning of respondents about their same-gender sexual experiences. These two aspects of the NSM suggest plausible factors that may, individually or jointly, account for the apparent discrepancy between the NSM estimates and those obtained by other national surveys.

It could be that the NSM estimates for male–male contacts within the past 10 years are—despite the large difference in magnitude—entirely compatible with other national estimates of the prevalence of male–male contacts in adulthood. With an appropriate distribution of ages at last male–male contact, it is theoretically possible that twice as many persons ages 20 to 39 years would report male–male contact since age 18 as would

report male–male contact during the past 10 years.* The authors suspect, however, that this factor is unlikely to provide a complete answer. Given that the NSM estimates of contact in the past 10 years are roughly equivalent in size to other national estimates of contact during the past 12 months, the estimates could be consistent only if there were very few, if any, men who had male–male contact during the period 2 to 10 years before the survey but who did not have male–male contact during the 12 months before the survey. Previous analyses of the 1970 Kinsey and 1988 to 1990 GSS data suggest that this is unlikely. As noted, there appears to be a sizable fraction of men who have episodic male–male contacts, and the authors would expect many should report some history of adult contacts that does not include contact during the prior year. Furthermore, there is one available estimate for male–male contact in the past 5 years; this estimate exceeds the NSM estimate for contact during the past 10 years (3.8% versus 2.3%). Although the 1991 GSS estimate is derived from a sample of men (n = 513) too small to convincingly reject the hypothesis that sampling fluctuations might have produced the discrepancy in these two estimates, the weight of the available evidence suggests that the explanation for the anomalous NSM estimate lies elsewhere.

A more plausible hypothesis for this apparent discrepancy involves measurement biases that may have been introduced into the NSM estimates by the mode of survey administration. The NSM used female interviewers who read these questions aloud to respondents and recorded their answers. (Respondents replied using a letter on a showcard, which corresponded to a verbal description of their behaviors; e.g., "A" for "exclusively heterosexual, only women.") Given the long history of discrimination and stigmatization of same-gender sexual contact in this society, it is reasonable to expect that male–male contact would be a particularly sensitive topic for respondents to report. All other surveys included in Table 5 used private, self-administered questionnaires to obtain information on same-gender contact.

Self-administered questionnaires (SAQs) eliminate the need for literate respondents to risk disclosing their same-gender experiences to the interviewer. The authors cannot tell whether this difference in survey procedures induced sufficient negative reporting bias in the 1991 NSM to account for the apparently low estimates obtained by this survey. However, results of a large-scale methodological experiment[45] embedded in the National Household Survey of Drug Abuse (NHSDA) suggest that such effects do occur and can be substantial. (A smaller scale experiment (Ns = 100 [IAQ] and 100 [SAQ]) done as a pretest for the 1970 Kinsey Institute survey led Klassen et al to use an SAQ rather than interviewer administration for the most sensitive sexual behavior questions in their 1970 survey.)[30]

In a methodological field test for the NHSDA, one-half of a sample of 3,326 respondents was randomly assigned to give reports of illicit drug use to a survey interviewer, whereas the other half of the sample reported their drug use on a self-administered questionnaire. This experiment obtained significantly higher estimates of the prevalence of illicit drug use with the self-administered questionnaire. Reports of the most sensitive behaviors (recent drug use and use of "harder" drugs) were most influenced by the mode of survey administration. Thus, estimates of the prevalence of cocaine use during the past 30 days were 2.4 times higher when the SAQ was used to collect data, and the prevalence of reported marijuana use during the past 30 days was 1.6 times higher. Estimates of the prevalence of alcohol use during the past 30 days, however, were unaffected by the mode of data collection (ratio of estimates = 1.06). This is consistent with the fact that alcohol consumption is a licit behavior for adults, and it should be a relatively nonsensitive behavior to report. Reporting of alcohol use by teenagers, however, is a more sensitive matter, and it was affected by the mode of survey administration (ratio = 1.36 for teenagers reporting of alcohol use in the past 30 days).

If interviewer-administration of questions on male–male sexual contact deflated the NSM estimates to an extent similar to that observed for measurements of illicit drug use in the NHSDA experiment, then the apparent discrepancy between estimates derived from the NSM and those derived from other national surveys using self-administered questionnaires would have found an explanation. Attempts to test this hypothesis are currently being planned using a new technology for collecting data on sensitive behaviors.

Below, we briefly review the problems that have attended past use of self-administered questionnaires in research on sexual and other sensitive behaviors, and describe ongoing work on a new survey technology that is likely to supplant SAQs for the measurement of sensitive behaviors. This new technology, audio computer-assisted self interviewing (Audio-CASI), affords the privacy of a self-administered questionnaire without demanding literacy on the part of respondents.

*This is an empirical question for which the NSM investigators might adduce some helpful evidence. It would be interesting to know, for example, whether there was any marked variation in the prevalence rates estimated for 20 versus 30 year olds in the NSM sample. Similarly, it would be instructive to compare NSM estimates for contact in the past 10 years with estimates for contact in the past 5 years derived from a comparable birth cohort drawn from the General Social Survey dataset. Although the GSS data might be sparse, the crude comparison of these estimates could be helpful in discovering the source of this apparent discrepancy.

New Technologies for Reducing Measurement Bias

Although SAQs provide a reasonable technology for surveying sexual, contraceptive, and other sensitive behaviors, they have important drawbacks. It is difficult, for example, to make extensive use of contingent questioning (i.e., branching or skip patterns) in self-administered questionnaires because some respondents have difficulty following complex instructions to navigate their way through a self-administered form. This limitation makes it difficult to match the questions that are asked of a respondent to the particular behaviors that they report (e.g., by asking detailed follow-up questions). Even more importantly, the reading skills of a sizable segment of the U.S. population are not adequate for them to complete a self-administered paper-and-pencil form. This problem is particularly severe among some populations of particular interest including persons whose history of STDs or drug use places them at elevated risk of HIV infection. (In studies of intravenous drug users in Baltimore, for example, AIDS researchers[46] have estimated that between 30% to 50% of study participants could not reliably complete a self-administered survey form.)

As a result of such literacy problems, a sizable proportion of the respondents in national surveys and other research projects must be questioned by a survey interviewer. This introduces potential bias into the resultant measurements of stigmatized sexual, drug use, and related behaviors. Furthermore, the bias that is introduced when an SAQ must be administered by the interviewer will be correlated not only with the respondent's literacy but with other important variables associated with literacy (e.g., education).

The available evidence suggests that SAQs invite other data quality problems among respondents who do complete the SAQs. These include the following.

> Attempts by Fay et al to derive national estimates of the prevalence of male–male sexual contact from the 1970 Kinsey Institute survey required more than a year of statistical effort to impute values for the 20% of cases in which key data elements were missing on the SAQ.[8]
>
> Analysis of more recent SAQ data on sexual behavior[9] indicate that the nonresponse problem has not markedly improved over the past 20 years. Rogers and Turner found, for example, that reports of male–male contact in the sexual behavior SAQs used in the 1989 and 1990 NORC General Social Survey were missing for 19% of the males. Similarly, Witt et al[47] found that 14% of the respondents to the 1988 National Household Survey of Drug Abuse were missing data for one or more SAQ questions asking about cocaine use.
>
> Assessments of the patterns of response on major surveys using SAQs also indicate that substantial proportions of respondents give logically inconsistent responses. Cox et al[48] reported, for example, that of 946 respondents who reported cocaine use on one or more questions in the 1988 NHSDA, more than 14% gave logically inconsistent answers (i.e., responses to one or more questions indicated they had never used cocaine). Similarly, Smith[49] reported evidence suggesting that approximately one-half of the men who reported male–male contact in the 1988 GSS gave responses to other items in the face-to-face segment of the survey that raised questions about the validity of their reports of homosexual contact on the SAQ.

Until recently, these problems have been unavoidable. Recent advances in survey technology, however, offer some hope that these problems may be overcome in the future.

In the past 3 years, researchers at the Research Triangle Institute[50,51] and the University of Michigan[52] have developed a computer-driven technology that can administer complex survey questionnaires in an audio format and record respondents' answers without the intervention of a survey interviewer.* This process is entirely private; respondents listen to questions though headphones and enter answers by pressing labeled keys. This new technology offers a number of important methodological advantages, the most important being the following.

> It can be used with any respondent who can hear and speak; it does not require literacy in any language.
>
> It 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.).
>
> It provides a completely standardized measurement system; every respondent (in a given lan-

*Survey interviewers perform whatever household screening or respondent selection is required, demonstrate the use of the audio-CASI equipment, and allow the respondent to complete the interview in private. Thus, respondents listen to all questions through earphones, and interviewers do not hear the questions or observe the responses. The survey interviewers wait at a discreet distance to answer any questions respondents may have about the use of the equipment or other matters. Although this new technology bears a superficial resemblance to attempts to use a personal cassette player to read survey questions,[53] the new technology is fundamentally different. In particular, the new technology is computer-controlled, and is capable of executing skip patterns, checking whether responses are within range and consistent across questions, etc.

guage) hears the same question asked in exactly the same way.

It may permit efficient multilingual administration of surveys without requiring multilingual survey interviewers.

Results of pilot testing of Audio-CASI for the measurement of sensitive sexual and drug use behaviors suggest that self-administered computerized questioning offers the possibility of obtaining better quality data and possibly higher levels of disclosure of sensitive behaviors than SAQs.[51] Further research is presently underway to replicate and extend these preliminary findings. These efforts include the following.

Use of an Audio-CASI component for the next round of the National Survey of Family Growth (NSFG), which is being conducted in 1995.[54,55]

A 4-year program of basic research on the use Audio-CASI technology for the survey measurement of adult sexual and contraceptive behaviors funded by the National Institutes of Health[56].

Methodological testing of the use of Audio-CASI to assess the risk and sexual behaviors of a national sample of adolescents.

The authors hope that application of this new technology will improve the quality and reduce the costs of large-scale studies of sexual behavior. If this were to occur, we may bequeath to the next generation of researchers both an expanded body of data charting patterns of sexual behaviors and their relationship to the spread of STDs, as well as better tools for conducting such research.

References

1. President's Commission on the HIV Epidemic. Final report. Washington, DC: Government Printing Office, 1988.
2. Turner CF, Miller HG, Moses LE, eds. AIDS, Sexual Behavior, and Intravenous Drug Use. Washington, DC: National Academy Press, 1989.
3. Miller HG, Turner CF, Moses LE, eds. AIDS: The Second Decade. Washington, DC: National Academy Press, 1990.
4. General Accounting Office. AIDS forecasting: Undercount of cases and lack of key data weaken existing estimate. Washington, DC: General Accounting Office, 1988.
5. U.S. Public Health Service. Coolfont report: Public Health Service plan for combatting AIDS. Public Health Reports 1986; 101:341–349.
6. Kinsey AC, Pomeroy WB, Martin CE. Sexual Behavior in the Human Male. Philadelphia: W.B. Saunders, 1948.
7. Kinsey AC, Pomeroy WB, Martin CE, Gebhard PH. Sexual Behavior in the Human Female. Philadelphia: W.B. Saunders, 1953.
8. Fay RE, Turner CF, Klassen AD, Gagnon JH. Prevalence and patterns of same-gender sexual contact among men. Science 1989; 243:338–348.
9. Rogers S, Turner C. Patterns of same-gender sexual contact among men in the U.S.A.: 1970–1990. Journal of Sex Research 1991; 28:491–519.
10. Sonenstein F, Pleck J, Ku L. Levels of sexual activity among adolescent males. Fam Plann Perspect 1991; 24:100–106.
11. Kantner JF, Zelnik M. Sexual experience of young unmarried women in the United States. Fam Plann Perspect 1972; 4:9–18.
12. Zelnik M, Shah FK. First intercourse among young Americans. Fam Plann Perspect 1983; 15:64–70.
13. Hofferth SL, Kahn JR, Baldwin W. Premarital sexual activity among U.S. teenage women over the past three decades. Fam Plann Perspect 1987; 19:46–53.
14. Catania JA, Coates TJ, Stall R, et al. Prevalence of AIDS-related risk factors and condom use in the United States. Science 1992; 258:1101–1106.
15. Laumann E, Gagnon J, Michael R. The National Study of Health and Sexual Behavior Design Report. Final Report to the National Institute of Child Health and Human Development under Contract N01-HD-8-2907. Chicago: National Opinion Research Center, 1989.
16. Gagnon JH. Sex research and sexual conduct in the era of AIDS. J Acquir Immune Defic Syndr 1988; 1:593–601.
17. Brandt A. No Magic Bullet. New York: Oxford University Press, 1987.
18. Institute of Medicine. Confronting AIDS. Washington, DC: National Academy Press, 1986.
19. Institute of Medicine. Confronting AIDS: Update. 1988. Washington, DC: National Academy Press, 1988.
20. Aron JL, Billard L, Brookmeyer RS, et al. Monitoring the epidemic. In: Turner CF, Miller HG, Moses LE, eds. AIDS, Sexual Behavior and Intravenous Drug Use. Washington, DC: National Academy Press, 1989:31–42.
21. Gagnon JH, Lindenbaum S, Martin JL, et al. Sexual behavior and AIDS. In: Turner CF, Miller HG, Moses LE, eds. AIDS, Sexual Behavior and Intravenous Drug Use. Washington, DC: National Academy Press, 1989:73–185.
22. Klassen AD, Williams CJ, Levitt EE, Rudkin-Miniot L, Miller HG, Gunjal S. Trends in premarital sexual behavior. In: Turner CF, Miller HG, Moses LE, eds. AIDS, Sexual Behavior, and Intravenous Drug Use. Washington, DC: National Academy Press, 1989:548–567.
23. Billy JOG, Tanfer K, Grady WR, Klepinger DH. The sexual behavior of men in the United States. Fam Plann Perspect 1993; 25:52–60.
24. Sonenstein FL, Pleck JH, Ku LC. Sexual activity, condom use and AIDS awareness among adolescent males. Fam Plann Perspect 1989; 21:152–158.
25. Ku L, Sonenstein F, Pleck J. Young men's risk behaviors for HIV infection and sexually transmitted diseases, 1988 through 1991. Am J Public Health 1993; 83:1609–1615.
26. Davis JA, Smith TW. General Social Surveys, 1972–1991, Chicago: National Opinion Research Center, 1991.
27. Bachrach CA, Horn MC, Mosher WD. National Survey of Family Growth, Cycle III: Sample Design, Weighting, and Variance Estimation. Rockville, MD: National Center for Health Statistics, 1985. (Vital and Health Statistics. Series 2: Whole No. 98).
28. Tanfer K. National Survey of Men: Design and execution. Fam Plann Perspect 1993; 25:83–86.
29. Research Triangle Institute. National Household Seroprevalence Survey Feasibility Study Final Report. Research Triangle Park, NC: Research Triangle Institute, 1990. (RTI Report No. 4190-01/01F).
30. Klassen AD, Williams CJ, Levitt EE. Sex and Morality in the United States. Middleton, CT: Wesleyan University Press, 1989.
31. Goodman LA. The analysis of cross-classified data: Independence, quasi-independence, and interactions in contingency tables. Journal of the American Statistical Association 1968; 63:1091–1131.
32. Goodman LA. The analysis of multidimensional contingency tables: Stepwise procedures and direct estimation methods for building models of multiple classifications. Technometrics 1968; 13:33–61.
33. Goodman LA. Analyzing Qualitative/Categorical Data. Cambridge, MA: Abt Associates, 1978.

34. Bishop YMM, Fienberg S, Holland PW. Discrete Multivariate Analysis. Cambridge, MA: Massachusetts Institute of Technology Press, 1975.
35. Fay R. Contingency Table Analysis for Complex Sample Designs (CPLX): Program Documentation. Washington DC: Statistical Methods Division, U.S. Bureau of the Census, 1989.
36. National Center for Health Statistics. National Survey of Family Growth, Cycle IV, 1988 (Dataset G7-G9, Schwarz SM, Crutchfield J, Card JJ, Archivists) Hyattsville, MD: National Center for Health Statistics (Producer). Los Altos, CA: Sociometrics Corporation, Data Archive on Adolescent Pregnancy and Pregnancy Prevention (Producer and Distributor).
37. Kish L. Survey Sampling. New York: Wiley, 1965: 258–259.
38. Biggar RJ, Brinton LA, Rosenthal MD. Trends in the number of sexual partners among American women. J Acquir Immune Defic Syndr 1989; 2:497–502.
39. Smith T. Discrepancies between Men and Women in Reporting Number of Sexual Partners: A Cross-National Comparison. Paper presented at Annual Meeting of the American Sociological Association, Cincinnati, OH, August, 1991.
40. Sonenstein FL, Pleck JH, Ku LC. Levels of sexual activity among adolescent males in the United States. Fam Plann Perspect 23:162–167.
41. Zelnik M, Kantner J, Ford K. Sex and Pregnancy in Adolescence. Beverly Hills, CA: Sage Publications, 1981.
42. Spencer L, Faulkner A, Keegan J. Talking About Sex. London: Social and Community Planning Research, 1988. (Publication P.5997).
43. Stokes JP, McKirnan DJ. Estimating prevalence of homosexual behavior (letter). Fam Plann Perspect 1993;25:184–185.
44. Billy JO, Tanfer K, Grady WR, Klepinger DH. Authors' reply (letter). Fam Plann Perspect 1993;25:185–186.
45. Turner CF, Lessler JT, Devore JW. Effects of mode of administration and wording on reporting of drug use. In: Turner CF, Lessler JT, Gfroerer JG, eds. Survey Measurement of Drug Use: Methodological Studies, Washington, DC: Government Printing Office, 1992; 177–220 (DHHS Publication (ADM) 92-1929).
46. David Celentano, discussions with Steering Committee for NIMH Multi-site Trial of Behavior Interventions to Halt the Spread of HIV, February, 1991.
47. Witt M, Pantula J, Folsom R, Cox B. Item nonresponse in 1988. In: Turner CF, Lessler JT, Gfroerer, JD, eds. Survey Measurement of Drug Use Methodological Studies. Washington, DC: Government Printing Office, 1992 (DHHS Publication Number (ADM)92- 1929).
48. Cox B, Witt M, Traccarella M, Perez-Michael A. Inconsistent reporting of drug use in 1988. In: Turner CF, Lessler JT, Gfroerer JD, eds. Survey Measurement of Drug Use: Methodological Studies. Washington, DC: Government Printing Office, 1992:109–154 (DHHS Publication Number 92-1929).
49. Smith TW. A methodological review of the sexual behavior questions on the 1988 and 1989 General Social Survey. Journal of Official Statistics 1992; 8:309–325.
50. O'Reilly JM, Turner CF. Survey interviewing using audio-format, computer-assisted technologies. Presentation to the Washington Statistical Society, March 18, 1992.
51. O'Reilly JM, Hubbard ML, Lessler JT, Biemer PP, Turner CF. Audio and video computer-assisted self interviewing: Preliminary tests of new technologies for data collection. Journal of Official Statistics 1992; 10:197–214.
52. Johnston G.. Demonstration of computer-assisted audio survey technology. Seminar presented at the National Center for Health Statistics, Hyattsville, MD, January 28, 1992.
53. Camburn D, Cynamon M, Harel Y. (1991). The use of audio tapes in written questionnaires to ask sensitive questions during household interviews. Paper presented at the National Field Technologies Conference, San Diego, CA, May 1991.
54. Weeks MF. The National Survey of Family Growth: Start-up of a complex CAPI project. Presentation at Southern Association for Public Opinion Research, Raleigh, NC, October 1993.
55. O'Reilly JM. Lessons learned programming a large, complex, CAPI instrument. Presentation to Blaise Users Conference, London, UK, October 1993.
56. Turner CF, Forsyth BF, Biemer PP, LaVange LM. Survey Measurement of Sensitive Behaviors using Audio-CASI: Evaluation of a new technology. Unpublished proposal for funded NIH Grant 1-R01-HD31067-001. Research Triangle Park, NC: Research Triangle Institute.
57. Ku LC, Sonenstein FL, Pleck JH. Patterns of HIV risk and preventive behavior among teenage men. Public Health Reports 1992; 107:131–138.

Appendix

GSS estimates of adult male–male sexual contacts were tabulated from responses to the following question asked of male respondents in 1989–93 GSS: "Now thinking about the time since your 18th birthday (including the past 12 months) how many male partners have you had sex with?" Estimates of male–male contacts in the previous year were tabulated from responses to the following question: "Have your sex partners in the last 12 months been exclusively male, both male and female, or exclusively female?" The estimate of the proportion of males reporting male-male contacts within the last 5 years was tabulated from the following question asked only in 1991: "Have your partners in the last five years been exclusively male, both male and female, or exclusively female?" All sexual behavior questions in the GSS were included in a supplement completed at the end of the regular survey. The supplement was self-administered, and the questionnaire was placed in a sealed envelope so the interviewer was not aware of the respondent's answers. Two introductions were used to the 1988 questions. On Form 1, the questions were preceded by "Now we would like to ask you some additional questions. Your answers are confidential and will be used for statistical reports." Form 2 added to the promise of confidentiality: "There is a great deal of concern today about the AIDs epidemic and how to deal with it. Because of the grave nature of this problem, we are going to ask you some personal questions and we need your frank and honest responses". Since 1989, the AIDS introduction has been used. All Kinsey estimates of male–male contact are derived from responses to the question: "What was your age at the first time you had sexual experience with someone of the same sex, when either you or your partner came to a sexual climax?" This question was included in a self-administered questionnaire administered after interviewers had asked 12 questions requesting demographic information and approximately 70 questions largely concerned with attitudes toward various sexual behaviors. The question was displayed in the SAQ with a box containing the additional explanation: "This includes persons of the same

sex helping each other masturbate." The question was followed by the instruction: "If you have never had this experience, write "never" and skip; to Q. 12 on page 11." The SAQ was subsequently placed in an envelope and sealed by the respondent. The estimates from the Kinsey survey shown in Table 5 include imputations for item nonresponse (see reference 8 for description of imputation procedures). NHSS estimates are derived from responses to the following questions: 1) "Since January 1978, how many different men did you have sex with?" and 2) "In the past 12 months, how many different men did you have sex with?" The interview portion of the NHSS Dallas pretest was conducted using a self-administered questionnaire that included seven questions on demographic and social background; 13 questions related to STD history, hemophilia, AIDS testing, and receipt of blood transfusion; 16 questions on sexual behavior; and two questions about reactions to the survey. The male contact questions were asked as questions 23 and 32 of 38 total questions. After completion, respondents sealed the SAQ with special tape to prevent tampering, and then placed it in an envelope. Respondents were guaranteed anonymity (not merely confidentiality), and unusual efforts were made to assure respondents that their answers could never be known. Respondents also were asked to provide a blood sample for blinded HIV testing. NHSS estimates include imputations for item nonresponses.[29] NSAM estimates were derived from responses to the following questions. 1) "Have you ever done any of the following with another male: you masturbating him; him masturbating you; his penis in your mouth; your penis in his mouth; his penis in your rectum; your penis in his rectum." (Each of these subquestions was followed by boxes labelled "Yes" and "No.") 2) "Have you done any of these (above) with another male in the last 12 months?" These questions appeared as the 38th and 39th questions in a 41-question SAQ that mainly focused on alcohol and drug use; involvement with police or violence; and sexual behaviors. The SAQ was administered after completion of the interviewer-administered sections of the survey (over 200 questions, including extensive sections on contraceptive and heterosexual behaviors). NSM estimates were derived from responses to the question: "During the last ten years, what would you say that your sexual activity has been . . .? Please tell me the letter." Respondents were given a showcard that contained the responses: "A. exclusively heterosexual, that is, only with women. B. mostly heterosexual, mostly with women, some with men. C. evenly heterosexual and homosexual, equally with women and men. D. mostly homosexual, mostly with men, some with women. E. exclusively homosexual, only with men." This question was asked by the survey interviewers, who were all women. This male contact question was asked after 61 questions that asked for social and demographic background information and 39 questions that asked about sexual behaviors (both heterosexual and homosexual).

Figures 1 and 2. Estimates were derived from the authors' analysis of weighted data from the 1988 National Survey of Family Growth (NSFG) public use dataset and unweighted data from the 1970 Kinsey Institute Survey, and from 1982 NSFG tabulations published by Hofferth et al.[13] The 1970 Kinsey estimates refer to premarital sexual contact to orgasm (for either partner). NSFG estimates refer to premarital sexual intercourse. (See text for description of method used to categorize intercourse as premarital in 1988 NSFG tabulations.) Kinsey estimates for each birth cohort have been deflated by dividing the raw estimate by the ratio of Kinsey to NSFG estimates for the one cohort in which the series overlap (see text for discussion). Note also that these tabulations from the 1970 Kinsey Institute Survey differ somewhat from those published by Turner et al[2] and Klassen et al[22] in that they have not been restricted to ever-married adults.

Figures 3 and 5. Estimates were derived from the authors' analysis of 1989–1991 General Social Survey using weights to adjust for unequal probabilities of selection for persons residing in households with different numbers of eligible adults.

Figure 4. Estimates were derived from authors' analysis of 1970 Kinsey Institute Survey. Note that the estimates presented in Figure 4 differ somewhat from those published by Turner et al[2] and Klassen et al[22] because the sample was not restricted to ever-married adults.