Reporting of Induced and Spontaneous Abortion in the 2002 National Survey of Family Growth*

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Abstract

Population estimates of pregnancy outcomes are widely used demographic measures that depend upon accurate reporting of the respondents' experience in retrospective surveys. But both induced and spontaneous abortions are substantially underreported in such surveys. We find that less than one-half (47%) of induced abortions performed in the United States between 1997 and 2001 were reported by women during face-to-face interviews in the 2002 National Survey of Family Growth (NSFG). Hispanic, black and low income women are among the least likely to report their abortions. Women are also less likely to report abortions that occurred in their 20's. Second trimester abortions are more likely to be reported than first trimester terminations. The levels of reported spontaneous abortion measured in the 2002 NSFG are consistent with the accumulated body of research to date, though substantially more pregnancy losses (including stillbirths and ectopic pregnancies) are reported on self-administered surveys than in face-to-face interviews. Our findings are consistent with previous analyses of earlier NSFG surveys demonstrating that abortion is substantially underreported and that reporting of this outcome has not improved relative to prior surveys. Research involving pregnancy outcomes should be adjusted for unreported induced abortions.

INTRODUCTION

Social scientists seldom have the opportunity to compare survey respondents' reported behaviors to the actual incidence of those behaviors. One exception is abortion, which is consistently underreported on surveys. Analyses of nationally representative samples of women in the United States have found that abortion reporting ranges from 35-59% (Fu et al. 1998; Jones and Forrest 1992). Self-administered surveys have been found to elicit higher levels of abortion reporting than face-to-face interviews (Fu et al. 1998; Jagannathan 2001; Mears et al. 2005), and the most accurate estimates are obtained when information from both face-to-face and self-administered surveys are combined (Fu et al. 1998; Jones and Forrest 1992). In smaller-scale surveys where women's reports were compared to their medical records, researchers have also found underreporting, ranging from 29% of abortions reported among New Jersey welfare recipients in 1994 (Jagannathan 2001) to 81%-90% reported among women aged 27-30 who were participants in a lifelong, longitudinal healthcare study (Udry et al. 1996). In addition, some groups of women appear to be less likely than others to report abortions, including unmarried women, those aged 20-24, black women, low-income women (Fu et al. 1998; Jones and Forrest 1992) and, less consistently, Hispanic women (Jagannathan 2002; Jones and Forrest, 1992). However, because of the combination of the relatively low incidence of the event and the high level of underreporting, the statistical significance of subgroup differences in abortion reporting has been difficult to confirm.

Underreporting of abortion will lead to inaccurate measurement of commonly used demographic measures such as pregnancy rates, levels of unintended pregnancy and contraceptive failure rates. Underreporting is also problematic for research in which abortion is a key variable (Coleman et al. 2002; Cougle, Reardon and Coleman 2003; Cougle, Reardon and

Coleman 2005; Reardon, Coleman and Cougle 2004; Reardon and Cougle 2002). If substantial numbers of abortions are not reported and if underreporting varies by characteristics of the women, then associations between abortion and other outcomes could be inaccurate or misleading.

Using the 2002 National Survey of Family Growth (NSFG), we address the question of whether the overall level of reporting of induced abortions among all U.S. women has changed and whether differences among population subgroups have widened or narrowed.

Another pregnancy outcome that is underreported is spontaneous abortion. Clinical studies have estimated levels of spontaneous abortion far higher (25%-71%) than what is reported by women in retrospective surveys, primarily because such studies are designed to detect very early pregnancy losses, many of which would have gone unnoticed by the women (Modvig, Schmidt and Damsgaard 1990; Shapiro, Levine and Abromovicz 1971; Wang et al., 2003; Whittaker, Taylor and Lind 1983; Wilcox et al 1988; Wilcox, Baird and Weinberg 1999, Zinaman et al. 1996).[1] Spontaneous abortion may also be underreported if some women forget that the event occurred because a subsequent birth has taken place, or if they deem it irrelevant or, conversely, too personal.

In addition, there is a possibility that some women report spontaneous abortions in place of induced ones, although previous research has concluded that this is probably not common (Fu et al. 1998; Jones and Forrest 1992). By comparing abortions reported in a self-administered portion of the 1988 NSFG to those reported in the regular interview, Jones and Forrest (1992) estimated that only about 1% of induced abortions may have been reported as spontaneous ones.

[1] The range of estimates reflects widely differing study designs and samples.

Similarly, Fu et al. (1998) found that about 2% of ectopic pregnancies and spontaneous abortions (combined) reported in face-to-face interviews were reported as induced abortions in the self-administered portion of the 1995 NSFG. But if women consistently report induced abortions as spontaneous ones in both the self-administered and face-to-face portions of the survey, it is possible that an even higher number of induced abortions are reported as spontaneous. Thus, there could be two conflicting types of misreporting: omission of recognized spontaneous abortions and over-reporting if induced abortions are reported as spontaneous ones. We assess patterns and levels of reporting of spontaneous abortion in the NSFG relative to what might be expected from prior research and explore the possibility that some women report induced abortions as spontaneous ones.

DATA AND METHODS

National Survey of Family Growth

Information for the 2002 NSFG was collected via interviews that took place in the homes of a national sample of civilian, non-institutionalized women (and men) in the United States aged 15-44 years. Conducted by the National Center for Health Statistics (NCHS), the purpose of the survey is to provide reliable national data on marriage, divorce, pregnancy, contraception, fertility and the health of women and infants. The 2002 survey contains information from 7,643 women. The survey response rate was 80% and included over-samples of teenagers, blacks and Hispanics.

Several measures of pregnancy outcomes are available on the 2002 NSFG. Detailed information about women's pregnancy histories were collected during the face-to-face interviews, including the number of pregnancies the woman had experienced, and the timing and outcome of each. Five pregnancy outcomes were measured: abortion, live birth, spontaneous

abortion, ectopic pregnancy and stillbirth. Because a relatively small number of induced and spontaneous abortions are reported to have occurred in any given year, we combine information from the five years preceding the 2002 NSFG, 1997-2001, to obtain a large enough sample of pregnancy outcomes.

A computer-assisted, self-administered questionnaire completed after the main interview covered several sensitive topics, including the woman's total number of lifetime births, abortions and pregnancy losses (a combined measure of spontaneous abortions, ectopic pregnancies and stillbirths). We examine discrepancies between number of lifetime abortions and lifetime pregnancy losses in the face-to-face interview and self-administered surveys. Unlike the 1995 NSFG, the self-administered portion of the 2002 NSFG questionnaire did not ask women to report the dates of pregnancy events, and we are unable to compare or combine abortions and pregnancy losses for the time period 1997-2001.

We examine abortion reporting according to age group, number of prior births, race/ethnicity, educational attainment, poverty status, union status, gestation (in weeks) and religious affiliation. Age, prior births, union status and gestation refer to characteristics at the time of the pregnancy outcome, and all other characteristics are measured at the time of the interview. The 2002 survey was the first NSFG to collect information on cohabitation at pregnancy outcome, and this characteristic has not been examined in prior analyses of abortion reporting. Our measure of union status includes outcomes to women who were married, cohabiting, previously married (and not cohabiting) and unmarried (and not cohabiting). Poverty status is a mutable characteristic, and it is possible that women who were poor (<100% of

poverty)[2] or near poor (100-199% of poverty) at the time of the interview were at the time of the abortion and vice versa. However, changes in social class are often gradual, and it is likely that the economic status of women remained generally stable during the five-year time period preceding the survey. Education is measured at the time of the interview and is analyzed for women aged 25 and older at the time of the abortion.[3]

External Abortion Data

We used data from a survey of all known U.S. abortion providers which collected information about abortion service provision in 1999, 2000 and the first half of 2001. (Finer and Henshaw 2003). The total number of abortions for each of the five years in our analysis (1997 to 2001) were calculated using information from this survey and supplemented by information from state health departments and reported by the U.S. Centers for Disease Control and Prevention (Straus et al. 2004). The collection of the data and the estimation of the total number of abortions for each year are described in detail elsewhere (Finer and Henshaw 2005; Finer and Henshaw 2003).

For each of the five years that constitute the focus of our analysis (1997 to 2001), we adjusted the national numbers of abortions to take into account that some abortions in each year were obtained by women who were not represented in the 2002 NSFG. For example, women who were age 40 or older at the time of their abortion in 1997 were not part of the population sampled for the 2002 NSFG, as they would have been 45 or older at the time of the interviews.

To examine underreporting of abortions by women's demographic characteristics, we estimated the numbers of abortions for each subpopulation for the period 1997-2001 by applying the distribution of characteristics in a nationally representative survey of over 10,000 U.S.

[2] Defined as percent of poverty level income based on family size and total family income.
[3] Inclusion of women younger than 25 who may still be completing their education could bias the results for the other women who are in a lower education group, because those completing their education will eventually move into a higher education group.

women having abortions in 2000–2001 (Jones, Darroch and Henshaw 2002a) to the numbers obtained in the abortion provider surveys. The one exception is age, for which we relied on annual distributions of abortions by age obtained from the CDC abortion surveillance reports with adjustments based on unpublished data from state health departments compiled by the National Bureau of Economic Research and by the Guttmacher Institute (Henshaw 2005). We used these distributions rather than the survey of abortion patients because they were available for each year in our analysis period (1997-2001) and therefore would allow us to include any changes in the age distribution of abortions in the five-year period.

Analytic methods

A total of 457[4] induced abortions and 638 spontaneous abortions were reported in the face-to-face interviews of the 2002 NSFG for the five years from January 1997 through 2001. Unless otherwise noted, NSFG data were weighted to represent national estimates, and we used the complex sampling feature of the statistical analysis package SPSS to take into account the clustered sampling design when calculating statistical significance. We provide 95% confidence intervals to demonstrate the variability in the estimates and to determine if subgroup differences and differences over time are statistically significant. Only 2-3% of women obtain an induced abortion in a given year (Finer and Henshaw 2005) and the number of reported spontaneous abortions in the 2002 NSFG is only a small proportion of all pregnancies. Thus, even when data from several years are combined for a large data set, the low incidence of these outcomes, combined with underreporting, results in relatively small numbers for analyses. In turn, the

[4] There were three abortions in the NSFG data that were originally reported by women to have two outcomes; the first outcome was a spontaneous abortion and the second an induced abortion. NCHS gave priority to the second pregnancy outcome (induced abortion). We recoded these induced abortions to spontaneous abortions because we assumed these women may have obtained the induced abortion in order to evacuate the uterus. These types of abortions are not included in national abortion statistics (Finer and Henshaw, 2003).

confidence intervals are typically large.

To obtain estimates of abortion underreporting, we compare the weighted number of abortions reported in the 2002 NSFG to the actual number of abortions that occurred based on the Guttmacher Institute figures. The ratio of the number reported by women in the NSFG and the number estimated using the provider and patient surveys constitutes our main measure of underreporting.

We compare estimates from prospective studies of spontaneous abortion among women who have clinically confirmed pregnancies, usually those that have survived to at least 5 weeks after conception, to those reported by women in the NSFG since both exclude women who did not detect early fetal losses.

RESULTS

National Trends in Abortion Reporting

Between 1997-2001, an estimated 6.5 million induced abortions were obtained by women who were aged 15-44 in 2002. Just under one-half, 47%, were reported in the face-to-face interview in the 2002 NSFG, although the confidence interval suggests that the actual value could be as low as 40% or as high as 55% (Table 1). This estimate is consistent with the overall levels of 45%-48% estimated by Jones and Forrest (1992) using the1976 and 1982 NSFG's and by Fu et. al. (1998) using the 1995 NSFG. In the 1988 NSFG, only 35% of induced abortions were reported (Jones and Forrest 1992).

Figure 1 shows the proportions of abortions reported during the face-to-face interviews for the years 1983-2001 from the 2002 NSFG, and for the years 1983-1994 from the 1995 NSFG (Fu et al. 1998.). Comparison of these two sources allows us to evaluate consistency in abortion reporting for the years in which there is overlapping information (1983-1994). For the 2002

NSFG, the level of reporting ranges from a low of 29% in 1996 to a high of 66% in 1984.[5] There is no clear evidence of recall bias, in that women do not appear less likely to report abortions that occurred farther in their past. While there are some differences in the proportions of reported abortions for overlapping years of the 1995 and 2002 NSFG surveys, levels of overall reporting are largely similar, suggesting that two surveys are comparable in their measurement of this outcome.

Underreporting among Population Subgroups

Levels of abortion reporting varied substantially across subgroups of women in the 2002 NSFG (Table 2). Nearly all of these estimates are based on small samples sizes, are highly variable and most of the confidence intervals surrounding the estimates overlap. Even so, statistically significant differences were found by age, race/ethnicity and gestation. Abortions to women aged 25-29 at the time of the abortion were least likely to be reported, 33%, and abortions to adolescents were significantly more likely to be reported (59%) compared to this group.[6] Hispanic women had lower proportions of reported abortions compared to non-Hispanic women (29% vs. 42%-61%), and the difference between non-Hispanic white women and Hispanic women was statistically significant. We found evidence that abortion reporting varies significantly by gestation, a characteristic previously unexamined in abortion underreporting research. Only 37% of abortions that occurred at eight weeks or less were reported, and the proportion increases steadily with gestation such that 85% of second trimester abortions were reported. Moreover, the differences are statistically significant when comparing those at

[5] Although reports from the two surveys show similar patterns and levels, the confidence intervals for these estimates were large enough that differences in underreporting between the two survey dates could not be detected (not shown).

[6] Seventy percent of abortions reported to have occurred to adolescents were reported by women aged 20-25 at the time of the survey. (Similarly, 60% of abortions that occurred between the ages of 20-24 were reported by women aged 25-30 at the time of the survey.)

gestations less than 9 weeks to those at 11 weeks or over (69%).

Although no statistically significant differences were found for the remaining estimates, patterns of underreporting were still evident. About one-half of abortions to nulliparous women were reported, 54%, compared to 42%-44% among those who had one or more births prior to the abortion. And 54% of abortions reported as first-time procedures were acknowledged compared to 40% of second and higher order abortions. Among religious affiliations, Catholic women reported the lowest proportion of their abortions (39%) while Protestants reported the highest (55%). Women with incomes at 200% of poverty or higher at the time of the survey had higher reporting levels than those who were poor or low-income. However, women who had not graduated from high school reported a higher proportion of their abortions (57%) than did those with a high school degree (43%) or some college (32%). Abortions that occurred to married women were more likely to be reported (56%) than those to formerly married and unmarried women, and those to cohabiting women were least likely to be reported (39%).

Among groups with higher than average abortion reporting, we examined smaller subgroups to see if we could identify subpopulations with complete or mostly complete abortion reporting (not shown). However we failed to find any that were both large and complete enough for analysis. For example, we found that 74% of abortions that occurred to non-Hispanic white married women (including women of "other" races) were reported, but the estimate was highly variable (ranging from 39%-109%) and this group accounts for only 7% of all abortions. While higher income (>200% poverty) non-Hispanic white and other women accounted for 22% of all abortions, we estimate that this group only reported 63% (range of 48%-78) of their abortions, still a high level of underreporting.

Abortion Reporting in the Self-Administered Questionnaire

Ninety-six percent of women were consistent in reporting the same number of abortions on both the face-to-face and self-administered interviews. But among the 1,421 women who reported at least one abortion in either format, 19% provided inconsistent answers (Table 3). Most commonly, women reported no abortions in the face-to-face interview and one or more abortions during the self-administered survey. Relative to non-Hispanic white women, women of all other racial and ethnic groups were significantly more likely to report an abortion in the self-administered survey that was not reported in the face-to-face interview (not shown). During the face-to-face interviews, a total of 1,843 abortions were reported by 1,218 women. Women were more forthcoming on the self-administered questionnaire: 2,272 abortions were reported by 1,402 women.[7] Thus the self-administered questionnaire captured 18% more lifetime abortions and 13% more women reporting abortions than the face-to-face pregnancy history interview.

Reporting of Spontaneous Abortions

For the five year period preceding the 2002 NSFG, 17% of all pregnancies reported were spontaneous abortions (Table 4). When the total number of pregnancies is increased to include the corrected number of abortions, the proportion of pregnancies reported as spontaneous abortions decreases to 15%. This figure is comparable to the level of spontaneous abortion reported in other studies, ranging from 12%-18% (Bongaarts and Potter 1983; Goldhaber and Fireman 1991; Harlap, Shiono and Ramcharan. 1980; Santow and Bracher 1989). We also looked at this outcome in 1995 to determine if the surveys were comparable in their measurement of this outcome. In 1995, 15% of reported pregnancies ended in spontaneous abortion, 13% when corrected, but the increase in proportion of pregnancies ending in

[7] In the self-administered survey, one woman reported 11 abortions and another reported 34 (and 0 abortions on the face-to-face). We assumed that these women incorrectly entered their responses, and we recoded these figures to be one and three abortions, respectively.

spontaneous abortion between 1995 and 2002 was not statistically significant.

Patterns in spontaneous abortion by age conform to those found in other studies (Andersen et al., 2000; Butler and Kalasinski 1989; Figa'-Talamanca and Repetto 1988; Harlap, Narod and Khazen, 1989; Shapiro et al., 1971; Shiono and Ramcharan 1980; Wilcox et al., 1988; see Table 4). Women aged less than 20 have a somewhat elevated proportion of pregnancies ending in spontaneous abortion (20%;18% corrected). The proportions of pregnancies ending in spontaneous abortion are lowest for women in their 20s, and then increase steadily with age. The highest level of spontaneous abortion was among women aged 35 and older (25%; 24% corrected).

Table 4 also shows spontaneous abortion by the woman's race/ethnicity and by the gestation of the spontaneous abortion. While the differences in the proportion of reported pregnancies ending in spontaneous abortion appear large between the different race and ethnic groups, the overlapping confidence intervals indicate that the differences are not statistically significant. At least part of the difference in the uncorrected rates (first column) could be attributed to differential reporting of induced abortion among the four groups. However, the differences remain, even after the total numbers of pregnancies are corrected for abortion underreporting (second column). Non-Hispanic black women report the highest proportion of their pregnancies ending in spontaneous abortion (17%), while non-Hispanic white women report the lowest (11%). We found no comparable studies showing differences in the risk of spontaneous abortion by race or ethnicity. Whether these differences are due to true differences in the risk of spontaneous abortion by race and ethnicity, to differences in recognition or reporting of spontaneous abortion, or simply to statistical variance in the sample cannot be determined from these data.

Although most spontaneous abortions occur in the earliest stages of pregnancy, those that women recognize usually occur at least after a missed menstrual period or a few weeks later, at a gestation of five weeks or more. Table 4 shows that reports of recognized spontaneous abortions by gestation in the NSFG reflect this pattern. Although some women report that they knew they had a spontaneous abortion in the first 4 weeks of pregnancy – 2.4% of all pregnancies – most report a spontaneous abortion having occurred after 5 to 7 weeks or after 8 to 10 weeks (5.3% and 4.9%, respectively). Ninety-four percent of the spontaneous abortions reported in the five years preceding the 2002 NSFG occurred within the first 20 weeks of pregnancy. While these estimates are comparable to the patterns found in other studies (Bongaarts and Potter 1983; Harlap, Shiono and Ramcharan. 1980; Shapiro, Levine and Abromovicz 1971; Wilcox et al. 1988), the actual levels are difficult to compare because of differing study designs, and because other studies often include all fetal losses – including stillbirths and ectopic pregnancies – in their calculations.

As with abortion, women reported more pregnancy losses -- spontaneous abortions, ectopic pregnancies and stillbirths combined-- during the self-administered survey than during the face-to-face interviews: 1,521 women reported 2,225 pregnancy losses during the interview, and 1,716 women reported 2,791 pregnancy losses on the self-administered survey (Table 3).[8] The 20% increase in the lifetime number of pregnancy losses reported on the self-administered questionnaire was similar to that for abortions (18%). Also similar to abortions, black and Hispanic women are more likely than white women to report a pregnancy loss only on the

[8] We corrected seven cases in the self-reported data that had obviously been incorrectly entered by the respondent. For example, four women entered that they had experienced 11 pregnancy losses, but only reported one during the interview. One woman reported 33 losses on the self-report portion and none during the interview and was considered to be a "missing value."

computer-assisted interview and not during the face-to-face interview.[9]

DISCUSSION AND CONCLUSIONS

Induced abortion continues to be grossly underreported in U.S. social surveys. While the low incidence of abortion, coupled with underreporting, make it difficult to identify statistically significant differences, our findings replicate many of the associations between socioeconomic characteristics and abortion reporting found in earlier surveys. This suggests that many of these characteristics are reliable predictors of underreporting. Abortions that occurred to adolescents and to women aged 35 and older were more likely to be reported, while women report fewer of the abortions that occurred when they were in their 20s (Fu et al. 1998). We also found underreporting to be higher for black women, low income women and Catholic women while abortions to married women were more likely to be reported (Fu et al. 1998; Jagannathan 2001; Jones and Forrest 1992).

Prior studies have been inconsistent in levels of abortion reporting among Hispanic women. Using the 1995 NSFG Fu et al. (1998) found comparable levels of abortion reporting between Hispanic and non-Hispanic women, while two other studies (Jones and Forrest 1992; Jagannathan 2001) suggest lower levels of reporting for Hispanic women. Our findings correspond with the latter studies, as we found Hispanic women to have the lowest level of reporting of all the racial/ethnic groups we examined. The difference in reporting between the two NSFG surveys, 48% of abortions to Hispanic women reported in 1995 compared to 29% in 2002, was not statistically significant. In addition, it has since been determined that the external

[9] Five percent of all Hispanic women, 4% of all black women and 5% of "other" women reported an abortion on the self-administered survey that was not on the face-to-face interview, compared to 1% of non-Hispanic white women. Similarly, 4% of Hispanic and 5% of Black women reported a pregnancy loss on the self-administered survey that was not reported on the face-to-face interview, compared to 1% of non-Hispanic white women.

estimates of the number of abortions to Hispanic women in the prior analyses of the 1995 NSFG were too low (see Jones, Darroch and Henshaw 2002a), and the corrected data result in 44% of abortions reported among Hispanic women (Guttmacher 2006). Nonetheless, it is possible that abortion reporting among Hispanic women is changing along with the growing Hispanic population.

At least one research group has conducted studies using the NSFG and other social surveys to examine associations between abortion and outcomes such as mental disorders and drug abuse (Coleman et al. 2002; Cougle, Reardon and Coleman 2003; Cougle, Reardon and Coleman 2005; Reardon and Cougle 2002; Reardon, Coleman and Cougle 2004). Because the extent of abortion underreporting is so large -- and varies considerably by the women's characteristics –research of this type should include strategies that take into account patterns of abortion underreporting or the potential effect of underreporting on the outcomes of interest (see Bachrach and Baldwin 1991; Schmiege and Russo 2005). We investigated the feasibility of one such strategy which would be to restrict the analysis to a population subgroup with relatively complete reporting. However, we found no subpopulations in the NSFG that were both large enough for meaningful analysis and who reported at least 75% of their abortions.

Little is known about the dynamics of abortion underreporting. Udry et al. (1996) identified two kinds of underreporting; of the 19% of women who underreported abortions in their study, half failed to acknowledge any abortions and half had multiple abortions but only reported some of them. We believe that both types of underreporting are also present in the NSFG. The large impact of the self-administered survey on revealing any lifetime abortions among women who reported none during the interview indicates that most underreporting can be attributed to complete unwillingness to acknowledge any prior abortions. On the other hand, we

found that first abortions were more likely to be reported than were second or higher order abortions. It is possible that this is an artifact of the second type of underreporting—such that some women who had multiple abortions chose to report only one during the NSFG interview—rather than a true association of number of abortions and willingness to report them. Currently, about half of abortions in the United States are to women who have had one or more prior abortions. Understanding the extent to which each type of underreporting impacts the overall accuracy of abortion reports would be useful in eliciting more complete reporting from respondents.

The most likely reasons for underreporting of abortion pertain to issues of social desirability and the high level of stigma that surrounds abortion in the United States. Women who have abortions but think abortion is immoral, or who experience guilt concerning their pregnancy terminations, may be unwilling to report them, even in confidence. Even women who do not themselves have ethical qualms about abortion may be reluctant to report their experiences out of concern that other individuals may regard them negatively. More speculatively, while half of women who have abortions got pregnant while using contraception (Jones, Darroch and Henshaw 2002b), those who were not, or who were using contraception inconsistently, may be embarrassed to acknowledge that they did not prevent the pregnancy in the first place. That is, apart from any stigma around abortion, women may feel that their inability to prevent an unwanted pregnancy is socially undesirable. The increase in reporting obtained using the confidential, self-administered questionnaires suggests these are contributing reasons (Fu et al 1998; Jagannathan 2001; Jones and Forrest 1992; Mears et al. 2005), but in large, national surveys even the promise of complete confidentiality does not increase abortion reporting to levels approaching the actual incidence.

Other issues apart from social desirability and stigma may influence whether women report their abortions. Later abortion, including those done in the second trimester and which are more stigmatized, are significantly more likely to be reported than abortions that occurred at earlier gestations. At least one study of spontaneous abortions requiring medical treatment found that those that occurred during earlier gestations were less likely to be reported (Wilcox and Horney 1984). It could be that later abortions, both spontaneous and elective, are harder to forget or deny as they involve greater medical intervention. Researchers of abortion reporting in contemporary Russia found that accuracy of abortion reporting declines over time and conclude that many women forget abortions that occurred more than two years prior to the survey period (Philipov et al. 2004). Our findings do not indicate this as an important factor in the United States, insofar as abortions that occurred three, or even ten, years prior to 2002 NSFG do not appear any more or less likely to have been reported. Nonetheless, at least one U.S. study found that even among women who accurately report having *any* prior abortions (10% underreporting), only about half accurately reported their abortions as occurring within one year of their actual date of occurrence (Udry et al.1996). Thus, it is likely that at least a small amount of abortion underreporting is due to faulty memory.

Shortcomings of the 2002 NSFG sample, which may be unavoidable for national surveys, may also have contributed to the underreporting, or underrepresentation, of abortions. While the NSFG response rate of 80% is generally considered more than adequate for most analyses, it is possible that the 20% who could not be reached or declined to participate were concentrated among those populations of women most likely to have had abortions. For example, economically disadvantaged women are substantially overrepresented among women obtaining abortions (Henshaw and Kost, 1996; Jones, Darroch and Henshaw, 2002a) and such populations

are typically difficult to reach and recruit for survey research.

In order to assess different reasons for and types of abortion underreporting, researchers will need to use alternate data gathering techniques. Cognitive interviews, in which respondents are asked to report directly on the internal cognitive processes employed to answer survey questions (Collins, 2003), could be used to explore the usefulness of conventional survey items that measure abortion experience. Interviews with women, including those obtaining abortion services, about reasons other women do not acknowledge their abortions might yield useful insights, including disclosures of abortions that were not acknowledged at the beginning of the interview and initial reasons for denial. It is likely that information that improves abortion reporting in surveys would contribute to the improvement of data collection techniques overall.

Pregnancy reporting in the 2002 NSFG has been shown to be complete with respect to replicating national numbers of births (Chandra et al. 2005). Our analysis indicates that patterns in levels of spontaneous abortion in 2002 are similar to those documented in other studies, and we conclude that these data are appropriate to use in calculating the risk of contraceptive failure and unintended pregnancy, as well as other analyses. While the data appear to be comparable to other studies in their measurement of recent and recognized spontaneous abortions, there is reason to believe that women's recollections of lifetime spontaneous abortion are inaccurate insofar as 20% more spontaneous abortions were reported on the self-administered survey compared to the face-to-face interviews. Wilcox and Horney (1984) found that 25% of recognized lifetime spontaneous abortions are not recalled by women. Spontaneous abortion and other types of pregnancy loss do not generally carry the same stigma as abortion, so it is unlikely that issues of social desirability are responsible for incomplete reporting. Some have suggested also that women who give birth after a pregnancy loss may "replace" the earlier event with the

latter as it is a more salient memory (Weinberg, Baird and Wilcox. 1994). It is possible that women who inadvertently omitted one or more pregnancy losses during the interviews were reminded of them after subsequent questions on the survey. Alternately, some women may have used this portion of the survey as an opportunity to include induced abortions without acknowledging that the pregnancies were voluntarily terminated.[10]

When administering surveys or analyzing survey data, social scientists typically assume that respondents are providing accurate information. Information from abortion reporting reaffirms that sensitive behaviors are often not reported, that the likelihood of reporting them can vary considerably by characteristics of the respondents, and that researchers should exercise caution when using these data.

[10] While Fu et al were able to compare face-to-face reports of spontaneous abortion with self-administered information on abortion, the 2002 NSFG did not contain information on number or timing of pregnancy losses on the self-administered survey.

Figure 1. Proportion of abortions reported by year of occurrence (1995 NSFG and 2002 NSFG)

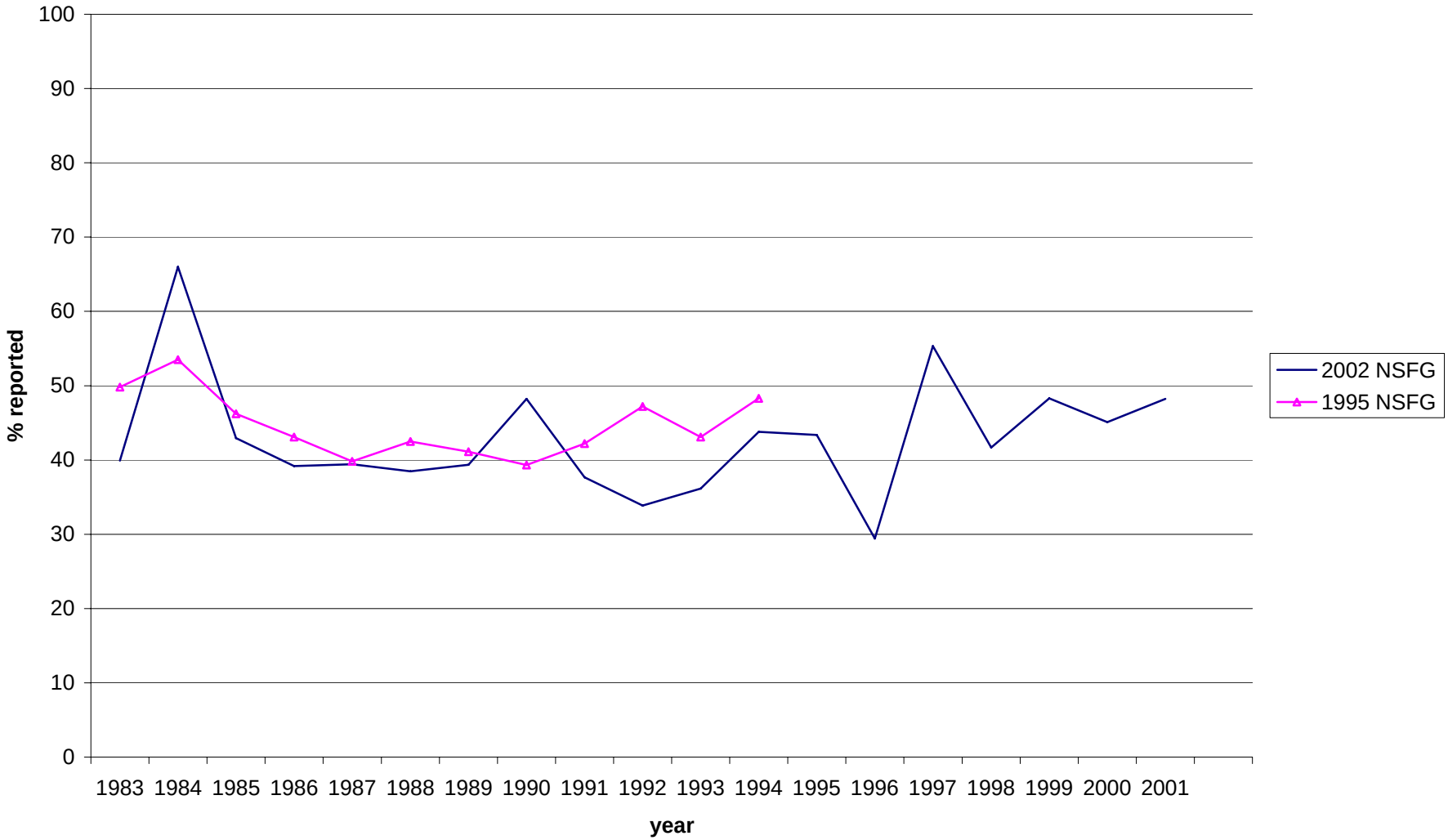

Table. 1 Abortions reported in the 1976, 1982, 1988, 1995 and 2002 cycles of the NSFG as a percent of abortions estimated as actually having occurred in the United States during the same time periods.

NSFG Year of Interview and Time Period of Reported Abortions		Actual N	Percent Reported	Confidence Interval
NSFG 1976†: 1973-1975		u	45	[32-57]
NSFG 1982: 1979-1982		u	48	[39-56]
NSFG 1988: 1984-1987		u	35	[30-40]
NSFG 1995: 1991-1994 Interview only		827	45	[39-51]
NSFG 1995: 1991-1994 Interview and self-report combined		1129	59	[52-66]
NSFG 2002: 1997-2001 Interview only (unweighted n=447 abortions)		457	47	[40-55]
	1997	92	55	[39-71]
	1998	75	42	[29-54]
	1999	94	48	[34-61]
	2000	91	44	[32-57]
	2001	105	48	[35-62]

u indicates that the data are unavailable.
† The 1976 estimate includes only married women ages 15-44; All other NSFG cycles include all women ages 15-44.
Source for all years except 2002: Fu et al., 1998.

Table 2. Percent of Abortions in 1997-2001 reported in 2002 NSFG, by women's characteristics

	2002	Unweighted no.	% reported	95% CI
Total	6,486,668	457	47	40 - 55
Age at abortion				
<20	1,249,447	109	59	43 - 76
20-24	2,126,280	152	47	35 - 59
25-29	1,532,070	89	33	24 - 42
30-34	948,330	66	50	31 - 68
35 and older	630,541	41	56	29 - 84
Number of lifetime abortions				
1	3,368,994	268	54	45 - 63
2 or more	3,117,675	189	40	31 - 50
Number of births prior to abortion				
0	2,561,509	195	54	42 - 65
1	1,780,442	124	42	31 - 54
2 or more	2,144,717	128	44	30 - 59
Race/ethnicity				
White, non-Hispanic	2,640,805	173	58	45 - 70
Black, non-Hispanic	2,071,730	161	42	30 - 55
Other, non-Hispanic	469,890	35	61	32 - 90
Hispanic	1,304,244	88	29	19 - 39
Poverty status				
<100%	1,731,690	132	44	30 - 58
100-199%	2,006,680	117	39	25 - 53
200+%	2,748,299	208	56	46 - 66
Religion				
Protestant	2,790,854	210	55	40 - 70
Catholic	1,747,234	106	39	25 - 53
Other	477,539	31	43	23 - 63
None	1,471,041	110	44	31 - 57
Union status at abortion				
Married	1,078,681	81	56	36 - 77
Cohabiting	1,654,716	44	39	28 - 51
Formerly married	699,468	95	52	26 - 79
Never Married	3,053,803	237	48	38 - 57
Level of education†				
<12	378,422	37	57	26 - 89
12	883,117	56	43	27 - 60
Some college	1,186,048	59	32	20 - 44
College degree	663,354	44	54	31 - 77
Weeks gestation‡				
<9	3,926,030	228	37	31 - 44
9-10	1,258,605	76	43	30 - 56
11 or more	1,302,033	130	69	47 - 91
11-12	677,923	42	55	27 - 83
13 or more	624,110	88	85	57 - 112

†Limited to abortions that occurred to women aged 25 and older.

‡ 23 abortions were missing information on gestation. This is the only characteristic in our analysis with missing, unimputed information.

Table 3. Comparing reporting of induced abortion and pregnancy losses on the face-to-face and self-administered surveys, 2002 NSFG

INDUCED ABORTIONS

Face-to-face interview	Self-administered survey† 0	1	2	3	4	5	6+	
0	6,154	113	41	9	12	25	3	6,357
1	15	767	21	2	1	1	1	808
2	2	8	270	6	1	1	0	288
3	1	0	4	64	2	0	0	71
4	1	0	2	2	15	3	0	23
5	0	1	0	0	1	10	2	14
6+	0	0	0	0	0	0	14	14
Total	6,173	889	338	83	32	40	20	7,575

PREGNANCY LOSSES§

Face-to-face interview	Self-administered survey‡ 0	1	2	3	4	5	6+	Total
0	5,825	122	40	22	9	23	6	6,047
1	23	991	39	12	7	3	7	1,082
2	1	14	257	13	2	0	2	289
3	2	2	4	73	10	0	1	92
4	0	0	3	2	22	4	0	31
5	0	0	0	0	3	11	1	15
6+	1	0	0	1	0	2	8	12
Total	5,852	1,129	343	123	53	43	25	7,568

†68 women did not answer the question on abortion in the self-administered questionnaire, 5 of whom reported one or more abortions during the face-to-face interview.

‡ 75 women had missing information on pregnancy losses on the self-administered questionnaire, 8 of whom reported one or more pregnancy losses during the face-to-face interview.

§ Includes ectopic pregnancies, spontaneous abortions and stillbirths.

Table 4: Percent of all pregnancies reported as spontaneous abortions in 2002 and 1995 NSFG, and percent reported by selected characteristics 2002 NSFG

	% of all pregnancies reported	95% CI	% of all pregnancies, corrected
2002 (1997-2001)	16.9	15.1 - 18.8	15.1
1995 (1991-1994)	14.6	13.3 - 16.1	13.1
Age at outcome			
<20	20.4	15.5 - 26.4	18.0
20-24	14.1	12.0 - 16.4	12.2
25-29	13.9	11.3 - 17.0	12.2
30-34	15.6	12.1 - 19.9	14.5
35+	25.3	18.1 - 34.3	23.8
Race/ethnicity			
Non-Hispanic white	18.4	15.7 - 21.4	17.3
Non-Hispanic black	15.4	12.4 - 19.1	12.3
Non-Hispanic other	16.2	8.6 - 28.4	14.6
Hispanic	13.3	11.0 - 16.0	11.3
Gestation (in weeks)			
1-4	2.4	1.9 - 3.1	2.2
5-8	5.3	4.2 - 6.7	4.7
9-12	4.9	4.0 - 5.9	4.3
13-16	1.8	1.3 - 2.6	1.6
17-20	1.4	0.9 - 2.0	1.2
21+	0.9	0.6 - 1.3	0.8

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