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Surgical Sterilization in the United States: Prevalence and Characteristics, 1965–95

June 1998



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics



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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
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Hyattsville, Maryland
June 1998
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Objectives

This report presents national data on the prevalence of surgical sterilization from 1965 to 1995 among women 15–44 years of age. Data are shown by type of sterilizing operation and demographic characteristics of the women. For the 1995 survey data, reasons for the three most common sterilizing operations (tubal ligation, vasectomy, and hysterectomy) are shown, as well as the desire for reversal among those with potentially reversible operations.

Methods

Data are based on nationally representative samples of women 15–44 years of age: the 1965 National Fertility Study (NFS), and the 1973, 1982, 1988, and 1995 cycles of the National Survey of Family Growth (NSFG).

Results

After rising from 16 to 42 percent between 1965 and 1988, the prevalence of surgical sterilization among married women 15–44 years old remained stable at 41 percent in 1995. Age, parity, religious affiliation, and education continued to be strongly associated with overall surgical sterilization levels. Tubal ligation and vasectomy were equally prevalent in the 1965 and 1973 surveys, but since 1982, tubal ligation has been more prevalent than vasectomy.

Conclusions

Several factors contributed to the rise in reliance upon surgical sterilization among women 15–44 years old over the last 3 decades: (a) aging of the post-World War II Baby Boom women (and their partners) through the primary reproductive years; (b) relatively high contraceptive failure rates, particularly among socioeconomically less advantaged women; and (c) higher expectations for contraceptive effectiveness, safety, and convenience. Overall sterilization prevalence may be leveling off among women 15–44 years old, in part due to greater delay of first and subsequent births, thus making sterilization less of a concern while women are in this age range.

Keywords: *surgical sterilization • population characteristics*

Surgical Sterilization in the United States: Prevalence and Characteristics, 1965–95

by Anjani Chandra, Ph.D., Division of Vital Statistics

Highlights

- Between the 1965 and 1988 surveys, the prevalence of surgical sterilization rose dramatically among married women 15–44 years of age in the United States from 16 to 42 percent. In 1995, the prevalence remained about the same at 41 percent.
- In the 1965 and 1973 surveys, tubal ligation and vasectomy were equally common among currently married and ever-married women aged 15–44 (and their partners). Since the 1982 survey, tubal ligation has become more prevalent than vasectomy, occurring 1½ to 2 times as often. Among married women in 1995, 24 percent reported a tubal ligation, compared with 15 percent reporting that their husbands had a vasectomy.
- The profile of the typical ever-married woman with a tubal ligation has changed over time, as has the profile of the typical woman who reported that her husband or partner had a vasectomy. From 1973 to 1995, an increasing proportion of tubal ligations occurred among ever-married women aged 35–44 years with 1 or 2 births (as opposed to 3 or more births) and with education beyond high school. Over

the same period, a similar shift toward older age, lower parity, and higher education occurred for vasectomies. In addition, vasectomies reported by Catholic women represented a greater proportion of all vasectomies reported in the 1995 survey than in the 1973 survey. Some of these shifts reflect similar changes among the general population of ever-married women between the survey years.

- Age, parity, religious affiliation, and education continued to be strongly associated with overall surgical sterilization rates. Marital status, race and Hispanic origin, and socioeconomic factors such as education and income were also strongly associated with particular types of sterilizing operations.
- Among ever-married women aged 15–44 years in 1995, 41 percent were surgically sterile (15.3 million women), 26 percent reported having a tubal ligation, 7 percent had a hysterectomy, and 12 percent were currently living with a husband or partner who had a vasectomy.
- The most frequently cited reasons for tubal ligation and vasectomy among women who had any births were that one or both partners wanted no more children. Among nulliparous women with tubal

The National Survey of Family Growth, Cycles 1–5, were jointly planned and funded by the National Center for Health Statistics, the National Institute for Child Health and Human Development, and the Office of Population Affairs. Additional support was provided for the 1988 and 1995 surveys from the Administration for Children and Families. Other agencies and individuals also provided helpful advice and assistance. Drs. William Mosher and Kate Brett of NCHS served as peer reviewers for this report and made a number of helpful and insightful suggestions.

ligation, medical reasons and problems with their birth control method were cited most often. As expected, medical problems were the most frequent reason given for hysterectomy, cited by 90 percent.

- Nearly 25 percent of women with an unreversed tubal ligation in 1995 expressed a desire for reversal of the operation, on the part of herself, her husband or partner, or both. About 11 percent of married or cohabiting women whose partner had a vasectomy reported some desire for reversal. Higher levels of desire for tubal ligation reversal were seen among younger women, Hispanic women, and women with lower levels of education and income.

Introduction

The data presented in this report suggest that the dramatic increase in the prevalence of surgical sterilization that occurred in the United States between 1965 and 1988 may have leveled off between 1988 and 1995. In 1965, 16 percent of married women 15–44 years of age reported a sterilizing operation undergone by either themselves or their husbands. In 1988, the prevalence had risen to 42 percent, and in 1995 the prevalence remained at about 41 percent. The data show that tubal ligation and vasectomy were chiefly responsible for the overall increase in prevalence of surgical sterilization in the 1970's and 1980's. The percent of women reporting hysterectomies, based on self-reported national survey data, has remained relatively stable over the period from 1965 through 1995, though analyses of hospital discharge data suggest that hysterectomy rates may be declining (1,2).

Surgical sterilization has grown to be the most common method of contraception among women of reproductive age in the United States. In 1995, female sterilization (primarily tubal ligation) or male sterilization (vasectomy) was reported by 38 percent of all women aged 15–44 years who

were currently using a form of contraception, compared with 19 percent of current contraceptors in 1982 (3,4). Nearly 70 percent of currently contracepting women 40–44 years of age in 1995 relied on female or male sterilization (3).

A fairly clear portrait of who undergoes sterilizing operations, particularly for contraceptive reasons but also for medical reasons, has been established based on national survey data and smaller-scale studies (4–16). Age, parity, education, religious affiliation, marital status, race, and region of residence are among the strongest correlates of overall surgical sterilization, and to a lesser but important degree, correlates of the type of sterilizing operation chosen. Earlier research has hypothesized that the increased reliance on surgical sterilization over time stems from higher rates of contraceptive failure, rates that are even higher among socioeconomically disadvantaged women (5,17). Bumpass (5) has also argued that the oral contraceptive pill, first introduced in the 1970's, created greater expectations for contraceptive methods because of its higher theoretical effectiveness and relative convenience. However, there were concerns about the pill's long-term use and safety. Health concerns about the intrauterine device (IUD), most notably the Dalkon Shield, led to the withdrawal of many types of IUD's from the U.S. market in the 1980's (18). The prevalence of IUD use fell from as high as 10 percent of contracepting women in the 1970's to less than 2 percent in 1995. Thus, high expectations for method effectiveness and convenience combined with fears about method safety may have led many women (and couples) toward more permanent contraceptive methods such as tubal ligation and vasectomy.

In conjunction with the higher prevalence rates of surgical sterilization within age groups, it should be noted that the absolute numbers of women potentially opting for surgical sterilization increased dramatically over the past 30 years. As the large Baby Boom generation of women, those born roughly between 1946 and 1964, were aging through their reproductive years,

the age composition of women 15–44 years of age shifted markedly toward older ages. For example, between 1982 and 1995, the number of women aged 35–39 years increased by 42 percent, the number aged 40–44 years increased by 59 percent, and the number aged 15–29 years decreased by 6–15 percent (3). An older age distribution among women of reproductive age can mean a surge in the number and prevalence of women achieving their desired family size and possibly choosing sterilization as a more permanent method of contraception. The apparent leveling off seen in 1995 in the overall prevalence of surgical sterilization among women 15–44 years of age may be due to the fact that Baby Boom women were aging out of the peak reproductive years, and may also represent the impact of delayed first births among these women.

Using the most recent national data available, this report presents trends in the prevalence of surgical sterilization overall, and by type of sterilizing operation. Several national surveys in recent decades have also included information on reasons for sterilizing operations. However, the questions used have changed enough between surveys that it is difficult to study changes over time in self-reported reasons for the three most common sterilizing operations. Therefore, in this report, only 1995 data on reasons for operations are shown, and can provide a starting point for future trend analyses.^a It is expected that tubal ligations and vasectomies were done primarily for contraceptive reasons, while women with hysterectomies are expected to report medical reasons with highest frequency.

Another topic on which this report is limited to the most recent survey data is the desire for reversal of tubal ligation and vasectomy; the questions asked across survey years were not

^aUsing only the data from 1995, it is possible to examine trends across birth cohorts by showing reasons for the operation according to age at time of interview, but this was deemed beyond the scope of this report. One would need to consider potential confounding by secular changes (if any) in age at time of operation.

sufficiently comparable to examine trends. Although measures of desire for reversal are sometimes referred to as “sterilization regret,” this phrase can be misleading and is not used in this report. Women are reporting their attitudes (and those of their husbands or cohabiting partners) at the time of interview, not at the time of operation or even postoperation. Given that one of the chief predictors of desire for reversal has been found to be the occurrence of remarriage (i.e., the operation occurred during an earlier union) (19,20), trends in desire for reversal may be more a reflection of changes in the incidence of divorce and remarriage, as well as changes in the likelihood of success of reversal operations.

Methods

To examine changes in the prevalence of surgical sterilization over time, this report provides national data from 1965 through 1995 by type of sterilizing operation. Reasons for sterilizing operations and desire for reversal of tubal ligation and vasectomy are shown for 1995, the most recently available survey year. Data are presented by key demographic and socioeconomic characteristics of the woman at the time of the interview, such as age, marital status, parity, income, education, religion, and race and Hispanic origin. With the exception of relatively unchanging attributes such as self-reported race and Hispanic origin, it is acknowledged that many of these characteristics may have been different at the time of the sterilizing operation and that some of the associations noted in this report may be affected by using characteristics at the time of interview rather than at the time of operation. In addition, it is noted that using characteristics of the woman may not be an adequate substitute for using her husband’s or partner’s actual characteristics.

Data for 1965 are obtained from the National Fertility Study (NFS), conducted by Princeton University. Data for 1973, 1982, 1988, and 1995 are from Cycles 1, 3, 4, and 5 of the

National Survey of Family Growth (NSFG), conducted by the National Center for Health Statistics (NCHS). The NFS and all cycles of the NSFG were based on multistage probability samples of the civilian noninstitutionalized population of women in the United States, yielding estimates that are representative of the national population of women in the age ranges covered by the surveys. Recent cycles of the NSFG have been jointly planned and funded by NCHS, the Office of Population Affairs (OPA), and the National Institute for Child Health and Human Development (NICHD), with additional support from the Administration for Children and Families. The main purpose of the NSFG is to collect data on factors affecting pregnancy and women’s health in the United States. The NSFG supplements and complements data from the National Vital Statistics System on births, marriage and divorce, fetal death, and infant mortality. The NSFG is also a significant part of the Centers for Disease Control and Prevention’s public health surveillance for women, infants, and children—particularly on contraception, infertility, unintended pregnancy and childbearing, teenage pregnancy, and breastfeeding.

The 1988 and 1995 NSFG surveys drew their samples from the National Health Interview Survey, an ongoing household survey also conducted by NCHS, in collaboration with the U.S. Bureau of the Census. The 1995 NSFG was the first in the series to be conducted with computer-assisted personal interviewing (CAPI), which significantly improved the quality and timeliness of the data. Further details on the sample design and data collection procedures for all of the NSFG cycles

can be found in several published reports (21–26).

The 1995 NSFG was based on personal, inhome interviews with a national sample of 10,847 women 15–44 years of age. Interviews were conducted between January and October of 1995 with 1,553 Hispanic women, 6,483 non-Hispanic white women, 2,446 non-Hispanic black women, and 365 women of other races and ethnic origins. The 1988 NSFG consisted of personal interviews with 8,450 women aged 15–44 years, the 1982 NSFG included 7,969 women aged 15–44 years, and the 1973 NSFG included 9,797 women aged 15–44 years. The 1965 NFS included a wider age range of 15–54 years, but only data for the 4,810 women aged 15–44 years were used for this report because the NSFG surveys were limited to women in this age range.

Table A summarizes the number of sample cases in each survey year. The 1965 NFS was targeted at women who were currently married at time of interview, and the 1973 NSFG was targeted at women who were currently or formerly married (“ever-married”). The 1982 NSFG was the first in this series of surveys to include women regardless of marital status. Therefore, tables showing trends from 1965 to 1995 are limited to women currently married at the time of interview and those showing trends from 1973 through 1995 are limited to women ever married at the time of interview.

In all five surveys, women were asked about sterilizing operations that they or their current husbands have had. Beginning in 1982, women could report more than one such operation, and beginning in 1988, each woman cohabiting with a partner at the time of interview was explicitly asked whether

Table A. Number of sample women 15–44 years of age by survey year: 1965–95

Survey year	All women	Ever-married women	Currently married women
1965	4,810
1973	...	9,797	7,418
1982	7,969	4,651	3,551
1988	8,450	5,290	4,031
1995	10,847	6,844	5,291

... Category not applicable

her partner had ever had a vasectomy or other operation that rendered him sterile. Although the precise wording and flow of questions about sterilizing operations varied across survey years (see [appendix I](#)), certain information collected was comparable. For example, for each reported operation, women were asked to give the type of operation and the date so that trends can readily and reliably be examined over the 30-year period as to type of operation and age at operation. This report is limited to age at interview because the primary purpose was to describe changes over time in the *prevalence* of surgical sterilization among women 15–44 years of age.

Other data collected for each operation, such as reasons for the operation and desire for reversal (for tubal ligations and vasectomies), are less amenable to trend analyses because, as noted above, the series of questions were substantially different from year to year (see [appendix I](#)) and also because there have been significant advances in the operative techniques and success of sterilization reversals. In this report, reasons for sterilizing operations and the desire for reversal are presented based only on the most recent data (1995). This permits the inclusion of all women regardless of marital experience.

Results

Women's Age and Type of Operation: 1965–95

For each survey year from 1965 to 1995, [table 1](#) shows the percent of married women who were surgically sterile at the time of interview and the percents reporting tubal ligation, hysterectomy, and vasectomy. Bilateral oophorectomy (the removal of both ovaries) is included only in the “all operations” percents because this sterilizing operation was reported too infrequently to show separately in this report. The overall percent surgically sterile rose from 16 percent in 1965 to 39 percent in 1982 and appears to have leveled off at about 41–42 percent in the late 1980's and 1990's. As earlier

reports have documented, the prevalence of surgical sterilization increases with age, and this increase can be seen in each survey year. In 1965, sterilizing operations were reported by 3 percent of married women 15–24 years of age, 14 percent of those 25–34 years old, and 25 percent of those 35–44 years old. At their highest levels in 1988, the age-specific proportions surgically sterile were 6 percent among women 15–24 years old, 31 percent among those 25–34 years old, and 65 percent among those 35–44 years old. Among older women, there has been a downward turn in surgical sterilization since 1988, perhaps related to the delayed childbearing of Baby Boom women.

Looking at the three most common types of sterilizing operations, [table 1](#) shows that there was little change in the proportion of women with a hysterectomy, but considerable change in the proportions reporting tubal ligation and vasectomy since 1965. Both of these potentially reversible operations have increased in prevalence over the last 3 decades. The percent of all married women aged 15–44 years reporting tubal ligations grew sixfold, from 4 percent in 1965 to 24 percent in 1995. The bulk of the increase seems to have occurred between the 1973 and 1982 surveys. Similar trends were seen for tubal ligation within age groups. There were substantial increases in the prevalence of vasectomy, from 4 percent of husbands in 1965 to 15 percent in 1995. The pace of the increase appears to have slowed after the 1982 survey.

[Table 1](#) also shows that tubal ligation has become far more common than hysterectomy and vasectomy. Prevalence rates of tubal ligation and vasectomy were comparable in 1965 and 1973 among all women and within age groups. In the 1982 survey, tubal ligation began to overtake vasectomy in prevalence, particularly among women 25 years and older. By 1995, 24 percent of wives 15–44 years of age reported a tubal ligation compared with 15 percent who had husbands with vasectomies. Women 25–34 years of age showed the widest gap, with tubal ligation reported twice as often as vasectomy (18 compared with 9 percent).

Women's Race and Hispanic Origin and Type of Operation: 1973–95

[Table 2](#) depicts the percent surgically sterile among ever-married women according to type of operation and race and Hispanic origin over the period 1973–95. The overall prevalence of surgical sterilization was comparable across racial and ethnic groups in 1973, ranging from 20 percent among non-Hispanic black women to 23 percent among non-Hispanic white women. Over time, black women experienced the largest increase in surgical sterilization, from 20 percent in 1973 to nearly 50 percent in 1995. Hispanic women have generally had the lowest prevalence of surgical sterilization among the three racial/ethnic groups shown, but by 1995, their level (37 percent) was close to the level seen among non-Hispanic white women (41 percent).

Tubal ligation accounted for the bulk of the increase in surgical sterilization since 1973 across all three racial/ethnic groups, but this was particularly the case among black women, in whom the percent reporting a tubal ligation quadrupled from 10 to 41 percent. While tubal ligation among white women tripled from 8 to 24 percent, vasectomy among their husbands was a significant contributor to the overall increase in surgical sterilization among white women, nearly doubling from 8 to 15 percent. The rise in the prevalence of vasectomy among the husbands or partners of all women, from 7 to 12 percent, was primarily driven by its near-doubling among husbands or partners of white women, from 8 to 15 percent. With regard to hysterectomy, there has been a small decline in prevalence (about 2 percentage points) among all women and among non-Hispanic white women between 1982 and 1995. No significant change over time was seen among Hispanic and non-Hispanic black women, but the data suggest lower rates of hysterectomy among Hispanic women and higher rates among black women, relative to non-Hispanic white women in all survey years.

Women's Characteristics and Surgical Sterilization: 1973 and 1995

Percent Surgically Sterile

Table 3 compares the percent of ever-married women reporting sterilizing operations by selected sociodemographic characteristics of the woman and type of operation for 1973 and 1995. In every group shown, there was a significant increase in the prevalence of overall surgical sterilization between the two survey years. As demonstrated in earlier NSFG reports and in other studies, when all operations are considered together, surgical sterilization prevalence in both survey years increases steadily with age (at interview) and parity, and declines with education (at interview) and age at first birth. The effects of age, parity, and age at first birth are striking and generally consistent across types of operation, particularly for tubal ligation (**table 3**). For example, nearly 60 percent of women who had their first birth as a teenager were surgically sterile in 1995, with 44 percent reporting a tubal ligation. In contrast, 25 percent of women whose first birth occurred at 30 years or older were surgically sterile in 1995, with 14 percent reporting tubal ligation. Compared with 1973 figures, the prevalence of surgical sterilization remained about the same among women who were 30 years or older at first birth (22–25 percent), but nearly doubled among women who had their first births as teenagers (30–59 percent).

The association between higher education and lower levels of overall surgical sterilization has been observed in numerous surveys, including the NSFG. For example, a proportional hazards analysis of the 1984 Canadian Fertility Study found that education had a consistent predictive effect on sterilization rates in all birth cohorts, but showed the strongest effect in the youngest cohort (6). Based on NSFG data (**table 3**), education appears to play opposite roles in the prevalence of tubal ligation and vasectomy: higher education is associated with lower frequency of the female operation and higher frequency of the male operation.

The 1995 data suggest that women with education less than high school were less likely to have husbands or partners who have had a vasectomy. (While it should be noted that this report shows women's education rather than the men's, tabulations not shown in this report indicate similar patterns using men's education.) Comparing 1973 and 1995 figures, there was a widening of the gap between tubal ligation and vasectomy among less educated women. In 1973, women with less than a high school education reported tubal ligation twice as often as they reported vasectomies among their partners (14 compared with 7 percent). In 1995, such women reported tubal ligations 6 times more often than vasectomies (42 compared with 7 percent). High school graduates in 1973 reported tubal ligation and vasectomy at equal rates, but in 1995, they reported tubal ligation more than twice as often (33 compared with 14 percent).

As seen with education, higher income was associated with lower levels of overall surgical sterilization and had opposite effects on tubal ligation and vasectomy. Higher income was linked to lower prevalence of tubal ligation, particularly in 1995. Between 1973 and 1995, the prevalence of tubal ligation uniformly tripled across all income groups. In both survey years, higher income was associated with a narrower gap in prevalence of female versus male sterilization. Lower income women in 1995 were about 8 times as likely to have undergone tubal ligation than their husbands or partners were to have undergone a vasectomy (41 versus 5 percent). In contrast, higher income women were almost equally likely to have undergone the female operation as their husbands or partners were to have undergone the male operation (20 versus 15 percent).

With regard to religion, **table 3** shows that Protestant women in both survey years had the highest rates of overall sterilization and of tubal ligations, in particular, among all religious groups, with the exception of the "other" group (in 1973) that was small and probably more heterogeneous. Although sample sizes were small, Jewish women were less likely to have

undergone sterilizing operations than all other religious groups shown. While tubal ligations represented nearly two-thirds of the operations reported by Protestant and Catholic women, tubal ligations represented about one half of the operations reported by Jewish women, with the other half being almost all vasectomies. These findings are consistent with earlier reports of religious differences in contraceptive choice, as well as differences in selection of female versus male sterilizing operations (8,9).

The pattern of surgical sterilization by region of residence changed between 1973 and 1995. In 1973, women residing in the West were the most likely to report a sterilizing operation, with 8 percent reporting tubal ligations and 13 percent reporting vasectomies. In 1995, residence in the South was associated with the highest proportions surgically sterile, and tubal ligation was 3 times more common than vasectomy (31 compared with 10 percent). The data for 1995 also suggest that women in the South were more likely to have undergone hysterectomies than women in other regions. Data not shown indicated that Southern women's higher rates of tubal ligation and hysterectomy may be related to their generally younger age at first birth and higher parity. These findings appear consistent with earlier studies of female sterilization that have found higher rates of tubal ligation and hysterectomy in Southern hospitals (2,16,27). Given that nonwhite women are disproportionately represented among all births in the South, it should particularly be noted that postpartum ligation rates after vaginal delivery were found to be 20 percent higher for nonwhite women than for white women, and after cesarean delivery, about 40 percent higher (27).

Race and Hispanic Origin and Selected Characteristics

As noted above, some of the variation in surgical sterilization prevalence observed by race and Hispanic origin (**table 3**) may be tied to racial and ethnic differences in characteristics such as age at first birth, religious affiliation, and region of

residence. [Table 4](#) presents data for 1973 and 1995 that begin to address the question of whether the association between these characteristics and surgical sterilization may vary by race and Hispanic origin.

In both survey years, younger age at first birth was strongly associated with higher levels of overall sterilization and tubal ligation in particular, regardless of race and Hispanic origin. In 1973, there were no significant racial/ethnic differences (within categories of age at first birth) in the prevalence of overall sterilization or in tubal ligation. The 1995 data indicate two important shifts in the associations among surgical sterilization, age at first birth, and race and Hispanic origin. First, Hispanic women in 1995 whose first birth occurred before age 20 years were significantly less likely than white or black women to be surgically sterile (45 compared with 63 percent). Second, black women in 1995 were consistently more likely than Hispanic or white women to have undergone a tubal ligation, regardless of age at first birth. For example, over 55 percent of black women whose first birth occurred before age 20 years were surgically sterile compared with 43 percent of white women and 39 percent of Hispanic women with first births before age 20 years.

Protestant women in both survey years, regardless of race and Hispanic origin, were more likely to be surgically sterile than Catholic or Jewish women (though the Jewish subgroup could only be shown for non-Hispanic white women). The prevalence of tubal ligation was also higher for Protestant women than for Catholic or Jewish women in all racial/ethnic groups. The 1995 data show that black Protestant women were significantly more likely than white Protestant women to have undergone tubal ligations (41 versus 27 percent). Though numbers were small, the data suggest that black Catholic women in 1995 were nearly twice as likely as white Catholic women to report tubal ligations (35 compared with 18 percent), and also more likely than Hispanic Catholic women to report tubal ligations.

While overall sterilization levels in 1995 were higher for all residents of the South compared with residents of other regions ([table 3](#)), [table 4](#) shows that black women living in the South were more likely to be surgically sterile than their white and Hispanic counterparts (52 compared with 45 percent). Black women in the South were also significantly more likely to report a tubal ligation than Southern white women (43 versus 27 percent). Vasectomy was reported more often by white women in the West than other white women. Although numbers were small, the data suggest that black women in the West reported a higher vasectomy prevalence of their husbands or partners than among black women in other regions.

Parity, Age, Education, and Race and Hispanic Origin

[Table 5](#) shows the percent surgically sterile in 1973 and 1995 by parity, age, and education. [Figure 1](#) illustrates similar percents for 1995 by education and race and Hispanic origin. Earlier reports, as well as this analysis, have shown that the prevalence of surgical sterilization increases with age and parity and decreases with educational attainment. It is generally recognized that age, parity, and education are interrelated—for example, older age is associated with higher parity and higher education is associated with lower parity. It is also acknowledged that these factors are related to age at first birth, and that all of these factors vary by race and Hispanic origin (28,29). Women of higher socioeconomic status (e.g., higher education) are more likely to have their first birth at older ages and therefore less likely to undergo surgical sterilization in the age range covered by the NSFG. Similarly, women who have their first birth at younger ages are more likely to reach their desired family size earlier and choose to have a sterilizing operation.

[Table 5](#) shows that controlling for parity somewhat diminishes the association between education and the prevalence of surgical sterilization. In both 1973 and 1995, nulliparous women and high-parity women (those with 3 or more births) showed lower rates of

sterilizing operations at higher levels of education. For example, in 1995 nulliparous women with less than a high school education were nearly 3 times as likely to be surgically sterile than their counterparts with a college degree (32 versus 11 percent). However, for women with 1–2 births, the link between education and the prevalence of surgical sterilization appears to be less clearcut. [Figure 1](#) shows that after controlling for education, black women in 1995 had somewhat higher levels of surgical sterilization than Hispanic or non-Hispanic white women. For example, 56 percent of ever-married black high school graduates were surgically sterile compared with 50 percent of white women and 42 percent of Hispanic women.

In a preliminary assessment of the net effect of factors including race and Hispanic origin, [table 6](#) shows the adjusted odds of surgical sterilization in 1973 and 1995, derived from weighted logistic regression models that control for the variables shown in [table 3](#). (Note that the 1995 regression model was obtained using SUDAAN software, which takes into account the complex sample design of the NSFG. However, the 1973 regression model did not account for the design effect, but was weighted by the reciprocal of the mean weight to scale down the significance levels of the odds ratios.) In these regression models, black race did not show a significant net effect on surgical sterilization in either 1973 or 1995, although the sample sizes of nulliparous black women and college-educated black women in these cycles of the NSFG may have been too small to draw reliable inferences with respect to the net (main) effects of parity, education, and race or any possible interactions among these factors. The net effects of most of the variables in the models were quite consistent across both survey years: in addition to being married at the time of interview, the characteristics most strongly associated with reporting any sterilizing operation were Protestant affiliation, older age at interview, younger age (less than 20 years) at time of first birth, and higher parity. With regard to education, higher levels, particularly a college degree or higher,

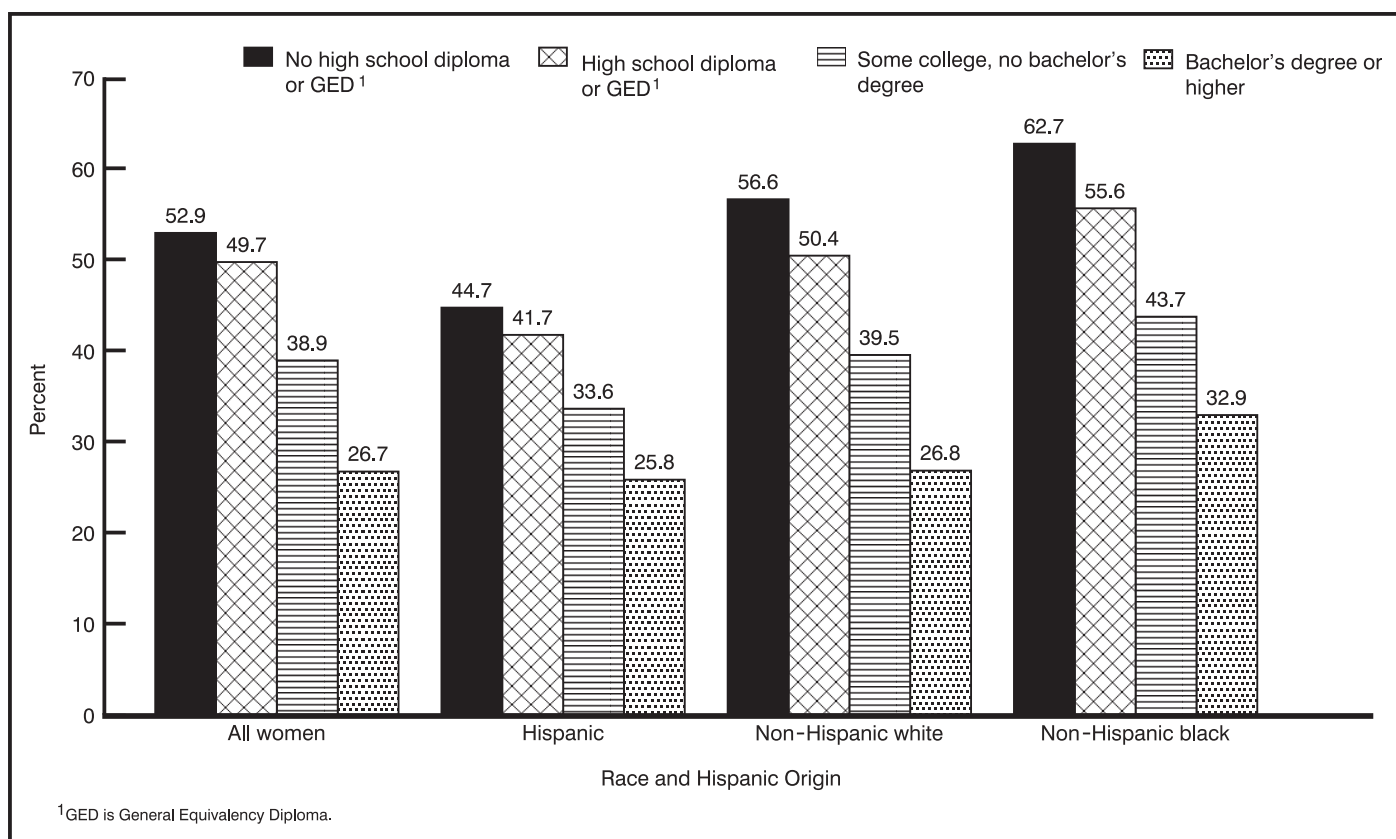


Figure 1. Percent of ever-married women 22–44 years of age who were surgically sterile by education and race and Hispanic origin: United States, 1995

were associated in both survey years with lower odds of having undergone a sterilizing operation. The net effect of region of residence has apparently changed over time. Compared with residents of the South, residents in the West were more likely to have undergone a sterilizing operation in 1973. However, in 1995 residents of all non-South regions, including the West, were less likely to report a sterilizing operation.

Percent Distribution of Selected Characteristics

Table 7 shows the data from a different standpoint than the earlier tables in this report. Tables 1–5 show the percent of women in various subgroups who reported sterilizing operations. In contrast, table 7 gives the percent distribution of sociodemographic characteristics among all ever-married women, women reporting any sterilizing operations, and women reporting tubal ligation, hysterectomy, or vasectomy. This table illustrates how the profiles of women who had undergone (or whose

partners had undergone) these operations changed between 1973 and 1995, as well as how the population of ever-married women changed over this time period. Among all ever-married women, there was little change in the percent distribution by region of residence, poverty level income, and race and Hispanic origin, though there was a decline in the proportion of non-Hispanic white women in 1995. For the most part, the distributions of these characteristics among surgically sterile women were also the same in 1973 and 1995. As supported by the results shown in table 3, a higher proportion of tubal ligations were reported by Southern women in the 1995 survey—41 percent compared with 34 percent in the 1973 survey.

With regard to age, parity, marital status, education, and religious affiliation, there were more noteworthy changes between 1973 and 1995.

Age

Ever-married women were significantly older in 1995 than in 1973. For example, the proportion aged 35–44

years increased from 36 to 51 percent. Women were also older at the time of their first birth—the percent who had their first birth at age 30 years or older rose from 2 to 11 percent, and the percent whose first birth occurred before age 20 years fell from 40 to 29 percent. Women who reported any sterilizing operations for themselves or their husbands or partners were generally older (35–44 years). The proportion of tubal ligations reported among women aged 35–44 years doubled from 34 to 68 percent from 1973 to 1995, and the fraction of hysterectomies and vasectomies reported by women aged 35–44 years more than doubled over this period. There was no change between 1973 and 1995 in the distribution of hysterectomies by age at first birth. However, for tubal ligations and vasectomies, there was a significant shift toward women who had their first births at older ages—mirroring the shift among all ever-married women.

Parity

Between 1973 and 1995, a substantially higher percent of sterilizing

operations, including hysterectomy, occurred among nulliparous women and lower parity women (those with 1 or 2 births). This may be expected given that a smaller proportion of ever-married women had 3 or more births (37 percent in 1973 compared with 25 percent in 1995). In 1995, nearly 60 percent of all operations were to women with fewer than 3 births, while in 1973, only 35 percent were in these parity groups.

Marital Status

The percent of ever-married women who were currently married at the time of interview fell from 85 percent in 1973 to 79 percent in 1995. There were corresponding shifts in the distribution of tubal ligations and hysterectomies by marital status over this time period. The figures for vasectomy do not signify any particular difference in marital status distribution compared with the female operations because only married or cohabiting women were asked about vasectomy. It can be noted, however, that the fraction of “divorced, widowed, or separated” women reporting that their partners had vasectomies rose slightly from less than 1 percent in 1973 to nearly 3 percent in 1995, probably due to the increased prevalence of nonmarital cohabitation in the last 2 decades (3,30).

Education

As in the earlier tables, the percent distributions for education were limited to women aged 22–44 years at the time of interview to maximize the chances for women to report college attendance. The proportion of ever-married women who had graduated from college doubled from 11 percent in 1973 to 23 percent in 1995, a finding corroborated by data from the Current Population Survey (31). This upward shift in the educational attainment of all ever-married women may be responsible for the general upward shift in education among the surgically sterile, regardless of the type of operation. The fraction of sterilizing operations that were reported by women with any college attendance also doubled, from 18 percent in 1973 to 37 percent in 1995.

Religion

Between 1973 and 1995, there was a decrease in the percent reporting Protestant affiliation among ever-married women, from 64 percent to 54 percent. Within each operation group in 1995, there was a comparable shift away from Protestant affiliation and apparently into the “no religious affiliation” category. While no change was seen in the proportion reporting Catholic affiliation, partners of Catholic women represented a higher proportion of vasectomies—30 percent in 1995 compared with 20 percent in 1973.

Reasons for Sterilizing Operations: 1995

As mentioned earlier, it is not possible to create a comparable measure of reasons for sterilizing operations across all surveys from 1965 through 1995 because the questions differed in important ways. In the 1995 survey, up to four separate female sterilizing operations were recorded to allow for women who may have had several operations including tubal ligation, hysterectomy, ovary removal, and some other type of operation. For each female sterilizing operation reported in the 1995 NSFG, the woman was asked a “code all that apply” question:

“Now please look at Card D-3 which lists some reasons that women sometimes give for having sterilizing operations. Which reason or reasons do you believe are closest to your own?”

The response categories were as follows:

- You had all the children you wanted.
- Your husband or partner at the time did not want any more children.
- Financial reasons.
- Medical reasons.
- Reasons related to birth control.
- Some other reason.

Women who reported “medical reasons” were asked to report which of the following medical reasons applied to them, again choosing all that may apply:

- Medical problems with your female organs.
- Pregnancy would be dangerous to your health.

- You would probably lose a pregnancy.
- You would probably have an unhealthy child.
- Some other medical reason (SPECIFY:).

Women who reported “reasons related to birth control” were asked:

“Was your method of birth control dangerous to your health, or did you not like your method of birth control for other reasons?”

Women could report health reasons only, other reasons only, or both health and other reasons. (Appendix I gives more details on the guidelines provided to the interviewer and the respondent for choosing among these reasons for sterilizing operations.)

A similar sequence of items was used for male sterilizing operations, with some minor wording changes to make the question and response categories appropriate for male operations. For example, the response set for “medical reasons” did not include “Medical problems with your female organs” but did include “He had health problems that required the operation.” It should also be noted that the woman was only asked to report on her husband’s or partner’s reasons for the operation if the operation was done during the time of their relationship. While she may know the reasons for his operation regardless of when it was done, it was believed that a woman could more accurately report on reasons for operations that occurred while she might potentially have been involved in the decisionmaking about sterilization.

In table 8, the most common reasons given for sterilizing operations are shown by parity and type of operation for all women, and to the extent possible given sample sizes, by type of operation for white, black, and Hispanic women. Table 9 gives the percent of women reporting specific medical reasons for their tubal ligations or hysterectomies or their husbands’ or partners’ vasectomies. The most commonly mentioned reason for tubal ligation was that the woman wanted no more children (71 percent), followed by medical problems (21 percent). Among nulliparous women who had tubal

ligations, medical problems (53 percent) and problems related to birth control (35 percent) were the most often cited reasons, while only 6 percent reported that either they or their partner wanted no children. Among women with any births, higher parity was associated with more reporting of contraceptive motivation and less reporting of medical problems, but no difference in reporting of financial barriers. No significant differences in reported reasons for tubal ligation were seen among white, black, and Hispanic women.

With vasectomy as with tubal ligation, contraception was the primary motivation reported by women. However, a higher percent of nulliparous women cited contraceptive reasons for their husbands' vasectomies than for their own tubal ligations (45 percent compared with 6 percent). Women with 1–2 births were also less likely to report contraceptive motivation for their tubal ligations than for their husbands' vasectomies. For example, 60 percent of women with one birth cited contraceptive reasons for their tubal ligations, compared with 89 percent of one-birth women whose partners had vasectomies. In general, across all parity groups, the husband or cohabiting partner who had undergone a vasectomy was reported as not wanting any more children more often than the woman herself was. Problems with birth control were cited as reasons for vasectomy more often than any other operation or parity group, with the exception of nulliparous women with tubal ligations. Among women giving reasons for their partners' vasectomies, birth control-related reasons were reported twice as often among nulliparous women as among women with any births (39 percent compared with 20–22 percent).

With regard to hysterectomy, 90 percent of all women reporting this operation cited medical problems. As seen in [table 9](#), nearly 90 percent cited medical problems with their reproductive organs, in contrast to some other danger to themselves or their babies. Regardless of parity, 4–10 percent reported that when they had these operations, they did not want to have any (more) children.

Desire for Sterilization Reversal: 1995

In the 1995 NSFG, women who reported an unreversed tubal ligation or an unreversed vasectomy as their only sterilizing operation(s) were asked about their desire for sterilization reversal. Women were also asked to report on their current husband's or cohabiting partner's desire for reversal of her tubal ligation and/or his vasectomy. These questions on desire for reversal were limited to women who reported no sterilizing operations other than tubal ligation or vasectomy. This permitted a focus on only those women who could potentially regain their fecundity, that is, their physical capacity to have a child. As with reasons for sterilizing operations, trends across survey years cannot readily be examined because the questions related to desire for reversal were modified significantly from year to year. Also, the probable success of sterilization reversal operations has increased over time.

It should be noted that neither tubal ligation nor vasectomy is necessarily reversible, and these operations should be considered as permanent contraception. Not only does reversal require major surgery that is costly and technically difficult (18), but also this surgery is generally not covered by health insurance, unlike the original sterilizing operation. NSFG data presented here on desire for reversal do not address socioeconomic barriers that may affect the likelihood of women or their partners undergoing reversal surgery, nor can they address clinical attributes that influence the success of reversal surgery (e.g., age, tubal length remaining, operative technique used in the first operation) (18,32).

While these limitations should be considered when interpreting data on desire for reversal, these data have intrinsic value as an important indicator of dissatisfaction with sterilization as a method of contraception. Desire for reversal may also represent a marker for "sterilization regret." As mentioned earlier, this report does not equate the two terms because "regret" is a complex psychological process that may or may not manifest itself in an actual

desire for reversal (19,20). Just as "regretting" one's sterilizing operation does not necessarily mean that the individual wants it reversed, expressing a desire to have the operation reversed is not equivalent to being sorry that the operation took place, nor is it equivalent to saying that one would not make the same choice again if given another chance to decide about undergoing surgical sterilization. In conjunction with reasons for sterilizing operations, data on desire for reversal have implications for those who provide counseling for family planning, particularly as sterilization has become the most prevalent form of contraception among women 15–44 years of age. These data also have research implications for those who develop and investigate permanent and nonpermanent methods of contraception.

In earlier studies of the predictors of poststerilization regret, couple agreement about the sterilization decision was a key factor (19). Extending this idea to the desire for sterilization reversal, [table 10](#) shows couple agreement separately for tubal ligation and vasectomy according to selected characteristics of the woman. Note that the partner's desire for tubal ligation reversal was only asked of married and cohabiting women. Questions on desire for vasectomy reversal were only asked of married or cohabiting women whose partners had their vasectomies during the time of their relationship. Therefore, it is not possible with these data to explore the hypothesis that women may report greater desire for reversal of vasectomies that occurred in their partners' previous unions. Other studies have identified younger age and the acquisition of a new partner (for example, following divorce) as significant predictors of sterilization regret and desire for reversal, along with ambivalence about future childbearing and about the sterilization decision itself (19,20).

Among 9.2 million women with unreversed and potentially reversible tubal ligations at the time of the interview in 1995, 76 percent expressed no desire for reversal on the part of either partner, 10 percent said that she

alone wanted reversal,^b 6 percent said that her partner alone wanted reversal, and 8 percent reported that both she and her partner desired reversal (table 10). Among 3.7 million married or cohabiting women reporting unreversed and potentially reversible vasectomies, 89 percent expressed no desire for reversal on either partner's part, and 3 percent shared a desire for vasectomy reversal with their partners. This lower level of desire for reversal of vasectomy compared with tubal ligation has been found in other studies (33). Desire for reversal by at least one partner was more common among younger women, as noted in other studies (19). Future studies with the NSFG data might investigate the role of age at operation (rather than at interview) and duration since the operation in the reporting of desire for reversal.

Table 10 also shows several other factors associated with desire for sterilization reversal. Women of Hispanic origin and those with education less than high school, lower income, and residence in the South or West were more likely to express some desire for reversal of tubal ligation. Hispanic origin, education, income, and region of residence were not associated with desire for vasectomy reversal, but to some extent this may be related to the very small numbers of vasectomies in these groups. Though the number of nulliparous women with potentially reversible tubal ligations was also quite small, it appeared that women with no births were no more likely to desire reversal than women who have had children. This absence of a relationship may be related to the higher prevalence of medical problems (53 percent) and birth control method problems (35 percent) among reasons cited for tubal ligation by women with no births (table 8).

^bSome of this group includes women who were not married or cohabiting at time of interview but who desired reversal of their tubal ligations. In contrast, because vasectomy reversal questions were only asked of married or cohabiting women, the "only R wants" group does indeed indicate women who alone desired reversal of vasectomies.

Reasons cited for having a potentially reversible sterilizing operation such as tubal ligation may be related to women's reports of a desire for reversal, perhaps as a result of women's perceptions of the "true" reversibility of their operations. For example, women who have undergone tubal ligations for medical reasons may not express a desire for reversal because they would consider themselves realistically unable or ill-advised to have children, due to their health problems, even after reversal of their ligations. To begin to explore this hypothesis, table 11 shows the percent distribution of desire for reversal according to selected reasons cited for tubal ligation and vasectomy. The data suggest that financial or medical reasons were more often associated with some degree of desire for tubal ligation reversal than women's wanting no more children.

Discussion

Overall Surgical Sterilization

The most recent national data indicate that after dramatic increases between 1965 and 1982, the prevalence of surgical sterilization among women in the primary reproductive years appears to have stabilized at about 40 percent of currently married and ever-married women. This report has largely been restricted to ever-married women because the occurrence of sterilization among never-married women in 1995, while higher than in previous survey years, was markedly lower than among currently and formerly married women (5 percent compared with 40–41 percent in 1995) (3). The increased overall prevalence of surgical sterilization among women 15–44 years of age between the 1965 and 1988 surveys can largely be attributed to the following factors:

- **Aging of the Baby Boomers**—The large post-World War II birth cohorts were passing through their reproductive years, and the age

composition of Baby Boom women was shifting upward throughout the 1970's and 1980's toward the ages when family sizes might be completed and permanent forms of contraception might be chosen.

- **Higher expectations for contraception**—With the introduction of more contraceptive options, in particular the oral contraceptive pill, women had higher expectations for the effectiveness, convenience, and safety of their birth control methods. Reduced fear and stigma associated with permanent sterilization, coupled with greater health concerns about nonpermanent methods such as the pill and the IUD, may have pushed more women and their partners to opt for surgical sterilization.
- **Contraceptive failure**—Women with prior histories of contraceptive failure and unintended births were more likely to undergo surgical sterilization (5). Because higher contraceptive failure rates were experienced disproportionately by women of lower socioeconomic status (17), nonwhite women and women with lesser education and income were disproportionately represented among the increasing number of surgically sterile women over time, particularly those reporting tubal ligations.

Similarly, several hypotheses may be suggested for the apparent leveling off in the prevalence of surgical sterilization among women 15–44 years of age in the 1988 and 1995 surveys:

- **Delayed childbearing**—Baby Boomers, and the birth cohorts that followed them, were more likely than their predecessors to delay their first births until older ages, as evidenced by the 1973–95 increase from 2 to 11 percent in the percent of women who had their first birth at 30 years or older (table 6), as well as increasing birth rates of all orders among older women (34). As a result, older women, especially those 35–44 years old, were and perhaps will continue to be less likely to have completed their families and less inclined to undergo

permanent sterilization. Because more women were still trying in their late 30's and 40's to have their desired number of children, fewer women in this age group were candidates for any form of contraception.

- ***Diminished health concerns about nonpermanent methods***—Although trend data from the NSFG do not indicate that pill use among women 35–44 years old has increased in the past 10–15 years (4,35), it may be that women are returning to the nonpermanent methods of birth control as health and safety concerns about the pill and other methods are allayed. For example, women over age 35 years are no longer advised against using the pill unless they have other contraindicating risk factors such as cigarette smoking or cardiovascular problems (18).
- ***Uncertainty of relationships***—Women and men may be more reluctant to adopt permanent forms of contraception in the face of greater uncertainty in their relationships—for example, as a result of higher rates of divorce in the last 2 decades (36). Several studies suggest that entering a new relationship, or at least the possibility of doing so, may lead women or their partners to avoid sterilization or to desire reversal of sterilizing operations they underwent in previous relationships (11,19,20,37).
- ***Greater concern about disease risk***—Though perhaps not as salient among married women or women in long-term monogamous relationships, heightened concerns about HIV and other sexually transmitted diseases (STD's) may deter reliance on sterilization. Given that only latex condoms and certain spermicidal jellies protect against STD's, it would not be sufficient for sexually active women to protect themselves only against pregnancy. Some studies have found that surgically sterile women are less likely to use condoms for HIV/STD prevention and may have less access to information, education, and preventive gynecologic care (38).

Type of Sterilizing Operation

The factors associated with overall surgical sterilization were generally those associated with the most prevalent operation, which has been tubal ligation since roughly the 1982 survey. Over time, higher levels of overall sterilization were consistently seen among women who were older at time of interview, were younger at time of first birth, had more births, were married, were less educated, and had lower income. The patterns of sterilization by region of residence changed between the 1970's and 1990's. In 1973, prevalence rates were highest in the West, driven largely by vasectomy. By 1995, they were highest in the South, driven largely by tubal ligation and hysterectomy—a finding observed in other studies (16). Higher prevalence of tubal ligation and hysterectomy in the South may be related to the higher proportion of black women than in other regions. Some studies have reported that hospitals in the South performed postpartum tubal ligations more frequently, particularly among nonwhite women, than hospitals in other regions. Also, nonwhite women (primarily black women) represented a disproportionately higher proportion of all deliveries in the South compared with other regions (27). Furthermore, Brett and colleagues (1) have suggested that higher hysterectomy rates among black women may be related to their higher incidence of uterine fibroids. These authors also found that hysterectomy was associated with low education and high parity, characteristics that are on average more common among black women than among white women in the United States.

Beginning with the 1982 survey, the prevalence of tubal ligation exceeded that of vasectomy. Despite that vasectomies are generally less expensive to perform and carry lower risks of side effects and complications, the majority of couples in the United States and other countries opt for the female operation (18,38,39). Although it should be noted that the NSFG cannot capture the full universe of men who have had vasectomies because the survey only

learns about men who are married to or cohabiting with women 15–44 years of age, more research is needed into the reasons why tubal ligation surpassed vasectomy among surgically sterile married couples. Some studies have pointed to advances in operative (and often out-patient) procedures that have improved the safety and convenience of tubal ligation, as well as societal and attitudinal changes that made sterilization more acceptable (5,7,11,40). It may also be that contraception has become more the domain and responsibility of women, particularly because of greater uncertainty of relationships. It can be difficult for a woman to control whether her partner uses a condom, and just as difficult and impractical, if not impossible, for her to expect or rely on her partner(s) to have a vasectomy.

More study is also needed to explain the significantly higher rates of tubal ligation among black women compared with nonblack women and the lower prevalence of vasectomy among the husbands and partners of Hispanic and black women in comparison with white women (3,16). Hispanic women are less likely to choose surgical sterilization of any type compared with other women. Black women are equally likely, if not more likely than white women, to report surgical sterilization, but they report a higher proportion of female operations than white women report. The higher prevalence of tubal ligation among black women may be tied to the fact that black women are, on average, younger when they have their first child (29). Younger age at first birth often means earlier completion of families and longer premenopausal intervals at risk of contraceptive failure and unintended pregnancy. As this report and other studies have shown, tubal ligation is less common among women of higher socioeconomic status (e.g., higher education and income). These women tend to have their first birth at older ages, making surgical sterilization less likely when they are between 15 and 44 years of age. Lower vasectomy rates among partners of black women (who are primarily black men) may also be related to racial differences in socioeconomic status. From the

perspective of NSFG, which interviews only women, vasectomy is more common among partners of women with higher education and income. These characteristics are usually less common among nonwhite individuals than among white individuals. In addition, black and Hispanic men are more likely to be uninsured or underinsured and may not be able to afford vasectomies (28).

Conclusion

This report presents national data on the prevalence of surgical sterilization from 1965 through 1995 by type of operation and key demographic and socioeconomic characteristics. After a dramatic rise in popularity between the 1960's and early 1980's, the prevalence of surgical sterilization among currently married and ever-married women 15–44 years of age appears to have leveled off at about 40 percent in the last 15 years. Among women reporting potentially reversible tubal ligations and vasectomies in the 1995 NSFG, nearly 25 percent of those with ligations and 11 percent of those whose partners had vasectomies expressed some desire for reversal of the operations. These data on desire for reversal, along with reported reasons for sterilizing operations, are included in this report as important descriptors of the surgically sterile population, and may suggest levels of dissatisfaction with permanent and nonpermanent forms of contraception. This information should not only prove relevant for providers of family planning and medical services, but also underscore the need for improving contraceptive options for individuals of all ages and fertility intentions.

References

- Brett KM, Marsh JVR, Madans JH. Epidemiology of hysterectomy in the United States: Demographic and reproductive factors in a nationally representative sample. *J Wom Health* 6(3):309–16. 1997.
- Lepine LA, Hillis SD, Marchbanks PA, Koonin LM, Morrow B, Kieke BA, Wilcox LS. Hysterectomy surveillance—United States, 1980–93. In: *CDC Surveillance Summaries*, Aug 8 1997. *MMWR* 46(SS-4):1–15. 1997.
- Abma JC, Chandra A, Mosher WD, Peterson LS, Piccinino LJ. Fertility, family planning, and women's health: New data from the 1995 National Survey of Family Growth. National Center for Health Statistics. *Vital Health Stat* 23(19). 1997.
- Peterson LS. Contraceptive use in the United States: 1982–90. Advance data from vital and health statistics; no 260. Hyattsville, MD: National Center for Health Statistics. 1995.
- Bumpass LL. The risk of an unwanted birth: the changing context of contraceptive sterilization in the U.S. *Pop Stud* 41:347–63. 1987.
- De Wit M, Rajulton F. Voluntary sterilisation among Canadian women. *J Biosoc Sci* 23:263–73. 1991.
- Ding WV. Contraceptive sterilization: A multivariate analysis of United States data (dissertation). Ann Arbor, Michigan, University Microfilms International. Publication order number DA8826982. 1987.
- Eckhardt, KW, Hendershot, GE. Religious preference, religious participation, and sterilization decisions: Findings from the National Survey of Family Growth, Cycle II. *R Rel Res* 25(3):232–246. 1984.
- Goldscheider C, Mosher WD. Patterns of contraceptive use in the United States: The importance of religious factors. *Stud Fam Plann* 22(2):102–15. 1991.
- Marquette CM, Koonin LM, Antarsch L, Gargiullo PM, Smith JC. Vasectomy in the United States, 1991. *Am J Pub Health* 85(5):644–9. 1995.
- Miller WB, Shain RN, Pasta DJ. The sterilization decision in a U.S. sample. In: Bulatao R, Palmore J, Ward S (eds.). *Choosing a contraceptive: Method choice in Asia and the U.S.* (pp. 257–73). Boulder, CO: Westview Press. 1989.
- Morgan GT, Magnani RJ, Haws JM, Pollack AE, Koonin LM, Gargiullo PM. Vasectomy in the United States, 1991–95. Poster presented at the Annual Meeting of the Population Association of America. 1997.
- Mosher WD, Pratt WF. Fecundity, infertility, and reproductive health in the United States, 1982. National Center for Health Statistics. *Vital Health Stat* 23(14). 1987.
- Pratt WF. The motivation for surgical sterilization: Findings from the National Survey of Family Growth. Presented at the Annual Meeting of the American Public Health Association, 1984.
- Rindfuss RR, Liao F. Medical and contraceptive reasons for sterilization in the United States. *Stud Fam Plann* 19(6):370–80. 1988.
- Schwartz DB, Wingo PA, Antarsch L, Smith JC. Female sterilizations in the United States, 1987. *Fam Plann Perspect* 21(5):209–12. 1989.
- Jones EF, Forrest JD. Contraceptive failure rates based on the 1988 NSFG. *Fam Plann Perspect* 24:12–9. 1992.
- Hatcher RA, Trussell J, Stewart F, Stewart GK, Kowal D, Guest F, Cates W Jr, Policar MS. *Contraceptive technology*, 16th rev ed. New York: Irvington Publishers. 1994.
- Miller WB, Shain RN, Pasta DJ. The predictors of post-sterilization regret in married women. *J Appl Soc Psych* 21(13):1083–1110. 1991.
- Miller WB, Shain RN, Pasta DJ. The nature and dynamics of post-sterilization regret in married women. *J Appl Soc Psych* 20(6):506–30. 1990.
- Bachrach C, Horn M, Mosher W, Shimizu I. National Survey of Family Growth, Cycle III: Sample design, weighting, and variance estimation. National Center for Health Statistics. *Vital Health Stat* 2(98). 1985.
- French D. National Survey of Family Growth, Cycle I: Sample design, estimation procedures, and variance estimation. National Center for Health Statistics. *Vital Health Stat* 2(76). 1978.
- Grady W. National Survey of Family Growth, Cycle II: Sample design, estimation procedures, and variance estimation. National Center for Health Statistics. *Vital Health Stat* 2(87). 1981.
- Judkins D, Mosher W, Botman S. National Survey of Family Growth, Cycle IV: Design, estimation, and inference. National Center for Health Statistics. *Vital Health Stat* 2(109). 1991.
- Kelly JE, Mosher WD, Duffer AP, Kinsey SH. Plan and operation of the 1995 National Survey of Family Growth. National Center for Health Statistics. *Vital Health Stat* 1(36). 1997.
- Potter FJ, Iannacchione VG, Mosher WD, Mason RE, Kavee JD. Sample design, sampling weights, and variance estimation in the 1995 National Survey of Family Growth. National Center for Health Statistics. *Vital Health Stat* 2(124). 1998.
- Taffel SM, Placek PJ. The rise in postpartum sterilization in cesarean and vaginal deliveries: United States, 1970–85. Presented at the Annual

- Meeting of the American Public Health Association, 1987.
28. U.S. Bureau of the Census. Statistical abstract of the United States, 1996. Washington: U.S. Department of Commerce. 1996.
 29. National Center for Health Statistics. Vital statistics of the United States, 1988, vol I, natality. Washington: Public Health Service. 1993.
 30. London KA. Cohabitation, marriage, marital dissolution, and remarriage: United States, 1988. Advance data from vital and health statistics; no 194. Hyattsville, MD: National Center for Health Statistics. 1991.
 31. U.S. Bureau of the Census. <http://www.census.gov/population/sociodemo/education/tablea-02.txt>. Dec. 15, 1997.
 32. Rouzi AA, Mackinnon M, McComb PF. Predictors of success of reversal of sterilization. *Fertil Steril* 64(1):29–36. 1995.
 33. Rind P. Vasectomy proves to be preferable to female sterilization. *Fam Plann Perspect* 21(4):191. 1989.
 34. Ventura SV, Martin JA, Curtin SC, Mathews TJ. Report of final natality statistics, 1995. *MVSR* 45(11, supp 2). Hyattsville, MD: National Center for Health Statistics. 1997.
 35. Piccinino LJ, Mosher WD. Trends in contraceptive use in the United States: 1982–95. *Fam Plann Perspect* 30(1):4–10,46. 1998.
 36. Clarke, SC. Advance report of final divorce statistics, 1989 and 1990. *Monthly vital statistics report* 43(8, suppl). Hyattsville, MD: National Center for Health Statistics. 1995.
 37. Philliber SG, Philliber WW. Social and psychological perspectives on voluntary sterilization: A review. *Stud Fam Plann* 16(1):1–29. 1985.
 38. Pollack AE. Male and female sterilization: Long-term health consequences. *Outlook* 11(1):1–8. 1993.
 39. Alderman PM, Gee EM. Sterilization: Canadian choices. *CMAJ* 140:645–9. 1989.
 40. Hunt K, Annandale E. Predicting contraceptive method usage among women in West Scotland. *J Biosoc Sci* 22(4):405–21. 1990.
 41. Mosher WD, Pratt WF. Fecundity and infertility in the United States, 1965–82. Advance data from vital and health statistics; no 104. Hyattsville, MD: National Center for Health Statistics. 1985.
 42. U.S. Bureau of the Census. Marital status and family status: March 1965. Current Population Reports, Series P-20, No. 144, tables 1 and 3. Washington, D.C.: Government Printing Office. 1965.
 43. U.S. Bureau of the Census. Fertility of the population: June 1964 and March 1962. Current Population Reports, Series P-20, No. 147, table 1. Washington, D.C.: Government Printing Office. 1966.

Table 1. Number of currently married women 15–44 years of age and percent who have ever had (or whose husbands have had) sterilizing operations, by survey year, age at interview and type of operation: United States, 1965–95

Age and type of sterilizing operation	1965	1973	1982	1988	1995
	Number in thousands				
All ages	26,454	26,240	28,231	29,147	29,673
15–24 years	5,429	5,780	4,741	3,337	2,805
25–34 years	10,027	11,186	12,924	13,646	12,242
35–44 years	10,998	9,274	10,566	12,163	14,625
	Percent				
All ages					
All operations	15.9	23.1	38.9	42.4	41.1
Tubal ligation	3.9	7.8	19.4	23.1	23.8
Hysterectomy	7.1	6.8	8.8	7.7	6.8
Vasectomy	3.6	8.2	13.0	14.5	14.9
	15–24 years				
All operations	2.6	4.3	7.2	6.0	5.9
Tubal ligation	0.9	2.6	4.0	4.4	3.9
Hysterectomy	0.4	0.1	0.0	0.0	0.3
Vasectomy	1.1	1.6	3.1	1.6	1.7
	25–34 years				
All operations	13.6	19.9	31.6	31.1	27.2
Tubal ligation	4.3	7.7	17.6	18.1	17.6
Hysterectomy	4.7	3.4	4.7	3.5	1.9
Vasectomy	4.0	8.6	10.6	10.3	8.9
	35–44 years				
All operations	24.9	38.7	62.0	65.1	59.5
Tubal ligation	5.1	11.1	28.5	33.8	32.9
Hysterectomy	12.9	15.1	17.7	14.6	12.2
Vasectomy	4.6	11.9	20.4	22.7	22.4

0.0 Quantity more than zero but less than 0.05.

NOTES: The percents with each separate operation may not add to the percent with "all operations." Since 1982, women were allowed to report more than one sterilizing operation. Also, in all survey years "all operations" include other operations not shown separately (for example, oophorectomy).

Table 2. Number of ever-married women 15–44 years of age and percent who have ever had (or whose current husbands or cohabiting partners have had) sterilizing operations, by survey year, race and Hispanic origin, and type of operation: United States, 1973–95

Race and Hispanic origin and type of sterilizing operation	1973	1982	1988	1995
	Number of women in thousands			
All women ¹	31,018	34,935	36,842	37,521
Hispanic	2,104	2,914	3,452	4,116
Non-Hispanic white	25,001	27,684	28,579	28,250
Non-Hispanic black	3,604	3,341	3,458	3,536
	Percent			
All women ¹				
All operations	22.4	38.0	41.9	40.9
Tubal ligation	8.1	20.2	24.2	25.8
Hysterectomy	7.0	9.5	8.5	7.4
Vasectomy	7.0	10.6	11.7	12.1
	Hispanic			
All operations	20.7	26.7	33.4	37.4
Tubal ligation	11.6	16.7	25.8	30.6
Hysterectomy	5.1	6.1	4.7	5.1
Vasectomy	4.0	5.1	3.2	4.5
	Non-Hispanic white			
All operations	23.0	39.0	43.1	41.1
Tubal ligation	7.6	19.7	23.0	23.8
Hysterectomy	7.0	9.7	9.0	7.5
Vasectomy	8.1	12.2	14.3	14.7
	Non-Hispanic black			
All operations	19.8	37.6	45.2	49.0
Tubal ligation	10.2	25.6	34.9	40.5
Hysterectomy	8.8	11.3	10.5	10.4
Vasectomy	0.6	1.4	0.9	2.6

¹Includes women of other race and origin groups not shown separately.

NOTES: The percents with each separate operation may not add to the percent with "all operations." Since 1982, women were allowed to report more than one sterilizing operation. Also, in all survey years "all operations" include other operations not shown separately (for example, oophorectomy).

Table 3. Number of ever-married women 15–44 years of age and percent who have ever had (or whose current husbands or cohabiting partners have had) sterilizing operations, by selected characteristics: United States, 1973 and 1995

Characteristic	1973					1995				
	Number in thousands	Any sterilizing operation ¹	Tubal ligation	Hysterectomy	Vasectomy	Number in thousands	Any sterilizing operation ¹	Tubal ligation	Hysterectomy	Vasectomy
All women	31,018	22.4	8.1	7.0	7.0	37,521	40.9	25.8	7.4	12.1
Age at interview										
15–24 years	7,059	4.5	3.0	0.1	1.3	3,501	6.4	4.8	0.2	1.4
25–34 years	12,959	19.7	8.2	3.9	7.5	15,074	28.1	19.7	2.2	7.5
35–44 years	11,000	37.1	11.4	15.2	10.0	18,931	57.4	34.6	12.9	17.8
Parity										
0 births	5,216	5.2	0.8	2.9	1.4	7,154	12.9	2.9	4.8	6.5
1 birth	6,297	7.0	1.5	3.3	2.0	8,223	19.6	9.2	6.6	6.4
2 births	8,154	21.2	7.1	5.9	7.9	12,665	51.9	32.9	8.0	16.6
3 or more births	11,352	39.7	15.9	11.8	11.7	9,463	65.7	48.1	9.3	15.4
Age at first live birth (if any)										
Under 20 years	10,213	30.2	12.4	9.3	8.2	8,737	59.3	44.2	13.0	10.4
20–24 years	11,694	24.4	8.0	7.3	8.9	11,387	49.9	32.7	8.2	14.2
25–29 years	3,268	18.5	7.9	5.0	5.3	6,992	39.3	20.6	4.3	17.7
30 years or over	629	22.4	4.1	10.1	7.3	3,237	24.7	13.9	2.1	9.7
Marital status at interview										
Married	26,240	23.1	7.8	6.8	8.2	29,660	41.1	23.8	6.8	14.9
Divorced, widowed, or separated	4,779	18.5	10.0	8.2	0.1	7,846	40.0	33.3	9.6	1.7
Religious affiliation at interview										
Protestant	19,948	25.0	8.9	7.8	8.0	20,139	45.5	29.1	9.5	12.9
Catholic	8,809	18.1	7.1	5.9	4.8	11,398	34.4	20.9	4.4	11.8
Jewish	487	16.5	3.8	5.3	7.4	540	23.1	12.0	2.6	11.2
Other	716	24.3	7.0	6.8	9.4	1,620	34.8	18.5	5.7	11.8
None	1,058	11.4	5.3	2.6	3.5	3,809	40.6	28.1	7.0	9.2
Region of residence at interview										
Northeast	6,457	17.0	7.9	5.3	3.5	6,776	37.5	25.0	4.1	10.9
Midwest	8,011	21.6	8.1	5.0	8.1	8,886	40.2	24.5	6.7	14.1
South	10,399	22.0	8.2	9.1	4.6	12,952	45.4	30.7	10.1	10.1
West	6,151	29.7	8.4	8.0	13.3	8,892	37.5	20.6	6.7	14.0
Education at interview ²										
No high school diploma or GED ³	7,791	32.5	13.8	11.7	6.5	4,168	52.9	42.0	8.8	6.6
High school diploma or GED ³	13,019	23.9	8.0	7.3	8.3	14,881	49.7	32.5	9.8	13.5
Some college, no bachelor's degree	3,826	21.5	7.0	6.0	8.4	9,016	38.9	23.7	7.4	12.8
Bachelor's degree or higher	3,140	13.9	3.3	2.9	7.5	8,282	26.7	11.4	3.5	13.3

See footnotes at end of table.

Table 3. Number of ever-married women 15–44 years of age and percent who have ever had (or whose current husbands or cohabiting partners have had) sterilizing operations, by selected characteristics: United States, 1973 and 1995—Con.

Characteristic	1973					1995				
	Number in thousands	Any sterilizing operation ¹	Tubal ligation	Hysterectomy	Vasectomy	Number in thousands	Any sterilizing operation ¹	Tubal ligation	Hysterectomy	Vasectomy
Poverty level income at interview ²		Percent reporting				Percent reporting				
0–149 percent	5,453	27.8	13.7	9.5	4.2	6,788	48.3	40.8	6.6	4.6
150–299 percent	9,801	24.7	10.0	7.1	7.3	11,463	45.2	29.3	8.4	12.7
300 percent or higher	12,521	23.7	6.0	7.7	9.7	18,096	37.9	19.5	7.5	15.3
Race and Hispanic origin										
Hispanic	2,104	20.7	11.6	5.1	4.0	4,109	37.4	30.6	5.1	4.5
Non-Hispanic white	25,001	23.0	7.6	7.0	8.1	28,245	41.1	23.7	7.5	14.7
Non-Hispanic black	3,604	19.8	10.2	8.8	0.6	3,534	48.9	40.5	10.4	2.6
Non-Hispanic other	309	18.8	6.2	5.4	7.2	1,619	28.2	17.7	4.7	8.0

¹Includes other operations not shown separately (for example, oophorectomy).

²Limited to women 22–44 years of age at interview.

³GED is general equivalency diploma.

Table 4. Number of ever-married women 15–44 years of age and percent who have ever had (or whose current husbands or cohabiting partners have had) sterilizing operations, by race and Hispanic origin and selected characteristics: United States, 1973 and 1995

Characteristic	1973					1995				
	Number in thousands	Any sterilizing operation ¹	Tubal ligation	Hysterectomy	Vasectomy	Number in thousands	Any sterilizing operation ¹	Tubal ligation	Hysterectomy	Vasectomy
All women ²	31,018	22.4	8.1	7.0	7.0	37,521	40.9	25.8	7.4	12.1
Non-Hispanic white	25,001	23.0	7.6	6.9	8.1	28,250	41.1	23.7	7.5	14.7
Age at first live birth (if any):										
Under 20 years	7,196	32.5	11.8	9.2	11.0	5,558	62.9	43.1	15.0	14.6
20–24 years	9,935	25.5	7.8	7.8	9.7	8,532	51.5	31.2	8.8	17.4
25–29 years	2,802	19.2	7.9	5.2	5.9	5,769	39.8	19.2	4.4	19.8
30 years and over	473	22.6	2.4	10.4	8.8	2,638	25.2	13.5	1.5	11.1
Religious affiliation at interview:										
Protestant	16,292	26.1	8.6	7.7	9.5	15,890	44.9	26.6	9.5	15.1
Catholic	6,804	17.2	5.5	6.0	5.3	7,828	34.2	17.5	4.1	15.4
Jewish	482	16.6	3.7	5.3	7.5	506	22.6	10.7	2.7	11.9
Other	584	28.0	8.4	6.5	11.5	958	41.5	19.7	6.4	15.8
None	839	10.8	5.5	1.5	3.8	3,069	41.7	28.5	7.2	10.4
Region of residence at interview:										
Northeast	4,984	15.8	6.4	4.7	4.3	5,497	38.6	24.4	4.0	13.0
Midwest	7,092	21.7	7.3	4.9	9.0	7,771	40.0	23.2	6.3	15.7
South	7,856	23.4	8.2	9.4	5.5	9,219	44.5	27.3	10.7	12.5
West	5,069	31.3	8.2	8.3	14.8	5,763	39.6	18.2	7.4	18.3
Non-Hispanic black	3,604	19.8	10.2	8.8	0.6	3,536	48.9	40.5	10.4	2.6
Age at first live birth (if any):										
Under 20 years	2,098	23.2	12.3	10.4	0.4	1,459	63.4	55.5	13.3	1.8
20–24 years	928	16.4	9.4	5.6	1.1	936	51.8	45.8	8.2	3.0
25 years and over	248	17.2	7.6	7.9	1.5	560	41.2	33.1	5.1	4.9
Religious affiliation at interview:										
Protestant	3,194	20.0	10.5	8.7	0.6	2,897	49.8	41.3	10.7	2.6
Catholic	237	19.9	8.4	10.6	0.9	243	41.7	35.2	11.8	–
Other/none	173	15.4	6.3	8.7	–	397	47.0	37.9	7.6	4.6
Region of residence at interview:										
Northeast	840	20.9	10.0	10.5	0.2	492	42.0	35.7	6.8	0.9
Midwest	709	22.3	14.7	6.8	0.8	667	48.4	39.2	12.2	2.6
South	1,829	18.0	8.0	9.1	0.7	2,028	52.2	43.2	10.8	2.8
West	226	21.4	13.9	6.1	1.2	350	40.6	34.2	10.2	4.4
Hispanic	2,104	20.7	11.6	5.1	4.0	4,116	37.3	30.6	5.1	4.5
Age at first live birth (if any):										
Under 20 years	884	28.6	17.8	7.4	3.4	1,456	44.8	39.4	6.2	3.8
20–24 years	753	18.8	8.6	4.3	5.9	1,456	42.1	34.9	5.2	4.9
25 years and over	262	13.6	8.1	2.0	3.5	721	32.4	22.3	4.5	7.0

See footnotes at end of table.

Table 4. Number of ever-married women 15–44 years of age and percent who have ever had (or whose current husbands or cohabiting partners have had) sterilizing operations, by race and Hispanic origin and selected characteristics: United States, 1973 and 1995—Con.

Characteristic	1973					1995				
	Number in thousands	Any sterilizing operation ¹	Tubal ligation	Hysterectomy	Vasectomy	Number in thousands	Any sterilizing operation ¹	Tubal ligation	Hysterectomy	Vasectomy
	Percent reporting					Percent reporting				
Religious affiliation at interview:										
Protestant	379	20.3	7.1	3.9	9.2	888	45.5	36.8	7.3	6.7
Catholic	1,639	21.3	13.2	5.3	2.7	2,862	34.9	29.3	4.3	3.7
Other/none	86	11.5	—	6.1	5.5	366	35.8	25.3	6.4	5.2
Region of residence at interview:										
Northeast	582	23.1	18.0	3.5	1.6	548	34.4	29.8	4.5	1.9
Midwest	169	23.3	15.5	5.4	2.4	253	39.0	30.5	7.8	6.3
South	635	15.1	7.3	5.1	2.8	1,295	44.8	37.9	6.0	4.4
West	718	22.9	9.2	6.4	7.4	2,020	33.1	26.1	4.4	5.0

— Quantity zero

¹Includes other operations not shown separately (for example, oophorectomy).

²Includes women of other race and origin groups not shown separately.

Table 5. Number of ever-married women 15–44 years of age and percent who have ever had (or whose husbands or cohabiting partners have had) a sterilizing operation, by parity, age, and education: United States, 1973 and 1995

Parity, age at interview, and education at interview ¹	1973		1995	
	Number in thousands	Percent surgically sterile	Number in thousands	Percent surgically sterile
All women	31,018	22.4	37,521	40.9
0 births	5,216	5.2	7,154	12.9
Age:				
15–24 years	2,685	0.7	1,372	1.5
25–34 years	1,844	4.6	3,383	6.4
35–44 years	676	24.7	2,399	28.6
Education:				
No high school diploma or GED ²	422	14.9	208	31.7
High school diploma or GED ²	1,643	8.7	2,153	16.0
Some college, no bachelor's degree	725	2.5	1,788	12.6
Bachelor's degree or higher	1,000	4.2	2,530	11.3
1 birth	6,297	7.0	8,223	19.6
Age:				
15–24 years	2,688	0.5	1,239	1.5
25–34 years	2,587	6.4	3,383	6.4
35–44 years	1,022	25.9	3,236	39.6
Education:				
No high school diploma or GED ²	999	15.8	590	18.3
High school diploma or GED ²	2,530	8.1	3,124	28.5
Some college, no bachelor's degree	731	7.2	2,124	18.8
Bachelor's degree or higher	657	4.1	1,890	11.2
2 births	8,154	21.2	12,665	51.9
Age:				
15–24 years	1,263	12.8	630	16.1
25–34 years	4,214	16.7	4,732	39.6
35–44 years	2,677	32.1	7,313	63.0
Education:				
No high school diploma or GED ²	1,881	24.6	1,209	50.0
High school diploma or GED ²	3,890	20.9	5,441	58.5
Some college, no bachelor's degree	1,192	20.8	3,212	51.9
Bachelor's degree or higher	816	20.9	2,656	42.1
3 births or more	11,352	39.7	9,463	65.7
Age:				
15–24 years	424	28.8	261	37.8
25–34 years	4,303	37.1	3,212	57.0
35–44 years	6,625	42.1	5,990	71.7
Education:				
No high school diploma or GED ²	4,488	41.1	2,162	66.0
High school diploma or GED ²	4,956	39.4	4,163	71.4
Some college, no bachelor's degree	1,178	42.8	1,901	64.2
Bachelor's degree or higher	666	29.5	1,212	49.3

¹Education figures are limited to women 22–44 years of age at interview.²GED is general equivalency diploma.

Table 6. Adjusted odds ratios for surgical sterilization among ever-married women 15–44 years of age: United States, 1973 and 1995

Characteristic	Odds ratio (95 percent confidence interval)	
	1973	1995
Age at interview		
15–24 years ¹	1.0	1.0
25–34 years	3.3 (2.6–4.1)***	5.4 (3.7–7.8)***
35–44 years	6.0 (4.7–7.6)*	20.2 (13.8–29.5)***
Parity		
0 births ¹	1.0	1.0
1 birth	1.6 (1.2–2.2)*	3.0 (2.2–4.0)***
2 births	4.0 (3.1–5.2)***	10.0 (7.6–13.3)***
3 births or more	7.7 (6.0–10.0)***	15.0 (11.5–19.5)***
Age at first live birth		
Under 20 years ¹	1.0	1.0
20–24 years	0.7 (0.7–0.8)***	0.7 (0.5–0.8)***
25–29 years	0.6 (0.5–0.8)***	0.5 (0.4–0.6)***
30 years or more	0.8 (0.6–1.2)	0.2 (0.2–0.3)***
Marital status at interview		
Married	1.4 (1.2–1.6)	1.4 (1.2–1.6)***
Divorced, widowed, or separated ¹	1.0	1.0
Religion		
Protestant ¹	1.0	1.0
Catholic	0.7 (0.6–0.7)***	0.6 (0.5–0.7)***
Jewish/other/none	0.7 (0.6–0.9)*	0.9 (0.8–1.1)
Region of residence at interview		
South ¹	1.0	1.0
Northeast	0.8 (0.6–0.9)**	0.7 (0.6–0.8)***
Midwest	0.9 (0.8–1.0)	0.7 (0.6–0.8)***
West	1.5 (1.3–1.8)***	0.7 (0.6–0.8)***
Education at interview		
No high school diploma or GED ^{1,2}	1.0	1.0
High school diploma or GED ²	0.9 (0.8–1.0)*	1.2 (0.9–1.4)
Some college, no bachelor's degree	0.8 (0.6–0.9)*	0.8 (0.7–1.1)
Bachelor's degree or higher	0.6 (0.4–0.7)***	0.5 (0.4–0.7)***
Poverty level income at interview		
0–149 percent ¹	1.0	1.0
150–299 percent	0.9 (0.8–1.1)	1.1 (0.9–1.3)
300 percent or higher	1.2 (1.0–1.4)^	1.3 (1.1–1.6)***
Race and Hispanic origin		
Hispanic	0.8 (0.6–1.0)^	0.8 (0.7–1.0)
Non-Hispanic white or other ¹	1.0	1.0
Non-Hispanic black	0.8 (0.6–0.9)*	0.9 (0.8–1.1)

^ $p < 0.10$ * $p < 0.05$ ** $p < 0.001$ *** $p < 0.0001$ ¹Reference category.²GED is general equivalency diploma.NOTE: Based on weighted logistic regression. See [Methods](#) section for further details.

Table 7. Number of ever-married women 15–44 years of age, number of sterilizing operations they reported, and percent distribution by selected characteristics, according to type of operation: United States, 1973 and 1995

Characteristic	1973					1995				
	All ever-married women	Women reporting				All ever-married women	Women reporting			
		Any sterilizing operations ¹	Tubal ligation	Hysterectomy	Vasectomy		Any sterilizing operations ¹	Tubal ligation	Hysterectomy	Vasectomy
Number in thousands										
Total	31,018	6,950	2,524	2,179	2,164	37,521	15,331	9,685	2,779	4,546
Percent distribution										
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Age at interview										
15–24 years	22.8	4.5	8.4	0.4	4.4	9.3	1.5	1.7	0.3	1.1
25–34 years	41.8	36.7	42.1	23.2	44.8	40.2	27.7	30.7	11.7	24.9
35–44 years	35.5	58.8	49.6	76.5	50.9	50.5	70.9	67.6	88.0	74.0
Parity										
0 births	16.8	3.9	1.7	6.9	3.3	19.1	6.0	2.1	12.2	10.2
1 birth	20.3	6.4	3.7	9.5	5.7	21.9	10.5	7.8	19.6	11.6
2 births	26.3	24.8	22.8	22.2	29.9	33.8	42.9	43.0	36.5	46.2
3 births or more	36.6	64.9	71.7	61.4	61.1	25.2	40.6	47.0	31.7	32.0
Age at first live birth (if any)										
Under 20 years	39.6	46.1	51.0	46.7	39.8	28.8	36.0	40.8	46.4	22.3
20–24 years	45.3	42.7	37.5	42.1	49.8	37.5	39.4	39.3	38.5	39.7
25–29 years	12.7	9.1	10.5	8.1	8.3	23.1	19.1	15.2	12.4	30.3
30–44 years	2.4	2.1	1.1	3.1	2.2	10.7	5.6	4.7	2.7	7.7
Marital status at interview										
Married	84.6	87.3	81.0	82.1	99.8	79.1	79.5	73.0	72.8	97.1
Divorced, widowed, or separated	15.4	12.7	19.0	17.9	0.2	20.9	20.5	27.0	27.2	2.9
Religious affiliation at interview										
Protestant	64.3	71.7	70.4	71.4	74.0	53.7	59.8	60.6	68.7	57.1
Catholic	28.4	22.9	24.7	23.9	19.5	30.4	25.6	24.6	17.9	29.7
Jewish	1.6	1.2	0.7	1.2	1.7	1.4	0.8	0.7	0.5	1.3
Other	2.4	2.5	2.0	2.2	3.1	4.3	3.7	3.1	3.3	4.2
None	3.4	1.7	2.2	1.2	1.7	10.2	10.1	11.0	9.6	7.7
Region of residence at interview										
Northeast	20.8	15.8	20.2	15.7	10.4	18.1	16.6	17.5	10.0	16.2
Midwest	25.8	25.0	25.6	18.4	29.9	23.7	23.3	22.5	21.5	27.6
South	33.5	33.0	33.8	43.3	21.9	34.5	38.4	41.1	46.9	28.7
West	19.8	26.3	20.5	22.7	37.8	23.7	21.7	18.9	21.6	27.5

See footnotes at end of table.

Table 7. Number of ever-married women 15–44 years of age, number of sterilizing operations they reported, and percent distribution by selected characteristics, according to type of operation: United States, 1973 and 1995—Con.

Characteristic	1973					1995					
	All ever-married women	Women reporting				All ever-married women	Women reporting				
		Any sterilizing operations ¹	Tubal ligation	Hysterectomy	Vasectomy		Any sterilizing operations ¹	Tubal ligation	Hysterectomy	Vasectomy	
Education at interview ²						Percent distribution					
No high school diploma or GED ³	28.0	36.7	43.1	41.8	23.7	11.5	14.4	18.1	13.2	6.1	
High school diploma or GED ³	46.9	45.1	41.9	43.5	50.5	40.9	48.2	50.0	52.3	44.3	
Some college, no bachelor's degree	13.8	11.9	10.8	10.5	14.9	24.8	22.9	22.1	24.1	25.3	
Bachelor's degree or higher	11.3	6.3	4.2	4.2	11.0	22.8	14.4	9.8	10.4	24.3	
Poverty level income at interview ²											
0–149 percent	19.6	22.0	30.1	23.8	10.5	18.7	21.4	28.7	16.1	6.8	
150–299 percent	35.3	35.0	39.4	31.9	33.1	31.6	33.8	34.8	34.8	32.1	
300 percent or higher	45.1	43.0	30.4	44.3	56.4	49.8	44.8	36.6	49.1	61.1	
Race and Hispanic origin											
Hispanic	6.8	6.3	9.7	4.9	3.9	11.0	10.0	13.0	7.6	4.1	
Non-Hispanic white	80.6	82.7	75.1	79.8	94.1	75.3	75.7	69.3	76.4	91.1	
Non-Hispanic black	11.6	10.3	14.5	14.5	1.0	9.4	11.3	14.8	13.3	2.0	
Non-Hispanic other	1.0	0.8	0.8	0.8	1.0	4.3	3.0	3.0	2.8	2.8	

¹Includes other operations not shown separately (for example, oophorectomy).

²Limited to women 22–44 years of age at interview.

³GED is general equivalency diploma.

NOTE: Percents may not add to 100 due to rounding.

Table 8. Number of sterilizing operations reported by women 15–44 years of age and percent mentioning selected reasons for the operation, by parity, race and Hispanic origin, and type of operation: United States, 1995

Characteristic	Number in thousands	Woman wanted no more children	Husband or partner wanted no more children	Either partner wanted no more children	Could not afford more children	Medical problems ²	Problems with birth control method ¹
All women ²		Percent mentioning					
All parities:							
Tubal ligation	10,659	70.6	12.2	75.6	14.3	21.1	8.2
Hysterectomy	3,023	6.4	0.9	7.1	0.9	89.5	0.7
Vasectomy	3,927	40.1	77.8	86.0	13.1	7.2	21.6
0 births:							
Tubal ligation	278	5.9	1.9	5.9	1.9	52.8	35.3
Hysterectomy	422	3.6	1.6	5.2	–	91.6	–
Vasectomy	196	26.1	38.6	44.9	–	6.0	39.1
1 birth:							
Tubal ligation	840	55.1	8.7	60.2	10.0	36.7	9.4
Hysterectomy	568	4.2	0.9	4.2	2.9	93.8	2.4
Vasectomy	390	43.5	77.9	88.5	9.3	9.1	6.8
2 births:							
Tubal ligation	4,491	69.5	13.8	75.3	14.9	22.9	7.8
Hysterectomy	1,090	5.5	1.3	6.9	0.5	89.5	–
Vasectomy	1,987	43.0	79.2	88.7	11.6	6.4	22.3
3 births or more:							
Tubal ligation	5,050	77.8	12.0	82.2	15.2	15.1	6.9
Hysterectomy	944	9.9	–	9.9	0.7	86.0	0.8
Vasectomy	1,354	31.8	81.5	87.4	18.3	8.1	20.2
Non-Hispanic white							
All parities:							
Tubal ligation	6,929	69.3	13.7	74.6	14.6	23.0	8.9
Hysterectomy	2,225	6.6	0.9	7.2	1.1	89.2	0.8
Vasectomy	3,604	39.8	78.9	86.3	13.0	7.4	21.7
Non-Hispanic black ³							
All parities:							
Tubal ligation	2,016	79.2	6.8	81.7	11.8	16.2	5.0
Hysterectomy	483	6.8	–	6.8	0.6	88.7	–
Hispanic ⁴							
All parities:							
Tubal ligation	1,400	67.2	12.7	73.0	16.7	20.0	7.7
Hysterectomy	238	3.1	–	3.1	–	90.8	–

– Quantity zero

¹See [Methods](#) section and [appendix I](#) for further explanation of terms.²Includes women of other race and origin groups not shown separately.³There were not enough vasectomies among husbands/partners of non-Hispanic black women and Hispanic women to show this operation separately.

NOTES: Percents will not add to 100 because women could mention multiple reasons and not all reasons are included here. Women were only asked about reasons for vasectomy if they were with this husband or partner at the time of his operation.

Table 9. Number of sterilizing operations reported by women 15–44 years of age and percent mentioning the specified medical reasons for the operation, by type of operation: United States, 1995

Reason	Tubal ligation	Hysterectomy	Vasectomy
All women		Number in thousands	
Sterilizing operations	10,659	3,023	3,927
		Percent mentioning	
Any medical reasons	21.1	89.5	7.2
Medical problems with female reproductive organs	7.4	86.4	...
Pregnancy would be dangerous to woman's health	10.9	4.8	5.8
Woman would probably lose the baby	3.9	3.6	1.3
Woman would probably have an unhealthy baby	2.5	1.1	1.4
Husband or partner had a health problem	0.4
Women with 0 births		Number in thousands	
Sterilizing operations	278	422	196
		Percent mentioning	
Any medical reasons	52.8	91.6	6.0
Medical problems with female reproductive organs	30.9	88.0	...
Pregnancy would be dangerous to woman's health	13.7	3.8	3.4
Woman would probably lose the baby	17.2	5.2	6.0
Woman would probably have an unhealthy baby	1.9	–	–
Husband or partner had a health problem	–

... Category not applicable

– Zero quantity

NOTES: Women could report more than one medical reason for each sterilizing operation, so the percents mentioning individual reasons may not add to the percent mentioning "any medical reasons." See the [Methods](#) section and [appendix I](#) for further explanation about these medical reasons for sterilizing operations.

Table 10. Number of women 15–44 years of age with unreversed tubal ligations, number of women 15–44 years of age whose current husbands or cohabiting partners have had unreversed vasectomies, and percent distribution by desire for reversal of these sterilizing operations, according to selected characteristics: United States, 1995

Characteristic	Tubal ligation						Vasectomy					
	Number in thousands	Total	Neither wants	Only woman wants ¹	Only husband or partner wants	Both want	Number in thousands	Total	Neither wants	Only woman wants ¹	Only husband or partner wants	Both want
	Percent distribution						Percent distribution					
Total ²	9,249	100.0	75.7	10.2	6.5	7.7	3,672	100.0	88.8	5.7	2.6	2.9
Age at interview												
15–24 years	226	100.0	66.7	26.3	–	7.0	25	100.0	33.7	–	–	66.3
25–34 years	3,288	100.0	68.4	13.4	6.9	11.3	978	100.0	83.0	9.3	3.9	3.8
35–44 years	5,736	100.0	80.2	7.6	6.5	5.7	2,669	100.0	91.4	4.4	2.2	2.0
Parity												
0 births	190	100.0	77.5	15.1	–	7.4	182	100.0	85.0	8.5	3.2	3.3
1 birth	693	100.0	82.9	6.6	6.4	4.2	354	100.0	88.0	5.9	0.6	5.5
2 births	3,926	100.0	74.5	10.5	6.4	8.6	1,888	100.0	89.3	5.2	2.3	3.3
3 births or more	4,440	100.0	75.5	10.2	6.8	7.5	1,249	100.0	88.9	6.0	3.6	1.6
Religious affiliation at interview												
Protestant	5,576	100.0	75.5	10.3	7.1	7.2	2,007	100.0	88.6	6.1	2.6	2.7
Catholic	2,289	100.0	75.2	9.6	5.9	9.4	1,155	100.0	90.0	5.5	1.8	2.7
Jewish	57	100.0	76.1	9.8	14.0	–	48	100.0	100.0	–	–	–
Other/no specific denomination	269	100.0	82.0	3.8	7.7	6.5	192	100.0	80.1	–	11.4	8.5
None	1,058	100.0	76.2	12.5	4.0	7.3	270	100.0	89.1	8.1	0.8	1.9
Region of residence at interview												
Northeast	1,709	100.0	79.3	9.9	4.9	6.0	678	100.0	89.3	5.9	1.9	2.9
Midwest	2,069	100.0	80.9	7.7	5.0	6.3	1,021	100.0	87.3	6.5	2.3	3.9
South	3,778	100.0	72.9	12.6	6.8	7.7	960	100.0	88.2	7.8	2.7	1.2
West	1,693	100.0	71.9	8.1	9.0	11.0	1,013	100.0	90.5	2.7	3.3	3.5
Education at interview ³												
No high school diploma or GED ⁴	1,928	100.0	69.6	15.1	6.3	9.1	193	100.0	81.9	9.9	5.1	3.1
High school diploma or GED ⁴	4,536	100.0	76.2	9.2	6.7	7.9	1,629	100.0	92.2	4.6	1.4	1.9
Some college, no bachelor's degree	1,895	100.0	77.9	9.3	6.2	6.7	952	100.0	81.9	9.4	2.5	6.2
Bachelor's degree or higher	873	100.0	81.3	6.3	6.4	6.0	898	100.0	91.4	2.9	4.4	1.3
Poverty level income at interview ³												
0–149 percent	3,135	100.0	71.8	14.9	4.9	8.4	247	100.0	87.3	6.9	1.8	4.0
150–299 percent	3,075	100.0	74.8	9.3	8.3	7.7	1,259	100.0	88.3	6.5	2.4	2.7
300 percent or higher	3,022	100.0	80.5	6.2	6.3	7.0	2,166	100.0	89.2	5.1	2.8	2.9

See footnotes at end of table.

Table 10. Number of women 15–44 years of age with unreversed tubal ligations, number of women 15–44 years of age whose current husbands or cohabiting partners have had unreversed vasectomies, and percent distribution by desire for reversal of these sterilizing operations, according to selected characteristics: United States, 1995—Con.

Characteristic	Tubal ligation						Vasectomy					
	Number in thousands	Total	Neither wants	Only woman wants ¹	Only husband or partner wants	Both want	Number in thousands	Total	Neither wants	Only woman wants ¹	Only husband or partner wants	Both want
Race and Hispanic origin		Percent distribution					Percent distribution					
Hispanic	1,261	100.0	64.4	14.3	8.5	12.8	147	100.0	85.0	11.9	3.1	–
Non-Hispanic white	5,886	100.0	79.0	8.7	6.1	6.3	3,360	100.0	89.0	5.6	2.6	2.9
Non-Hispanic black	1,802	100.0	72.5	13.4	6.5	7.7	76	100.0	86.8	6.1	7.0	–
Non-Hispanic other	300	100.0	77.6	2.3	5.1	15.0	89	100.0	87.9	–	–	12.1

– Quantity zero

¹Includes women who were not currently married or cohabiting.

²Total includes women with missing information on desire for reversal, and whether woman was with husband or partner at time of his operation. Desire for reversal was only asked if woman (or couple) reported no sterilizing operations other than ligation or vasectomy. Only married or cohabiting women were asked about their husband's or partner's desire for reversal.

³Limited to women 22–44 years of age at interview.

⁴GED is general equivalency diploma.

NOTES: Desire for reversal means that the woman answered "definitely yes" or "probably yes." Percents may not add to 100 due to rounding.

Table 11. Number of women 15–44 years of age with unreversed tubal ligations, number of women 15–44 years of age whose current husbands or cohabiting partners have had unreversed vasectomies, and percent distribution by desire for reversal of these sterilizing operations, according to reasons cited for the operation: United States, 1995

Reason	Number in thousands	Total	Neither wants	Only woman wants ¹	Only husband or partner wants	Both want
Percent distribution						
All women with unreversed tubal ligations ²	9,249	100.0	75.7	10.2	6.5	7.7
Woman wanted no more children	6,847	100.0	79.4	7.4	7.5	5.8
Husband or partner (at the time of operation) wanted no more children ³	1,204	100.0	73.3	13.5	4.6	8.7
Could not afford more children	1,403	100.0	70.8	9.8	7.5	11.9
Medical problems	1,638	100.0	71.6	12.9	4.6	10.9
Problems with birth control method	777	100.0	76.4	10.8	4.7	8.3
All women with husbands or cohabiting partners who have had unreversed vasectomies ²	3,672	100.0	88.8	5.7	2.6	2.9
Woman wanted no more children	1,508	100.0	91.1	2.8	4.6	1.5
Husband or partner wanted no more children	2,835	100.0	90.2	5.8	2.1	1.9
Could not afford more children	492	100.0	85.3	8.1	4.6	2.0
Medical problems	266	100.0	89.3	1.8	3.1	5.8
Problems with birth control method	803	100.0	89.3	4.3	2.4	4.0

¹Includes women who were not currently married or cohabiting.

²Total includes women with missing information on desire for reversal or reasons for the operation. Desire for reversal was only asked if woman (or couple) reported no sterilizing operations other than tubal ligation or vasectomy. Only married or cohabiting women were asked to report on their husbands' or partners' desire for reversal. Reasons for vasectomy were only asked if the woman was currently married or cohabiting and the vasectomy occurred during the time of their relationship.

³If the tubal ligation occurred before her current marriage or cohabitation, the woman was asked whether her husband or partner at the time of the operation had wanted no more children.

NOTES: Desire for reversal means that the woman answered "definitely yes" or "probably yes." Percents may not add to 100 due to rounding.

Appendix I

Definition of Terms

Sterilization-related Terms

Sterilizing operations—were any operations reported by women that would make it impossible for them to have a baby—that is, operations that rendered them surgically sterile. Married women, and in the later surveys also cohabiting women, were asked to report on sterilizing operations that their partners ever had. This report presents data separately for the three most commonly mentioned sterilizing operations—tubal ligation, hysterectomy, and vasectomy. Tubal ligation refers to all surgical procedures that result in the removal, tying off, or cutting of both fallopian tubes. Hysterectomy refers to the surgical removal of all or part of the woman’s uterus (or womb). Vasectomy refers to surgical procedures that result in both of the man’s vas deferens being cut or tied off.

Since the 1982 NSFG, respondents were allowed to report more than one sterilizing operation, and as a result, the percents reporting “any sterilizing operations” or “all operations” may be less than the sum of the percents reporting individual operations. Also, “all operations” include other operations not shown separately, such as oophorectomy (ovary removal).

Reasons for sterilizing operations—were asked in different ways in each survey year. Therefore, this report presents data only for 1995. The primary differences across survey years were in the way that “contraceptive intent” was determined and in the range of reasons explicitly offered to the respondent.

In the 1965, 1973, and 1982 surveys, women were only asked about contraceptive intent, and no other motivations for the operation were included. For example in 1973, women were asked: “Was the operation done at least partly so that you would not have any (more) children?” In 1982, women were asked a somewhat similar question: “Was one reason for having

(OPERATION) because (you had all the children you wanted/did not want to have any children)?”

In the 1988 and 1995 surveys, women were asked about a range of reasons and could report as many as they wished. In 1988, women were first given the chance to answer an open-ended question about why they or their husbands or partners had the operation. Then they were offered the following list of “reasons people often give for having sterilizing operations” and asked “Which reason or reasons do you believe come closest to your own?”:

- I had all the children I wanted or I did not want any children.
- My husband wanted no more children.
- A pregnancy would be dangerous to my health.
- I would probably lose a(nother) pregnancy or have an unhealthy child.
- I could not afford or take care of more children.
- The method of birth control I was using was dangerous to my health.
- I didn’t like the method of birth control I was using for other reasons.
- Medical problems with my female organs (such as infections, cancer, etc.).
- None of the above.

In the 1995 NSFG, women were not offered the open-ended question about their reasons for the operation. As described in the Methods section, women were asked the following “code all that apply” question for each female sterilizing operation: “Now please look at Card D-3 which lists some reasons that women sometimes give for having sterilizing operations. Which reason or reasons do you believe are closest to your own?” The response categories were as follows:

- You had all the children you wanted.
- Your husband or partner at the time did not want any more children.
- Financial reasons.
- Medical reasons.
- Reasons related to birth control.
- Some other reason.

Women who reported that they had medical reasons were asked to report which of the following medical reasons applied to them, again choosing all that applied:

- Medical problems with your female organs.
- Pregnancy would be dangerous to your health.
- You would probably lose a pregnancy.
- You would probably have an unhealthy child.
- Some other medical reason (SPECIFY:).

Respondents and interviewers were provided with the following guidance both on-screen and in a separate booklet to help them choose among the specific medical reasons:

- Medical problems with your female organs include such things as infections, cancer, fibroids, endometriosis, and so on.
- Some possible reasons for having an unhealthy child include incompatible Rh factor (between mother and baby) and family history of diseases such as Tay-Sachs, hemophilia, and sickle-cell anemia.

Women who reported “reasons related to birth control” were asked: “Was your method of birth control dangerous to your health, or did you not like your method of birth control for other reasons?” Women could report health reasons only, other reasons only, or both health and other reasons. The interviewer and respondent were offered the following on-screen and in-print guidelines:

- Health reasons might include pain, side effects or complications, and so on.
- Other reasons might include inconvenience, messiness, and so on.

A similar sequence of items was used for male sterilizing operations, with some minor changes in wording to make the question and response categories appropriate for male operations. For example, the response set for “medical reasons” did not include “Medical problems with your female organs” but did include “He had health problems

that required the operation.” It should also be noted that the woman was only asked to report on her husband’s or partner’s reasons for the operation if the operation was done during the time of their relationship. While she may know the reasons for his operation regardless of when it was done, it was believed that she could more accurately report on reasons for operations that occurred while she might potentially have been involved in the decisionmaking about sterilization.

Selected Demographic Terms

Further details on these terms have been published elsewhere (3).

Age at interview—is based on the woman’s age (as of her last birthday) at the midpoint of the interviewing period for each survey year. This date was used to determine whether each respondent was in the eligible age range for the survey.

Education at interview—is based on the woman’s educational attainment at the time of interview. Results shown by education in this report are limited to women 22–44 years of age to allow all women to report college attendance. For the 1973 survey, educational attainment was based on a recoded variable (EDUCAT) that gives the completed years of school attended. Those who completed 16 or more years of education are considered as having a “bachelor’s degree or higher.” Those with 13–15 years of school are considered as having “some college,” those with 12 years as having a high school diploma, and those with less than 12 years as having no high school diploma.

In the 1995 survey, which obtained greater detail about each respondent’s school attendance and educational attainment, a somewhat different recode was used (HIEDUC). This recode is based on the specific degrees earned, but still takes into account the number of years of school attended (EDUCAT). For example, women who earned a bachelor’s degree in less than 16 years would be classified appropriately as having a “bachelor’s degree or higher,” rather than as having “some college.” In

general, priority is given to the actual degree earned, rather than the length of time taken to earn it. In the 1995 survey, women are considered high school graduates if they report either a regular high school diploma or a general equivalency diploma (GED) or certificate, regardless of the number of years of high school they attended. It should be noted that the tabulations shown in this report were also run with EDUCAT for 1995, as opposed to HIEDUC, but the differences were not substantial. It was considered preferable to use HIEDUC for 1995 because these data are more comparable with other data sources, such as the Current Population Surveys of the U.S. Census Bureau.

Marital status at interview—indicates the woman’s formal (legal) marital status at time of interview. In this report, women who were widowed, divorced, or separated are grouped together.

Parity—is defined as the total number of live births ever had by the woman. This number is distinguished from gravidity, which is the total number of times she has been pregnant. Nulliparous women are those who have had no live births, and parous women are those who have given birth to at least one baby. The term “nulliparous” is used in this report instead of “childless” because (a) women may be “childless” even though they have given birth (e.g., they relinquished their babies for adoption or their children died), and (b) women may have children although they have never given birth (e.g., nulliparous women who adopted a child).

Poverty level income at interview—is based on the poverty index ratio calculated for the given survey year. Poverty status, measured in this way, adjusts the total family income for the number of persons in the family and accounts for the current poverty levels defined by the U.S. Census Bureau. In this report, poverty level income at interview is shown for 1973 and 1995.

Race and Hispanic origin—can be defined in all of the NSFG surveys, but

Hispanic origin was not obtained in the 1965 NFS. Women who reported any Hispanic or Spanish ancestry were classified as Hispanic. All other women were classified according to race, yielding groups for “non-Hispanic white,” “non-Hispanic black,” and “non-Hispanic other” women.

Region of residence at interview—is classified into the four major census regions: Northeast, Midwest, South, and West for the 1973 and 1995 NSFG. These regions, which correspond to those used by the U.S. Census Bureau, are as follows:

<i>Region</i>	<i>States included</i>
Northeast	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania
Midwest	Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas
South	Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas
West	Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii

Appendix II

Sampling Errors

Because the statistics presented in this report are based on sample surveys, they may differ from the statistics that would have resulted if all of the millions of women represented by the surveys had been interviewed. The standard error of an estimate is a measure of such differences.

It was not possible (at the time of this writing) to use the same statistical software and techniques to estimate standard errors across all survey years from 1965 to 1995. Standard errors for the percents based on the 1965 National Fertility Study and the 1973 NSFG were estimated based on the approximations shown in tables I and II. Although standard error approximation tables are also presented for the 1982, 1988, and 1995 NSFG rounds (tables III–V), an alternate approach was used in this report for these 3 survey years. This approach uses the design effect of each survey round.

The design effect indicates the factor by which variances for a given estimate are elevated—or sometimes diminished—because simple random

sampling (SRS) was not used. The overall design effect for 1982 was 3.01; for 1988, it was 1.55; and for 1995, it was 1.46. For example, the 1982 NSFG relied upon multistage probability sampling, variances are on average 3 times higher than if SRS had been used. The standard error of a percent is the square root of its variance, and the variance of a percent can be approximated using the design effect by the following formula:

$$D \cdot (p \cdot q / n)$$

where D = design effect for the given survey round or subgroup
 p = percent
 q = 100 – percent
 n = sample size on which the percent is based

Statistical significance of differences was assessed by constructing confidence intervals around each estimated percent. Confidence intervals can be considered to be the range of acceptable null hypotheses for the statistic in question. A difference between percents was considered significant at the 5-percent level if the 95-percent confidence intervals did not overlap. Nonoverlapping 90-percent confidence intervals indicated statistical significance at the 10-percent level. The formula for defining confidence intervals for a percent is as follows:

$$\begin{aligned} &\text{percent} \pm [C \cdot (\text{standard error} \\ &\text{of the percent})] \\ &= \text{percent} \pm [C \cdot \sqrt{(D \cdot (p \cdot q / n))}] \end{aligned}$$

where D = Design effect for a given survey round or subgroup, and C is based on the standard normal distribution:

$C = 1.96$ for constructing 95-percent confidence intervals, and

$C = 1.64$ for constructing 90-percent confidence intervals.

In this report, terms such as “higher,” “lower,” “increase,” and “decrease” indicate that the observed differences were statistically significant at the 5-percent level. Statements using phrases such as “the data suggest” indicate that the difference was significant at the 10-percent level. Lack of comment about any two statistics does not mean that statistical significance of the difference was ruled out—that is, overlap between 90-percent or 95-percent confidence intervals was not examined for all possible pairs of statistics.

Statistics in this report may also be subject to nonsampling error, that is, errors or omissions in responding to the interview, recording answers, and processing data. The NSFG data for each survey year have been adjusted for nonresponse by adjustment to the sample weights assigned to each case. Other types of nonsampling error were minimized by a series of quality control measures that have been described elsewhere (21–26).

Table I. Approximate standard errors expressed in percentage points of estimated percents for currently married white women or women of all races combined: 1965 National Fertility Study

Size of sample	Estimated percent							
	5 or 95	10 or 90	15 or 85	20 or 80	25 or 75	30 or 70	40 or 60	50
	Standard error in percentage points							
50	3.1	4.3	5.1	5.7	6.2	6.6	7.0	7.2
75	2.6	3.5	4.2	4.7	5.1	5.4	5.8	5.9
100	2.2	3.1	3.7	4.1	4.4	4.7	5.0	5.1
150	1.8	2.5	3.0	3.4	3.7	3.9	4.2	4.2
200	1.6	2.2	2.6	3.0	3.2	3.4	3.6	3.7
250	1.5	2.0	2.4	2.7	2.0	3.1	3.3	3.3
300	1.3	1.9	2.2	2.5	2.7	2.8	3.0	3.1
400	1.2	1.6	1.9	2.2	2.4	2.5	2.7	2.7
500	1.1	1.5	1.8	2.0	2.2	2.3	2.4	2.5
600	1.0	1.4	1.7	1.9	2.0	2.1	2.3	2.3
800	0.9	1.3	1.5	1.6	1.8	1.9	2.0	2.1
1,000	0.8	1.1	1.4	1.5	1.7	1.8	1.9	1.9
1,500	0.7	1.0	1.2	1.3	1.4	1.5	1.6	1.7
2,000	0.7	0.9	1.1	1.2	1.3	1.4	1.5	1.5
2,500	0.6	0.9	1.0	1.2	1.2	1.3	1.4	1.4
3,000	0.6	0.8	1.0	1.1	1.2	1.3	1.3	1.4
3,500	0.6	0.8	0.9	1.1	1.1	1.2	1.3	1.3

Table II. Approximate standard errors expressed in percentage points of estimated percents for women of all races combined: 1973 National Survey of Family Growth

Base of percent	Estimated percent						
	2 or 98	5 or 95	10 or 90	20 or 80	30 or 70	40 or 60	50
	Standard error in percentage points						
100,000	3.0	4.6	6.4	8.5	9.7	10.4	10.6
500,000	1.3	2.1	2.8	3.8	4.3	4.6	4.7
1,000,000	0.9	1.5	2.0	2.7	3.1	3.3	3.3
3,000,000	0.5	0.8	1.2	1.5	1.8	1.9	1.9
5,000,000	0.4	0.6	0.9	1.2	1.4	1.5	1.5
7,000,000	0.3	0.5	0.8	1.0	1.2	1.2	1.3
10,000,000	0.3	0.5	0.6	0.8	1.0	1.0	1.1

Table III. Approximate standard errors expressed in percentage points of estimated percents for women of all races combined: 1982 National Survey of Family Growth

Base of percent	Estimated percent						
	2 or 98	5 or 95	10 or 90	20 or 80	30 or 70	40 or 60	50
	Standard error of percentage points						
100,000	6.4	10.1	13.8	18.5	21.2	22.6	23.1
500,000	2.9	4.5	6.2	8.2	9.4	10.1	10.3
1,000,000	2.0	3.2	4.4	5.8	6.7	7.1	7.3
5,000,000	0.9	1.4	2.0	2.6	3.0	3.2	3.3
10,000,000	0.6	1.0	1.4	1.8	2.1	2.3	2.3
30,000,000	0.4	0.6	0.8	1.1	1.2	1.3	1.3
50,000,000	0.3	0.4	0.6	0.8	0.9	1.0	1.0

Table IV. Approximate standard errors expressed in percentage points of estimated percents for women of all races combined or for other-than-black women: 1988 National Survey of Family Growth

Base of percent	Estimated percent						
	2 or 98	5 or 95	10 or 90	20 or 80	30 or 70	40 or 60	50
	Standard error in percentage points						
100,000	4.6	7.1	9.8	13.1	15.0	16.1	16.4
500,000	2.1	3.2	4.4	5.9	6.7	7.2	7.3
1,000,000	1.5	2.3	3.1	4.1	4.7	5.1	5.2
5,000,000	0.6	1.0	1.4	1.9	2.1	2.3	2.3
10,000,000	0.5	0.7	1.0	1.3	1.5	1.6	1.6
30,000,000	0.3	0.4	0.6	0.8	0.9	0.9	0.9
50,000,000	0.2	0.3	0.4	0.6	0.7	0.7	0.7
58,000,000	0.2	0.3	0.4	0.5	0.6	0.7	0.7

Unlike the NSFG, the 1965 National Fertility Study did not include procedures to obtain weighted numbers. Therefore, approximate numbers of currently married women for 1965 were obtained from population estimates made by the U.S. Bureau of the Census. Further details of this estimation procedure have been published elsewhere (41–43).

Appendix III

Availability of Data and Related Data Sources

Public-use data files containing data from all surveys used in this report are available from the National Technical Information Service. Ordering information for data and selected reports based on the data can be found on the NCHS homepage at <http://www.cdc.gov/nchswww/nchshome.htm>. One can also order paper copies of NCHS reports based on the NSFG by contacting the Data Dissemination Branch at 301–436-8500 or the U.S. Government Printing Office at 202–512-1800.

In addition to the NSFG, other sources of data on surgical sterilization include several provider-based surveys conducted by NCHS, including the National Hospital Discharge Survey and the National Ambulatory Medical Care Survey. The Association for Voluntary Surgical Contraception (AVSC) has also conducted provider-based surveys that yield annual incidence rates for tubal ligation and vasectomy. The AVSC surveys include primarily clinical descriptors, but do provide limited demographic data on persons undergoing these operations. The NSFG remains the only nationally representative dataset that includes information on type of operation, reasons for operation, and desire for reversal of potentially reversible operations, in conjunction with key demographic and socioeconomic characteristics.

Table V. Generalized standard errors expressed in percentage points of estimated percents for women of all races combined or for white women: 1995 National Survey of Family Growth

Sample size	Weighted size (thousands)	Estimated percent									
		50	45 or 55	40 or 60	35 or 65	30 or 70	25 or 75	20 or 80	15 or 85	10 or 90	5 or 95
100	555	4.95	4.93	4.86	4.73	4.54	4.28	3.94	3.51	2.92	2.09
200	1,110	3.61	3.60	3.54	3.45	3.31	3.13	2.88	2.56	2.13	1.53
300	1,665	3.00	2.99	2.95	2.87	2.76	2.60	2.39	2.13	1.77	1.27
400	2,220	2.64	2.63	2.59	2.52	2.42	2.28	2.10	1.87	1.56	1.11
500	2,775	2.38	2.37	2.34	2.28	2.18	2.06	1.90	1.69	1.41	1.01
600	3,330	2.19	2.18	2.15	2.09	2.01	1.90	1.75	1.55	1.29	0.93
700	3,885	2.04	2.04	2.01	1.95	1.87	1.77	1.63	1.45	1.21	0.86
800	4,440	1.92	1.92	1.89	1.84	1.76	1.66	1.53	1.36	1.14	0.81
900	4,995	1.82	1.82	1.79	1.74	1.67	1.58	1.45	1.29	1.08	0.77
1,000	5,550	1.74	1.73	1.71	1.66	1.59	1.50	1.38	1.23	1.03	0.73
1,200	6,660	1.60	1.59	1.57	1.53	1.47	1.38	1.27	1.13	0.94	0.68
1,600	8,880	1.40	1.40	1.38	1.34	1.29	1.21	1.12	0.99	0.83	0.59
2,000	11,100	1.27	1.26	1.24	1.21	1.16	1.10	1.01	0.90	0.75	0.54
3,000	16,650	1.05	1.05	1.04	1.01	0.97	0.91	0.84	0.75	0.62	0.45
4,000	22,200	0.93	0.92	0.91	0.88	0.85	0.80	0.74	0.66	0.55	0.39
5,000	27,750	0.84	0.83	0.82	0.80	0.77	0.72	0.67	0.59	0.49	0.35
6,000	33,300	0.77	0.77	0.76	0.74	0.71	0.67	0.61	0.54	0.45	0.33
8,000	44,400	0.68	0.67	0.66	0.65	0.62	0.58	0.54	0.48	0.40	0.29
10,000	55,500	0.61	0.61	0.60	0.58	0.56	0.53	0.49	0.43	0.36	0.26
10,847	60,201	0.59	0.59	0.58	0.56	0.54	0.51	0.47	0.42	0.35	0.25

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For answers to questions about this report or for a list of reports published in these series, contact:

Data Dissemination Branch
National Center for Health Statistics
Centers for Disease Control and Prevention
6525 Belcrest Road, Room 1064
Hyattsville, MD 20782-2003
(301) 436-8500
E-mail: nchsquery@cdc.gov
Internet: www.cdc.gov/nchswww/

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